

CALIFORNIA COASTAL COMMISSION

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**W4a****FINAL ADOPTED FINDINGS**

APPLICATION FILE NO.: E-06-013

PERMITTEE: Poseidon Resources (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.

ADOPTED: August 6, 2008

SUBSTANTIVE FILE DOCUMENTS: See Appendix A

EXHIBIT 1: Location Map
EXHIBIT 2: Site Layout
EXHIBIT 3: Aerial View of Site
EXHIBIT 4: Diagram of Subsurface Intakes

ATTACHMENT 1: November 15, 2007 Hearing Transcript. Note: attached transcript includes Commission deliberations only.
ATTACHMENT 2: Staff Proposed Conditions of November 14, 2007 and Poseidon Proposed Conditions of November 15, 2007. *Ex Parte* Forms.
ATTACHMENT 3: June 25, 2008 letter from Latham & Watkins with requested revisions to Revised Findings.
ATTACHMENT 4: June 11, 2008 e-mail from Latham & Watkins with requested revisions to Revised Findings.
ATTACHMENT 5: June 11, 2008 e-mail from Latham & Watkins with requested revisions to Revised Findings.
ATTACHMENT 6: May 22, 2008 Applicant's Requested Revisions to Revised Findings.

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 Lagoon (the Lagoon), 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 in September 2007 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 Findings are based on these “stand-alone” operations.

Key Coastal Act Issues:

- *Protection of Marine Life and Water Quality:* The project as proposed and conditioned herein will be consistent with policies of Coastal Act Sections 30230 and 30231 meant to protect marine life and water quality. Results of Poseidon’s entrainment study show 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 Commission finds that the certified project EIR determined that the project’s discharge into coastal waters of its waste stream would result in levels of salinity higher than the natural variability of these waters in an area ranging from about eight to over 40 acres of benthic habitat, but would not cause significant adverse impacts to marine life, and that the San Diego Regional Water Quality Board (Regional Board) studied the project’s expected discharge before issuing the project’s NPDES permit, and that the Regional Board adequately conditioned all potential discharge-related impacts to ensure compliance with applicable Clean Water Act criteria and the California Ocean Plan. As documented in the certified EIR prepared for the project by the City of Carlsbad, the desalination facility would not cause significant impingement or entrainment impacts when it operates while the power plant is using at least 304 million gallons per day (MGD) of cooling water (i.e., “co-located” operations). Operating stand-alone – that is, when the power plant is using little or no cooling water – the EIR found that the desalination facility would not cause significant impacts. Poseidon’s entrainment study results show that the desalination facility’s entrainment impacts would result in a loss of productivity in the Lagoon equal to that produced in approximately 37 acres of wetland and open water habitat.

To address these impacts, Poseidon submitted a conceptual plan to restore 37 acres of lost wetland and upland habitat productivity.¹ The Commission is requiring through **Special Condition 8** that Poseidon submit its full entrainment study and develop a Marine Life Mitigation Plan for further Commission review and approval that fully documents the facility's anticipated entrainment and impingement impacts, mitigates those impacts to the maximum extent feasible through creation, enhancement, or restoration of aquatic and wetland habitat, and ensures long-term performance, monitoring, and protection of the approved mitigation measures in a manner consistent with the policies of Coastal Act Sections 30230 and 30231. The Commission is also requiring through **Special Condition 9** that Poseidon obtain an amendment to its coastal development permit if it proposes or is required to withdraw more than the currently anticipated 304 million gallons per day of estuarine water from Agua Hedionda Lagoon. Further, the project is subject to continuing review by the Regional Board to ensure conformity to federal Clean Water Act and state Porter-Cologne Act requirements related to protection of water quality impacts. **Special Condition 4** requires Poseidon to submit, prior to construction, documentation that it has received final approvals from the Regional Board and other agencies for project construction and operations. For the reasons set forth more fully below in these Findings and in Poseidon's submissions, the Commission finds that alternative intakes that would avoid or reduce entrainment and impingement impacts are infeasible or would cause greater adverse impacts.

With implementation of these **Special Conditions**, the Commission finds the project will conform to applicable provisions of Coastal Act Sections 30230 and 30231 by ensuring that marine resources are maintained, enhanced, and restored.

- *Energy Use and Greenhouse Gas Emissions:* The project's electrical use would cause emissions of carbon dioxide of about an estimated 130 million to 200 million pounds (approximately 61,000 to 90,000 metric tonnes) per year², which would result in adverse impacts to a wide range of coastal resources, as described in Section 4.5.5 of these Findings. Poseidon has agreed 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 yet demonstrated how it would implement this mitigation proposal. To ensure the project conforms to Coastal Act Section 30253(4) and other applicable policies, and avoids or minimizes its effects on coastal resources, the Commission is requiring through **Special Condition 10** that Poseidon develop an Energy Minimization and Greenhouse Gas Reduction Plan for further Commission review and approval.

¹ Poseidon has also submitted the plan to the San Diego Regional Water Quality Control Board (Regional Board) as required by its conditional NPDES permit. The Regional Board reviews various water quality issues and will ensure compliance with its regulations and policies via its review and approval of the plan.

² As described more fully in Section 4.5.5 herein, Commission staff estimates that the project will emit 90,000 metric tonnes (200,000,000 pounds) of carbon dioxide per year, while Poseidon, relying on the California Climate Action Registry's certified protocol, estimates 61,000 metric tonnes (134,500,000 pounds) of carbon emissions.

- *Dredging and Protection of Coastal Waters and Wetlands:* The project may require future dredging to ensure its continued use of the existing intake structure, and the Commission, through imposition of **Special Condition 12** requiring Poseidon to obtain separate coastal development permits for any future proposed dredging activities, has ensured that any needed dredging will conform to applicable Coastal Act policies.

However, the project represents a use and alteration of Agua Hedionda Lagoon that is not permitted under Coastal Act Section 30233(c). That Coastal Act policy identifies Agua Hedionda as one of 19 coastal estuaries in which alterations are allowed for just a limited set of uses, including "...very minor incidental public facilities, restorative measures, [and] nature study...", and the project's removal and use of water from Agua Hedionda does not fall within the set of allowable uses or alteration. The Commission therefore finds the project is not consistent with the use prohibitions of Coastal Act Section 30233(c). Even so, because the project is a coastal-dependent industrial facility, the Commission can approve the project, notwithstanding its nonconformity to Coastal Act Section 30233(c), if the Commission finds that it meets the requirements of Section 30260, as described below.

- *Application of Coastal Act Section 30260:* Because the proposed project is a coastal-dependent industrial facility, its inconsistencies with Coastal Act Section 30233(c) 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 location for the proposed project; (2) that the project's adverse environmental impacts be mitigated to the maximum extent feasible; and, (3) that not permitting the proposed project would adversely affect the public welfare. In applying these tests to the proposed project, the Commission finds, as discussed in detail in Section 4.5.7 of these Findings, the following:

- There are no feasible and less environmentally damaging alternative locations to draw in the needed seawater (e.g., subsurface or offshore, as further described in Section 4.2.1 of these Findings) that would avoid nonconformity to the use prohibitions of Section 30233(c). For reasons set forth more fully below in these findings, the Commission finds that slant wells are infeasible because the water quality available from such intakes would make it difficult, if not impossible, to treat for desalination purposes, and that the construction impacts associated with this alternative render it environmentally inferior to the proposed project. The Commission also finds that an infiltration gallery is environmentally inferior to the proposed project because this alternative would disrupt public access to marine resources, require frequent dredging, and would require the destruction of 150 acres of coastal habitat, and that the alternative is economically infeasible. The Commission further finds that an offshore intake system would result in greater environmental impacts and that construction of an offshore intake would render the project economically infeasible.

- **Special Conditions 4, 8, 9, 10, 11, 12, 15, 16, and 17**, ensure the project's adverse effects to Agua Hedionda Lagoon are mitigated to the maximum extent feasible. The Commission finds that the required development of the necessary mitigation plans, the limitation on water withdrawals, prohibition of dredging without further Commission review and approval, and imposition of water quality best management practices, will ensure that the project is mitigated to the maximum extent feasible.
- Denial of the proposed project would adversely affect the public welfare for a number of reasons. As set forth in the project's EIR and described herein and elsewhere in the Commission's record, the project would provide public benefits in the form of a local water supply in an area where current and anticipated water imports are expected to decline. Although it is a privately funded project, the water produced by the project will be put to public use by eight public water districts. The sale of water to public water districts is expected to both alleviate expected water supply shortfalls and augment other supply options such as recycled water and conservation. It also provides public benefits to those districts and their ratepayers because they will not be expected to pay directly for more than \$300 million of the project's start-up and construction costs. The project also includes public benefits in the form of increased public access opportunities to both Agua Hedionda Lagoon and to the Pacific Ocean.

Commission Action: On August 6, 2008, the Commission approved, as conditioned, proposed project E-06-013 as described herein.

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.

TABLE OF CONTENTS

1.0	Motion and Resolution.....	7
2.0	Standard Conditions.....	8
3.0	Special Conditions.....	8
4.0	Findings and Declarations.....	14
4.1	Project Purpose and Description.....	14
4.2	Background.....	18
4.3	Coastal Commission Jurisdiction and Standard of Review.....	29
4.4	Other Permits and Approvals.....	29
4.5	Conformity to Applicable Coastal Act Policies.....	33
4.5.1	Protection of Marine Life (Coastal Act Sections 30230 & 30231).....	33
4.5.2	Use of Wetlands and Coastal Waters (Coastal Act Section 30233).....	65
4.5.3	Public Access.....	71
4.5.4	Scenic and Visual Resources.....	73
4.5.5	Energy Use and Greenhouse Gas Emissions (Coastal Act Section 30253(4)).....	75
4.5.6	Development and Public Services (Coastal Act Sections 30250 & 30254).....	91
4.5.7	Coastal-Dependent “Override” (Coastal Act Section 30260).....	93
5.0	California Environmental Quality Act.....	100

1.0 MOTION AND RESOLUTION

Motion

Staff recommends the Commission adopt the following findings in support of its actions on November 15, 2007 to approve Coastal Development Permit E-06-013.

I move that the Commission adopt the Revised Findings in support of the Commission's actions on November 15, 2007 concerning the Commission's Coastal Development Permit E-06-013.

Resolution

The Commission hereby adopts the Findings set forth below regarding Coastal Development Permit E-06-013.

2.0 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.

3.0 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 within the coastal zone needed to construct and operate the project, including:
 - Lease(s) from the California State Lands Commission for structures on state tidelands. Any conflicts between conditions of the lease(s) and those adopted by the Coastal Commission shall be presented to the Coastal Commission for resolution.
 - 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.

- 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 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 project site 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-approved 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 (the Plan) that complies with 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) To the maximum extent feasible, the mitigation shall take the form of creation, enhancement, or restoration of aquatic and wetland habitat.
 - 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 criteria. The Plan shall also identify contingency measures that will be implemented should any of the mitigation sites not meet performance criteria.
 - d) Requires submittals of "as-built" plans for each site and annual monitoring reports for no less than five years or until the sites meet performance criteria.
 - e) Defines legal mechanism(s) proposed to ensure permanent protection of each site – e.g., conservation easements, deed restriction, or other methods.

The Permittee shall comply with the approved Plan. Prior to implementing the Plan, the Permittee shall submit a proposed wetlands restoration project that complies with the Plan in the form of a separate coastal development permit application for the planned wetlands restoration project.

- 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 COMMENCEMENT OF OPERATIONS**, Poseidon shall cause to be dedicated, in accordance with the City of Carlsbad's Precise Development Plan PDP 00-02, the below-described parcels of land. The dedications shall be in the form of easements, title transfers, and/or deed restrictions, whose purpose is to further Coastal Act goals of maximizing public access and recreational opportunities along the coast in the South Carlsbad Coastal Resource Redevelopment Area and maintaining, restoring and enhancing marine resources. The four sites are:
- Fishing Beach: public access and parking easement in favor of the City of Carlsbad covering approximately 2.4 acres of land along the west shore of Agua Hedionda Lagoon.

- **Bluff Area:** approximately 10.2 acres of land on the west side of Carlsbad Boulevard opposite the power plant, which shall be dedicated in fee title to the City of Carlsbad for recreational and coastal access uses.
 - **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, which shall be deed restricted to uses such as fish hatchery, aquatic research, and trails.
 - **South Power Plant Parking Area:** an access easement over approximately 0.3 acres of land on the east side of Carlsbad Boulevard near the south entrance of the power plant that shall be dedicated to the City of Carlsbad for public parking.
- 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.
- 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 land 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 desalination facility, 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 or other equivalent means. 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, but not 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.

4.0 FINDINGS AND DECLARATIONS

4.1 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 (the Lagoon) in Carlsbad, San Diego County (see Exhibit 1), to produce 50 MGD of potable water for local and regional use.³ 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 on 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 2010.⁴ 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. Although they represent about two-thirds of the plant's generating capacity,⁵ Cabrillo anticipates that these two units would operate only a few weeks per year. The power plant's generating capacity is subject to "Reliability Must Run" status, as contracted by the California Independent System Operator (Cal-ISO), which is meant to provide electrical grid reliability. At the October 2007 State Lands Commission meeting, a Cabrillo representative testified that the units would remain in service indefinitely and that Cal-ISO would determine when they are no longer needed for grid stability.

Cabrillo's announced change in the power plant's operations represents a change in how Poseidon's facility was originally proposed. 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. The project's EIR prepared by the City of Carlsbad analyzed the project's impacts

³ 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 200 MGD into its intake and discharge system for dilution. This is discussed in more detail in Section 2.5.1 of these Findings.

⁴ 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).

⁵ Poseidon Resources Corporation, Response to Staff Report, November 9, 2007, Exh. B, at p. 2.

as both a co-located and a stand-alone facility. The EIR determined that as a stand-alone facility, the project would cause less entrainment and impingement losses than the existing power plant's operations and would have no significant impacts.⁶ 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 and the measures imposed to mitigate those impacts and ensure conformity to the Coastal Act. 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. 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.⁷ 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. A study submitted by Dr. Scott Jenkins on September 28, 2007 on behalf of Poseidon indicates that if the Lagoon is not regularly dredged, it would close in about five to seven years and slowly revert to its pre-dredging condition, which consisted largely of shallow marshy channels with hyper-saline water. In that condition, many of the Lagoon's current uses, such as recreation, fishing, and aquaculture

⁶ See also Poseidon Resources Corporation, *Response to Staff Report*, November 9, 2007, Exh. A at pp. 9-11; see Project EIR Section 4.3.

⁷ 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.

would be eliminated or reduced.⁸ Past dredging of the Lagoon has also provided sand to maintain Carlsbad State Beach, grunion spawning habitat, and a popular surfing break.

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 Plan⁹ 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 4.5.1 of these Findings.

Need for the Project: The project would provide an important and much-needed source of potable water for Southern California. Since Poseidon filed its Coastal Development Permit ("CDP") application, the water supply situation in the State of California – already bad – has substantially deteriorated. Poseidon has previously provided the Commission with newspaper reports that recognize a looming water crisis and clearly identify the need for California, and more specifically San Diego County, to lessen its demand on the State Water Project and Colorado River watersheds, which were critically dry in 2007.¹⁰

There is a convergence of warnings that California's water supply will continue to shrink. Climate change brought on by global warming could disrupt weather patterns, leaving the state vulnerable to punishing drought. There is a possibility that 2007 will be the beginning of a multi-year drought. If 2008 offers hydrologic conditions similar to those this year, some significant sources of water for Southern California may not be available. The most recent example of the deteriorating supply situation occurred in May 2007, when state water officials temporarily turned off the pumps that send water to Southern California from the Sacramento-San Joaquin Delta to protect the endangered smelt and salmon.¹¹

⁸ *Comparative Analysis of Intake Flow Rate on Sand Influx Rates at Agua Hedionda Lagoon: Low Flow vs. No-Flow Alternatives*, Dr. Scott Jenkins, September 28, 2007.

⁹ 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."

¹⁰ See Poseidon Resources Corporation, Response to Staff Report, November 9, 2007, Exh. A at p. 5.

¹¹ See *id.*

In the summer of 2007, the Metropolitan Water District put San Diego County Agriculture on notice that it will cut agricultural water deliveries by 30 percent beginning January 1, 2008. With \$1.4 billion in annual revenue, San Diego County is the twelfth largest agricultural economy among all counties in the nation, and it could be severely harmed by this reduction in water supply. The Metropolitan Water District also has warned municipal and industrial water users to anticipate water rationing if 2008 – like preceding years – is a dry year. Rationing of municipal and industrial supplies would be highly disruptive to San Diego's \$150 billion annual economy.¹²

Moreover, State, regional, and local water plans all have confirmed that the immediate and pressing water needs are so great, that they cannot be met by conservation and recycled water alone and that a substantial investment in seawater desalination, including the project, is required. The project's capacity of 56,000 AFY of new water supply for the San Diego region is about ten percent of 500,000 AFY of desalinated water identified by the California Department of Water Resources as needed by 2030, as stated in its 2006 Water Plan Update. This Update lists the project as a potential source of desalinated water. The Metropolitan Water District of Southern California's Integrated Water Resources Plan identified a need for 150,000 AFY of seawater desalination (including 56,000 AFY from the Carlsbad project) to ensure regional water supply reliability. In addition, the San Diego County Water Authority updated its 2005 Urban Water Management Plan in April 2007 specifically to reaffirm the need for 56,000 AFY of seawater desalination from the project by 2011. The project is a central component of state, regional and local water supply planning to meet already-identified demand.¹³ Recognizing the importance of the project, eight water agencies – Carlsbad Municipal Water District, Valley Center Municipal Water District, Rincon del Diablo Municipal Water District, Sweetwater Authority, Rainbow Municipal Water District, Santa Fe Irrigation District, Vallecitos Water District, and Olivenhain Municipal Water District – have already contracted to purchase 100% of the project's capacity, and have identified the project's water supply as a component of their water plans.¹⁴

¹² See id.

¹³ See id. at p. 6.

¹⁴ See id. at p. 6-7.

4.2 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 interest in 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 force¹⁵ 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*

¹⁵ 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

Poseidon proposes to use the existing Encina power plant intake and discharge. Originally, Poseidon planned to reuse some of the estuary water the power plant drew in from Agua Hedionda Lagoon to cool its generating units. However, as discussed in Section 4.1 above, Cabrillo has applied to cease operations of its existing facility and to build a new power plant. 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. The two remaining units would represent up to about 528 MGD of pumping capacity. As noted previously, the power plant is subject to "Reliability Must Run" contracts with Cal-ISO. At the October 2007 State Lands Commission hearing, a Cabrillo representative stated that the generating units will be available for service indefinitely and that Cal-ISO would ultimately determine when they are no longer needed for grid reliability. Once the power plant's operations cease, Poseidon would continue to use the existing power plant intake and discharge structure for its water supply. The proposed project was the subject of CEQA review conducted by the City of Carlsbad. The Final EIR, certified by the City on June 14, 2006, addressed the potential stand-alone operation of the facility and concluded that such a facility would not result in any significant adverse environmental impacts.¹⁶ In March 2007, 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.¹⁷ Poseidon also provided in December 2006 and May 2007 technical papers showing the amount of Lagoon sedimentation caused by use of the intake.¹⁸

¹⁶ See Project EIR Section 4.3, Appendix E.

¹⁷ See *Carlsbad Seawater Desalination Project Revised Flow, Entrainment, and Impingement Minimization Plan*, June 1, 2007, Attachment 4, Tenera Environmental, Inc., *Assessment of Potential Impingement and Entrainment Attributed to Desalination Plant Operations and Associated Area of Production Forgone*, May 2007, at p. 4.

¹⁸ See *Carlsbad Seawater Desalination Project Revised Flow, Entrainment, and Impingement Minimization Plan*, June 1, 2007: Attachment 6, Scott A. Jenkins and Joseph Wasyl, *Coastal Process Effects of Reduced Intake Flows at Agua Hedionda Lagoon*, December 13, 2006, Attachment 8, Steve Le Page, *Potential Adverse Changes in Agua Hedionda Lagoon Resulting From Abandonment of the Lagoon Intake*, May 18, 2007.

As a stand-alone facility, Poseidon would operate the power plant's pumps to take in approximately 304 MGD of estuarine water. The project would use about 100 MGD of that water in the desalination process to create about 50 MGD of potable water and about 50 MGD of a high salinity discharge. The facility's NPDES permit issued to Poseidon by the Regional Board requires that Poseidon's discharge not exceed a maximum salinity level of 40.1 parts per thousand. Poseidon would use the additional 200 MGD of estuarine water it pumps in to reduce its discharge's salinity concentration to levels established in the NPDES permit.

Some other 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 and due to the Regional Board's requirements, this project would require a 6:1 ratio. This is discussed in more detail in Section 4.5.1 of these Findings.

Poseidon's preferred operating scenario, which is the basis of the analyses herein, is to use the power plant's Unit 4 pumps to provide the necessary 304 MGD.¹⁹

A number of regulatory, policy, and legal challenges have been raised with respect to once-through cooling. Their relevance to the project is not yet certain, in part because while the project will use the existing once-through cooling system, it will not be using that system for once-through cooling. Issues that may be relevant include:

- *Entrainment/impingement studies along California's coast:* California's coastal power plants have been studied over the past few years to determine what effects their use of seawater for cooling has on the marine environment.²⁰ 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.
- *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

¹⁹ 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.

²⁰ 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).

of once-through cooling systems.²¹ The resolution recognizes that such systems cause significant adverse impacts to the marine ecosystem. The Council 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.²²

- *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)). In response, the U.S. EPA rescinded its proposed requirements and directed state water quality agencies to use Best Professional Judgment in determining applicable NPDES requirements for once-through cooling systems.

In conjunction with that ruling, the State Water Resources Control Board is developing a *Statewide Policy for Once-Through Cooling*²³ 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)²⁴ 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-Cologne-Act require be avoided and minimized. At this time, the Regional Water Quality Control Board is processing a plan to regulate Poseidon’s use of the power plant intake structure for desalination purposes. This plan is described in more detail in Section 4.5.1 of these Findings. In addition, the Commission retains full authority to ensure the project’s consistency with the Coastal Act’s marine resources protection policies through the imposition of **Special Condition 8**, which provides that Poseidon shall submit a Marine Life Mitigation Plan for Commission review and approval.

²¹ See *Resolution of the California Ocean Protection Council Regarding the Use of Once-through Cooling Technologies in Coastal Waters*, April 20, 2006.

²² Coastal Commission staff is active in the interagency coordinating group.

²³ 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.

²⁴ Pursuant to Coastal Act Section 30412(a), the Commission shares responsibilities with the State Board in implementing this section of the Porter-Cologne Act.

Without the mitigation measures in the **Special Conditions** contained herein, the proposed use of the existing intake and discharge facilities would be inconsistent with applicable Coastal Act policies. As mitigated and conditioned, the Commission finds the project will be consistent with the Coastal Act because all feasible mitigation measures will be adopted to reduce impacts to marine resources and **Special Condition 8** and Poseidon's mitigation package will ensure that marine resources are maintained and enhanced to the maximum extent feasible.

Public use of water

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 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. 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.

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 beyond adjacent communities. Poseidon's proposal includes pipelines and pumps necessary to transport its produced water to Carlsbad's Maerke Reservoir, which serves parts of Carlsbad, and its other pipelines would serve parts of some other neighboring communities. Poseidon's proposal includes several pipeline route alternatives, for the most part outside the coastal zone, that would allow it to provide water to portions of the cities of Carlsbad, Oceanside, Vista, San Marcos, Escondido, Encinitas, and Solana Beach. The project EIR examined facilities to connect with these local water delivery systems. 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. Poseidon does not currently plan to

connect the desalination facility to the regional water distribution system. This new pump station and pipeline are included in the SDCWA's 2007 Draft Integrated Water Resource Management Plan, which describes the project as conveying desalinated water from Carlsbad to the regional water distribution system.

Further, Maerckle 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 during a shutdown of the regional delivery system – and, as noted in the Water Purchase Agreement between Poseidon and the Carlsbad Water Department, the City's need for water from the regional system is likely to be significantly reduced after Poseidon is able to provide water to the City at or below the cost of imported water, thereby freeing up capacity in the reservoir for operational storage of desalinated water.

Expected Project Costs

The Commission does not directly regulate costs; however, 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 extent feasible or whether there are feasible and less environmentally damaging alternatives to aspects of a proposed project (see, for example, Coastal Act Sections 30212.5, 30230, 30231, 30233(a), and 30260). 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. The Commission includes the following discussion of the project's estimated costs to assist in determining feasible mitigation measures and alternatives for the project.

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.²⁵ Those costs now range from about \$250 to \$700 per acre-foot for water districts in the San Diego area.²⁶ Poseidon provided the Commission with a description of its expected costs,²⁷ which are currently higher than what local

²⁵ More precisely, Poseidon's Water Purchase Agreements describe the price as: "The lower of (i) the sum of (A) \$861/acre-foot [\$0.70/m³] (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. The "Base Price" method is tied to the Consumer Price Index and is based on the following formula:

$$\text{Current Base Price} = (\text{Base Price}_{\text{initial}})(70\%(\text{CPI}_i / \text{CPI}_{\text{initial}}) + (30\%(\text{EC}_i / \text{EC}_{\text{initial}})))$$

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²⁶ 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%.

²⁷ Poseidon has provided the Commission with the following documents supporting its projections of expected costs: Poseidon Resources Corporation, *Response to California Coastal Commission's September 28 Request for Additional Information*, November 30, 2006 pp. 46-51; Poseidon Resources Corporation, *Response to California*

*Final Adopted Findings – Coastal Development Permit Application E-06-013
Poseidon Resources (Channelside) LLC
Approved August 6, 2008– Page 26 of 106*

water districts are paying for imported water. However, Poseidon stated at the Commission’s November 15, 2007 hearing that it intends to operate at a loss for some unknown number of years until the costs of imported water increase to match Poseidon’s costs for constructing and operating the desalination facility.

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

Total capital costs:	\$300 million	
Annual gross revenues:	\$53 million	
(based on 56,000 acre-feet per year X ~\$950 per acre-foot)		
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

Commission staff believe, based on the analysis below, however, that the overall cost would likely be somewhat higher and, in fact, for some components of the proposed project could only verify higher costs. These higher costs, which would make Poseidon’s water cost more than the expected \$950 per acre-foot, include those listed below. Poseidon states, however, that it has taken all these potential costs into consideration in assessing the feasibility of its project.²⁸

- *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, due in part 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. 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 increased from \$270 million to about \$300 million during the same period.
- *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. For example, Poseidon stated it is considering purchasing “carbon offset” credits for its greenhouse gas

Coastal Commission’s July 3 Request for Additional Information, July 16 2007, at pp. 11-13; Poseidon Resources Corporation, Transmittal of Intake Cost Estimates, October 17, 2007.

²⁸ See Poseidon Resources Corporation, *Response to Staff Report*, November 9, 2007, Ex. B, at p. 7; Poseidon Resources Corporation, *Response to California Coastal Commission’s July 3, 2007 Request for Additional Information*, July 16, 2007; and Poseidon Resources Corporation, *Response to California Coastal Commission’s September 28, 2006 Request for Additional Information*, November 30 2006: (Attachment 3) Water Purchase Agreement by and between The Carlsbad Municipal Water District and Poseidon Resources (Channelside) LLC, September 28, 2004, at § 3.1.2; (Attachment 4) Water Purchase Agreement by and between Rincon del Diablo Municipal Water District and Poseidon Resources (Channelside) LLC, March 14, 2006, at § 3.1.2; (Attachment 5) Water Purchase Agreement by and between Valley Center Municipal Water District and Poseidon Resources (Channelside) LLC, December 20, 2005, at § 3.1.2.

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 indicated that it has taken all of these costs into consideration in assessing the feasibility of the project and addressed these costs in its Climate Action Plan.

- *Poseidon's reliance on a MWD subsidy:* Poseidon's anticipated costs are also based in part on it being eligible to benefit from the \$250 per acre-foot subsidy available from the MWD described previously in these Findings. Without this subsidy, Poseidon's stated costs would be \$250 per acre-foot higher.
- *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) and its eligibility for a discount due to its participation in SDG&E's emergency response program.

However, to Commission staff, 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 which, if applicable, would increase Poseidon's expected costs per acre-foot by about \$125.²⁹ Poseidon responds that the applicable SDG&E tariff is subject to a discount due to the project's ability to reduce demand during peak periods and to shed up to 95 percent of the project's energy load during local utility emergencies.³⁰ Additionally, to Commission staff, it appears that Poseidon's anticipated costs do not recognize likely future rate increases for electricity, which it expects would add about \$25 per acre-foot if applied next year to Poseidon's costs.³¹

- *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 Maerke 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.

²⁹ 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.

³⁰ See 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, at p. 3.

³¹ For 2008, SDG&E has already proposed an increase of about 5% increase for its industrial users, which would add about \$25 per acre-foot to Poseidon's current estimated costs.

- *Additional costs for dredging Aqua Hedionda Lagoon:* The power plant owner is currently responsible for dredging the Lagoon and is expected to maintain that responsibility as long as the power plant plans to use its once-through cooling system. When the power plant ends its use of that system, it might allow Poseidon to take on responsibilities for dredging the Lagoon, which based on the power plant's current costs, could add about \$1 million per year to Poseidon's costs.

In sum, Commission staff estimates that the additional costs described above could add up to about \$450 to Poseidon's stated \$950 per acre-foot costs, which is more in line with cost estimates available from other seawater desalination facilities operating or being developed in California.

Regardless of which cost estimates are more accurate – those provided by Poseidon or those of Commission staff – the Commission has found that the project, as conditioned herein, will incorporate all feasible mitigation measures needed for the project to conform to applicable Coastal Act provisions, and Poseidon has stated it has taken all these costs into consideration in assessing the project's feasibility. There are no feasible and less environmentally damaging alternative locations to draw in the needed seawater (e.g., subsurface or offshore). The Commission finds that slant wells are infeasible because the water quality available from such intakes would make it difficult, if not impossible, to treat for desalination purposes, and that the construction impacts associated with this alternative render it environmentally inferior to the proposed project.³² The Commission also finds that an infiltration gallery is environmentally inferior to the proposed project because this alternative would disrupt public access to marine resources, require frequent dredging and require the destruction of 150 acres of coastal habitat, and that the alternative is economically infeasible.³³ The Commission further finds that an offshore intake system would result in greater environmental impacts than the proposed project's use of the existing power plant intake, and that construction of an offshore intake would render the project infeasible.³⁴

Moreover, should Poseidon's costs or other concerns make the project unsuccessful, measures exist to protect coastal resources. First, under the water purchase agreements between Poseidon and the Carlsbad Municipal Water District, the Water District at its option can assume operation or ownership of the facility. Second, if the Water District chooses not to assume either of those options, or if operations ceased for some reason, Poseidon is required to remediate the site and remove the facility. To accomplish this, and as described in the Water Purchase Agreement

³² See Poseidon Resources Corporation *Response to California Coastal Commission's Letter of September 28, 2006*, November 30, 2006, at pp. 24-51; Poseidon Resources Corporation, *Response to Staff Report*, November 9, 2007, Exh. A at pp. 16-17.

³³ See Poseidon Resources Corporation, *Additional Analysis of Submerged Seabed Intake Gallery*, October 8, 2007; Poseidon Resources Corporation, *Response to Staff Report*, November 9, 2007, Exh. A at pp. 17-18.

³⁴ See Poseidon Resources Corporation, *Response to Staff Report*, November 9, 2007, Exh. A at pp. 19-20; *Issues Related to the Use of the Agua Hedionda Inlet Jetty Extension EIR to Recommend An Alternative Seawater Intake for the Carlsbad Desalination Project*, Graham, Le Page and Mayer, October 8, 2007.

between the Water District and Poseidon, Poseidon is required to post a security in the form of either a letter of credit or an irrevocable bond with the property owner.³⁵

4.3 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.

4.4 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.
- **Environmental Impact Report:** On June 14, 2006, the City of Carlsbad certified a Final EIR for the project. At the request of the Coastal Commission staff, the City added a discussion to the Final EIR to address stand-alone operations of the project. In addition, the potential for stand-alone operations was evaluated in the City's staff reports to the City Planning Department and City Council. The City concluded that the project, operating as either a co-located or a stand-alone facility, would not result in any significant adverse impacts.³⁶

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.

³⁵ See Water Purchase Agreement by and between The Carlsbad Municipal Water District and Poseidon Resources (Channelside) LLC, September 28, 2004, at § 14.2.

³⁶ Note: The EIR found that all but one of the project-related impacts would be nonsignificant or through mitigation would be less than significant. The EIR found that the project would indirectly contribute to a significant cumulative impact to air quality because it is likely that at least part of the mix of electricity that the desalination plant uses will come from pollutant-emitting sources in the San Diego air basin. However, the EIR also found that there were no feasible mitigation measures to reduce this impact. (See Project EIR, Chapter 5, p. 5-9.)

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 requires additional written approval from the State Lands Commission for use of the intake or discharge by a future desalination project. Poseidon submitted its lease application in February 2007. As Commissioner Thayer explained at the hearing, the State Lands Commission held a hearing on Poseidon's lease application on October 30, 2007. Staff recommended approval of the lease but the Commission took no action and continued the hearing at the request of the public because the hearing was held just days after the San Diego region fires and at least one individual who wanted to participate in that hearing had been evacuated. Commissioner Thayer said a second hearing would be scheduled in December 2007 or at a later date.

Coastal Act Section 30601.5³⁷ requires in part that an applicant demonstrate its ability to comply with all conditions of a coastal development permit prior to issuance of that permit. This demonstration includes landowner approval, which in this case would take the form of Poseidon obtaining the necessary State Lands Commission leases. To ensure Poseidon complies with this requirement, **Special Condition 2** requires Poseidon, prior to the Commission's issuance of the coastal development permit, to submit for Executive Director review and approval all necessary leases from the State Lands Commission, local governments, and the power plant owner showing that it has the necessary legal interest in all property within the coastal zone necessary to construct and operate the project. **Special Condition 3** further requires Poseidon to execute and record against its leasehold interests restrictions that bind both Poseidon and any future holders of those interests to the terms and conditions of the Commission's approval. This, too, requires review and approval by the Executive Director before issuance of the coastal development permit.

- **National Pollutant Discharge Elimination System (NPDES) permit from the Regional Water Quality Control Board:** Poseidon's proposed project is subject to a NPDES permit issued by the San Diego Regional Water Quality Control Board in August 2006 pursuant to the Clean Water Act (33 U.S.C. § 1251 et seq.) and the Porter-Cologne Water Quality Control Act (Cal. Water Code § 13000 et seq.). The NPDES permit, issued after the Regional Board reviewed several studies and analyses of the project, covers discharges from the project to the Pacific Ocean. The NPDES permit addresses marine impacts of the project by requiring compliance with applicable water quality control plans, water quality objectives,

³⁷ 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."

performance goals, effluent limitations, and other receiving water and discharge limitations. In September 2006, Surfrider Foundation and Orange County CoastKeeper filed a petition with the State Board challenging the permit on several grounds. In June 2007, the State Board dismissed the petition because it failed “to raise substantial issues that are appropriate for review” by the State Board.³⁸ The permit requires Poseidon to 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.

One of the required documents is a *Flow, Entrainment and Impingement Minimization Plan*, which Poseidon submitted in February 2007 and revised in June 2007 and which the Board is still reviewing. This plan is described in more detail in Section 4.5.1 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 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. Poseidon states, citing documentation by the Regional Board, that the 303(d) listing of Agua Hedionda Lagoon as an impaired body is based on fine-grained sedimentation discharged by urban run-off into the Lagoon from the neighboring watersheds (predominantly Agua Hedionda Creek), impacting 6.8 acres primarily located in the east basin of the Lagoon.³⁹ As noted in the *Carlsbad Watershed Plan*, developed pursuant to an NPDES Permit issued in 2001 to a number of local jurisdictions 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. Poseidon contends that the intake is only partially responsible for this sedimentation, and that the fine-grained sedimentation in the Inner Basin is primarily the result of urban run-off discharge. 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. The Commission expects that action by the Regional Board will result in conformity to these applicable NPDES requirements.

³⁸ See Poseidon Resources Corporation, *Response to Staff Report*, November 9, 2007, at Exh. B p. 6; see also SWRCB/OCC File A-1773, June 5, 2007.

³⁹ 2006 Clean Water Act 303(d) List of Water Quality Limited Segments Requiring TMDLs, San Diego Regional Water Quality Control Board, June 28, 2007.

Federal:

- **Federal “incidental take” permits:** Poseidon’s proposed project may 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 an independent “Incidental Harassment Authorization” (“incidental take” permit) under the Marine Mammal Protection Act for any impacts to sea lions, seals, or any other protected marine mammals resulting from construction or operation of the project. During review of Poseidon’s application, the National Marine Fisheries Service would engage in consultation under Section 7 of the federal Endangered Species Act to ensure that the project will not jeopardize the continued existence of any species listed as threatened or endangered under the Act. Past power plant operations have caused documented entrapment of species protected under the federal Endangered Species Act, including two endangered East Pacific green turtles (*Chelonia mydas*) over the past several decades. Poseidon’s operations of the intake system at velocities of less than 0.5 feet per second are expected to decrease the likelihood of future sea turtle impingement.

Agua Hedionda 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 was developing a critical habitat designation for the species about the same time as publication of Commission staff’s recommended Findings to the Commission.⁴⁰ In November 2006, the USFWS issued a proposed designation that did not include Agua Hedionda as critical habitat, stating that the goby has not been detected in the Lagoon for many years; the last goby specimen from Agua Hedionda was collected in 1940.⁴¹

To ensure Poseidon conforms to these other coastal resource protection requirements, **Special Condition 4** requires Poseidon, prior to starting construction, to submit documentation of other permits and approvals needed for project construction and operation, including those 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.

⁴⁰ 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. The USFWS had not issued its final habitat designation as of the date of the Commission’s decision.

⁴¹ See Poseidon Resources, Response to Staff Report, November 9, 2007, Exh. B, at p. 9.

4.5 CONFORMITY TO APPLICABLE COASTAL ACT POLICIES

4.5.1 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.⁴²

Other policies as guidance

In applying the above-quoted Chapter 3 policies, the Commission may be guided by Porter-Cologne Act Section 13142.5, pursuant to Coastal Act Section 30412(a).⁴³ Subsection (b) of Section 13142.5 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.

⁴² “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).

⁴³ 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.”

State, regional and local water plans all have confirmed that water needs in the San Diego region will rely in part on seawater desalination.⁴⁴ To that end: (1) the proposed project will provide 56,000 AFY of new water supply for the San Diego region; (2) the California Department of Water Resources' 2006 Water Plan Update identifies the need for 500,000 AF of desalinated water by 2030; (3) the Metropolitan Water District of Southern California's Integrated Water Resources Plan identified a need for 250,000 AFY of seawater desalination (including 56,000 AFY from the Carlsbad project) to ensure regional water supply reliability; (4) the San Diego County Water Authority (SDCWA) updated its 2005 Urban Water Management Plan in April 2007 specifically to reaffirm the need for 56,000 AFY of seawater desalination from the Carlsbad project by 2011; and (5) Carlsbad Municipal Water District, Valley Center Municipal Water District, Rincon del Diablo Municipal Water District, Sweetwater Authority, Rainbow Municipal Water District, Santa Fe Irrigation District, Vallecitos Water District, and Olivenhain Municipal Water District have entered into long-term water purchase agreements with the Carlsbad Desalination Project.⁴⁵ Collectively, these water districts will use 100% of Poseidon's capacity.⁴⁶ These agencies that have or are planning to acquire water from the Carlsbad Desalination Project have organized the "San Diego Desal Partners" and meet on a regular basis to coordinate efforts to advance the project. In a communication to Commission Chairman Kruer, the San Diego Desal Partners described the Carlsbad Desalination Project as "one of the most important water infrastructure projects currently being planned for the State of California."⁴⁷

The SDCWA's April 18 Update of 2007 Metropolitan Water District supply assessment projected 2007 to be a critically dry year in both the State Water Project and Colorado River watersheds.⁴⁸ In light of this concern, the public support for the project continues to grow. For example, among key findings of the SDCWA 2006 Public Opinion Survey, the top response by respondents when asked what the most critical things the SDCWA could do to ensure a safe and reliable water supply was to develop seawater desalination.⁴⁹

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.

⁴⁴ See Poseidon Resources Corporation, *Response to California Coastal Commission's February 20 Request for Additional Information*, June 1, 2007, at pp. 7-9.

⁴⁵ See *id.*

⁴⁶ See *id.*

⁴⁷ See *id.*

⁴⁸ See *id.*

⁴⁹ See *id.*

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.⁵⁰ Coastal wetlands identified in this report are subject to the additional protections of Coastal Act Section 30233(c), which are described in Section 4.5.2 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."

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

⁵⁰ See also the California Coastal Plan, December 1975.

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 approximately 304 million gallons per day (MGD) of estuarine water from the Lagoon.⁵¹ 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 254 MGD to dilute its high salinity discharge.⁵² These proposed project characteristics and issues associated with this discharge are discussed 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.⁵³ 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 as having impaired water quality due to the presence of indicator bacteria and because of siltation and sedimentation.⁵⁴ As noted in the *Carlsbad Watershed Plan*, the impairment is due largely to fine-grained sediments being discharged into the Lagoon from urban runoff coming from the neighboring watersheds (predominantly Agua Hedionda Creek)⁵⁵, although part of the excess sedimentation within the estuary has been due to the power plant's water intake causing an imbalance between sediment

⁵¹ 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.

⁵² 304 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.

⁵³ 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.

⁵⁴ As noted in Section 4.4 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.

⁵⁵ 2006 Clean Water Act 303(d) List of Water Quality Limited Segments Requiring TMDLs, San Diego Regional Water Quality Control Board, June 28, 2007.

inflow and outflow, and Poseidon's proposed project would cause similar sedimentation problems. Poseidon has also submitted a study indicating that due to sedimentation and in the absence of the power plant, if the Lagoon is not regularly dredged, it would close in from about five to seven years and slowly revert to its natural state of marshy channels with hyper-saline waters.

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.⁵⁶ 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.⁵⁷ 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.

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 potential "take" of protected species. However, with implementation of the mitigation measures and **Special Conditions** described in these Findings, these impacts can be mitigated to an insignificant level such that the project conforms to Coastal Act Sections 30230 and 30231.

⁵⁶ From California Wetlands Information System database at: http://ceres.ca.gov/wetlands/gco_info/so_cal/agua_hedionda.html.

⁵⁷ 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 4.4 of these findings, Agua Hedionda Lagoon is not listed as critical habitat for the 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 establish 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, the project EIR at Section 4.3 and Poseidon's 2004-05 study described below showed that it would not cause impingement at levels beyond those caused by the power plant and that its use of the power plant intake would impinge about 20,000 fish per year (or about 55 per day) weighing a total of about 4500 pounds (or about 12 pounds per day). During the study period, however, most of this impingement – about 80% – was caused by power plant heat treatments, which Poseidon would not have to do as a stand-alone desalination facility. Therefore, Poseidon's impingement rate would be much less, averaging less than 2.5 pounds per day. The City of Carlsbad's EIR determined that under the stand-alone "No Power Plant Operation" scenario, the project would have an intake flow velocity that would not exceed 0.5 feet per second, which is consistent with the U.S. EPA guidance for "best available technology" for cooling water intakes, and that under these operating conditions the project "would not result in significant impingement effects." See project EIR Section 4.3. Poseidon has prepared a *Flow, Entrainment and Impingement Minimization Plan* in accordance with its Regional Board issued NPDES Permit (Regional Board Order No. 2006-0065). The *Flow, Entrainment and Impingement Minimization Plan* provides that the project, when operating stand-alone, is expected to impinge approximately 2.12 pounds of fish per day, which Poseidon provides is less than the average daily consumption of an adult pelican (more than 2.5 pounds per day), which for this project the Commission considers *de minimis* and insignificant.⁵⁸

Moreover, **Special Condition 8** requires Poseidon to submit a Marine Life Mitigation Plan for Commission approval, and implementation of that Plan will mitigate any expected impingement impacts. Past impingement at the power plant has included entrapment and "take" of the endangered Eastern Pacific green turtle a protected species. During the past several decades, one green sea turtle has been entrained and released unharmed and a second one was found dead at the intake structure. Sea turtles are rarely seen in the Lagoon area, or in the intake or outflow bays of the power plant. The flow rate of the water in the intake bays is expected to be at or below 0.5 fps; therefore, death of healthy sea turtles after entering these areas is highly unlikely. Because there will be either no change to the existing conditions, or in the case of the project operating by itself a substantial reduction in the seawater pumping rate, it is not anticipated that continued operation of the power plant or the needs of the project will have significant adverse impacts on sea turtle species. The current design of the power plant minimizes the possibility of entrainment of sea turtles in the power plant structures. The intake structure is outfitted with metal guard rails (trash racks) that prevent animals from entering the forebay area on the plant side. The slow moving water in the Lagoon and through the intake trash racks allow the sea turtles to get out of the area if

⁵⁸ See also Poseidon Resources Corporation, *Response to Staff Report*, November 9, 2007, Exh. A at pp. 9-10.

they enter.⁵⁹ Because the turtles do not breed in this area, only adults would be susceptible to potential “take”, and adult turtles are too large to fit through the bar racks at the intake entrance. Poseidon has documented that stand-alone operation of the facility would result in intake water velocities at or below 0.5 feet per second, which is consistent with the U.S. EPA guidance for “best available technology” for cooling water intakes. As noted above, Poseidon will also apply for an incidental take permit from NMFS to mitigate any such impacts. Based on the above, and with **Special Condition 8**, the Commission finds the impingement impacts and the potential for an incidental take associated with stand-alone operations will be consistent with the Coastal Act and fully mitigated.

- **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 the Encina power plant 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

⁵⁹ See Poseidon Resources Corporation, *Response to Staff Report*, November 9, 2007, Exh. B at p. 14.

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 ($0.05 \times 60 \text{ miles} = 3 \text{ miles}$). 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: The project is expected to cause adverse effects to marine life due to its use of 304 MGD of estuarine water. The City of Carlsbad determined, in Section 4.3 of the project EIR, that under standalone operations, the facility would have no significant effects “on the source water populations [ability] to sustain themselves”.⁶⁰ However, in 2004-05, Poseidon conducted a study as part of the documentation for its Flow, Entrainment, and Impingement Minimization Plan to determine the entrainment impacts that would be caused by continuous 304 MGD water use. In May 2007, Poseidon provided a technical memorandum to Commission staff summarizing the results of that study and its Flow, Entrainment, and Impingement Minimization Plan and stated that the study used Regional Board approved protocols for sampling and analysis. Poseidon stated its study showed that the desalination facility’s water withdrawals would entrain an average of 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, none of which are listed as endangered or threatened. 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).

To ensure Poseidon’s study accurately assesses the project’s entrainment impacts, **Special Condition 8** requires that Poseidon provide a full copy of its study for further Commission review and approval.

⁶⁰ See Project EIR, Section 4.3.

Poseidon has argued, for a number of reasons, that this expected entrainment impact does not constitute a significant adverse impact, and that several features of its project will reduce entrainment impacts:

- *Ongoing use of the intake by the power plant:* Poseidon states that its entrainment impacts will be reduced as long as the power plant continues to use its cooling water intake. Poseidon states that the power plant expects to continue its use of the once-through cooling system indefinitely. The magnitude of the entrainment losses identified in Chapter 3 of Poseidon's *Revised Flow, Entrainment and Impingement Minimization Plan*, dated June 1, 2007, is estimated for continuous operation of the desalination plant on a stand-alone basis notwithstanding the fact that the power plant generating units will be available for service indefinitely. The power plant owner has proposed removing three of the existing plant's five generating units and operating the remaining two units only part time for several more years until replacement power becomes available. The two remaining generating units represent 528 MGD of pumping capacity. Cal-ISO would ultimately determine when the remaining units are no longer needed for grid reliability. Poseidon states that in the meantime, seawater pumping by the power plant would likely meet a substantial portion of the desalination facility's flow requirements, resulting in a comparable reduction of entrainment and impingement impacts attributable to the facility.⁶¹
- *Modifications to the intake system for desalination facility use:* Poseidon states that entrainment mortality that occurs within the existing power plant screens, pumps, and condensers upstream of the desalination facility intake would be substantially reduced during the desalination facility's standalone operations due to lower water temperatures, volumes, velocities, and turbulence resulting from desalination operations compared to those of the power plant.⁶²
- *Use of water for dilution:* Of Poseidon's 304 MGD use of estuarine water, about two-thirds, or 200 MGD, would be pulled in to the intake system and used, without further processing, to dilute the high salinity discharge from the desalination facility. Poseidon states that only 104 MGD would be subjected to additional processing that would cause entrainment mortality, as 200 MGD bypasses the desalination facility and is discharged to the ocean.⁶³
- *"Cropping" and population size:* Poseidon 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

⁶¹ See Poseidon Resources Corporation *Response to California Coastal Commission's Letter of February 20, 2007*, June 1, 2007, at Attachment 25.

⁶² See *Carlsbad Seawater Desalination Project Revised Flow, Entrainment, and Impingement Minimization Plan*, June 1, 2007, at p. 26.

⁶³ See *Carlsbad Seawater Desalination Project Revised Flow, Entrainment, and Impingement Minimization Plan*, June 1, 2007, at pp. 1-19.

organisms via entrainment is beneficial in that it allows remaining individuals to have less competition. It states that entrainment samples collected during the study were consistently dominated by larvae of three lagoon-dwelling species and contained relatively few numbers of ocean-dwelling species. It states that study samples were dominated by gobies, a mud-dwelling group of fish ubiquitous to all California lagoons and bays, blennies, fish that are crevice dwellers; and garibaldi, a typical rocky reef dweller in open ocean habitat, but in this case occupying the rocky reef of rock rip-rap armoring the Lagoon side of the Carlsbad Boulevard jetty. None of the species entrained is listed as threatened or endangered. In addition, Poseidon states its samples showed entrainment would affect about 0.2% of other species, including white croaker, Northern anchovy, California halibut, and queenfish. Poseidon further states that because the affected species are primarily gobies, which are ubiquitous in California lagoons and bays, blennies, which are also common, and garibaldi, which are more often found in rocky habitats in the open ocean, the 12% average loss is not significant. Poseidon states that most of the organisms that would be entrained are species that are not commercially or recreationally fished, and since they are not harvested, the entrainment mortality is being imposed on populations that are at a level close to the natural carrying capacity of the coastal environment. Therefore, Poseidon contends, mortality due to entrainment would not affect such populations, and any impingement or entrainment impacts of the project, if it should operate stand-alone in the future, would have no significant adverse effects on marine biology. Poseidon also applies measures from the California Department of Fish and Game's *Nearshore Fisheries Management Plan* to conclude that because the 12% loss is below the levels identified in that Plan (i.e., 30% or 60% loss of a fish stock's biomass) that require a fisheries management response, the entrainment loss is not significant. Poseidon states that because the fish are not harvested, the mortality levels caused by entrainment would not affect the populations.

However, Commission staff's analysis shows that Poseidon's arguments are not supported by available science or the findings from the past several years of entrainment studies conducted at power plants along the California coast and elsewhere in the U.S.

Regarding ongoing use by the power plant of its once-through cooling system, Commission staff concur that in that situation, the entrainment caused would be shared by both Poseidon and Cabrillo; however, it is not able to determine what proportion of the adverse effects could be assigned to either entity. Staff's analysis was based on Poseidon's stand-alone operations pulling in about 304 MGD. Cabrillo has stated that while it would continue to make available two of its generating units as needed, that it expects them to operate for no more than a few weeks per year once its new dry-cooled facility is operating, and it is not possible to predict how often or for how long these units might run in the future. Therefore, the Commission is unable to determine whether continued, part-time co-located operations would affect Poseidon's entrainment impacts. If the power plant operates at times when Poseidon is operating and draws in additional water, Poseidon's impacts may be a "share" of the overall total; however, as noted previously, the adverse effects to marine biology evaluated in these Findings and the necessary mitigation are based on Poseidon operating as a stand-alone facility and drawing in about 304 MGD.

Regarding the modifications and different processes Poseidon states may occur within the intake and discharge system, including use of estuarine water for dilution, staff notes that the standard protocols used for conducting entrainment studies and determining the levels of adverse effects do not allow a lower mortality rate to be applied to the different processes organisms may experience in the various types of these systems. There are no peer-reviewed scientific studies that support a lower mortality level – therefore, the protocols' assumption of 100% mortality applies to each study regardless of the variable temperatures, water volumes, velocity, and turbulence caused by any particular intake system. Further, the project EIR stated that it did not evaluate how larvae may be affected differently by different levels of turbulence and temperature, and also noted that entrained organisms would be subject to the same level of turbulence from the desalination facility whether the power plant is operating or not.

In all entrainment studies done at California's coastal power plants, and per guidance and findings from the U.S. EPA, the California Regional Water Quality Control Boards, the California Energy Commission, and previous Coastal Commission decisions, entrainment mortality is assumed to be 100% regardless of the various processes and stressors the entrained organisms may experience in different intake systems. Even if some organisms may survive the initial heat, turbulence, or pressure-induced stresses experienced when passing through these systems, they are expected to be injured and suffer mortality shortly after being discharged due to injury, increased rates of predation, or other related causes. A stand-alone desalination facility using the same type of water intake structure is assumed to cause the same level of mortality, due to its use of filters and high pressures to remove most particles from seawater and due to its high salinity discharge. Those organisms drawn into the intake in water used just to dilute the desalination discharge may experience somewhat less than 100% immediate mortality; however, there are insufficient data or peer-reviewed scientific studies to conclude that the overall mortality from desalination processes and discharges would be anything less than the 100% mortality the protocols apply to organisms going through the power plant processes and discharges. Further, for this particular intake and discharge system, organisms that may survive being pulled from the estuary and through the desalination processes would be discharged into the very different habitat conditions of the nearshore ocean shoreline, which in itself is likely to cause substantial mortality.

Regarding "cropping" and population size, staff notes that Poseidon's proposed use of the CDFG's fisheries management definitions do not apply to the species Poseidon states are most subject to its entrainment impacts – that is, gobies, blennies, and garibaldi, none of which are managed as part of a fishery. Further, Poseidon's contentions regarding the ubiquity and population sizes of these species do not incorporate standard ecological concepts that recognize the importance of forage fish, such as gobies and blennies in supporting other species and ecosystem functions.

Each of the entrainment studies done in California since 1998 concluded that the power plant intakes caused significant adverse impacts to local or regional marine biota.⁶⁴ Additionally,

⁶⁴ 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 (e.g., *Morro Bay Power Plant 316(b) Resource Assessment, 2001*; *AES Huntington Beach Generating Station Entrainment and Impingement Study, 2005* and *California Energy Commission Entrainment and Impingement Final Staff Analysis, August, 2006, etc.*).

for the most part, the main adverse entrainment effects these studies identified were to species of forage fish (e.g., gobies, queenfish, etc.) similar to those identified in Poseidon's study, and each study resulted in a requirement of substantial mitigation for the identified losses. 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. Each of the three recent studies done for intakes within estuarine environments identified 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. In each of these power plant siting cases, the Commission found that mitigation was necessary to allow Coastal Act conformity. 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 summary Poseidon provided, rather than the full study, the Commission is requiring through **Special Condition 8** that Poseidon provide the full study 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.⁶⁵ 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 30.9×10^9 , 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.

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 species for higher trophic level species, including many that are important for commercial or recreational fishing.⁶⁶

⁶⁵ See Cabrillo Power I LLC, *Proposal for Information Collection Clean Water Act Section 316(b) Encina Power Station*, April 1, 2006.

⁶⁶ 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.

Three species – the garibaldi, California halibut, and Northern anchovy – make up about 6% 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 an adverse impact to marine biological resources protected under the Coastal Act.

Overall, Poseidon's entrainment study results show that its proposed use of an estuarine intake would cause a substantial reduction of important individual species and 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.

Therefore, although the Final EIR found the project would cause no significant entrainment impacts pursuant to CEQA, the Commission finds that the project's entrainment impacts will require mitigation to ensure conformity to Coastal Act Sections 30230 and 30231.

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.⁶⁷ 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 less than 2.5 pounds of fish per day, which the Commission considers a *de minimis* 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

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.

⁶⁷ See, for example, the CEQA Guidelines at Section 15370.

and 2.8 fps, or from more than three to five times the acceptable rate. However, in Exhibit B of its November 9, 2007 letter to Commission staff, Poseidon states that water velocities at the intake bar racks during stand-alone operations would be less than 0.5 fps, which would conform to the U.S. EPA's "Best Technology Available" standard for minimizing impingement impacts. Additionally, as noted previously, Poseidon has stated it intends to apply for an "incidental take permit" from NMFS. With these measures, the project is not likely to cause substantial adverse impingement effects. Furthermore, Poseidon's Exhibit B and its Revised Flow, Entrainment, and Impingement Minimization Plan state that it will install variable frequency drives to further decrease water flow intake velocities. With these low velocities, the already *de minimis* impingement impacts that Poseidon's project may cause are expected to be further reduced and thus mitigated to an insignificant level and consistent with Coastal Act Sections 30230 and 30231.

Avoiding Entrainment Impacts: The most direct way to avoid Poseidon's expected adverse entrainment effects would be, if feasible, to use an alternative intake structure that avoids those effects. Certain types of subsurface intakes may avoid these effects by drawing in water through an overlying layer of sand. As discussed below, however, the Commission finds that these alternatives are infeasible.

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 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. As explained below, the most common adverse effects of wells would be caused by 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, high salinity concentrations, or high levels of suspended solids that are difficult to treat and which may make a project practically or economically infeasible. Adverse effects of galleries for this project would include significant environmental impacts related to constructing structures that would affect up to more than 150 acres of coastal habitat. Although subsurface intakes can, like open water intakes, cause adverse environmental effects, they may be less severe and temporary, and a properly designed subsurface system can be environmentally benign. 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.

Carlsbad EIR analyzed the feasibility and environmental impact of several types of alternative intake systems pursuant to the Modified Intake Design Alternative. The EIR concluded that the use of horizontal wells, vertical beach wells and infiltration galleries in lieu of the project's proposed use of the power plant intake system was either infeasible and/or had greater environmental impacts than the proposed project.⁶⁸ Poseidon also provided evidence 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 position, Poseidon has submitted extensive analysis and cost estimates it prepared at the request of Commission staff. This information provides further confirmation that alternative intake systems were infeasible and not the environmentally preferred alternative.⁶⁹ 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.

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.⁷⁰ The facility would draw 30 MGD from nine 500-foot long wells extending under the seafloor at about a 20° angle.

⁶⁸ See Project EIR at Section 6.3.

⁶⁹ See Poseidon Resources Corporation, *Response to California Coastal Commission's Letter of September 28, 2006*, November 30, 2006, at pp. 24-51; See Poseidon Resources Corporation, *Response to California Coastal Commission's December 28 Request for Additional Information*, February 2, 2007, at pp. 2-4; See Poseidon Resources Corporation, *Response to California Coastal Commission's February 20 Request for Additional Information*, June 1, 2007, at pp. 2-7, 10-11; See Poseidon Resources Corporation, *Response to California Coastal Commission's July 3 Request for Additional Information*, July 16, 2007, at pp. 4-8, 11-14; Poseidon Resources Corporation, *Additional Analysis of Submerged Seabed Intake Gallery*, October 7, 2007; Poseidon Resources Corporation, *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, *Intake Cost Estimates*, October 2007.

⁷⁰ See Boyle Engineering's *Dana Point Ocean Desalination Project – Engineering Feasibility Report* (March 2007), prepared for the Municipal Water District of Orange County.

Poseidon submitted evidence stating slant wells are infeasible because pilot testing indicates that the quality of the water available from them would be so low as to be difficult, if not impossible, to treat due to salinity concentrations twice that of seawater, excessive iron, and high suspended solids.⁷¹ Poseidon's studies also confirmed that, at best, one slant well could provide only 5% of the water required by the project. Thus, numerous slant wells would be needed to meet project objectives and address the well-documented water needs in Southern California. As a result of the necessity for multiple slant wells in public areas, this option is infeasible due to their noticeable presence on the beach and disruption of public access and recreation. The EIR prepared by the City of Carlsbad concluded that the construction and use of subsurface intakes for the project would cause adverse environmental impacts to coastal resources at Carlsbad beach, including but not limited to the creation of negative traffic, noise, and air pollution impacts for a period of two years during construction, and disturbance of and, loss of public access to, the beach area occupied by the wells both during and after construction.⁷² The EIR also concluded that the slant wells would require the construction of permanent access ramps from the Pacific Coast Highway to the beach to transport equipment during construction and to permit well inspection during the life of the wells. Because the project would require multiple smaller well facilities to meet its water needs, these wells would result in far greater environmental impacts and costs than the project, and they would be neither feasible to address water needs nor consistent with Coastal Act policies.⁷³

An infiltration gallery is another potential alternative. 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 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, 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.

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". While Poseidon's initial geophysical surveys of an area offshore of Agua Hedionda showed an area of over 200 acres of featureless bottom with fine-grained sand, which may be suitable for such a system, recent surveys of the area indicated that 70% of the inspected area would contain sensitive basement and high relief reefs.⁷⁴ During construction, not all the seafloor material within the gallery area would need to be removed, and it certainly

⁷¹ See Poseidon Resources, *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 September 28, 2006 Request for Additional Information*, November 30, 2006, at pp. 31-41.

⁷² See Project EIR Section 6.3.

⁷³ See Poseidon Resources Corporation, *Response to Staff Report, November 9, 2007*, Exh. A at pp. 16-18.

⁷⁴ See Poseidon Resources Corporation, *Response to Staff Report, November 9, 2007*, Ex. B, p. 18.

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. 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. However, based on testimony provided at the Commission's November 15, 2007 hearing, the facility in Spain is now having significant fouling problems with the intake; the plant and a future expansion will rely on an open ocean intake for its primary source of seawater.

For this project, infiltration galleries would cause even greater environmental impacts than slant wells and would be economically infeasible. In Exhibit B of its November 9, 2007 letter to Commission staff, Poseidon confirmed that over 70% of this area offshore of Carlsbad actually consists of more sensitive basement and high relief reefs. Poseidon also provided evidence that an adequately-sized subsurface system would require about 150 acres of seafloor, which would be adversely affected by gallery installation. Based on this information, environmental impacts to 150 acres of offshore habitat would be greater adverse impacts than caused by the proposed existing intake for the following reasons:

First, construction of an infiltration gallery would result in a physical removal and alteration of 150 acres of coastal habitat, such that a 15-foot thick layer of ocean bottom shelf with all living organisms in it would be removed, as compared to the annual productivity loss of 36.8 acres identified in Poseidon's entrainment study results.⁷⁵

Second, it would be necessary to excavate and construct 76 intake water collection wells and trenches for collector piping along a three-mile beach strip of the City of Carlsbad shore, which would limit public access to the beach for a period of 2 to 4 years, result in significant loss of recreational activities for the City of Carlsbad, and result in a permanent loss in public access and visual resources impacts where the collection wells are located.⁷⁶

Third, excavation of three-mile long by 400 feet wide strip of seafloor will make this area of the ocean unavailable for recreational activities such as fishing and diving and will result in additional NOx and carbon dioxide gas emissions associated with operation of barges and platforms and equipment needed to excavate and remove the ocean shelf material over this vast area.⁷⁷

Fourth, in order to secure consistent operation of the filter bed at this location, the bed may require dredging every one to three years to remove the sediment and entrained marine life that would accumulate in the intake filter bed and which, over time would plug the bed. The dredged material would require disposal away from the one-mile strip of the intake filter bed to prevent the removed solids from returning to the area of the bed. This would not only result in frequent adverse impacts to the marine flora and fauna in the area but would also render the area

⁷⁵ See Poseidon Resources Corporation, *Additional Analysis of Submerged Seabed Intake Gallery*, October 8, 2007.

⁷⁶ Id.

⁷⁷ Id.

unavailable for recreational activities during maintenance activities.⁷⁸ Based on the foregoing, a 150-acre gallery in this area would be physically and environmentally infeasible. Poseidon also submitted evidence demonstrating that 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.

In reviewing the EIR, Commission staff's presentation, and Poseidon's submissions about alternative intake systems, including the potential environmental impacts, site-specific constraints, and costs of subsurface intakes, the Commission finds that the substantial weight of the evidence is that subsurface intakes are an infeasible alternative for two reasons. First, the proposed alternatives would result in greater environmental impacts than the proposed project due to destruction of coastal habitat from construction of the intake systems, the loss of public use of coastal land due to numerous intake collector wells that would be located on the beach, and the adverse environmental impacts to coastal resources during construction, including but not limited to the creation of negative traffic, noise, and air pollution impacts. Second, the alternative intake systems are infeasible at the project site due to site-specific geologic and/or water quality conditions, which render the water untreatable, and the increased and prohibitive costs of such intake systems.

Minimize or reduce entrainment impacts: Another alternative that was considered to reduce but not eliminate adverse entrainment and impingement impacts would be to move the intake offshore into open coastal waters.

In Exhibit B of its November 9, 2007 letter to Commission staff, Poseidon states that using an offshore intake would likely require installation of a large diameter pipe over one thousand feet long which, depending on placement, might cross areas of rocky reef habitat, and terminate in an area near some kelp beds. It also states that the effects of this pipe's placement and operations on habitat, sand flow, and sedimentation are not known. Poseidon's experts concluded that entrainment and impingement caused by this intake could potentially affect a greater diversity of organisms than those affected by the existing intake in Agua Hedionda and that organisms colonizing the inside of the pipe would consume much of the entrained plankton.⁷⁹

Poseidon also provided evidence that such an intake would also be economically infeasible. On October 18, 2007, Poseidon provided cost estimates showing that a 1000-foot long offshore intake would cost about \$150 million.

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.

⁷⁸ Id.

⁷⁹ See *Issues Related to the Use of the Agua Hedionda Inlet Jetty Extension EIR to Recommend An Alternative Seawater Intake for the Carlsbad Desalination Project*, Graham, Le Page and Mayer, October 8, 2007.

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 be 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. However, the sewer system has limited capacity, and this option would be feasible only if additional capacity were to be made available. Further, Poseidon has noted that the system is not currently designed to handle what would be a highly corrosive discharge of concentrated seawater, thereby making this option infeasible.

As noted in Exhibit B of its November 9, 2007 letter, Poseidon has submitted to the Regional Board a *Flow, Entrainment and Impingement Minimization Plan* meant to identify feasible methods to minimize the remaining entrainment impacts. The Board's approval of that Plan is to be based on Poseidon identifying the best available and feasible operational, technological, and mitigation measures to meet that standard. Poseidon further notes that a proposed condition of the draft State Lands Commission lease would require, ten years after the lease is issued, that Poseidon be subject to further environmental review to ensure its operations at that time are using technologies that may reduce any impacts. Regarding the potential to route all or part of its discharge to the nearby sewer treatment system, Poseidon notes that the system is not designed to handle highly corrosive concentrated seawater.

Therefore, based on the above, and along with the Regional Board's approval of Poseidon's *Flow, Entrainment and Impingement Minimization Plan* to ensure that Poseidon implements all feasible methods to minimize the project's entrainment impacts, the Commission finds that Poseidon's proposal is using all feasible methods to minimize or reduce its entrainment impacts. Even so, project operations will result in ongoing substantial entrainment impacts that require compensatory mitigation, as described below.

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.

On October 10, 2007, Poseidon provided to Commission staff its updated proposed *Coastal Habitat Restoration and Enhancement Plan* that it intends to submit to the Regional Board. This Plan described seven possible mitigation options at various locations in Agua Hedionda or elsewhere in northern San Diego County. 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 yet 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. However, with the Commission's imposition of **Special Condition 8**, requiring that Poseidon submit for further Commission approval a revised Plan that fully documents Poseidon's entrainment study, identifies specific mitigation measures, implementation criteria, monitoring measures, and other standard mitigation plan elements, the Commission ensures that the Plan will provide adequate mitigation for Coastal Act conformity.

The Commission has authority to require mitigation for the anticipated entrainment impact even though the Regional Board is expected to also address any mitigation needs. 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 to conform to Coastal Act policies. As noted previously, these include Moss Landing, Morro Bay, and South Bay, which have intakes in estuaries.

Poseidon stated 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 then presented Commission staff with seven proposals from the responses received. On November 9, 2007, Poseidon presented to Commission staff a modified plan focused on just one of the seven mitigation options (i.e., the San Dieguito Coastal Habitat Restoration, shown below) described in its previous plan. The seven proposals are described 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.
- *Frazer 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.

Poseidon states that it believes the *San Dieguito Coastal Habitat Restoration* is best fit to preserve, restore and enhance existing wetlands, lagoons or other high-productivity near-shore coastal areas located in the vicinity of Agua Hedionda Lagoon and/or elsewhere in San Diego County.⁸⁰ Poseidon's proposal is to create 40.71 acres of coastal wetlands habitat which it states will be comparable to that found in and around Agua Hedionda Lagoon and will provide sustainable, comprehensive environmental benefits for water quality, habitat diversity for species abundance and for sensitive and endangered species.⁸¹

Overall, although Poseidon contends this proposal will more than mitigate for Poseidon's anticipated entrainment impacts, Commission staff's evaluation shows that the Plan does not currently provide enough information or certainty to determine what mitigation would actually occur. Staff notes that the Plan's shortcomings include the following:

- The Plan provides no certainty that the potential project would occur, as Poseidon states the mitigation is contingent upon possible Regional Board approval.

The proposal does not 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. The proposal has the potential to mitigate for entrainment impacts, but the Commission would need a substantially more detailed proposal to determine whether it would meet Coastal Act mitigation standards.

The Commission notes, for example, that Poseidon's proposed mitigation area would be adjacent to a wetland mitigation site the Commission required as part of its approval of the San Onofre Nuclear Generating Station (SONGS). To ensure the Commission's approval of the SONGS mitigation plan conformed to Coastal Act policies, it required extensive scientific study, substantial amounts of data collection, and detailed impact analyses to

⁸⁰ Poseidon Resources, *Carlsbad Desalination Project, Coastal Habitat Restoration and Enhancement Plan*, November 2007, at p. 3.

⁸¹ *Id.* at p. 7.

determine the appropriate types and amount of mitigation needed to compensate for the identified adverse effects of the SONGS once-through cooling system – for example, the mitigation required included creation of new kelp beds to address the SONGS' impacts to nearby kelp beds. The Commission's approval also required Southern California Edison to meet specific performance standards and to provide ongoing monitoring efforts to ensure the mitigation area functions as intended. Mitigation necessary to address Poseidon's impacts will need to include a similar approach and level of detailed information to ensure Coastal Act conformity.

- Commission staff further notes that the Plan does not include habitat restoration projects in Agua Hedionda Lagoon, which is already the subject of extensive study on restoration needs and 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. 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. The Network requested that any mitigation the Commission may require of Poseidon be integrated with this existing state-funded effort. 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. Staff believes, however, that the potential projects offered do not 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.
- Commission staff further notes that 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 October 10, 2007 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. Regarding Commission staff's concerns about the Plan's relationship to costs rather than mitigation needs, at the November 15, 2007 hearing Poseidon confirmed that it commits to providing 37 acres of tidally-exchanged marine wetlands. Poseidon has also proposed additional marine resources restoration and enhancement beyond that described in the Plan.

Poseidon contends, however, that the Plan adequately resolves the concerns raised by Commission staff, will more than fully mitigate any project-related entrainment impacts, and ensures that the productivity of coastal waters, wetlands and estuaries will be enhanced and restored in compliance with Coastal Act Sections 30230 and 30231, based on the following:

- Regarding the concerns about Regional Board approval of the Plan, Poseidon's position is that 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 managements initiatives.⁸² 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.⁸³ The Network requested that any mitigation the Commission may require of Poseidon be integrated with this existing state-funded effort.⁸⁴ In addition, the Commission retains full authority to ensure the project's consistency with the Coastal Act's marine resource protection policies through the imposition of **Special Condition 8**, which provides that Poseidon submit a Marine Life Mitigation Plan for Commission review and approval.
- Poseidon has stated that it would be very interested in collaborating on a habitat restoration project for Agua Hedionda Lagoon, but that it has not yet received proposals from entities interested in doing marine wetlands mitigation in the Lagoon. On-site mitigation has not yet been identified as a feasible mitigation option for the project, but the revised Plan provides for further research into on-site mitigation opportunities. The revised Plan contains a detailed description of Poseidon's efforts to identify feasible restoration projects on-site in

⁸² 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.”

⁸³ *Case Study: Systemic Evaluation of Compensatory Mitigation Sites Within the Carlsbad Hydrologic Unit*, by Nicholas R. Magliocca, UCSD.

⁸⁴ See September 24, 2007 letter from Carlsbad Watershed Network to Commission staff.

Agua Hedionda Lagoon. In August 2007, Poseidon sent “Requests for Expressions of Interest” to 77 public and private entities and individuals that are involved in, have jurisdiction over, or interest in wetlands restoration in the San Diego region, including the Carlsbad Watershed Network. Through this effort, Poseidon received a total of eight mitigation proposals. Three proposals involved proposed mitigation projects in the Agua Hedionda Lagoon watershed; however, none of these proposals addressed the primary purpose of the mitigation project – restoration of marine wetlands. Because these proposals did not meet the mitigation project objective, they were not considered further.

Because investigations to date have not resulted in the identification of any mitigation opportunities within Agua Hedionda Lagoon that meet the basic marine wetlands restoration objectives of the Plan, Poseidon’s proposed mitigation includes a core off-site project that meets the Plan goals and objectives. This mitigation project, located in the San Dieguito River Valley adjacent to the marine wetlands restoration project implemented by Southern California Edison as mitigation for the entrainment and impingement impacts from its San Onofre Power Plan, is being developed in parallel with continued efforts to identify feasible mitigation opportunities in Agua Hedionda Lagoon.

In addition to the core off-site mitigation project, Poseidon’s Flow, *Entrainment and Impingement Minimization Plan* sets forth a mitigation plan that includes additional coordination activities either (1) to identify if new mitigation options within Agua Hedionda Lagoon have arisen since Poseidon’s last Requests for Expressions of Interest or (2) to confirm the lack of on-site mitigation opportunities. If mitigation opportunities within Agua Hedionda Lagoon have arisen, and such mitigation is determined to be feasible, Poseidon will coordinate with regulatory agencies – including the Commission – to implement such mitigation.⁸⁵ If Agua Hedionda Lagoon mitigation that meets the objectives is confirmed to be unavailable and infeasible, Poseidon will implement the proposed off-site mitigation project.⁸⁶ In the meantime, however, on-site mitigation remains as an option to be further explored after approval of the Plan.

- Poseidon also contends that the Plan provides more than 1:1 mitigation for reduced productivity in about 37 acres of habitat within Agua Hedionda. However, in Commission staff’s view, 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 may have to provide mitigation at more than 1:1 ratio. In contrast to staff’s view, Poseidon contends that the wetlands in the Plan’s proposed off-site San Dieguito mitigation are of the same type of habitat that would be impacted by desalination plant operations (i.e., gobies, blennies, anchovy, topsmelt, white croaker, etc.), based on the biological survey of the existing tidal wetlands of the San Dieguito Lagoon completed as a part of the Southern California Edison Restoration Project.⁸⁷ Poseidon therefore states that implementation of the proposed restoration project at San Dieguito will create in-kind replacement habitat, which has 1:1 restoration value. Poseidon notes that the Coastal Commission found the San Dieguito

⁸⁵ *Id.*

⁸⁶ *Id.*

⁸⁷ SCE, *San Dieguito Wetlands Restoration Project, Final Restoration Plan*, November 2005.

Lagoon to be acceptable for mitigation of the entrainment and impingement impacts of the San Onofre Nuclear Generating Station, which is 45 miles away from the San Dieguito Lagoon and which is impacting open water fish species that do not necessarily reside in a lagoon environment. The proposed desalination facility is much closer to the proposed mitigation site (12 miles) and Poseidon is proposing to replace tidally exchanged coastal lagoon habitat with in-kind mitigation.

- Regarding Commission staff's concerns about the Plan's relationship to costs rather than mitigation needs, at the November 15, 2007 hearing Poseidon did confirm that it commits to providing at least 37 acres of tidally exchanged marine wetlands.

In sum, Poseidon has described several mitigation options, but has not yet confirmed which mitigation option(s) it would implement to address impacts caused by its use of the estuarine intake. Poseidon has currently identified the need to restore no less than about 37 acres of marine wetlands. However, as described in these Findings and through imposition of **Special Condition 8**, which requires Poseidon to submit for Commission review and approval a Marine Life Mitigation Plan that includes a full entrainment study that documents its expected impacts and identifies the specific mitigation measures, implementation plans, and compliance monitoring needed to mitigate the impacts identified in that study, the Commission is ensuring that Poseidon will provide the mitigation necessary to address those impacts in a manner consistent with applicable Coastal Act provisions. **Special Condition 8** ensures that all project-related entrainment impacts will be fully mitigated and that marine resources and the biological productivity of coastal waters, wetlands, and estuaries will be enhanced and restored in compliance with Coastal Act Sections 30230 and 30231.

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. The NPDES permit additionally requires Poseidon to conduct monitoring, identify additional methods to minimize its discharge-related impacts, and to implement many of those methods.

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, alkalinity adjusters, and various membrane cleaning chemicals such as hydrochloric acid, detergents, or caustic soda. Poseidon stated in Exhibit B of its November 9, 2007 *Response to Staff Report* that chemicals used would be neutralized or sent to the sanitary

sewer system instead of the seawater discharge. 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, a 50 MGD high salinity discharge would cause salinity levels twice that of seawater and cause 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 254 MGD when the power plant is not operating or is discharging less than that amount. Poseidon determined that an overall 254 MGD discharge would dilute its 50 MGD 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 determined that a discharge of 40 ppt salinity would not cause significant adverse impacts to marine life.⁸⁸ 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 (e.g., hard bottom habitat, kelp beds, etc.). Using the EPA guidance would result in a maximum allowable discharge level of about 38.4 ppt in the kelp beds 2000 feet offshore. Poseidon's NPDES permit allows an average daily concentration of 40 ppt and an average hourly concentration of up to 44 ppt. Poseidon's hydrodynamic modeling indicated that as long as the discharge remains at or below these concentrations, the salinity in the kelp bed would be below 36.8 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 salinity range of the discharge would not exceed 40 ppt (or 44 ppt maximum hourly concentration) at the point of discharge, and the discharge would be diluted to near 36.5 ppt within the zone of initial dilution, which extends 1000 feet from the discharge channel. While the discharge would create conditions beyond the range experienced by the local

⁸⁸ 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.

biota, Poseidon has provided test results showing that a 40 ppt salinity level would cause no acute or chronic effects to several test organisms. The site-specific Comprehensive Salinity Tolerance Study completed for Poseidon by Dr. Steven Le Page and Dr. Jeffrey Graham indicates that the proposed discharge will not result in acute or chronic toxicity. The Study included long term (5.5 months) exposure of 18 marine species inhabiting the discharge area to a typical discharge salinity of 36 ppt. According to the project's EIR, all of the test species were chosen due to their known existence in the subject area, and several of the species (abalone, sand dollar and red sea urchin) were chosen for their susceptibility to environmental stress. (See project EIR, at Appendix E.) Poseidon provides that the results of the 5.5 month test of exposure of the 18 species to typical discharge salinity of 36 ppt indicate that all organisms remained healthy throughout the test period. No mortality was encountered and all species showed normal activity and feeding behavior. Poseidon further provides that additional acute and chronic toxicity studies completed subsequently for the project using the United States Environmental Protection Agency's standard whole effluent toxicity (WET) test have confirmed the validity and results of the Salinity Tolerance Study.

However, Commission staff's view is that the organisms studied in the Salinity Tolerance Study 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.⁸⁹ Other studies show that slight differences in salinity levels can affect the population density of various species, their ability to tolerate various environmental stressors, reproductive rates, and other effects.⁹⁰

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.

⁸⁹ 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.

⁹⁰ 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.

Based on the above, Poseidon's proposed discharge would likely 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.

The Regional Board studied the project's discharge before issuing the project's NPDES Permit (Regional Board Order No. 2006-0065). The Regional Board considered the discharge impacts of the project and conditioned all potential discharge-related impacts to ensure compliance with Clean Water Act and California Ocean Plan requirements. The Ocean Plan contains water quality objectives and beneficial uses for ocean waters of California. The beneficial uses of ocean waters include industrial water supply; water contact and non-contact recreation, including aesthetic enjoyment; navigation; commercial and sport fishing; mariculture; preservation and enhancement of designated areas of special biological significance; rare and endangered species; marine habitat; fish migration; and fish spawning and shellfish harvesting. The Regional Board determined that an average daily effluent limitation of 40 parts per thousand for salinity would protect beneficial uses of the Ocean (including protection of fish habitat) and ensure that no salinity-related toxicity effects would occur in receiving waters. The NPDES Permit establishes extensive monitoring and reporting requirements to ensure compliance with this effluent limitation.⁹¹

As noted previously, Poseidon states in its November 9, 2007 letter that the project's NPDES permit and the Regional Board's eventual approval of Poseidon's *Flow, Entrainment and Impingement Minimization Plan* will ensure that the proposed facility uses all feasible measures to avoid and reduce any discharge-related impacts. Further, the Board's approval is necessary before the facility can operate. Because the Board's final approval would include such findings and would ensure that the project's discharges conform to relevant requirements of the federal Clean Water Act and the water quality objectives of the state's Ocean Plan, the Commission therefore finds that project-related discharges result in minimal adverse effects to water quality and marine life.

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 next section of these Findings. As documented by the Regional Board's 303(d) listing of Agua Hedionda Lagoon as an impaired water body⁹² and by Poseidon's sediment studies, the

⁹¹ See Poseidon Resources Corporation, *Response to Staff Report, November 9, 2007*, Exh. A, at p. 12; NPDES Permit, Regional Board Order R9-2006-0065 at 12, F-18, F-37 (Attachment 1 to Poseidon Resources Corporation, *Response to California Coastal Commission's September 28, 2006 Request for Additional Information*, November 30, 2006).

⁹² 2006 Clean Water Act 303(d) List of Water Quality Limited Segments Requiring TMDLs, San Diego Regional Water Quality Control Board, June 28, 2007.

sedimentation is due both to fine-grained material from urban runoff being deposited in the Lagoon's Inner Basin and 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. As noted previously in Section 4.4 of these Findings, sedimentation concerns will be addressed through the Regional Board's NPDES review and through ongoing Coastal Commission permit review of future dredging proposals.

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 is assumed to kill all the larval and planktonic organisms in that water, which Poseidon estimates represent about 37 acres worth of wetland and open water productivity in Agua Hedionda. Poseidon has proposed a compensatory mitigation approach to mitigate these impacts.

Poseidon contends that the assumption that the project will cause 100 percent mortality to the marine organisms in the seawater diverted from Agua Hedionda Lagoon is overly conservative because it ignores the design and technology features that have been incorporated in the proposed project. Poseidon contends the project has incorporated several technology features that will substantially lessen the impacts to marine life, including: mortality will be reduced due to the lower temperature, volume, velocity and turbulence of the desalination facility's operations compared to the power plant; and only 35 percent of the seawater in the desalination plant's intake will actually enter the desalination facility and be subject to processing that could result in entrainment mortality, while the rest of the water will be returned to the ocean. However, as noted above, both the project EIR and the entrainment study protocols used to assess this type of impact do not recognize a lower mortality rate for these types of factors, and the 100 percent mortality is a reasonable assumption.

As noted above, the Commission has determined that alternative intakes that might avoid or minimize environmental impacts are infeasible or would cause greater environmental damage. Therefore, to ensure Poseidon provides adequate compensatory mitigation for the proposed project's marine life impacts and to conform to Coastal Act Sections 30230 and 30231, **Special Condition 8** requires Poseidon to submit to the Commission for review and approval a marine life mitigation plan. This plan must document the project's expected impacts to marine life caused by entrainment and impingement and identify the types and amounts of mitigation best suited to address those impacts. It must also provide mitigation to the maximum extent feasible in the form of creation, enhancement, or restoration of aquatic and wetland habitat and must include standard mitigation measures, including acceptable performance standards, monitoring, contingency measures, and legal mechanisms to ensure permanent protection of the proposed mitigation site(s). The coastal development permit will not be issued until the Commission approves a mitigation plan meeting these requirements. Further, to ensure the identified marine life impacts do not exceed those identified through development of this mitigation plan, **Special**

*Final Adopted Findings – Coastal Development Permit Application E-06-013
Poseidon Resources (Channelside) LLC
Approved August 6, 2008– Page 64 of 106*

Condition 9 requires Poseidon to obtain an amendment of its coastal development permit before any increase in its average seawater flows of 304 MGD.

Therefore, based on the studies cited and the information provided above, the Commission finds that the project as conditioned, conform to Coastal Act Sections 30230 and 30231.

4.5.2 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 previously in these Findings. These Findings also show that Poseidon expects its use of estuary water would create adverse entrainment effects equal to the loss of about 37 acres of Agua Hedionda's wetland and open water areas. As explained below, Poseidon's proposed water use and the resulting adverse effects would be an alteration of Agua Hedionda subject to review under Coastal Act Section 30233(c).

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 primarily by fine-grained sedimentation discharged by urban runoff into the Lagoon and 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.⁹³ 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.⁹⁴ 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).

While it is clear that continued use of the intake will require some level of dredging, it is unclear at this time how much dredging will be needed and whether dredging would be done just to ensure the intake channel remains open or would also be done to protect or enhance other lagoon

⁹³ 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.

⁹⁴ Elwany, Dr. Hany. *Study of Sediment Transport Conditions in the Vicinity of the Agua Hedionda Lagoon, 1999.*

functions. Further, the power plant owner has stated it anticipates dredging and maintaining the lagoon as long as it plans to use the existing once-through cooling system. To address these uncertainties, **Special Condition 12** clarifies that the Commission's approval at this time does not authorize Poseidon to conduct any dredging and that future proposed dredging activities will require submittal of new coastal development permit applications for the Commission's further review and approval. However, Poseidon's proposed withdrawal of approximately 304 MGD of estuarine water and the resulting loss of marine life and estuarine productivity caused by entrainment represent an alteration to Agua Hedionda subject to review pursuant to Coastal Act Section 30233(c).

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 activity – i.e., alteration in the form of removal and use of about 304 MGD of estuarine water for desalination that results in a loss of estuarine productivity equal to about 37 acres of the lagoon, along with other lost biological functions and associated adverse impacts – is not for a "very minor incidental public facility," and is not a restorative measure or nature study. Further, although not currently proposed, dredging is expected to be necessary in the future to allow the facility to use water from the lagoon, and this alteration would also be subject to review under Section 30233(c) (see below). Therefore, the project's proposed use of these wetlands does not conform to this section of the Coastal Act.⁹⁵ The Commission further notes

⁹⁵ 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.

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.

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.

However, because the proposed project is considered a “coastal-dependent” industrial facility, the Commission may 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 4.5.7 of these Findings.

Additional evaluation of the proposed project’s dredging component

Coastal Act Section 30233 also includes other provisions that are applicable to projects involving fill or dredging. These include Section 30233(a), which imposes a three-part test to determine whether proposed dredging is for an acceptable use, whether there are feasible and less damaging alternatives, and if feasible mitigation measures are included to minimize adverse environmental effects. Additionally, Coastal Act Section 30233(b) requires dredging and spoils disposal be implemented in a manner that avoids significant disruption to habitat and water circulation. Further, Coastal Act Section 30233(c), in addition to the use limitations noted above, includes a provision that dredging maintain or enhance the functional capacity of wetlands or estuaries. However, with the Commission’s imposition of **Special Condition 12** requiring Poseidon to submit separate coastal development permit applications for any proposed future dredging, the project as currently reviewed does not include dredging activities that would be subject to these provisions. Further, as noted above, there is substantial uncertainty about how much dredging Poseidon would be required to perform, where the dredging would occur, its effects, and the mitigation needed to address those effects. Additionally, the currently available information shows that the power plant owner plans to dredge and maintain the lagoon for the foreseeable future. It is therefore appropriate to conduct the necessary review for Coastal Act conformity when these aspects of any needed dredging are better known. At that time, proposed dredging activities would be reviewed to determine their conformity to applicable Coastal Act provisions.

Poseidon contends that its proposed dredging of the lagoon would be a permitted use under Coastal Act Section 30233. It states that its dredging would benefit the lagoon and the marine resources, scientific research, fishing, public access and recreational activities that rely on the lagoon.⁹⁶ Poseidon further contends that there is no feasible alternative to its proposed dredging and that dredging is a project benefit that is fully consistent with the Coastal Act. It states that the Commission has approved dredging of the Lagoon on at least 17 separate occasions since 1977, most recently in November 2006 (see CDP 6-06-061). Poseidon further contends that, because Cabrillo Power, the owner of the power plant, currently dredges the Lagoon on a routine basis and has done so for the past fifty years, the existing environmental baseline from which the Commission must review the project is an environment in which dredging occurs routinely.⁹⁷ Poseidon states that it would voluntarily take over this responsibility if, at some point in the future, the power plant were to shut down and Poseidon would do nothing to change this existing

⁹⁶ See Poseidon Resources Corporation, Response to Staff Report, November 9, 2007, Exh. A at p. 25.

⁹⁷ See, e.g., *Fat v. County of Sacramento*, 97 Cal. App. 4th 1270 (2002) (environmental baseline consists of environmental conditions as they exist prior to the commencement of environmental review of the project).

dredging activity other than reduce the frequency of the dredge cycle as described in Dr. Scott Jenkin's report, *Comparative Analysis of Intake Flow Rate on Sand Influx Rates at Agua Hedionda Lagoon: Low-Flow vs. No-Flow Alternatives*, September 28, 2007.

Poseidon further contends that routine dredging is required to maintain the Lagoon in its current state and prevent it from reverting to its original state – a slough comprised of shallow marsh channels filled with anaerobic hyper-saline water – and that the recreational, fishing, and aquaculture activities would halt if the power plant shut down and Poseidon did not volunteer to continue maintenance dredging of the Lagoon. Poseidon also contends that, while dredging may have minimal short-term environmental impacts, the long-term environmental benefits that dredging provides, including protecting the valuable Lagoon in its current state, far outweigh the minimal short term impacts.⁹⁸ Poseidon relies on *Comparative Analysis of Intake Flow Rate on Sand Influx Rates at Agua Hedionda Lagoon: Low-Flow vs. No-Flow Alternatives*, Jenkins and Wasyl, September 28, 2007, to demonstrate that there is no alternative to dredging to protect the Lagoon from returning to "stinky water." In the absence of Poseidon's operations and its assumption of the responsibility for maintenance dredging and stewardship of the Lagoon after the Encina power station is decommissioned, Lagoon sedimentation from urban run-off will result in closure of the Lagoon in five to seven years, and nearly complete loss of existing beneficial uses thereafter.⁹⁹ Poseidon believes its project will therefore enhance marine habitat because it will preserve the Lagoon for both existing organisms and current recreational, fishing and aquaculture activities.

For several reasons, however, the Commission does not concur. Poseidon does not own or control lagoon areas subject to dredging or the various activities described above. Cabrillo, the power plant owner, owns the lagoon, including the underlying aquatic lands, and has stated it intends to continue its dredging and maintenance activities for the foreseeable future, both to ensure a water supply for any of its generating units that may be needed as a regional back-up power supply and to maintain the lagoon's amenities to preserve the value of its adjacent upland properties. It is therefore not apparent that Poseidon will be conducting dredging, or that it would be able to conduct dredging without permission from Cabrillo and approval from the State Lands Commission, and the Commission is not aware of such any agreements or approvals that could be incorporated into these Findings or **Special Conditions**.¹⁰⁰ The Commission also notes that the original power plant owner dredged the lagoon and started operating in the 1950s, well before adoption of the Coastal Act, and that Poseidon's proposal would represent a new use of the lagoon. The Commission notes, too, that it approved previous power plant-related dredging activities on a case-by-case basis by reviewing detailed dredging proposals provided by the power plant owners and making findings on those specific proposals. Poseidon has not yet proposed or submitted a detailed dredging plan that describes how it would conduct dredging or how it would maintain these lagoon functions and activities. Such a plan would not only require

⁹⁸ See *Sierra Club v. California Coastal Commission*, 19 Cal. App. 4th 547, 562 (4th Dist. 1994) (finding that "the Commission has the power in particular cases to permit significant short-term disruption [from dredging] in order to provide long-term benefits [to coastal resources]" under Coastal Act Section 30233.)

⁹⁹ *Comparative Analysis of Intake Flow Rate on Sand Influx Rates at Agua Hedionda Lagoon: Low Flow vs. No-Flow Alternatives*, Dr. Scott Jenkins, September 28, 2007.

¹⁰⁰ As described previously, Coastal Act Section 30601.5 requires in part that an applicant demonstrate, prior to issuance of a coastal development permit, its ability to comply with all conditions of approval.

landowner approval and other regulatory approvals, but would require detailed analyses of the amounts and locations of dredging needed to maintain the water intake channel, additional dredging that may be needed to maintain these various functions and activities, and further analyses to determine whether there are feasible and less environmentally damaging alternatives to dredging for both the intake and the other functions. Additionally, Cabrillo's existing State Lands Commission lease for the lagoon inlet structure on state tidelands is limited to use for power plant operations only and would require modification to allow Poseidon's proposed use or subsequent dredging in areas subject to State Lands Commission jurisdiction. It would therefore be speculative for the Commission at this time to concur with Poseidon's contentions, and the Commission is therefore requiring these issues be appropriately addressed through **Special Condition 12**, which will ensure the Commission has the opportunity in the future to determine whether proposed dredging activities conform to applicable Coastal Act provisions.

Conclusion

The proposed project would represent a use and alteration of the Agua Hedionda wetlands not permitted by 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. However, because the proposed project is 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 4.5.7 of these Findings. The Commission further finds that the project as currently proposed does not include dredging but that imposition of **Special Condition 12** ensures that Poseidon will apply for new, separate coastal development permits for any future dredging projects it may propose. Commission review at that time will determine whether a particular proposed dredging project will conform to applicable Coastal Act provisions.

4.5.3 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:

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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 affect public access to the shoreline at that location. The project also includes constructing pipelines under roads within the coastal zone, although the pipeline construction would be similar to other road construction projects and its temporary impacts 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 on intake jetties and a discharge structure on State tidelands would affect public access by limiting accessibility to those areas. However, as noted previously in these Findings, no feasible

alternatives exist that would allow cessation of use of these structures. Further, the project would require ongoing dredging within the Lagoon and deposition of the dredged spoils (which would be subject to Cabrillo, Poseidon, or another dredging proponent obtaining a new, separate coastal development permit), which could allow for beach nourishment along nearby beaches. While these activities would cause temporary disruptions to public access, they would have a long-term public benefit by adding sand to the beach. The alternatives determined by the Commission to be infeasible would cause impacts 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 of Carlsbad 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 2.4 acres on the west shore of the Lagoon's Outer Basin to be used as a fishing beach;
- A site of about 10.2 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 covering about 0.3 acres at the south end of the power plant for public parking.

These sites total about 15 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. To ensure these sites are made available for public use, **Special Condition 11** requires that, prior to starting operations of the desalination facility, Poseidon ensure these parcels are dedicated for public access and recreation as described in the City's Precise Development Plan #PDP 00-02. 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 conditioned conforms to the Coastal Act's public access provisions.

4.5.4 Scenic and Visual Resources

Coastal Act Section 30251 states:

The scenic and visual qualities of coastal areas shall be considered and protected as a resource of public importance. Permitted development shall be sited and designed to protect views to and along the ocean and scenic coastal areas, to minimize the alteration of natural land forms, to be visually compatible with the character of surrounding areas, and, where feasible, to restore and enhance visual quality in visually degraded areas. New development in highly scenic areas such as those designated in the California Coastline Preservation and Recreation Plan prepared by the Department of Parks and Recreation and by local government shall be subordinate to the character of its setting.

The proposed project would be built largely within the existing developed area of the Encina power plant. The desalination facility site is currently occupied by large oil tanks that are no longer in use and that have been proposed for demolition. The desalination facility would create less of a visual impact than the currently existing tanks.

Poseidon's project plans include a number of measures to minimize any adverse visual effects of the proposed facility. The facility would be a relatively low profile building of about 44,000 square feet and reaching about 35 feet above the existing grade. Its appearance would be similar to a large warehouse. As part of the facility design, Poseidon has added both vegetative and architectural screening to ensure that exposed pipelines, tanks, and other industrial-type equipment are screened from public view.

The Commission considered several intake alternatives, including slant wells and an intake gallery, and concluded that they are environmentally inferior to the proposed project. With respect to visual and scenic resources, each of the alternatives would require development of permanent structures on the beach that could result in a permanent impact to visual resources. The slant well alternative would require between 20 and 200 beach wells along a two mile stretch of coast, and associated access roads, parking, pipelines and electrical supply.¹⁰¹ The intake gallery alternative would require 78 beach wells, each of which would require approximately 2,800 square feet of beachfront property, for a combined loss of seven acres of beachfront property.¹⁰² Construction of the intake gallery alternative would also require trenches for collection piping and could limit access to the beach for a period of 2 to 4 years, and would require the creation of permanent access ramps from the Pacific Coast Highway to the beach to transport equipment during construction and to permit well inspection during the life of the wells.¹⁰³ Therefore, the proposed project is the environmentally superior alternative.

¹⁰¹ See Poseidon Resources Corporation, *Response to Staff Report*, November 9, 2007, Exh. B at p. 16.

¹⁰² Id. at 17-19.

¹⁰³ See Poseidon Resources Corporation, *Response to Staff Report*, November 9, 2007, Exh. A at pp. 17-18.

To ensure the facility conforms to the Coastal Act's scenic and visual resource policies, **Special Conditions 13 and 14** require Poseidon to submit, prior to starting construction, a Screening Plan and a Lighting Plan showing the planned appearance of the facility. The plans must describe how Poseidon will screen the facility's industrial and mechanical equipment and how the facility and surrounding area will be lighted to provide the necessary level of safety and security while minimizing offsite glare and other adverse affects. Both plans must be submitted to the Executive Director for review and approval before construction can begin.

Conclusion

Based on the above, the Commission finds that the project, as conditioned, will conform to the Coastal Act's scenic and visual resource provisions.

4.5.5 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 from about 134,400,000 pounds (or about 61,000 metric tonnes) to 200,000,000 pounds (about 90,000 metric tonnes) of carbon dioxide emissions per year.¹⁰⁴ The difference between the Commission's conclusion and Poseidon's estimates is further described below.

Note: The anticipated emissions described herein, in Commission staff's view, 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 Maerle 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. Also, it includes only carbon dioxide emissions, not emissions of other greenhouse gases generated by power plants. Commission staff's 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 greater than those created by other water sources and would contribute 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).

Poseidon's position is that it shares the Governor's commitment to address climate change, but disagrees with Commission staff that the project will be a contributing factor to climate change for several reasons: the project is consistent with its proposed Climate Action Plan, which Poseidon

¹⁰⁴ 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.usctgateway.net).

believes will result in a reduction in regional greenhouse gas emissions, and the project includes numerous components to ensure that it will use only the minimum energy necessary.¹⁰⁵ Moreover, Poseidon maintains that the Commission's authority to impose greenhouse gas emission standards or emissions-related mitigation is limited.¹⁰⁶ Poseidon states that due to the importance of the project and Poseidon's environmental stewardship, it has proposed a Climate Action Plan pursuant to which Poseidon commits to measures that will offset the project's net carbon emissions so that the project is net carbon neutral.¹⁰⁷

As described below, Poseidon will demonstrate 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 through its conformity to **Special Condition 10**, as described below.

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 3,400 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 30% more than the State Water Project, which provides a part of the water imported to the San Diego area, and about 120% more kilowatt-hours per acre-foot than water imported to the area from the Colorado River, which requires about 2000 kilowatt-hours per acre-foot.

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.¹⁰⁸ 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. In response, Poseidon has proposed a Climate Action Plan, which is discussed in greater detail later in these Findings.

¹⁰⁵ See Poseidon Resources Corporation, *Response to Staff Report*, November 9, 2007, Exh. A at pp. 20-21.

¹⁰⁶ See Poseidon Resources Corporation, *Response to Staff Report*, November 9, 2007, Exh. A at pp. 20-21.

¹⁰⁷ See *id.*

¹⁰⁸ See, for example, the California Energy Commission's 2007 *Draft Integrated Energy Policy Report*.

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 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 agriculture 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:** 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 CO₂, although the rate of ocean mixing is too slow to prevent the current buildup in the atmosphere. Without this net absorption of CO₂ 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 CO₂ emissions, substantially reducing the net atmospheric concentrations of CO₂. This effect does not come without a cost, however. When CO₂ is absorbed by the ocean, some of it combines with water to form carbonic acid (H₂CO₃). This results in only a modest decrease in ocean pH, however, because most of the carbonic acid recombines to form bicarbonate ions (HCO₃⁻). In the process, carbonate ions (CO₃⁻²) are consumed, with the net result being that absorption of CO₂ 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 (reduced pH associated with increased environmental CO₂ 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 CO₂ levels in seawater decreases the saturation state of seawater with respect to calcium carbonate (CaCO₃) and raises the saturation horizon closer to the surface. The CaCO₃ saturation horizon is a depth in the ocean above which CaCO₃ can form, but below which CaCO₃ dissolves. Increasing surface CO₂ levels could have serious consequences for organisms that make external CaCO₃ 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 (about 90,000 metric tonnes) 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 (SDG&E) energy portfolio. Conversely, Poseidon, relying on California Climate Action Registry (CCAR) Protocol, estimates that its electricity use would generate approximately 61,004 metric tonnes of carbon dioxide emissions each year, based upon its use of 246,156 megawatt-hours per year from SDG&E, which has a CCAR certified

emissions factor of 546.46 lbs of CO₂/MWH. Since Poseidon intends to buy all of its energy from SDG&E system power, Poseidon states that the appropriate emission factor to use for the project's indirect carbon emissions from its electricity purchases is SDG&E's annual emission factor for delivered electricity as stated in their CCAR Annual Emissions Report.¹⁰⁹ SDG&E last filed an Annual Emissions Report with the CCAR on March 7, 2007, and it provides an emission rate of 546 lbs of CO₂/MWH.

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, but that this figure would be lowered to about 4,400 kilowatt-hours by implementing measures described below. This includes using the power plant's pumps to bring water into the intake channel, pumping that water into the proposed facility, pretreating the water, producing desalinated water using reverse osmosis membranes, and pumping the water from the facility to delivery points in Carlsbad and nearby communities. At 4,833 kilowatt-hours per acre-foot, Poseidon's electrical use would total 270,648 megawatt-hours per year.¹¹⁰ 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.¹¹¹

Poseidon's proposed Climate Action Plan describes 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 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, or approximately 250,000 megawatt-hours per year, which is used as the basis for the analyses in these findings. Using Commission staff's calculations, this would result in carbon dioxide emissions of about 200,000,000 pounds (about 90,000 metric tonnes) per year.¹¹²

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 and manufacture of materials used.

¹⁰⁹ See Poseidon Resources Corporation, *Response to Staff Report*, November 9, 2007, Exh. A at pp. 23-24.

¹¹⁰ $4,833 \times 56,000 \text{ acre-feet per year} / 1,000 \text{ kilowatts per megawatt} = 270,648 \text{ megawatt-hours}$.

¹¹¹ At a steady rate of electrical use, $30 \text{ megawatts} \times 24 \text{ hours per day} \times 365 \text{ days per year} = 262,800 \text{ megawatt-hours}$.

¹¹² Based on the CCAR average rate of 804.54 pounds per megawatt-hour of carbon dioxide emissions from California's electrical sources.

Recent letters and memoranda from Poseidon (see October 21 and 22, 2007) provide a much lower estimate of its anticipated greenhouse gas emissions. Poseidon, citing the most recent CCAR protocol and certified SDG&E emission rate, 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 134,400,000 pounds (about 61,000 metric tonnes) of carbon dioxide per year instead of 200,000,000 pounds (90,000 metric tonnes). However, Commission staff's analysis shows that 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.¹¹³ For example, coal and natural gas, which have average emission rates much higher than 804.54 pounds per megawatt-hour,¹¹⁴ 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.¹¹⁵ Elsewhere, SDG&E's emissions are cited as 915 pounds per megawatt-hour for electricity it purchases.¹¹⁶ Commission staff, therefore, contend that Poseidon's reliance on the latest published CCAR rate calculations for SDG&E may be in error. The CCAR-certified figure 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 determinations related to emissions from different 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. Poseidon, however, states that the CCAR-certified figure is not erroneous, since CCAR is the only certifying entity currently authorized by California and because CCAR used SDG&E's credible self-reported Annual Entity Emissions report.¹¹⁷

¹¹³ 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

¹¹⁴ Natural gas emissions range from about 800-1200 lbs/megawatt-hour, and coal emissions are more than 2000 lbs/megawatt-hour.

¹¹⁵ 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.

¹¹⁶ See Powers, Bill, *Assessment of Energy Intensity and CO2 Emissions Associated with Water Supply Options for San Diego County*, October 12, 2007.

¹¹⁷ See Poseidon Resources Corporation, *Response to Staff Report*, November 9, 2007, Exh. A at pp. 23-24.

In selecting an appropriate rate to use for these analyses, Commission staff used CCAR's standard figure for California to establish Poseidon's 200 million pound contribution to greenhouse gas emissions.¹¹⁸ Poseidon disagrees, stating that because Commission staff did not follow the CCAR protocol or rely on the CCAR certified SDG&E emissions factor, staff's analysis was in error.¹¹⁹ Regardless, because SDG&E reports its overall emission rate on an annual basis and that rate changes based on the particular mix of electricity sources SDG&E uses each year, the rate used to determine Poseidon's greenhouse gas contributions each year is at this point unknown but will be determined through Commission review and approval of Poseidon's Energy Minimization and Greenhouse Gas Reduction Plan as described later in these Findings.

In its October 21, 2007 memorandum, Exhibit D to its November 9, 2007 letter to the Commission, and in its presentation to the Commission at the November 15, 2007 hearing, Poseidon presented its proposal to offset or reduce the proposed project's energy use and greenhouse gas production so that the facility's operations would be net carbon neutral. Poseidon states that it will develop a Climate Action Plan that (1) would ensure the project minimizes energy consumption in compliance with Coastal Act Section 30253(4), and (2) would render the project net carbon neutral. Poseidon stated its Climate Action Plan may include the following, which are described in more detail below:

Energy Minimization Measures:

- Installing a state-of-the-art high efficiency energy recovery system that will decrease the amount of electricity required by the facility by 10% or about 433 kWh/AF.
- 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).
- Installing variable-frequency drives on the intake water pumps of the desalination facility to improve the energy-efficiency of these pumps.
- Installing low-friction piping materials (e.g., FRP and HDPE) wherever possible to reduce head losses and related energy consumption through the piping.

Carbon Neutrality Measures:

- Acquiring renewable power through installation of photovoltaic array and other renewable energy sources.
- Acquiring Renewable Energy Credits (RECs) or purchasing carbon offset projects.
- Restoring and preserving coastal wetlands for carbon sequestration.
- Providing \$1 million worth of trees for reforestation in the San Diego area.

As noted previously, Poseidon initially estimated that its facility would require 4,833 kilowatt-hours of electricity to produce each acre-foot of potable water (kWh/AF) and transport that water to delivery points in and near Carlsbad. This figure would otherwise be somewhat higher – about 5,990 kWh/AF

¹¹⁸ 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.

¹¹⁹ See Poseidon Resources Corporation, *Response to Staff Report*, November 9, 2007, Exh. A at pp. 23-24.

– 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 about 200 million pounds (90,000 metric tonnes) per year according to Commission staff's calculations, or about 134 million pounds (61,000 metric tonnes) per year using Poseidon's calculations. It would clearly be to Poseidon's advantage to use any cost-effective energy efficiency devices available to reduce its operating costs, and Poseidon has committed to use this device, so 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 significantly lower emissions from Poseidon's anticipated electrical use. Further, Poseidon has not yet committed to these measures.

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.¹²⁰ 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 any foregone use would lower Poseidon's overall greenhouse gas contributions by about 77% (i.e., the difference between Poseidon's 4400 kilowatt-hour per acre-foot energy use and the State Water Project's 3400 kilowatt-hour per acre-foot).¹²¹ Poseidon states that the Carlsbad facility will supply 56,000 acre-feet of water per year to the San Diego region, water that would otherwise have to be pumped into the region through either the State Water Project or the Colorado River Aqueduct. Poseidon further contends, as stated by all Carlsbad desalination project water agency partners in letters to the State Lands Commission dated November 6 and November 7, 2007, which were also provided to the Coastal Commission, that water from the desalination plant will provide direct, one-

¹²⁰ 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.

¹²¹ See Poseidon Resources Corporation, *Response to Staff Report*, November 9, 2007, Exh. D (Climate Action Plan).

for-one replacement of imported water to meet the requirements of their Urban Water Management Plans, thus eliminating the need to pump 56,000 acre feet of water into the region.¹²² Conversely, Poseidon contends that if the project is not approved the demand for imported water by the eight public water agencies will increase by 56,000 AF/Y starting in 2010. Additionally, Metropolitan Water District of Southern California (MWD) has committed to pay Poseidon's customers \$250/AF for each acre-foot of water purchased from the project that offsets a demand on MWD. The availability of MWD funding is subject to annual audit demonstrating that the desalinated water was used to offset a demand for imported water that would otherwise have to be delivered by MWD. Poseidon concludes that, if the replaced water is pumped into the region for other uses, then the associated carbon emissions from such pumping should be and is the responsibility of the proponents of those other uses. Poseidon believes that any other result would be an unfair and unwarranted "double counting" of carbon emissions, requiring Poseidon to offset emissions caused by other activities not associated with its own operations.¹²³

For several reasons, however, the Commission staff believe 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.¹²⁴ 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 3,400 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 carbon dioxide emissions.

¹²² See Poseidon Resources Corporation. *Letter to Paul Thayer Re: Desalination Project's Impact on Imported Water Use*, November 8, 2007, including attachments from eight water agencies.

¹²³ See Poseidon Resources Corporation, *Response to Staff Report*, November 9, 2007, Exh. A at p. 24.

¹²⁴ 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, Commission staff's analysis shows the electrical demand of Poseidon's proposed project would contribute approximately 200 million pounds (90,000 metric tonnes) of carbon dioxide annually, and Poseidon's calculations, using the most recent CCAR-certified emission factor estimate about 134 million pounds (61,000 metric tonnes) of carbon dioxide emissions annually.

Poseidon and the Commission staff will consult with CCAR and CARB and other agencies to ensure that the carbon emissions will be neutralized regardless of the actual output, and **Special Condition 10** will assure that all net greenhouse gas emissions will be offset. Additionally, as noted above, because the SDG&E emission factor will change each year based on its electricity portfolio, the method used to determine Poseidon's needed emission reductions each year would need to be identified in the plan reviewed and approved by the Commission.

As described above, Poseidon's proposed Climate Action Plan presents a variety of measures it is exploring to reduce the plant's electricity consumption and resulting emissions and to offset the remaining emissions. The Plan does not currently commit to specific electricity minimization measures beyond those identified above; however, Poseidon is still exploring its options in regard to further electricity minimization and the Plan commits to specific electricity reductions.

To ensure Poseidon's proposal will conform to Coastal Act Section 30253(4) and other applicable Coastal Act provisions by minimizing energy consumption and reducing effects of greenhouse gas emissions on coastal resources, **Special Condition 10** requires Poseidon, prior to issuance of its coastal development permit, to submit to the Commission for review and approval a revised Energy Minimization and Greenhouse Gas Reduction Plan. That Plan is to be developed in conjunction with Coastal Commission staff and staff of other interested agencies and is to describe the procedures and mitigation measures that will be implemented to minimize electricity consumption of the desalination facility and to reduce or offset emissions resulting from the facility's remaining electrical use.

As noted above, Poseidon contends that its Climate Action Plan further provides a commitment that Poseidon will render the project "net carbon neutral" through measures including:

- Acquiring Renewable Energy Credits (RECs)
- Purchasing carbon offset projects
- Restoring and preserving coastal wetlands for carbon sequestration
- Providing \$1 million worth of trees for reforestation in the San Diego area.

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.¹²⁵ Carbon offsets are

¹²⁵ 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.

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.¹²⁶ As part of its proposal, Poseidon has committed to purchase one million dollars worth of native and non-invasive trees to be planted in areas of San Diego County that were burned during the October 2007 wildfires. The Commission requested that Poseidon work with the San Diego Air Quality Management District to determine what kinds of trees would be appropriate to use. 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.

To ensure Poseidon's proposal will avoid and offset the adverse coastal resource impacts noted above and will conform to applicable Coastal Act provisions, **Special Condition 10** requires Poseidon, prior to issuance of its coastal development permit, to submit to the Commission for review and approval a revised Energy Minimization and Greenhouse Gas Reduction Plan. That Plan is to be developed in conjunction with Coastal Commission staff and staff of other interested agencies and is to describe the procedures and mitigation measures that will be implemented to determine the amount of carbon dioxide emitted due to Poseidon's electrical use and to ensure that project operations are "net carbon neutral". These may include measures described above and others, such as confirmed use of renewable energy sources like solar or wind power that would reduce the project's carbon footprint.

Conclusion

Special Condition 10 requires Poseidon to submit to the Commission for review and approval a Revised Energy Minimization and Greenhouse Gas Reduction Plan that addresses comments submitted by the staffs of the Commission, State Lands Commission and the Air Resources Board prior to issuance of the permit. The Commission finds that imposition of **Special Condition 10** will ensure that Poseidon minimizes electricity consumption of the project and mitigate any effects of the project's emissions on coastal resources, and that, as mitigated and conditioned, the project is consistent with the requirements of Section 30253(4) and other relevant Coastal Act provisions. The proposed project is meant in part to respond to the threat of drought and dwindling water supplies, and with adequate minimization and compensatory mitigation measures, the project will help achieve those goals. Poseidon's revised plan shall establish that the project will avoid, minimize, or mitigate adverse

¹²⁶ 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).

*Final Adopted Findings – Coastal Development Permit Application E-06-013
Poseidon Resources (Channelside) LLC
Approved August 6, 2008– Page 90 of 106*

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 minimized and mitigated energy consumption. Based on the above, the Commission finds that the project, as conditioned, will conform to Coastal Act provisions related to minimizing energy use and mitigating any adverse effects on coastal resources from greenhouse gas emissions.

4.5.6 Development and Public Services (Coastal Act Sections 30250 & 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. The facility would be located on an existing industrial site in an area with public services provided. 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 project's capacity of 56,000 AFY of new water supply for the San Diego region is about ten percent of 500,000 AFY of desalinated water identified by the California Department of Water Resources as needed by 2030, as stated in its 2006 Water Plan Update. This Update lists the project as a potential source of desalinated water. The Metropolitan Water District of Southern California's Integrated Water Resources Plan identified a need for 250,000 AFY of seawater desalination (including 56,000 AFY from the Carlsbad project) to ensure regional water supply reliability. In addition, the San Diego County Water Authority updated its 2005 Urban Water Management Plan in April 2007 specifically to reaffirm the need for 56,000 AFY of seawater desalination from the project by 2011. The project is a central component of state, regional and local water supply planning to meet already-identified demand.

The proposed project conforms to Sections 30250(a) and 30254 because any adverse effects to coastal resources will be mitigated as described in other sections of these Findings. Regarding growth implications, the Commission finds that the project will not induce growth since Poseidon will be selling its produced water to various public water districts. In this instance, use of that water by those districts will be subject to the applicable current and future growth plans, allowable levels of build-out, and conservation plans adopted by those districts or by the local jurisdictions they serve. The project provides part of the water supply that the California Department of Water Resources has identified as being needed in the area. The project does not induce growth, but rather, concentrates on providing a secure water supply for a region importing about 85% of its water and whose sources of imported water may not be secure. Accordingly, the project is a needed component of, and is consistent with, state, regional, and local water supply planning to meet an identified demand.

Conclusion

Based on the above, the Commission finds that the project will not result in growth-inducing impacts and, as proposed and conditioned conforms to Coastal Act Sections 30250 and 30254.

4.5.7 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, as conditioned, would conform to applicable Coastal Act policies except Section 30233(c). Therefore, the Commission’s approval of the project requires use of the Section 30260 “override”. As shown in the discussion below, the Commission has determined that the project, as conditioned, meets the three tests of Section 30260 and thereby conforms to this Coastal Act policy. 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 Section 4.5.1 of these Findings, the Commission found that there are no feasible alternative locations that would significantly reduce any impacts of the proposed intake and the outfall.

Based on the analysis provided previously in these Findings, the Commission finds that there are no feasible and less environmentally damaging alternative locations available for the project's seawater intake and discharge components and that the proposed project meets 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. Poseidon's proposal meets this test of Section 30260 through imposition of **Special Conditions 4 (Other Agency Approvals), 8 (Marine Life Mitigation Plan), 9 (Seawater Withdrawal), 10 (Energy Minimization and Greenhouse Gas Reduction Plan); 11 (Public Access), 12 (Dredging), 13 (Visual Resources), 15 (Construction Plan), 16 (Storm Water Pollution Prevention Plan) and 17 (Water Quality)**, which, among other protections, impose requirements that Poseidon implement mitigation measures that will minimize potential adverse environmental effects to the maximum extent feasible. These conditions will, among other things require Poseidon to (1) submit to and obtain from the Commission approval of a revised Marine Life Mitigation Plan in the form of an amendment to the CDP that will mitigate to the extent feasible project-related impacts to marine life; (2) submit to and obtain from the Commission approval of a revised Energy Minimization and Greenhouse Gas Reduction Plan that results in reduction in electrical use and reduction or offset of greenhouse gas emissions associated with the project's operations to the maximum extent feasible through Poseidon's agreement that the project will be net carbon neutral; and (3) submit separate coastal development permit applications to the Commission for future dredging of the Lagoon so the Commission can ensure that future dredging is consistent with the Coastal Act. Together, these and the other **Special Conditions** ensure the project will mitigate to the maximum extent feasible the project's adverse effects on coastal resources.

Based on the above and on the previous Findings herein, the Commission finds that the proposed project as conditioned mitigates its impacts to the maximum extent feasible and that it meets 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 is a part of this portfolio. For the reasons below, the Commission finds that denial of the proposed project is not in the public interest.

- **Effects of environmental impacts on public welfare:** Through imposition of **Special Conditions 8 and 10**, the Commission finds that the project as mitigated will address the need to improve marine life productivity and will therefore be consistent with the goals of Sections 30230 and 30231. The Lagoon also provides many beneficial uses to the public that this project will support through continued and increased opportunities for public access, ongoing use for marine life science and research, and others. Additionally, **Special Condition 12** requires

Poseidon to obtain separate coastal development permits for any proposed future dredging activities in the Lagoon, which will ensure those activities conform to applicable Coastal Act provisions.

- **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 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 San Diego) 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.¹²⁷ 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.

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?¹²⁸

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.¹²⁹ 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's water purchase agreements with the eight municipal water agencies that will be purchasing water from the project are public documents, which provide the public with transparency regarding the project's financial relationship with the agencies.¹³⁰

Additionally, as noted previously in Section 4.2 of these Findings, Poseidon's contracts with the Carlsbad Municipal Water District provide that the Water District could assume operation or ownership of the facility if necessary, and Poseidon is required to post securities to ensure site remediation or removal of the facility, if warranted. Additionally, Poseidon's water purchase agreements with the various public water districts primarily obligate the purchasers to buy up to a certain amount of water at a specified price. Decisions about use and distribution of that water will remain the purview of these public water districts.

¹²⁷ However, the San Diego County Water Authority supports the desalination facility and passed a resolution on June 28, 2007 in support of the Project finding that "the Carlsbad Desalination Project is essential to the Water Authority's ability to achieve the supply diversification goals contained in the 2005 UWMP [Urban Water Management Plan]."

¹²⁸ See the Pacific Institute's report, *The New Economy of Water: The Risks and Benefits of Globalization and Privatization of Fresh Water*, February 2002.

¹²⁹ See State Desalination Task Force recommendations and March 15, 2004 letter from Resources Secretary Mike Chrisman to Coastal Commission.

¹³⁰ See Reporter's Transcript of Proceedings, Application No. E-06-013, November 15, 2007, Agenda Item No. 7.a., at p. 275-276.

Overall, however, the Commission recognizes the importance and the urgency in providing a reliable water supply in the San Diego region during a time of declining availability of imported water and a time of significant fiscal constraints on public water agencies. Even with regional initiatives to emphasize water conservation and to reuse existing supplies, the population and economy of the San Diego area is heavily reliant on maintaining and creating an adequate water supply such as the supply created by this facility. Further, this facility's initial development and construction costs, which are expected to exceed \$300 million, will be borne directly by a willing private entity rather than by the water districts that have agreed to purchase the water produced at the facility. Further, as noted above, the San Diego County Water Authority withdrew its proposal to construct a desalination facility at this site, leaving Poseidon as the only entity willing to undertake construction and operation. The Commission therefore finds in this case that it is in the public interest to allow private development of a portion of the region's water supply.

- **The combination of this facility and other alternatives 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.

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.¹³¹ We note, too, for example, that the same treatment system Poseidon proposes for its facility is used in indirect potable reuse applications. The Commission expects that the use of these and other conservation measures will continue and will increase, with or without the proposed project.

Even with these conservation measures in place and with other conservation measures still available, the Commission finds that it is in the public interest for this desalination facility to provide water that augments these other sources. The project would provide an important and much-needed source of potable water for Southern California. Since Poseidon filed its CDP application, the water supply situation in the State of California – already bad – has substantially deteriorated. Poseidon has previously provided the Commission with newspaper reports that recognize a looming water crisis and clearly identify the need for California, and more specifically San Diego County, to lessen its demand on the State Water Project and Colorado River watersheds, which were critically dry in 2007.¹³²

State, regional, and local water plans all have confirmed that the immediate and pressing water needs are so great, that they cannot be met by conservation and recycled water alone and that a substantial investment in seawater desalination, including the project, is required. The project's capacity of 56,000 AFY of new water supply for the San Diego region is about ten percent of 500,000 AFY of desalinated water identified by the California Department of Water Resources as needed by 2030, as stated in its 2006 Water Plan Update. This Update lists the project as a potential source of desalinated water. The Metropolitan Water District of Southern California's Integrated Water Resources Plan identified a need for 150,000 AFY of seawater desalination (including 56,000 AFY from the Carlsbad project) to ensure regional water supply reliability. In addition, the San Diego County Water Authority updated its 2005 Urban Water Management Plan in April 2007 specifically to reaffirm the need for 56,000 AFY of seawater desalination from the project by 2011. The project is a central component of state, regional and local water supply planning to meet already-identified demand.¹³³

Eight public water agencies have already entered into long-term agreements with Poseidon to receive 100% of the supply of desalinated water from the project. These agencies have some of the most aggressive water recycling programs in the region, but they have stressed the need for desalinated water to ensure regional water supply reliability and to meet existing demands and planned-for future growth, and they have identified the project's water supply as a component of their water plans.¹³⁴ The entire plant's output will be put to public use by these public agency partners, ensuring that the water will remain in the public domain.

¹³¹ See Carlsbad's 2007 *State of Effectiveness Report*.

¹³² See Poseidon Resources Corporation, *Response to Staff Report*, November 9, 2007, Exh. A at p. 5.

¹³³ See *id.* at p. 6.

¹³⁴ See Poseidon Resources Corporation, *Letter to State Lands Commission Executive Director re: Desalination Project's Impact on Imported Water Use*, November 8, 2007 (including attachments from water districts); Poseidon Resources Corporation, *Carlsbad Desalination Project Briefing Package*, CDP Application No. E-06-013, November 2007.

Public agencies will continue to control the allocation and use of the water, so local government oversight will be preserved. Under Poseidon's contracts with each public water agency, the customers' price of water will not exceed the price that the customer would have paid for the imported water supply from the San Diego County Water Authority.

The region expects further restrictions in the amount of water being imported to the area. If the restrictions are as severe as expected – i.e., reductions of up to about 30% -- it will need to rely on conservation, desalination, and other means to make up the water deficit. This facility is therefore a necessary and integral part of the region's water portfolio.

- **Public benefits resulting from increased shoreline access opportunities:** In addition to the above public welfare benefits, the project will result in increased access to the shoreline of both Agua Hedionda Lagoon and the Pacific Ocean. As part of its project, Poseidon has offered to dedicate for public use four sites totaling about 15 acres on or near the shore of both the Lagoon and the ocean. The dedicated area will not only provide greater public access to formerly private ocean and Lagoon front property, but it will provide additional opportunities for recreation, fishing and marine research and restoration.¹³⁵ Specifically, the dedicated area would be used for expansion of the existing fish hatchery and aquatic research uses, a fishing beach, recreation and coastal access, and public parking. To ensure the sites are made available for public use, **Special Condition 11** requires that, prior to starting operations of the desalination facility, Poseidon ensure these parcels are dedicated for public access and recreation as described in the City's Precise Development Plan #PDP 00-02. These public access dedications provide adequate conformity to the Coastal Act's public access provisions. One of the Coastal Act's primary goals is to maximize public access and recreational opportunities along the coast¹³⁶, and the project's public access aspects support that goal.

Based on the above, the Commission finds that the proposed project meets the final test of Section 30260.

Conclusion

The Commission recognizes that the San Diego region is clearly in need of reliable and local water sources. As noted above, the Commission has found that this coastal-dependent industrial facility, as conditioned, conforms to all applicable Coastal Act policies except Section 30233(c). However, the Commission has determined through applying the three tests above that the project conforms to the "override" provisions of Coastal Act 30260 provided for such facilities. The Commission therefore finds that by meeting the requirements of these three tests and with imposition of the **Special Conditions** described previously in these Findings, the project conforms to Coastal Act Section 30260. The Commission may therefore approve the project pursuant to that Coastal Act policy.

¹³⁵ See Poseidon Resources Corporation, *Response to Staff Report*, November 9, 2007, Exh. A at p. 4, 26.

¹³⁶ See, for example, Coastal Act Section 30001.5, which states in relevant part: "The Legislature further finds and declares that the basic goals of the state for the coastal zone are to... (c) Maximize public access to and along the coast and maximize public recreational opportunities in the coastal zone consistent with sound resources conservation principles and constitutionally protected rights of property owners."

5.0 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.

As discussed above, although the project is not an allowable use pursuant to Section 30233(c), it is a coastal-dependent industrial facility and the Commission has therefore approved the project pursuant to the policies of Coastal Act Section 30260, which allows such projects to be approved if the Commission finds there are no feasible less environmentally damaging alternative locations, that all adverse environmental impacts are mitigated to the maximum extent feasible, and that to not approve the project would not be in the public welfare. Pursuant to these Findings and the review conducted in the City of Carlsbad's EIR, the project includes all available and feasible measures to avoid or minimize significant adverse environmental impacts. There are no feasible alternatives or feasible mitigation measures available that would substantially lessen any significant adverse impact that the activity would have on the environment. Therefore, the Commission finds that the proposed project, as conditioned, is consistent with the requirements of CEQA.

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*Final Adopted Findings – Coastal Development Permit Application E-06-013
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Approved August 6, 2008– Page 103 of 106*

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- Verification of All Other Permits or Approvals Applied for by Public Agencies
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- City of Carlsbad Ordinance No. NS-805 - SP 144 (H)
- City of Carlsbad Ordinance No. NS-806 - PDP 00-02
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- 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.
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- 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.
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- Poseidon Resources Corporation. Climate Action Registry CO2 Conversion Calculation, October 18, 2007.
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*Final Adopted Findings – Coastal Development Permit Application E-06-013
Poseidon Resources (Channelside) LLC
Approved August 6, 2008– Page 105 of 106*

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- 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.
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 - 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.

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- Exhibit A: Response to Staff Report
- Exhibit B: Correction of Staff Report Misstatements, Inaccuracies and Omissions
- Exhibit C: Draft Proposed Conditions of Approval
- Exhibit D: Climate Action Plan, November 2007
- Exhibit E: Requested Additions to Substantive File Documents

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