

## **RESPONSE TO STAFF COMMENTS ON HEAT TREATMENT REGARDING THE FLOW ENTRAINMENT AND IMPINGEMENT MINIMIZATION PLAN**

Prepared for:  
Poseidon Resources Corporation

By:  
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M-REP Consulting

**Background of consultant's experience:** I have over 13 years of experience in marine biological consulting. Over the last 10 years I have worked primarily with bio-fouling control, and impingement/entrainment effects for the Encina Power Station, El Segundo Power Station, and several desalination plants located in several countries including Israel, Australia and in the USA. I have worked on the Poseidon desalination projects for Carlsbad and Huntington Beach for 9 years.

**Comment 1:** Within the March 27, 2009 staff report regarding Poseidon's Flow Entrainment and Impingement Minimization Plan, a concern was raised regarding the potential need for higher frequency of heat treatments of the Encina Power Station than what is currently required. This is speculated to be a result of the CDP's additional water demands over the current flow requirement.

**Response 1:** Heat treatments are used to remove fouling organisms from the inside of pipes and condensers and is considered a regular maintenance issue. The frequency at which heat treatment is required is not determined by flow rates; rather, heat treatment is supposed to occur at intakes such as Encina Power Station's at approximately regular intervals every six weeks as a matter of industry standard. This standard has been used at the Encina Power Station regardless if the plant has been operating at full capacity or during times of reduced power demands. Completing heat treatments at this frequency assures that, at any given settlement rate, the growth rate of the juvenile organism will not allow the overall size of the organism to become a problem for proper flow through the cooling system. The every-six-week rule is a guideline, but the actual frequency of heat treatments is usually spread out over longer periods of time. This is because during a heat treatment, the power plant must run at a fairly low rate so that the temperature can be slowly raised and controlled within the cooling system. CAL ISO's approval is required to do a heat treatment. However, CAL ISO has on many occasions cancelled scheduled heat treatments at the last minute at Encina because power demands are too high to permit slowing the system down to do the treatment; that is, if CAL ISO requires a higher power demand than the required demand for a safe and effective heat treatment, the scheduled event is cancelled. During 2008 there were numerous successive cancellations of heat treats as a result of CAL ISO directives.

In conclusion, since heat treatment frequency is a standard maintenance issue at set intervals regardless of flow rates, there are no logical reasons to assume that the

frequency of heat treatments will change as a result of any potential increase in water flow from the CDP over the power plant's projected water demand.

**Comment 2:** In its comments regarding the quantification of impingement impacts, “staff concurs that the elimination of heat treatments would result in a substantial reduction in mortality due to impingement, i.e., approximately 50% reduction.” Staff also states that “additional evaluation of the CDP’s operations will be necessary if/when Poseidon proposes to operate independently. In particular, the proposed alternative to heat treatments, i.e., the use of scrubber balls, will need to be evaluated in terms of potential impacts to marine organisms.”

**Response 2:** Although this comment is generally correct, I would like to clarify that the mortality of fish during heat treatments is a result of the unavoidable trapping of fish living within the power plant's intake system. The heat treatment process blocks off the intake and discharge structure and then re-circulates the discharge water back through the power plant. This re-circulation causes the water temperature to increase to a level that kills off the bio-fouling and also causes fish mortality. The dead fish then become impinged on the traveling screens and removed. When the CDP operates as a stand-alone operation, it will have flexibility to use alternative methods to heat treatment. The vast majority of these potential methods do not require the blocking off of the intake and discharge system, thus eliminating the potential for the fish to become entrapped in the system and killed. The removal of bio-fouling with an open system provides for favorable conditions for fish survival. It is for this reason that impingement should be greatly reduced.

# Curriculum Vitae

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**SYNOPSIS:** I have over 13 years of research and professional experience in environmental monitoring and taxonomic identification of fishes and invertebrates in marine and estuary systems, and over 7 years of part time college teaching experience in the biological sciences. To complement my scientific background, I have a solid experience base in all aspects of business administration including negotiation, administration, management, and fiscal performance of commercial and government contracts.

## **EDUCATION:**

1993-1996 Masters Degree in Biology. California State University, Fullerton.

- Thesis: Spatial and temporal distributions of soft bottom bivalves in Newport Beach, CA.
- Received "Honorable Mention" for the "Outstanding Thesis Award for 1997".

1983-1987 Bachelors Degree in Business Administration. California State University, Fullerton.

## **EXPERIENCE:**

**MAY 1998 to Present** **Owner/Marine Biologist**, Marine Research and Educational Products, Carlsbad, CA.

### **Company Profile**

- Scientific consulting dealing with 316b issues, marine taxonomy, EIR/EIS, Bio-fouling removal, marine toxicity, water quality, habitat enhancement, and marine aquaculture issues.
- Supply of marine organisms and marine extracts for the purpose of natural drug discovery, research, and education.
- Community and educational lectures concentrating on the ecology, preservation, and aquaculture issues of Aqua Hedionda Lagoon, CA.

### **Contract Responsibilities**

Principle investigator representing IDE technology for the investigation of bio-fouling removal and management for Cape Person Desalination Plant, Australia

Principle investigator representing Poseidon Resources for the investigation of marine pytoplankton blooms and its related effect of RO biofilm formation for the Carlsbad Desalination Plant, Carlsbad, CA. USA.

Co-principle investigator and team member for the SCCWRP Bight '08 project. Completing deep water benthic trawls and invertebrate taxonomy.

Principle investigator representing IDE Technology for the investigation of organic small molecule detection in desalination feed water for RO biofilm reduction. Worked performed for the Ashkelon and Hadera desalination plants, Israel.

Principle investigator representing IDE Technology for the investigation of plankton as food source for marine biofilm formation. Worked performed for the Ashkelon and Hadera desalination plants, Israel.

Co-principle investigator representing Cabrillo Power LLC for satisfying EPA requirements on the new **316b** rulings.

Principle investigator representing Albany Molecular Research for the taxonomy of marine invertebrates for natural drug discovery.

Co-principle investigator and team member for the SCCWRP Bight '03 project. Completing deep water benthic trawls and invertebrate taxonomy.

Co-principle investigator representing Cabrillo Power LLC for the surveillance and eradication of the invasive alga *Caulerpa taxifolia*.

Co Principle investigator representing Poseidon Resources for the effects of increase salinity on nearshore marine habitats resulting from the proposed Carlsbad desalination plant. Includes salinity tolerance and **316b studies**.

Co-principle investigator for the Port of Los Angeles reef mitigation program. Work included invertebrate taxonomic identification and habitat comparisons.

Principle investigator representing El Segundo Power LLC for the marine biology component of the Application for Certification to the CEC, and the evaluation of water issues relating to the re-powering of the El Segundo Generating Station . **Includes 316b analysis.**

Principle investigator representing Cabrillo Power LLC for the marine taxonomy and biology component/assessment of the Aqua Hedionda Lagoon Jetty Extension program.

Principle investigator representing Merck & Co. for the investigation of novel compounds for drug screening.

Principle investigator representing University of Texas for toxicity testing for novel herbicides in marine systems.

Principle investigator representing Cabrillo Power LLC for Field survey and comments addressing the proposed designation of Aqua Hedionda Lagoon as critical habitat for the Tidewater goby (*Eucyclogobius newberryi*).

Principle investigator representing Carlsbad Aquafarm, Inc for RWQCB TAC group investigation of point source pollution of fecal coliform in local San Diego Lagoons.

Principle investigator representing Carlsbad Aquafarm, Inc for increased productivity of the aquaculture growing area with the use of polyculture systems.

Research Biologist for the " Reestablishment of the genus *Haliotis* (abalone) into the Point Loma CA. area. Southern California Abalone Association, Cal. Fish and Game.

**Jan. 1991 to Present Instructor and Graduate Teaching Associate, Palomar College (San Marcos), Orange Coast College (Costa Mesa, CA.) and California State University, Fullerton (Fullerton, CA.).**

● Courses Taught: Vertebrate Zoology, Zoology, Upper Division Ecology, Microbiology General Biology for non-majors, and Biology for majors (Molecular biology emphasis).

**April 1997 to June 1998 Research Biologist, Vantuna Research Group, Los Angeles, CA.** Reason for leaving: Layoff

### **General Responsibilities**

- Scientific: Problem solving, data analysis, interpretation, and report writing.
- Marketing: 1) Initiate new contacts with potential clients and 2) prepared and designed marketing brochure, business cards, and logo for the firm.
- Proposal generation: Wrote or co-wrote all proposals.
- Subcontract administration: Prepared RFP's, negotiated, and monitored all subcontracts.
- Management: Managed the field and lab personnel and was responsible for overseeing in-field sampling activities.
- Other: Research diving and operated the SeaBird oceanographic profiler (CTD).

### **VRG Contract Responsibilities**

Co Program manager for the "Evaluation of fish enhancement structures, eelgrass mitigation plan for Nimitz class CVN Naval Air Station North Island, Coronado, San Diego, California". U.S. Navy.

Program manager for the "Receiving Water Monitoring and Reporting Program No. 1603 (NPDES permit No. CA000337) Chevron Products Company, El Segundo Refinery".

Co Program manager for the "Enhanced Receiving Water Monitoring Program Associated with Chevron's El Segundo Ocean Outfall, Chevron Products Company".

Research biologist as part of Chevron's Oil Spill Response Team. Chevron Products Company, El Segundo Refinery.

Co-project manager and field coordinator for Southern California Edison and Los Angeles Department of Water and Power Coastal Generating Stations, NPDES Permit, Task Order LA-1.

Research biologist for the "White Seabass, *Atractoscion nobilis*, Monitoring Project", Contract No. FG4336MR. California Department of Fish and Game.

Research biologist monitoring the ichthyofauna of King Harbor, Redondo Beach, CA and the Palos Verdes Peninsula, CA.

Field researcher monitoring the ichthyoplankton of King Harbor, Redondo Beach, CA

Field researcher assessing the biota of Portuguese Bend, Palos Verdes, California in order to evaluate the value of restoring a kelp bed, U.S. Army Corps of Engineers, Contract #DACA0994D0004.

**July 1996 to Sept. 1996**      **Scientist, MEC Analytical Systems, Chemistry Dept. Carlsbad, CA.** Reason for leaving: Temp. work while finishing my thesis.

- Prepared and wrote protocols for bioassay tests.
- Assisted in the preparation of final reports.
- Assisted in bioassays.
- Assisted in contract and subcontract management.

**July 1988 to May 1990**      **Contract Administrator, Parker Hannifin Aerospace Fuel Products Division, Irvine, CA.** Reason for leaving: Layoff.

- Responsible for the negotiation, administration, management, and fiscal performance of contracts.
- Prepared and priced commercial/government contracts for the sale of services and products.
- Approved work authorizations and coordinated with responsible departments to assure timely action.
- Managed government and customer supplied property.
- Prime interface between customer and Parker.
- Directed the activities of support personnel to expedite contract progress.

**PUBLICATIONS:**

Le Page, S.D. and Seapy, R.R. (In Prep.). Soft bottom bivalve assemblages of Newport Bay, California. Veliger.

Le Page, S.D. 1996. Spatial distribution and temporal fluctuations of bivalve assemblages in Newport Bay, California. Thesis, California State University, Fullerton.

**SKILLS:**

**Research:**

- Preparation of natural product extracts for drug screening.
- Conducting RWQCB/NPDES studies.
- Estuarine and wetland field surveys.
- Designing and conducting baseline studies.
- Designing and conducting population studies.
- Taxonomic identification of marine fishes and invertebrates.
- Sediment analysis (% organic, sand grain, and chemistry).
- Developing statistically robust experimental designs/protocols.
- Univariate and multivariate statistical analysis.
- Working knowledge of ASTM's for toxicological studies.
- Scientific writing
- Open water PADI SCUBA diver (certified in 1978), logged over 1000 hours of research diving in southern California since 1996, which include fish/invertebrate transects and effluent pipe surveys.
- GIS/GPS.
- Factory trained CTD operator (SeaBird Electronics).
- Water and Subsurface sampling.

**REFERENCES:** Available upon request