

January 26, 2009

VIA MESSENGER AND ELECTRONIC MAIL

Dr. Richard Wright
Chairman
San Diego Regional Water Quality Control Board
9174 Sky Park Court, Suite 100
San Diego, CA. 92123-4340

Re: February 11, 2009 San Diego Regional Board Meeting, Item 6 - Poseidon Resources Corporation, Proposed Carlsbad Desalination Project (Order No. R9-2006-0065, NPDES No. CA0109223)

Dear Chairman Wright:

At the request of Poseidon Resources Corporation, I am writing to address Regional Board staff concerns regarding the biological data used to support Poseidon's Impingement and Entrainment Assessment. Enclosed is my expert opinion regarding this matter.

If you have any questions, please feel free to contact me.

Respectfully submitted,

Dr. Scott A. Jenkins, Ph.D.
Principal Engineer
Scripps Institution of Oceanography

Enclosure
Expert Opinion
Curriculum Vitae

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WATER QUALITY
CONTROL BOARD

Staff are correct that the year in which the Impingement & Entrainment data were collected was an above-average year for rainfall in the relevant vicinity. I have examined the relevant characteristics of rainfall-runoff affecting Agua Hedionda Lagoon during the period of the field studies, June 2004-May 2005. I have concluded that the rainfall-runoff did not skew the results as staff were concerned. The rainfall and runoff during the relevant time period were neither intense enough nor persistent enough to significantly alter the predominately salt water environment of Agua Hedionda Lagoon.

DISCUSSION

The Regional Board need not share Regional Board staff's concern (expressed in their April 4, 2008 Technical Report) that the sampling set used for Poseidon's Impingement and Entrainment Assessment is likely to be skewed because the data were collected during a year that was atypical with regards to rainfall. As discussed more fully below, the 2004-2005 rainy season had an insignificant effect on the predominately salt water environment of Agua Hedionda Lagoon. Accordingly, the Regional Board can be confident that the sample set was not skewed by any non-representative hydrology.

1. At most, the heaviest rainfalls of 2004-2005 would lower salinity from 33.52 parts per thousand ("ppt") under dry conditions to 30.50 ppt during peak storm runoff; any such decrease in salinity would last only 2.6 days.

Agua Hedionda Lagoon is a salt water environment populated by salt water tolerant species. The watershed draining to Agua Hedionda Lagoon consists of 18,800 acres upstream from the lagoon, which drains to the lagoon principally via the Agua Hedionda Creek. (See Figure 1). The physical data show that this watershed is too small for runoff from it to significantly alter the predominantly salt water environment of Agua Hedionda Lagoon, even in a relatively wet year such as the period from June 2004 to June 2005 when the sampling for the entrainment study was done.

Tetra Tech (2007) prepared a comprehensive report on the Agua Hedionda Watershed water quality for the City of Vista, and Table 3 of that report provides flow rate data for Agua Hedionda Creek during 2005. Maximum daily flow rates in Agua Hedionda Creek during the 2005 rains was listed in Table 3 as 143.91 cfs, or the equivalent of 285.4 acre ft. Maximum daily rainfall totals in the Agua Hedionda watershed during 2005 were 1.45 in. (as measured by the NOAA/NCDC rain gage #03177 at Carlsbad Airport). Unfortunately the Tetra Tech (2007) provides no flow rate data for 2004, and there was one slightly heavier daily rainfall event on October 27, 2004 totaling 1.58 in. (See Figure 2). Flow rates reported in Tetra Tech (2007) for rainfall events of comparable magnitude in 2006 and 2007 indicate that the October 27, 2004 event could have produced flow rates in Agua Hedionda Creek no larger than 310 acre ft, and probably less since the October rains were the first to end the dry season, and antecedent soil moisture content was undoubtedly low, thereby diminishing runoff.

Now, consider how this maximum 285 acre ft to perhaps 310 acre ft of storm water runoff is diluted in the volume of sea water in the lagoon. On average, the lagoon

exchanges 1,700 acre ft. of seawater with the ocean each day through tidal flushing, and stores an average of 3,450 acre ft. of seawater, (Elwany, 2005; Jenkins and Wasyl, 2006.). Consequently, no more than 9% of the water in the lagoon was fresh water during the heaviest rains of 2004-2005; and, that would depress salinity from 33.52 ppt under dry conditions to no less than 30.75 ppt during peak storm runoff. Because of tidal flushing, this storm water would remain in the lagoon for only 2.6 days, based on the residence time of the lagoon water mass as determined by Elwany, (2005) and Jenkins and Wasyl, (2006) using two independent methods.

2. The physical data indicate that the 2005 rainy season did not alter the predominately salt water environment of Agua Hedionda Lagoon.

The NOAA/NCDC rain gage #03177 at Carlsbad Airport (cf. NWS, 2009) shows that only five other days besides the two peak rainfall events provided rainfall in excess of 1 in during the 2004-2005 entrainment sampling period. (See Figure 2). Consequently, the physical data indicates salinity in Agua Hedionda Lagoon was lowered by no more than three parts per thousand for a couple of days at a time, on no more than seven occasions during 2004-2005 entrainment sampling period. From this, I conclude that rainfall events during 2004-2005 were neither intense enough nor persistent enough to significantly alter the predominantly salt water environment of Agua Hedionda Lagoon.

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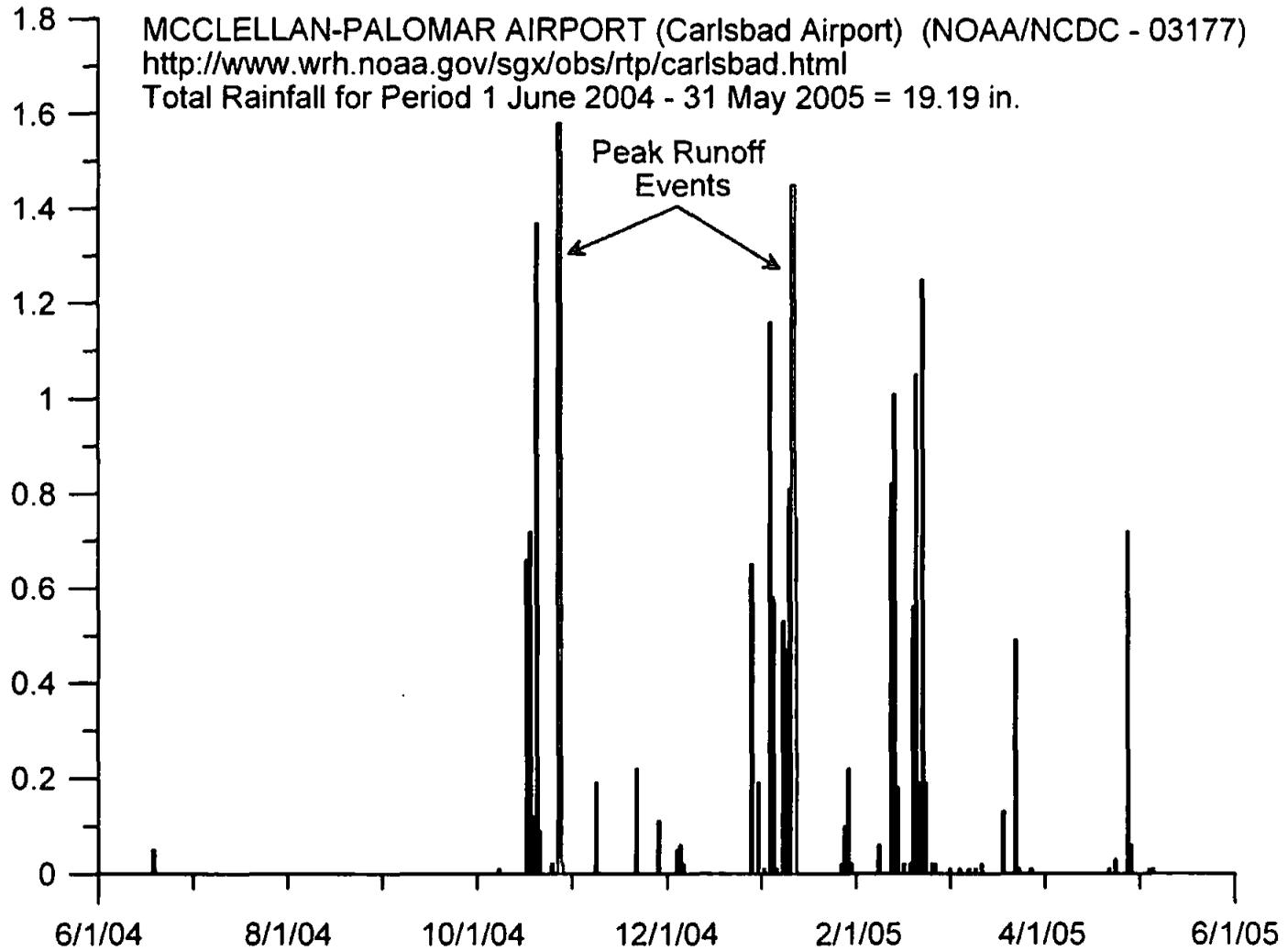


Figure 2. Rainfall: 1 June 2004 - 31 May 2005. NOAA/NCDC rain gauge #03177, Carlsbad Airport, CA.

NOAA/NCDC

SCOTT ALAN JENKINS

Principal Engineer
Scripps Institution of Oceanography
Marine Physical Laboratory, 0701
University of California, San Diego
La Jolla, California 92093-0701
(858) 822-4075

Home/Consulting: 14765 Kalapana St., Poway, CA 92064

Education:

Yale University, B. S., Chemistry, 1972
University of California, Scripps Institution of Oceanography
Ph. D., Physical Oceanography, 1980

Academic Honors:

- * Yale National Scholar, 1972
- * Howard Douglas Moore Prize, Yale University, 1972
- * Andrew Mellon Foundation Fellow, 1981-1983
- * Inventor of the Year, 1985, San Diego Patent Law Association
- * American Council of Consulting Engineers, GRAND AWARD, 1988, Best Special Project for Grays Harbor Jet Array, Co-recipient HNTB
- * 1995 Lincoln Award

Security Clearance

Secret (DISCO-S0830 UPDATE: 18 December 1997)

Patents:

- U. S. Patent No. 4,560,304, "Apparatus for impeding fine sediment deposition in harbors and navigation channels"
- U. S. Patent No. 4,661,013, "Improved apparatus for impeding sediment deposition in marine berths"
- U. S. Patent No. 4,957,392, "Method and apparatus for active prevention of sedimentation in harbors"
- U. S. Patent No. 5,558,460, "Apparatus for enhancing wave height in ocean waves"

Employment History:

Employed at the Scripps Institution of Oceanography since age 16, beginning with summer jobs through high school and college. Since then the following job titles were held at Scripps:

- Laboratory Assistant, 1966-1972, (summers only)
- Research Assistant, 1972-1974

- Sea Grant Fellow, 1974-1976
- Staff Research Associate IV, 1978-1981
- Mellon Research Fellow, 1981-1983
- Assistant Research Oceanographer, 1983-1988
- Lecturer, 1987-1993
- Assistant Research Engineer, 1988-1993
- Senior Development Engineer, 1994-2004
- Principal Engineer 2004 to present

Consulting History:

Provided consulting services in coastal processes, hydrodynamics, aerodynamics and hydraulics of harbors and estuaries. Services include both field measurements and numerical modeling. A partial list of clients includes:

- City of Carpinteria, 1983
- Moffatt & Nichol Engineers, 1983
- U. S. Army Corps of Engineers, 1983
- Port of Grays Harbor, 1983-1990
- Port of Mobile, 1984-1989
- Exxon Production Research Co., 1984-1990
- City of Oceanside, 1983-1984
- Port of San Francisco, 1985-1986
- Port of Benecia, 1987-1989
- Nolte Engineering, 1987-1988
- San Diego Gas and Electric Co., 1987-present
- Sierra Club Legal Defense Fund, 1991-present
- Abam Engineers, Inc., 1992
- Southern California Edison, 1992-present
- MEC Analytical Systems, 1992-present
- Science Applications International Co., 1993-present
- Naval Research and Development Laboratory 1995 - present
- Irvine Company
- NRG Energy, Inc.
- Cabrillo Power Operations, Inc.
- Poseidon Resources, Inc.
- Headlands Reserve, LLC
- Los Angeles Department of Water and Power

Teaching:

(1982 to present), Co-instructor SIO 216A, "Physics of Sediment Transport" with Professor Douglas L. Inman.

(1982 to present), Co-instructor SIO 216B, "Coastal Processes" with Professor Douglas L. Inman.

(1984 to present), Member AOS, Applied Ocean Science curricular group. Graduate advisor to Peter Mull, who graduated with an M. S. degree from Applied

Ocean Sciences curricular group of Scripps Institution of Oceanography in

January 1987.

Graduate advisor and thesis committee Co-Chairman to Saima Aijaz, who graduated with a Ph. D. degree from the AOS curricular group of Scripps Institution of Oceanography on March 16, 1993.

Undergraduate advisor to Kelly Boardman, who graduated with a B. S. degree from UCSD Urban Studies in June 1993.

(1994 to present), solo instructor MARS-20, "Introduction to Physical Oceanography," 3-hr. lecture and 3-hr. lab., Marine Science Department, University of San Diego.

Environmental and Professional Societies:

- National Research Council Committee on Sedimentation Control in Strategic Harbors and Waterways
- Scripps Institution of Oceanography Long Range Planning Committee
- American Geophysical Union
- San Diego Clean Water Program
- Surfrider Foundation, Environmental Director, 1990-1993
- Technical Advisory Committee, San Diego Regional Water Quality Control Board, 1995 to present

Television:

- ESPN, "Surfer Magazine Show," Host of "Surf-Science Segment," 1988-1992
- CBS, "Eye on the Earth," Interview with Dan Rather, 1992
- Discovery, "Hidden Treasures," Host, 1994
- BBC, "Walking on Water," Opening Host, 1994

Books or Chapters Submitted for Publication:

Inman, D. L. & S. A. Jenkins, in preparation, *Coastal Processes: Physics of Transport by Waves, Winds and Currents*, John Wiley and Sons, New York.

Peer Reviewed Publications:

Jenkins, S. A. & D. L. Inman, 1985, "On a submerged sphere in a viscous fluid excited by small-amplitude motions," *Jour. Fluid Mech.*, v. 157, p. 199–24.

Jenkins, S. A. & J. A. Bailard, 1989, "Anti-sedimentation system for harbors," *World Wide Shipping*, v. 52, n. 1, p. 70–75.

Heinz, R. A., J. A. Bailard & **S. A. Jenkins**, 1989, "Water jets fight silt," *Civil Engineering*, v. 59, n. 1, p. 54–58.

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