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Date: 4/3/2009 2:36 PM
Subject: Carlsbad Desalination Project
Attachments: Effectiveness of Wetland Mitigation Final Report 8-13-07.pdf

Chiara, Deborah:

While we are still attempting to respond to recently disclosed documents, we wanted to send you this portion of our upcoming comment letter as early as possible.

-Marco Gonzalez

Impingement

Based on our review of Poseidon's March 27th Flow Plan, the April 1st Staff Report, and expert reviews conducted by Chris Nordby, Dr. Jenkins, Dr. Chang, and Dr. Raimondi, we offer the following comments on Poseidon's proposed compensatory mitigation for CDP impingement impacts when CDP intake requirement exceed EPS flows, or during periods of temporary EPS shutdown.

General Comments

The Staff Report mentions a data discrepancy with regard to flows reported from EPS during the sampling period. (Staff Report , 15 fn. 31). EPS monitoring reports also show flows consistently lower for the data set compared to the Tenera flow data. (Personal communication with staff). Both data sets should be made publicly available, and re-evaluated. If impingement rates are calculated as mass/volume, the data set will be skewed in Poseidon's favor when flow rates are over-estimated.

Poseidon's assertion that .5 feet/second (fps) velocity at inlet screens will reduce impingement to insignificant levels is unsupported. We concur with Staff's determination that most impingement intake and mortality occurs at the bar rack rather than on the rotating screens.

(Staff Report , 8). Further, installation of VFDs on CDP intake pumps to reduce total intake flow for the desalination facility will only reduce intake flow for up to 104 MGD, as 200 MGD (dilution seawater) never flows to the desalination plant. Any reduction of impingement through use of VFDs (which is unvalidated) is therefore only attributable to that portion of flows going directly to the CDP. (Staff Report , 10). As Poseidon does not currently "take credit" for VFDs, or propose to use any design or technology measures to reduce impingement, we offer this position to rebut any future attempts to "take credit" for such measures. Further, because Poseidon fails to quantify the reduction in impingement resulting from any such technological "improvements," characterization as such is unwarranted.

Calculation Impingement Attributable to CDP Operations

Poseidon's individual sampling impingement rates are calculated as follows: average impingement weight, divided by the associated flow volume for the sampling day, multiplied by 304 MGD. These resulting "weights" are then averaged. Two sampling events had higher associated impingement rates. Poseidon argues for their exclusion, while Dr. Raimondi and staff believe they should remain in the data set. We concur with Dr. Raimondi and staff: the two data points with high associated impingement rates should not be considered outliers.

As staff correctly points out, Poseidon's proposed rainfall "flushing" theory is based on several flawed assumptions.

- High impingement rate is not always associated with heavy rainfall. (Staff Report , 14).

- Nor does high impingement rate correlate with any rainfall. (Staff Report , 15).

- The mechanism by which heavy rainfall might cause high impingement is unclear. (Staff Report , 15).

- Poseidon's proposed theory is unsubstantiated. Moreover, the data itself belies the proposed "flushing" theory, as the percentage of freshwater fish impinged is small. (Staff Report , 15).

Staff points out that several lines of evidence are missing and Poseidon has provided no actual data to shed light on the origin of high impingement rates. Moreover, staff's proposed theory as to the origin of the higher impingement rates on the two contested days is more persuasive than Poseidon's theory, and favors keeping the two days within the data set. (Staff Report , 15).Without conclusive proof that the two high impingement days are truly "outliers," the data set must remain undisturbed.

Dr. Raimondi also argues that Poseidon's theory is flawed and based on logical error. (Raimondi, 7). The lack of historical impingement data weighs in favor of being inclusive, rather than considering certain data sets outliers. (Raimondi, 7).

Further, Poseidon's proposed theory, as supported by Jenkins and Chang, is flawed and unsupported by the existing data. Indeed, Dr. Chang's analysis is flawed in and of itself. As Dr. Chang admits, the sampling period (2004-2005) was an abnormally wet period, as total rainfall was 26 inches as opposed to a typical average of 13 inches. However, Dr. Chang's overly narrow focus on the two data points undermines the credibility of his entire analysis. Without providing the rainfall data or statistical analysis of the probability of occurrence for the entire data set, Poseidon cannot credibly argue that the two "suspect" data points are outliers. Moreover, as Dr. Raimondi correctly points out, even if the storm events themselves are outliers (which we cannot know without the entire data set), this does not mean the impingement associated with those rain events is atypical. (Raimondi, 7).

Dr. Jenkins' data is equally unpersuasive. He first concludes that the rainfall data does not alter the validity of the sampling data, because lagoon salinity was not depressed on a persistent basis. (Jenkins, 2). He then concludes the above-average rainfall during the sampling period was "fortuitous" because it spanned the full range of "natural hydrologic variability" and "captured a range of conditions, including some that are not likely to re-occur in most years." It does not follow then, that the two "statistically anomalous" extreme storm event days should be excluded from the data set. (Jenkins, 4). If the entire data set includes a range of "natural hydrologic variability" the entire data set must be used. The fortuitous event of capturing these two high storm events, using Jenkins' logic, favors being inclusive rather than exclusive. Similar to Dr. Chang's analysis, Dr. Jenkins' assertions as to the two contested data points is flawed as well due to his overly narrow focus on those two data points. In failing to compare those two days to the entire sampling period, he also fails to prove why they should be excluded. Thus, Poseidon has not met its burden of conclusively proving the two days should be considered anomalies.

Heat Treatments

The impingement impact calculation also seems to reflect only "normal operations" and not heat treatments. Poseidon's Flow Plan calculations (and Dr. Raimondi's calculations based on approach 3-B) result in a weighted average impingement rate of 4.7 kg/day. This results in an annual impingement of 1715kg (to a 50 percent confidence level). However, as pointed out in the Staff Report, heat treatments will continue during co-located operations. The organisms already in the intake channel are killed when the intake channel is closed off, and the heated discharge water is circulated for hours. (Staff Report, 12 fn.

23). These organisms end up impinged when the pumps return to normal operation. Poseidon and Raimondi's calculations do not take into account the proportion of organisms killed during heat treatments attributable to Poseidon's flows. If EPS intake pumps are operating for the benefit of CDP, a larger number of organisms will be present in the intake channel than would occur if CDP were not operating. Thus, a larger number of organisms will be impinged at the time of heat treatments. The proportion of impingement due to CDP operations as opposed to EPS operations can be calculated real-time by determining the percentage of flow attributable to CDP operations, and multiplied by the total impingement due to heat treatments.

Poseidon's Proposed Impingement Mitigation Measures

Based on Dr. Raimondi's review of Chris Nordby's analysis, Poseidon's proposed mitigation for impingement is wholly inadequate. We agree with Dr. Raimondi's assessment that the approach used by Poseidon (and Nordby) is flawed for the following reasons:

- Entrainment compensation cannot also be used for impingement compensation. (Raimondi, 1-2)

- Nordby's approach relies on a 27-year old study by Larrry Allen that is inapplicable here.

- Nordby's estimation of fish production is based on mudflat wetlands, which only comprise 40 percent of Poseidon's proposed entrainment mitigation (as adopted by the CCC).

- The estimation of fish production also assumes no current production - which is only true if wetlands are created, not restored.

- Nordby's calculations are based on a 50 percent confidence level - inappropriate for mitigation calculations.

o A typical and more appropriate confidence level is 95 percent. (Raimondi, 3)

- Nordby's calculations rely on fish production calculations (productivity of newly created wetlands) based on species that are entrained - resulting in double-counting.

- The calculations incorrectly assume entrainment calculations equate to actual impact of entrainment.

- Entrained species are also impinged - thus the impacts are additive, and cannot be mitigated through creation of wetlands that mitigate for entrainment

Environmental Groups' Proposed Impingement Compensatory Mitigation - Assuming Compensatory Mitigation is Appropriate

In light of recent studies reflecting the poor performance of compensatory wetlands creation, a very conservative approach should be taken in assigning productivity to wetland mitigation. (An Evaluation of Compensatory Mitigation Projects Permitted Under Clean Water Act Section 401 by the California State Water Resources Control Board, 1991-2002, (2007) Ambrose, et al). Two findings of the cited report are particularly relevant here:

- Given the low ecological condition of most mitigation wetlands, it seems likely that many mitigation projects did not replace the functions lost when wetlands were impacted.

- A lack of explicit consideration of the full suite of functions, values, and services that will be lost through proposed impacts and might be gained through proposed mitigation sites and activities is at least partly due to regulatory agencies approving mitigation projects with conditions or criteria that are too heavily focused on the vegetation component of wetland function, with inadequate emphasis on hydrological and biogeochemical conditions and their associated functions and services.

The basic premise for compensatory mitigation is that the newly created or restored wetlands actually compensate for the loss associated with the project. Thus, the mitigation required for CDP impingement must take into account the validity of the impact calculations and the validity of mitigation calculations. Put another way, we cannot be certain that the impingement calculations truly reflect actual impingement impacts. They serve as a proxy for actual impingement assessment. Thus, the highest level of statistical certainty must be applied to impingement impact calculations. This equates to a 95 percent confidence interval in Raimondi's study. (Raimondi, 4)

Second, the mitigation wetland productivity calculations should be conservative, as underscored by the lack of success in actual wetland mitigation. Thus, because wetland productivity assumptions are based on completely newly created wetlands, Poseidon must be required to actually create wetlands, as opposed to restoring them. Another assumption associated with wetland productivity relates to the type of wetland created. Poseidon's MLMP presents a mix of wetlands, comprised of 40 percent intertidal mudflats or subtidal. Dr. Raimondi's calculations associated with this mix should be used to provide a wetland mitigation acreage. (Raimondi, 6)

The mitigation assessment study cited above also found "[t]he success of compensatory mitigation depends fundamentally on the mitigation requirements specified by the regulatory agencies." (Id. at v.) Thus, certain requirements regarding the success of compensatory mitigation must be imposed. Staff correctly points out that the success of MLMP entrainment mitigation is assessed through a 95 percent confidence interval of correlation in physical and biological criteria compared to

(yet-unspecified) reference stations, for a period of three consecutive years. (Staff Report, 19). This iterative assessment may result in a period of time where the restored wetlands are not meeting these criteria. For those years when the criteria are not met, the goal of compensatory mitigation-namely offsetting CDP impacts through productivity at the restored wetlands-is not being met. Thus, the whole basis for calculating the wetland mitigation is undermined. In order to account for this, a penalty for not meeting the performance criteria within a specified timeframe must be included in the permit. For example, if within 5 years of wetland restoration the 3-year benchmark is not attained, an additional 5 years of unmitigated impingement impacts must be taken into account. This would result in a total increased wetland restoration acreage. As the benchmark performance standards continue to be unmet, the penalty increases.

To summarize, at a minimum, the impingement compensatory mitigation should meet the following criteria[i]:

1) Impingement impacts should be calculated to a 95 percent confidence interval, as extrapolated by Dr. Raimondi from a 4.7kg/day (50 percent confidence interval) impact assessment.

2) Impingement impacts should be calculated at a rate of 304 MGD attributable to CDP impacts, or calculated real-time.

3) Impingement compensatory wetland productivity calculations must take into account the type of wetland created. If Poseidon's proposed mixture in the MLMP is applied to impingement mitigation, Dr. Raimondi's calculations should be used at a 95 percent confidence interval.

4) Wetlands must be created, not restored.

5) Penalties should be assessed when performance criteria are not met for a given period of time.

Using the above criteria, the required compensatory mitigation for impingement only, assuming 100 percent of CDP intake is attributable to CDP operations, a total of 54 additional acres of newly created wetlands (40 percent intertidal or subtidal) is required.

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[i] Dr. Raimondi was retained as an expert to evaluate the reasonableness of impingement projections. His expert opinion shows the error in major assumptions made by Poseidon's experts. As Dr. Raimondi is a neutral party, and a highly regarded expert, his evaluation should be the basis of calculating mitigation for impingement from CDP operations.