IntakeWorks

Memorandum

To: Jeanine Townsend, Clerk to the Board
State Water Resources Control Board
1001 I Street, 24th Floor
Sacramento, CA 95814

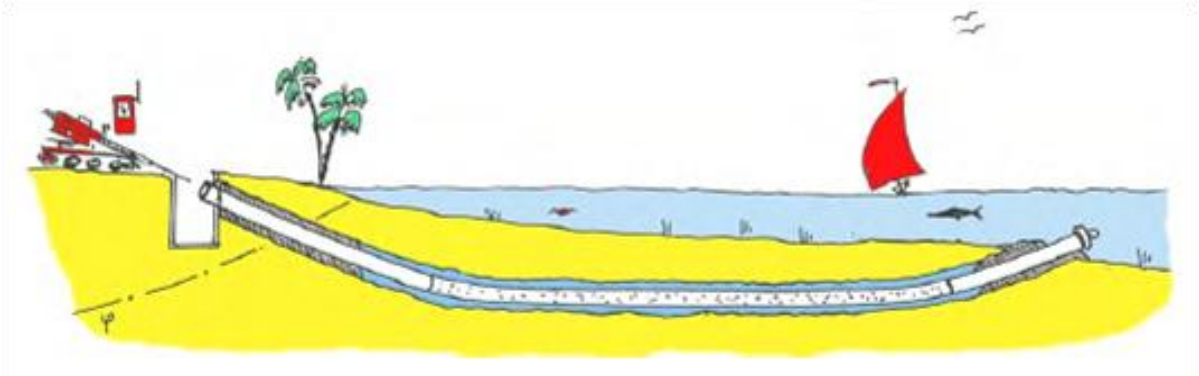
From: Anthony T. Jones, Ph.D.

Date: August 18, 2014

Re: Public Comment, Desalination Amendment to the Ocean Plan

Intake Works is a group of oceanographers, geologists, and experts in HDD and marine contractors. We appreciate the opportunity to address the board and appreciate the efforts of the Water Board staff has done in presenting the Draft Substitute Environmental Documentation. By way of reference, I attended the stakeholders meeting at Moss Landing Marine Laboratory in January 2013.

My current interest is in introducing to California a proven Horizontal Directional Drilled (HDD) under the sea intake system for seawater desalination. By proven, I mean inserted into the seabed and operating successfully on the front end of a seawater reverse osmosis desalination system.



The system, called Neodren® provides extremely low turbid water as source water. Non-corrosive HDPE pipes with microporous sections (60 μm or 120 μm pores) are inserted 10 feet to 20 feet below the seafloor. The HDD laterals yield 1 to 2 MGD per lateral of source water without fish larvae, red tide algal and have no contribution or exacerbation of the seawater intruding into on the inland aquifer.

Along the Mediterranean Sea, the Neodren® subsurface intake system first started operating in 1996 at a fish farm. In 2003, a large 45 MGD system was installed at San Pedro del Pinatar, Spain.

There are five plants with Neodren® systems, 87 MGD of capacity. The second largest is 21.9 MGD operating since 2008. The remainder are under 10 MGD and include a system used in southern Spain for irrigation. The seawater desalination plants are:

Desalination Plant in San Pedro del Pinatar
Desalination Plant in Águilas
Desalination Plant in Alicante
Desalination Plant in Tordera
Desalination Plant in Cabo Cope (Community Irrigation La Marina)

There are more HDD intake systems operating than slant wells, Rainey wells or Fukuoka-type infiltration galleries. Solutions developed in advanced European countries to counter the effect of impingement and entrainment have not been recognized.

I would be happy if the Board decides to make a preference toward subsea intakes. However, this restricts the proponents and their designers from deciding the best course of action for the specific site in question.

Staff did not include a specific slot size for intakes. Is it in the Water Board's interest to define a standard slot gap? Over-regulation at this early stage in the development of desalination project can also lead to problems and unintended consequences.

The determination of the slot size and approach to the problem should be determined by the proponent of the desalination system and their design consultants.

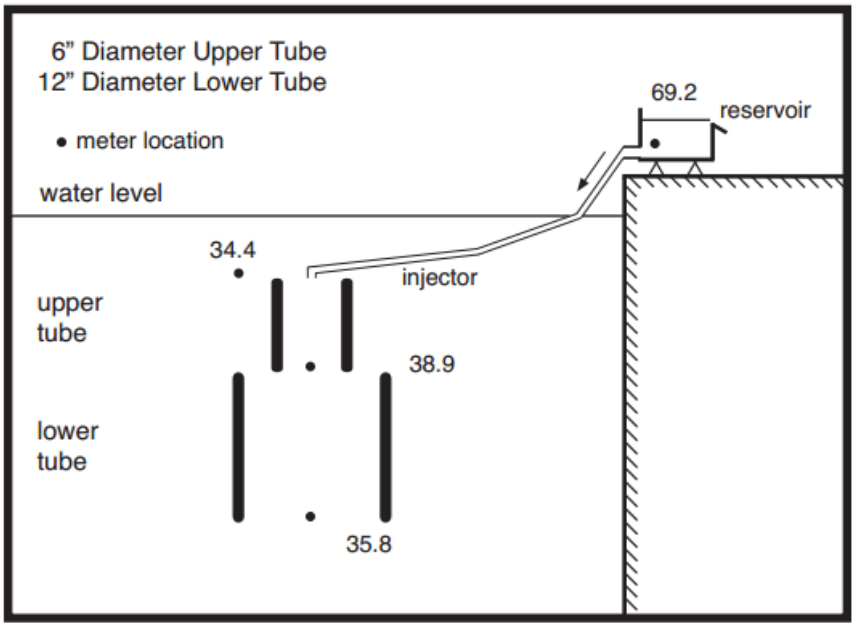
Vastly different coastal geology is observed in the State of California north of Point Conception versus the shorelines in Southern California. I personally do not have a problem with regional decisions on direct intake designs.

Concerning the Brine Discharge draft amendments, I concur with Staff Recommendation that Desal Proponents should evaluate dispersal methods relative to site–specific characteristic. And we would be in favor of defusing brine via flow augmentation, only if augmented waters are drawn thru subsurface intakes to eliminate impingement and entrainment mortality.

I would caution the board that the conclusion on the multi-diffuser port are from mathematical models. My understanding of the model is that the model do not take into account double diffusivity (Diffusion of the water and Diffusion of the salt).

I concur with Staff Recommendation on salinity management of 2 ppt at the edge of the zone of initial dilution of 100 m radius from discharge point. Giving the Desalination Proponent a means to define facility-specific salinities limits for receiving waters is reasonable given our state of knowledge.

One final thought, the process of separating the potable water (0.5 ppt) from seawater (33.5 ppt) involves work. The molecules are more organized than when they entered the system. The release of the concentrated reject (67 ppt) back into the environment is a source of energy that could be tapped. Experiments we have performed looked at discharging brine into seawater are presented below. Due to the miscibility of the two solutions, attaining an outcome of 2 ppt is quite easily done.



Salinity of the Effluent approximately 4% above the Ambient.