COMMENT ON SWRCB STAFF REPORT IN SUPPORT OF PROPOSED AMENDMENT TO THE WATER QUALITY CONTROL PLAN FOR OCEAN WATERS OF CALIFORNIA (Ocean Plan).

William Bourcier Ph.D.
8586 Tesla Road
Livermore CA 94550
wbourcier@gmail.com
bourcier1@llnl.gov

The analysis of the potential adverse environmental effect of greenhouse gases (GHG) emissions at section 12.1.7 fails to identify the effect of release of GHG from subsurface feed waters. Likewise, the alternatives analysis at section 12.4.4 fails to recognize the difference in GHG emissions between desalination facilities using subsurface intakes versus desalination facilities using open ocean intakes.

The amount of carbon dioxide contained in subsurface waters is much higher than surface water. When subsurface water is exposed to the atmosphere, the elevated level of carbon dioxide and, depending on the location of the subsurface waters methane gas, is discharged into the atmosphere. This is true in general for all pumped subsurface waters. The release of carbon dioxide and methane is therefore of concern in the siting of sea water intakes given the very large volumes of water being considered.

Macpherson (Chemical Geology, 2009; 264:328-336) estimates that globally this CO2 flux from pumping subsurface waters is about equal to the sum of all volcanic CO2 release. Macpherson did not consider release from desalination plants in his assessment. However, one can estimate the flux of carbon dioxide into the atmosphere from desalination of sea water obtained from the subsurface. If we assume a typical carbon dioxide partial pressure of 0.1 bars in the subsurface, we can calculate that upon equilibration of the fluid with the atmosphere, one cubic meter of fluid will release about 1.5 kilograms of CO2. For a 50 MGD sea water desalination plant this corresponds to about 200,000 tonnes per year of released CO2 – CO2 that is basically pumped from the subsurface into the atmosphere as a result of the operation of the desalination facility. In addition, subsurface fluids often contain significant methane concentrations which would also be released into the atmosphere.

In contrast, sea water is generally near saturation with carbon dioxide so there is no significant carbon dioxide release would occur from a desalination facility using an open ocean intake

The SWRCB should consider the potential adverse environmental effect of GHG emissions from the operation of desalination facilities utilizing subsurface feed waters. The SWRCB should also compare the relative amount of potential GHG emissions from desalination facilities using surface water intakes versus desalination facilities using open ocean intakes.

commentletters@waterboards.ca.gov

http://www.waterboards.ca.gov/water_issues/programs/ocean/desalination/