ATTACHMENT 3

STATE OF CALIFORNIA
REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL COAST REGION

DRAFT STAFF REPORT FOR REGULAR MEETING OF OCTOBER 16-17, 2008
Prepared on September 25, 2008

ITEM NUMBER: **10**

SUBJECT: **Adoption of Waste Discharge Requirements (WDRs) Order No. R3-2008-0017, Sand City, Monterey County**

KEY INFORMATION:

Plant Location:	Sand City, Monterey County
Discharge Type:	Desalination plant waste brine
Design Discharge Flowrate:	0.74 million gallons per day (mgd)
Treatment:	Filtration
Disposal:	Pipeline in beach sands
Reclamation:	None
Existing Orders:	None
This action:	**Adopt WDRs Order No. R3-2008-0017**

SUMMARY

Staff recommends the Water Board adopt Waste Discharge Requirements Order No. R3-2008-0017, which would regulate the discharge of desalination plant waste brine to a perforated pipeline emplaced within beach sands seaward of Sand City (the Discharger). The Discharger designed the plant to generate waste brine of salinity equal to or less than ocean salinity and to substantially reduce energy use. Most of the potable water produced by the plant will be added to the local water supply, which is currently limited. These features ensure that, while the Discharger provides potable water to the community with minimum energy use, the waste discharge does not impair the Pacific Ocean's beneficial uses.

BACKGROUND

Pumping of groundwater to serve agricultural and urban land uses has caused seawater to intrude into freshwater aquifers adjacent to Monterey Bay and has overdrafted groundwater supplies. Moreover, the pumping reduces groundwater contributions to surface waters and thereby to riparian habitat and other resources within the public trust.

In July 1995, in response to complaints, the State Water Resources Control Board adopted Order No. 95-10, which required the supplier of potable water to the Monterey Peninsula (California American Water Company or Cal-Am) to reduce pumping from the Carmel River. Cal-Am must obtain potable water from other sources, including desalination of waters rendered nonpotable by elevated salt concentrations. Other interested parties may also provide potable water from sources including desalination.

DISCUSSION

The Discharger's desal plant is designed to produce 300 acre feet per year (AFY) of potable water; Sand City will use 94 AFY and provide 206 AFY to address the regional water shortage. The feed water source for the desal plant will be brackish water pumped from wells in the shallow aquifer adjacent to Monterey Bay (see WDRs Attachment A). No impingement onto

intake screens or entrainment into the intake water of aquatic life will occur because the intake is buried in the beach sands. The feed water flowrate will range from 468 gallons per minute (gpm) to 700 gpm, depending on the aquifer's salinity, and the waste brine discharge flowrate will range from 282 gpm to 514 gpm.

Through dilution, the Discharger will keep the discharge's salinity at less than 34,800 milligrams per liter (mg/L) at all times, which approximately equals the salinity (35,000 mg/L) of the ambient ocean waters. The discharge will not possess sufficient excess salinity to impair the ocean's marine habitat or aquatic life. In addition, the plant's intake water filtration system will remove pathogens and other matter; therefore, the discharge will be cleaner than the intake water with respect to all filterable pollutants. From time to time, the Discharger will add small quantities of anti-scalant and/or anti-corrosion compounds to the flow through the desal plant.

The desal plant will discharge the waste brine into a horizontal perforated pipeline emplaced in the beach sands seaward of the community. This feature will provide additional protection of the ocean's water quality because the discharge will migrate slowly through the beach sands before entering the turbulent surf zone. This process will greatly increase the dilution of the discharge by ambient ocean waters.

The desal plant will employ reverse osmosis (RO) technology to produce potable water from brackish groundwater. Reverse osmosis is the opposite process of osmosis, a naturally occurring process. If saltwater is separated from fresh water by a semi-permeable membrane, freshwater flows through the membrane to the saltwater side, thereby reducing its salinity while increasing the salinity of the fresher water: this is osmosis and is driven by osmotic pressure. If pressure is applied to the saltwater side of the membrane, the flow ceases when the pressure reaches and counters the osmotic pressure. When the pressure is further increased, reverse osmosis occurs and freshwater flows from the saltwater side to the freshwater side.

Substantial energy is required to create the pressure needed to cause reverse osmosis. Brine from the saltwater side is disposed of as waste. The desal plant will employ a pressure recovery system to transfer the highly pressurized waste brine's pressure before disposal to the intake feed water. The process's efficiency exceeds 90 percent and substantially reduces the use of electrical power. The recovery process both reduces energy demand and contributes to the long-term sustainability of the desal plant.

Since it is unlikely the discharge will adversely affect ocean water quality, proposed Order R3-2008-0017 merely limits the discharge's flowrate to 0.74 mgd, the maximum possible flowrate, and limits its salinity to 35,000 mg/L, the proposed maximum salinity. Proposed Monitoring and Reporting Program No. R3-2008-0017 requires continual flow monitoring, monthly dissolved solids monitoring, and quarterly reporting.

CONCLUSION

The desal plant discharges waste brine at salt concentrations approximating seawater, which eliminates its adverse effects on the receiving waters.

COMMENTS

The Discharger clarified two features of the proposed project as follows:

1. The desal plant does not desalinate seawater; instead the plant desalinates brackish water.