

*Brine Disposal in Santa  
Cruz SWRO proposed  
project*

Science Advisory Panel

Dec. 8, 2011

# The Project

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- 2.5 mgd SWRO plant, expandable to 4.5 mgd in the future
- Production flows would range from .5 mgd to 2.5 mgd in the near future
- Municipally-owned with neighboring public water agency
- Project purpose for the City – drought protection and fisheries
- Project purpose for neighboring district – replace some of its current groundwater pumping to restore groundwater levels in its coastal groundwater basin

# Key design features

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- Intake:
  - Radial collector system, or;
  - Screened intake on ocean floor, or;
  - Slant wells
- Reverse Osmosis SW desalination
- Brine disposal via the City's Water Pollution Control Facility under the City's current NPDES permit after blending with the wastewater discharge

## Brine Disposal

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- City contracted with Brown and Caldwell, who designed the City's current ocean outfall, to model the intended project

## Key objectives of the study

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- How would such combined discharge still achieve minimum initial dilution ratio (seawater to effluent) (MIDR) of 139:1 as required by the City's National Pollution Discharge Elimination System (NPDES) permit
- How the brine discharge would need to be modulated to achieve continual permit compliance.
- With flows ranging from 3-100 mgd, would the installation of Red Valves over existing ports assist in spreading flow along the diffuser more uniformly and enhance jet mixing at lower flows
- Identify any other issues of concern regarding brine addition

# Conclusions of the Brine Study

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- On site storage for the brine concentrate was necessary to maintain a MIDR of 139:1 given the variable flows at the desal plant across a day and between seasonal flow variations
- A brine flow can be achieved across all seasons and flow regimes that meet a MIDR of 139:1
- The addition of brine to the effluent diluted concentrations of trace metal in the effluent and the concentrations of most trace metal (copper, zinc) in the combined effluent remained below trace metal effluent limits in the NPDES permit.

## Recommendations of the Study

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- When the City has determined an actual brine recovery from RO, it should update the brine dilution analysis based on actual brine recovery.
- The design of the on-site brine concentrate storage should include a safety factor of 20% in brine storage sizing