Monterey Peninsula Water Supply Project (MPWSP) Test Slant Well

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Overview

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In 2009 the State Water Resources Control Board (SWRCB) issued WR2009-060, which stated that California American Water (Cal-Am):

- Stop diverting Carmel River water by December 31, 2016.
- Loss of ~7,000 AFY of potable water.

Desalination determined to be most viable source, therefore, Cal-Am began development of the MPWSP.

MPWSP calls for a subsurface intake and desalination plant to produce new potable water source to serve the Monterey Peninsula.
The proposed MPWSP will produce 6.4 to 9.6 million gallons per day (mgd) of potable water which would be available for:

- Direct use; and
- Aquifer Storage and Recovery (ASR).

The MPWSP is being evaluated by the California Public Utilities Commission (CPUC) in a separate EIR.
MPWSP Overview

- Desalination Plant: 6.4 to 9.6 mgd
  - Size dependent on implementation of MRWPCA’s GWR project
- Subsurface Slant Well Intake System - 13 to 25 mgd (10 wells)
- ASR System in Seaside GW Basin
- Brine Discharge via MRWPCA existing outfall
- Return Flow to CSIP
MPWSP Water Sources

DESALINATION

6,252 AF

GWR
ground water replenishment

3,500 AF

MPWSP Water Supply

1,300 AF

ASR
aquifer storage and recovery
MPWSP Key Benefits

- Restores Carmel River flows
- Recharges the Seaside Groundwater Basin
- Minimizes marine biology impacts through the use of subsurface intakes
- Includes green energy sources
Open Ocean Intake Pilot Plant Facility in 2007
Co-Located at the Moss Landing Power Plant
CA Ocean Plan Amendment


- Subsurface intakes have become the preferred method of seawater intake by coastal regulators, who are opposed to a screened open ocean intake.

- After substantial stakeholder and regulatory outreach, technical studies, and extensive research, the Test Slant Well project was developed at the CEMEX Site.
Test Slant Well - Purpose

- Evaluate feasibility of slant rather than vertical wells in order to reduce impacts to inland groundwater.

- Subsurface intakes require substantial research in order to establish a location with suitable hydrogeology and acceptable water quality that will not impact inland groundwater supplies.

- Collect groundwater and water quality data to evaluate feasibility of a subsurface intake well system on the CEMEX Site to supply 24 mgd for a 9.6 mgd desalination plant.

- Provide specs for final design of the intake well system.
Test Well – Location

Legend

- Anticipated Construction Footprint
- Site Boundary

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Other Well Sites Considered...
Test Slant Well – Description

- **Drill Length:** 720 ft
- **Drill Angle:** 19 degrees below the horizontal
- **Well Tip:** ~200 feet below the ocean floor
- **Well Diameter:** 18-in casing and well screen (top 345 ft)
- **Well Diameter:** 14-in casing and well screen (bottom 375 ft)
- **Pump Column:** 10-in well pump column w/ discharge head
- **Pump:** 100 hp Indar submersible well pump
- **Material:** 2507 Super Duplex Stainless Steel
Test Slant Well – Schematic

-230’ sea level

300 ft  14 in. screen

720 Total Length

170 ft  18 in. screen

* All measurements shown as approximate for presentation purposes only
Test Slant Well – Permitting

1. **City of Marina**: Grading and Electrical Permit
2. **CA Coastal Commission**: CEQA Lead Agency, Coastal Dev. Permit
3. **Monterey Bay National Marine Sanctuary**: NEPA Lead Agency
4. **Central Coast RWQCB**: Discharge and CWA Section 401 Permit
5. **Monterey County Dept. of Environmental Health**: Well Permits
6. **Monterey Regional Water Pollution Control Agency**: Use of Outfall
7. **U.S. Fish and Wildlife Service (USFWS)**: Section 7 Consultation
8. **CA State Lands Commission**: State Lands Lease
Mitigation – Coastal Erosion

Movement of well insertion point east avoids long-term and storm coastal erosion. Further avoids potential impacts to Snowy plover nesting areas.
Mitigation - Biological

Although the project area has experienced prolonged and substantial disturbance due to sand mining operations, several mitigation measures were implemented to reduce impacts to the biological resources, which include:

- Preconstruction surveys, mapping, staking, noting habitat to be avoided (Snowy plover, Spineflower, Coast buckwheat).
- Biological Monitoring by Zander Associates and Point Blue.
- Construction window limited to OCT - Mar to avoid Snowy plover nesting activities.
- Upon completion, project site returned to pre-project conditions.
Mitigation - Biological

Primary Habitat Areas: "Habitat for all identified plant and animal species which are rare, endangered, threatened, or are necessary for survival of an endangered species"

Secondary Habitat Areas: "Areas adjacent to primary habitat areas within which development must be sited and designed to prevent impacts which would significantly degrade the primary habitat" and includes
Mitigation - Biological
Mitigation - Biological

“Spine Flower Island”
Mitigation - Biological

Sound Walls
Design Considerations

- Re-align slant well to not interfere with “Spine Flower Island”

- Modify well screen design to improve filter pack installation
Design Considerations

- Due to time constraints, we had to complete the mechanical piping above ground rather than a vault as designed.
Test Well – Construction Schedule

- **Nov 2014 to Dec 2014:**
  - Install disposal pipeline, valve vault, and connection to ocean outfall
  - Begin drilling, installing and developing Monitoring Wells

- **Dec 2014 to Mar 2015:**
  - Mobilize, Drill, Install, and Develop Test Slant Well

- **Mar 2015**
  - Well Start-up / Testing (Step Drawdown, 5-Day Constant Rate)

- **Mar 2015 to Mar 2016**
  - One Year Test Slant Well Sampling and Monitoring
  - Test Slant Well Sampling and Monitoring may continue longer than one year, which would be determined at the end of the first year.
Site Preparation for Drill Rig
Well Drilling / Installation

Typical Equipment Required at Drilling Site
Well Drilling / Installation

DR-40 Slant Drill Rig
Well Drilling / Installation

Well Casing
Well Pump
Test Slant Well Installation

Completed Test Slant Well
Electrical Infrastructure
Well Development
Discharge Vault
Discharge Pipeline
Discharge Pipeline
Connection to Outfall
Connection to Outfall
Operations

- **Long Term Pumping Begins:** April 2015
- **Duration:** 1-2 years
- **Flow Rate:** ~ 2,000 gpm
- **Issues:** Pump turned off in June 2015 due to water levels in MW-4 lower than permitted.
  - Regional agriculture pumping was cause, not test well.
  - Resumed pumping in late Oct 2015.
- **Reporting:** Weekly Long Term Pumping Test Report
Sampling

Sampling Panel Measures:
- Conductivity, Turbidity, pH, Dissolved Oxygen, and Temperature
Monitoring
Monitoring
Full-Scale Intake System

**Description:**
- 10 slant wells (including test well)
- Provide 24.1 mgd to desalination plant
- 300 hp each (2,500 gpm @ 310’ TDH)

**Improvements:**
- Design of slant wells
- Drilling method (Boart Longyear)
- Filter pack installation method

**Changes:**
- Well heads to be completed above ground
- Mechanical piping to be located in underground vault
- Electrical cabinets at each well site will be located in an above ground fiberglass enclosure
Full-Scale Intake System