NIPOMO COMMUNITY SERVICES DISTRICT

THURSDAY, AUGUST 9, 2007

1:00 P. M.

SPECIAL MEETING NOTICE & AGENDA

SUPPLEMENTAL WATER PROJECT DESIGN & CONSTRUCTION COMMITTEE

COMMITTEE MEMBERS
CLIFFORD TROTTER, **CHAIR**
ED EBY, **MEMBER**

PRINCIPAL STAFF
BRUCE BUEL, **GENERAL MANAGER**
LISA BOGNUDA, **ASSIST. ADMINISTRATOR**
DONNA JOHNSON, **BOARD SECRETARY**
JON SEITZ, **GENERAL COUNSEL**

MEETING LOCATION
District Board Room
148 S. Wilson Street
Nipomo, California

1. **CALL TO ORDER, ROLL CALL AND FLAG SALUTE**

   ACTION RECOMMENDED: None

2. **RECEIVE PROGRESS REPORT ON SUPPLEMENT WATER PROJECT**

   ACTION RECOMMENDED: Receive Report and Ask Questions

3. **DISCUSS DANA POINT DESALINATION PROJECT**

   ACTION RECOMMENDED: Develop Recommendations for Board

4. **SET NEXT COMMITTEE MEETING**

   ACTION RECOMMENDED: Set Time/Date for Next Committee Meeting

5. **ADJOURN**

**** End Special Meeting Notice ****

TO: COMMITTEE MEMBERS

FROM: BRUCE BUEL

DATE: AUGUST 1, 2007

AGENDA ITEM 2

AUGUST 8, 2007

SWP PROGRESS REPORT

ITEM

Receive progress report on supplemental water project [RECEIVE REPORT AND ASK QUESTIONS].

BACKGROUND

Mike Nunley from Boyle Engineering is scheduled to provide an update on the project.

RECOMMENDATION

Staff recommends that the Committee receive Boyle's presentation and ask questions as appropriate.

ATTACHMENT

- None

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TO: COMMITTEE MEMBERS

FROM: BRUCE BUEL

DATE: AUGUST 1, 2007

AGENDA ITEM 3

AUGUST 8, 2007

DANA POINT DESALINATION PROJECT

ITEM

Discuss Dana Point desalination project [FORWARD RECOMMENDATIONS TO BOARD].

BACKGROUND

Representatives from Boyle Engineering are scheduled to describe the Dana Point Desalination Project in South Orange County and answer questions regarding the project and the technology. It should be noted that the Dana Point project has made substantial progress in determining the feasibility of slant drilling as an intake source for the feed water. Attached is a 2006 summary of the project, which concludes that "high yield wells can be constructed out under the ocean with minimal environmental impact".

RECOMMENDATION

Staff recommends that the Committee receive Boyle's presentation and ask questions as appropriate.

ATTACHMENT

- Dana Point Ocean Desalination Project Test Slant Well Project

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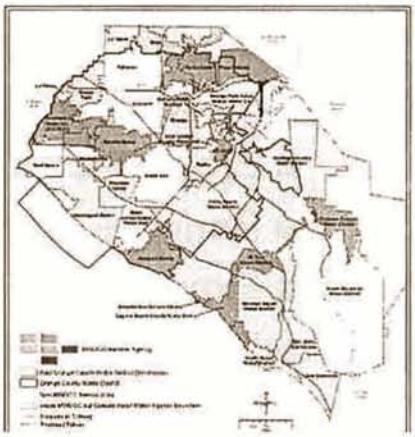
Dana Point
Ocean Desalination Project
Test Slant Well Project

CA/NV American Water Works Association
2006 Fall Conference
Long Beach, CA
October 4, 2006

Municipal Water District of Orange County

- Wholesale water supplier and regional planner to 29 cities & retail water agencies
- Governed by seven-member elected board of directors
- Member agency of Metropolitan Water District
- Service area: 600 sq miles
- Water demand: 522,000 AF
- Imported supply: 245,000 AF
- Local supplies: 277,000 AF
- Population: 2.3 million
- Annual budget: $150 million



South OC Water Reliability
The Problem

- 95% of supply from a single WTP
- WTP is adjacent to three large faults and is vulnerable to a major earthquake
- Economic impact of supply disruption is very large based on a study by the OC Business Council
- Recovery times estimated up to 30 days or longer to restore treated water service

South OC Water Reliability
The Solution

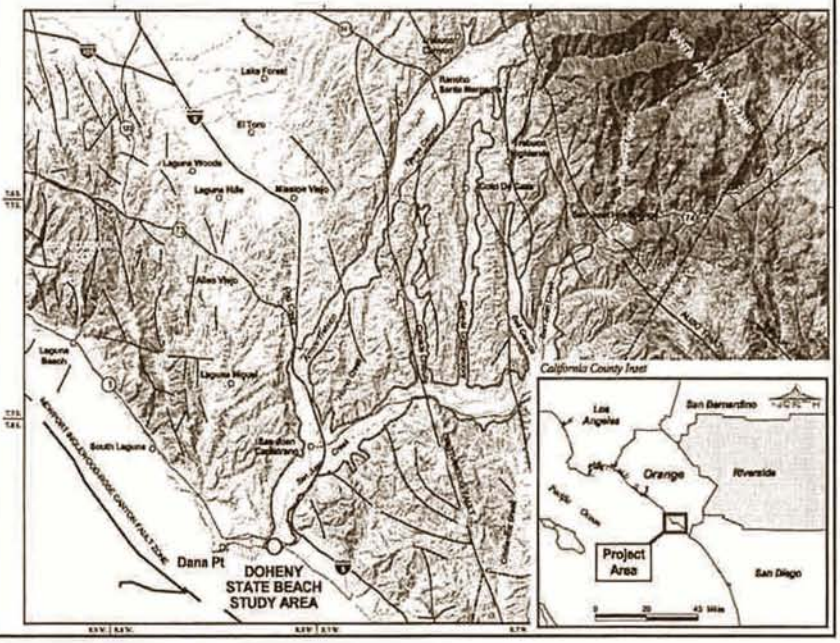
Agencies are implementing or evaluating the following projects:

- Lined/Covered Reservoir(s)
- Emergency Interconnections
- Regional Water Treatment Plant
- Expanded Recycling
- Expanded Groundwater Recovery
- Dana Point Ocean Desalination Project

Dana Point
Ocean Desalination Project

- Status: Feasibility Investigation
- Multiple Purpose Project
  - New Regional Supply
  - Improve Local System Reliability
- Location: Lower San Juan Creek
- Capacity: 25 mgd (Ultimate)
- Feedwater: Slant Well Intake System

San Juan Creek Alluvial Basin



Subsurface Intake System Advantages

- Slow sand filtration – pretreatment benefit
- Potential lower life-cycle cost
- Environmentally preferred approach
  - No entrainment/impingement impacts
  - No ocean construction impacts
- Protection from shock loads due to storms, spills, red tides, and urban runoff
- More certain permitting outcome

Status of Feedwater Supply Feasibility Investigation

Completed Work

- Hydrogeology study (Test Borings)
- Test slant well

Ongoing Work

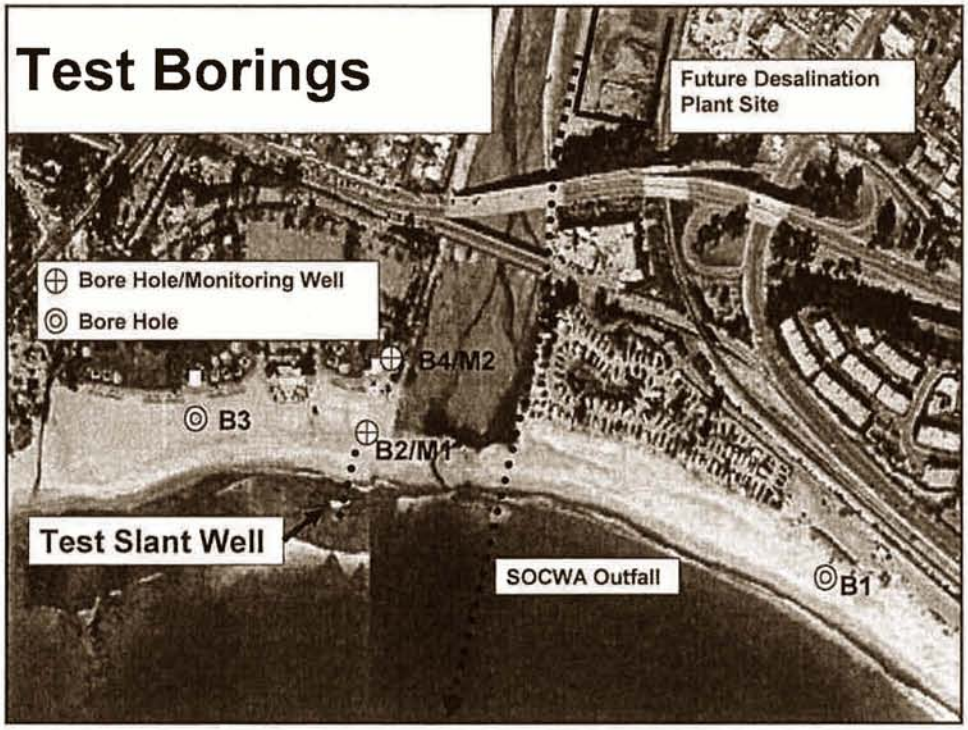
- Full scale system modeling evaluation
  - Wellfield configuration
  - Safe yield and impacts
- Engineering study on pump system

Research Focus

- Coastal hydrogeology/geochemistry
- Subsurface intake technology
- Intake well yield and performance
  - Specific capacity and well yield
  - Inflow by source vs time
- Water quality
  - Salinity response
  - Pretreatment level (SDI, etc)
  - Iron/Manganese reaction kinetics
- Well material corrosion study

Hydrogeology Investigation

- **Vertical and Lateral Extent of Alluvium**
- **Hydraulic Conductivity**
- **Water Quality**
- **Location of Freshwater Saltwater Interface**



Hydrogeology Findings

- The aquifer is comprised of coarse sand and gravel, promising conditions for high yield filtered water (K ~1000 gpd/ft²)
- Dimensions of alluvial channel
  - Width ~ 1800 feet
  - Depth ~ 160 to 180 feet
- Extends offshore within continental shelf
- Water quality was brackish (2600 mg/l)

Test Slant Well Project

- Research intake technologies
  - Radial wells
  - HDD wells
  - Dual rotary slant wells
- Dual rotary drilling found most suitable for this site
- Construction/testing schedule
  - Started January 30, 2006
  - Completed May 18, 2006

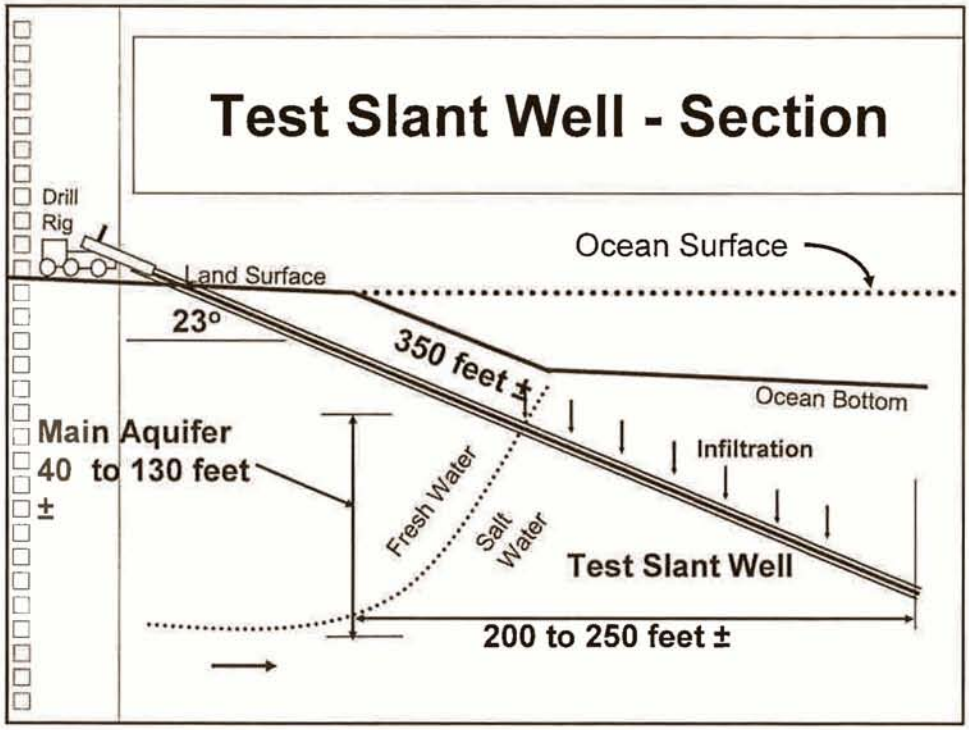
Test Slant Well Project Cost and Funding

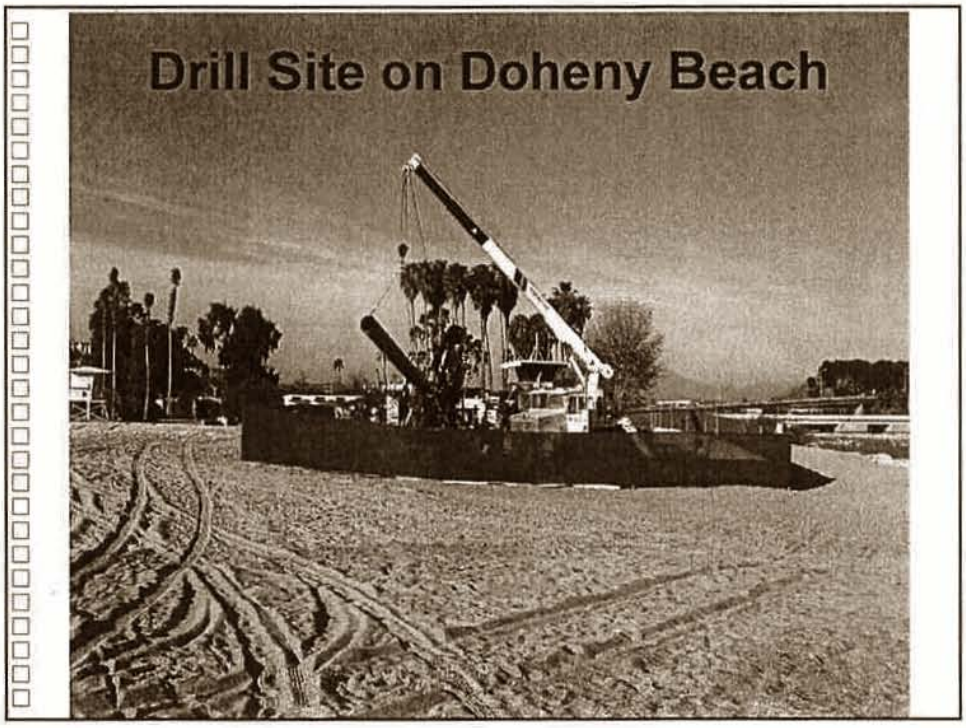
- Feasibility Investigation Costs (2 years)
  - $2.2 Million (includes drilling contracts)
- Federal/State Grants
  - DWR Prop 50 Grant $1,000,000
  - USBR Desalination Grant $360,000
  - USEPA Grant $144,500

Test Slant Well Project
Major Permits/Approvals

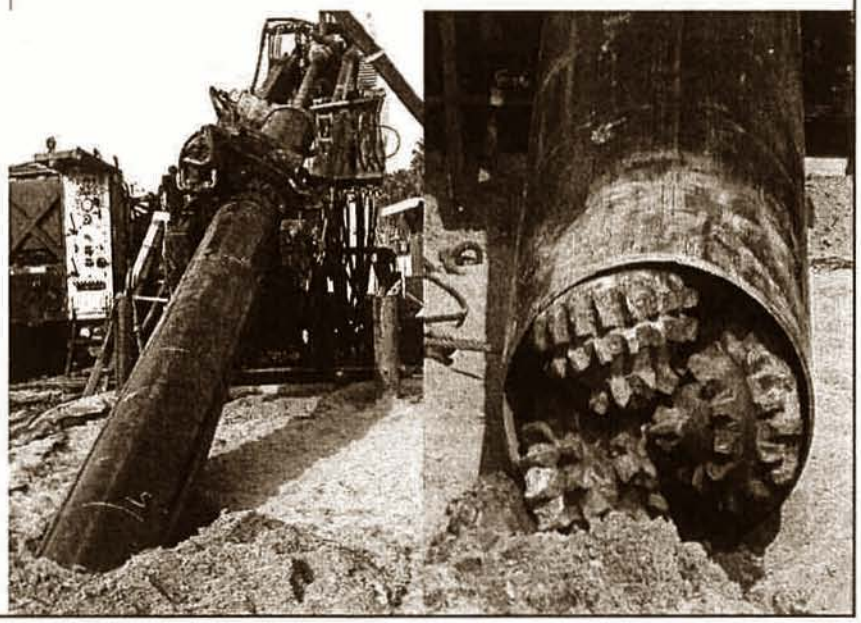
- California Department of Parks and Recreation
- California Coastal Commission
- California State Lands Commission
- Regional Water Quality Control Board
- US Army Corps of Engineers

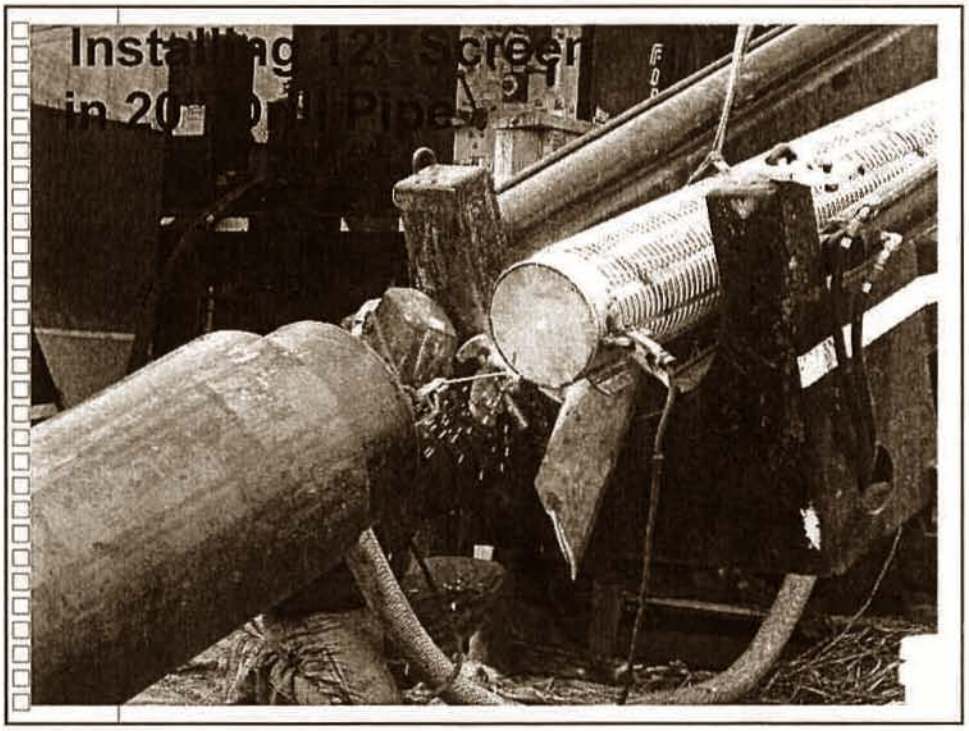
Test Slant Well - Section

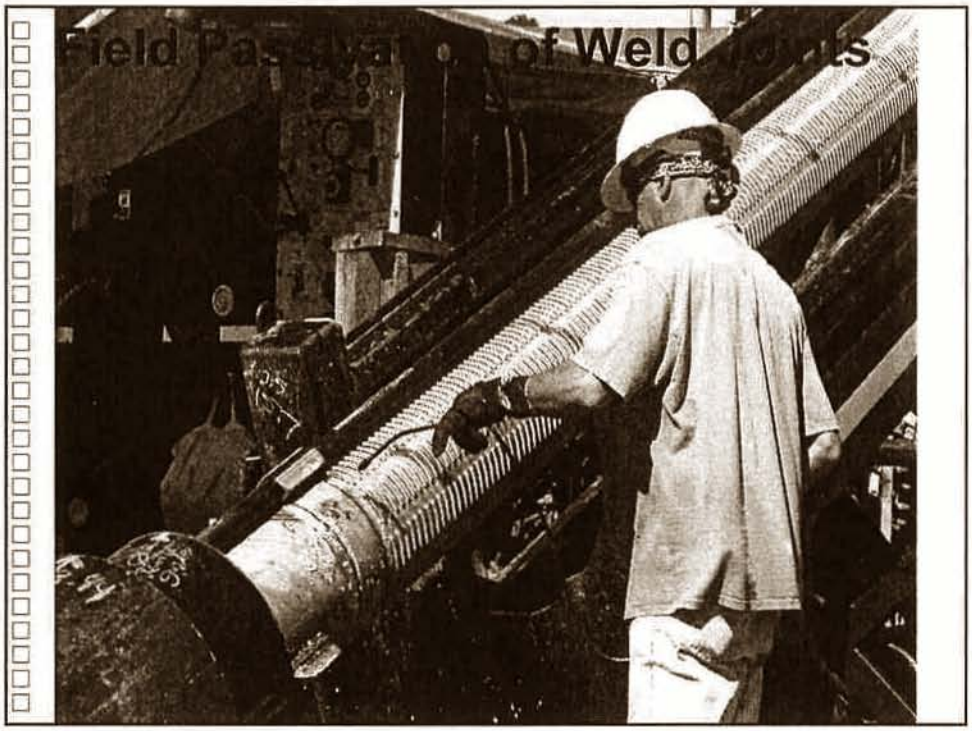




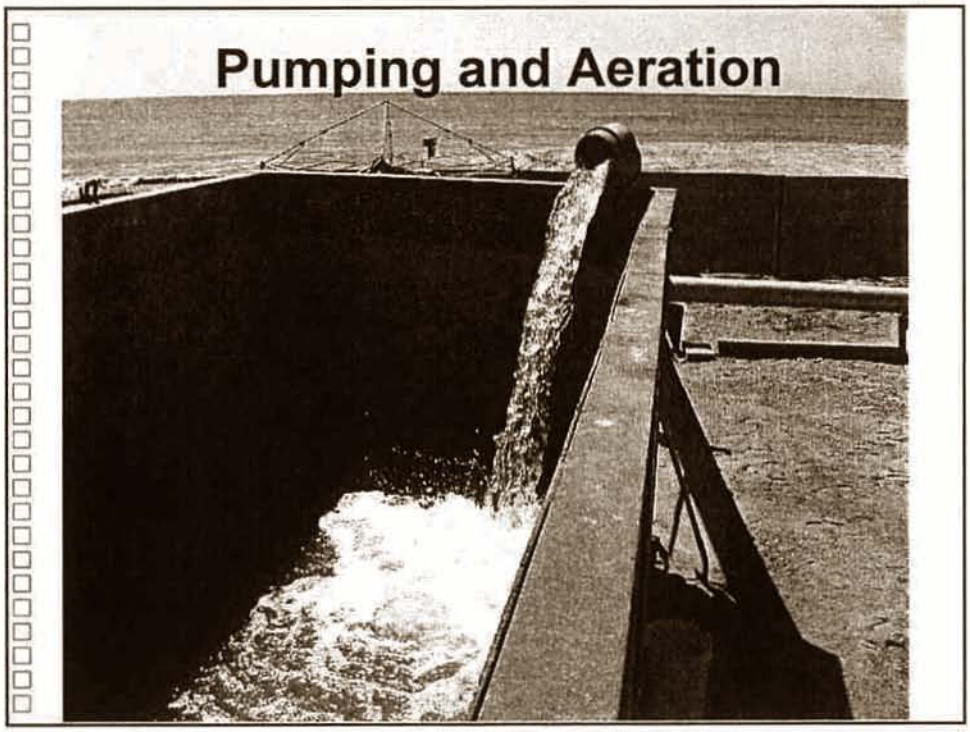
Slant Well Dual Rotary Drilling

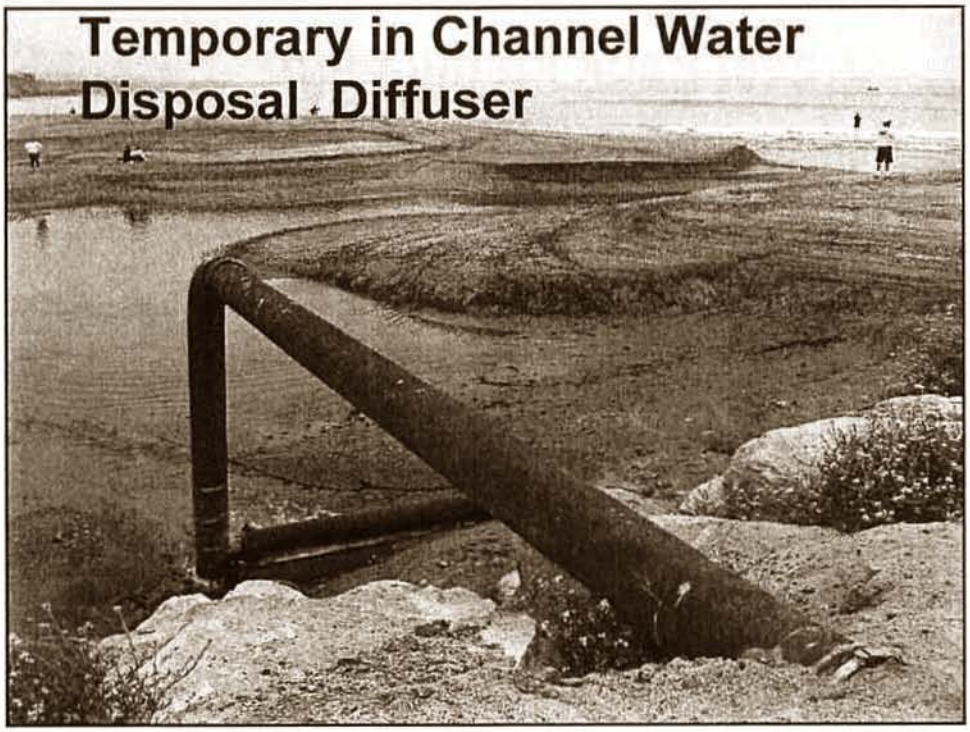






Gravel Pack Installation

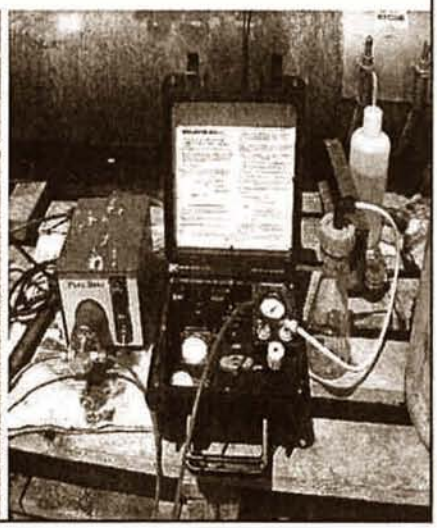




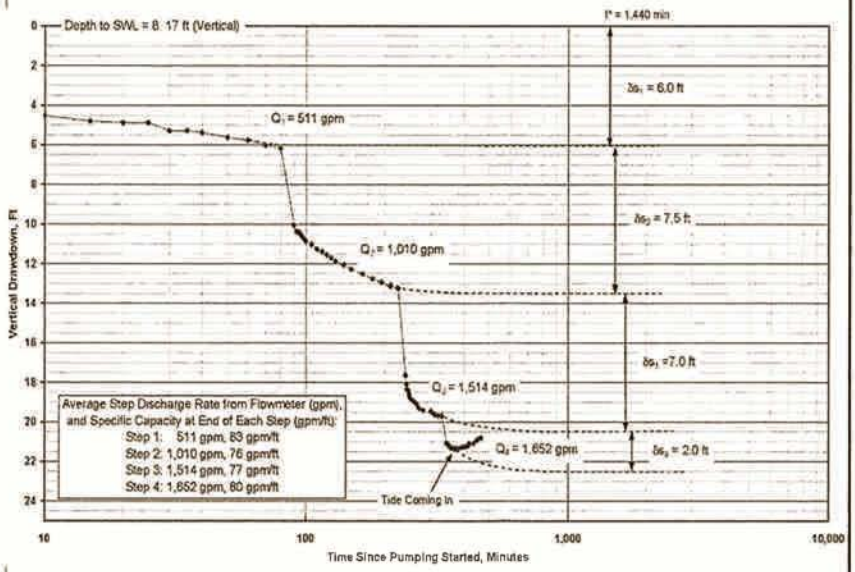
Testing Program

- Pump Testing and Water Levels
  - Step Drawdown Test
  - 5-Day Constant Rate Test
  - 2-Day Deep Zone Test
- Water Quality Testing
  - Feedwater Parameters

Measuring Water Levels and Silt Density Index (SDI)



Pumping Tests - Step Drawdown



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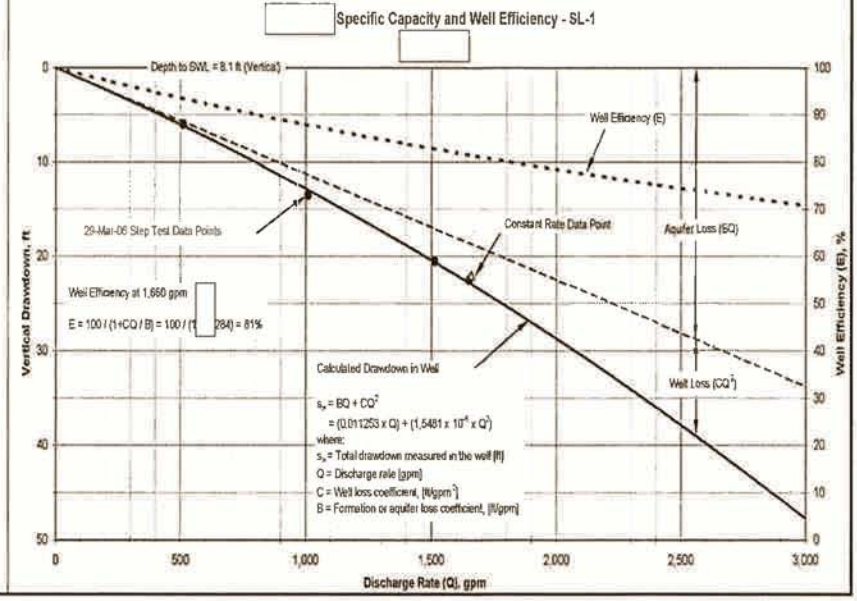
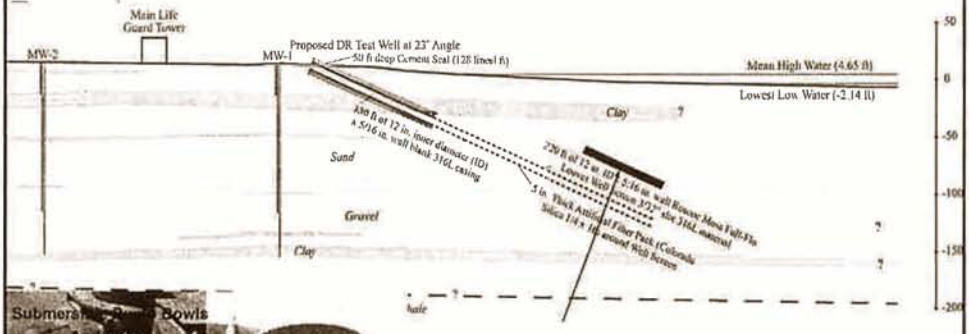


Ground Water Model Results

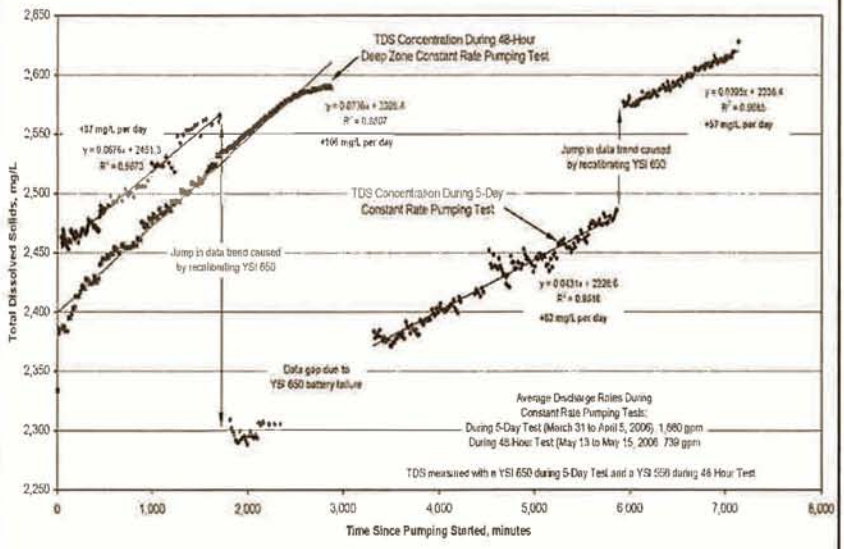
Aquifer Parameter	Units	Model Generated Value
Hydraulic Conductivity	gpd/ft²	1,618
Transmissivity	gpd/ft	139,000
Storativity	Fraction	0.00033
Vertical Leakance	1/days	0.0275

Deep Zone Pumping Test



The lower 50 ft of well screen was "packed off" using a pneumatic packer to test only Deep Zone aquifers. A 48 hr test showed a discharge rate of 730 gpm from this 50 ft zone

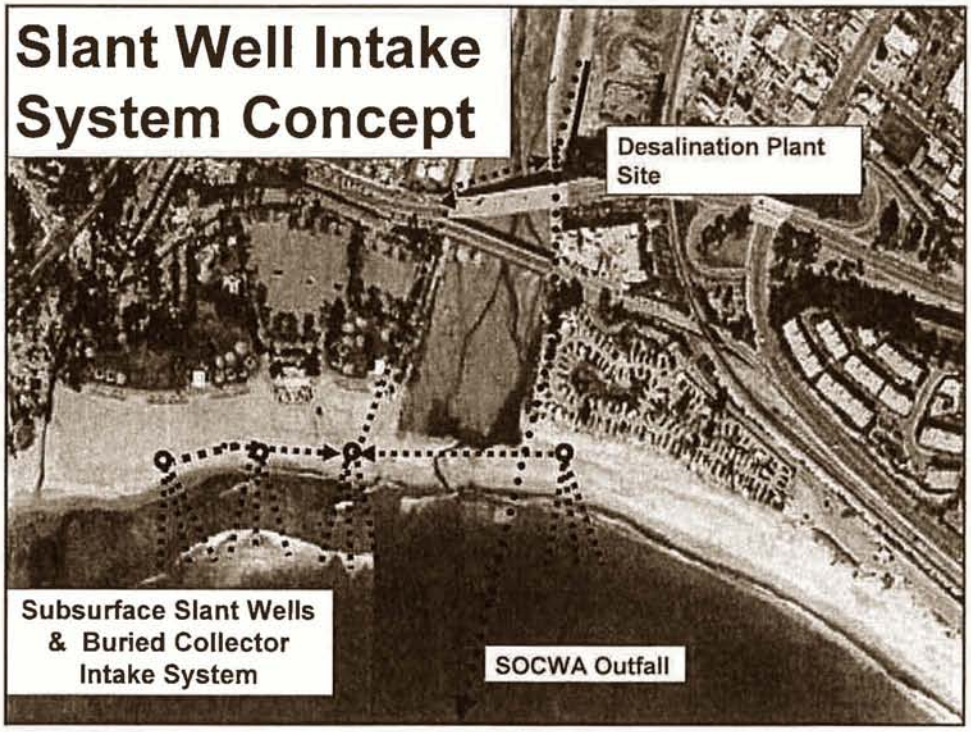
Water Quality vs. Pumping Time

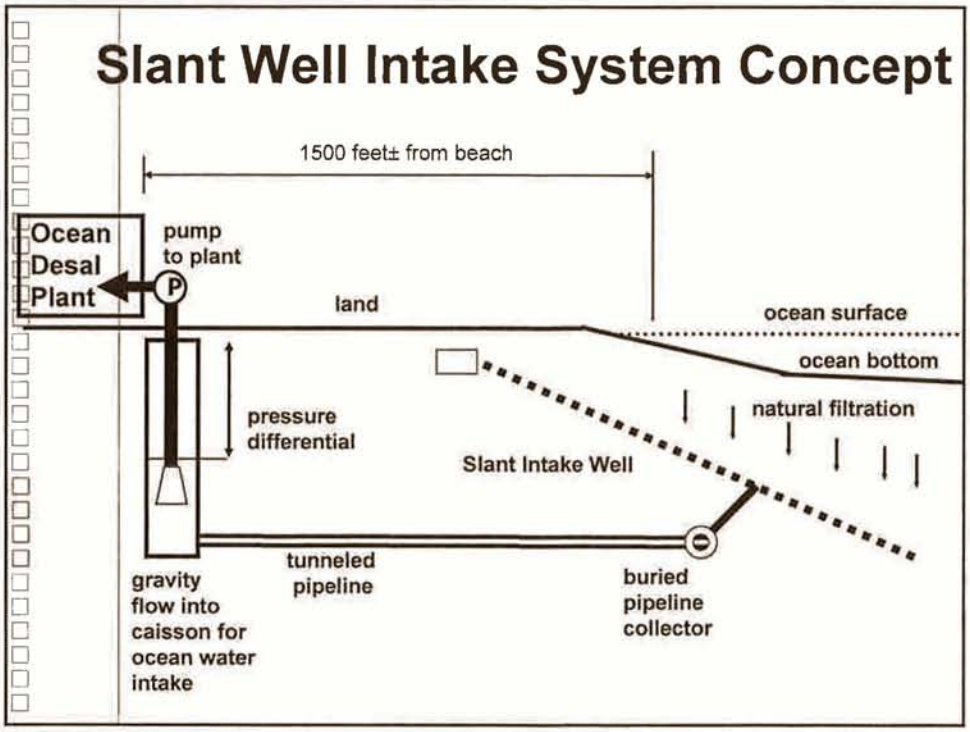


PRELIMINARY RESULTS - SUBJECT TO REVISION

Test Slant Well Results

- Construction period: 2 months
- Design: 12" Ø, 350 feet long at 23° angle
- Specific capacity: ~ 80 gpm/foot
- Yield: Max 3 to 4 mgd per intake well
- SDI range: 0.5 to 0.8
- Recommended next steps
  - Extended pumping test
  - Pilot plant and materials study





Conclusions - 1

- Successful project completion was the result of an experienced "team" effort
- Vertical water well technology including well design, gravel packing, construction and testing can be modified for slant wells with equal success

Conclusions - 2

- Dual-Rotary Drilling is now a proven technique for construction of gravel packed slant wells beneath the ocean
- Gravel packing slant wells is more challenging than vertical wells
- Well logging requires special tools and methods

Conclusions - 3

- High capacity slant wells with total lineal lengths > 350 ft are feasible with present technology (DR-24HD or DR-40)
- A 16" pump casing telescoped to a 12" well screen can be used to achieve longer lengths (>350 ft) and to house larger pumps (e.g. 3,000 gpm)

Conclusions - 4

- A modified drill bit will be required to prevent cobbles from lodging in the inner drill barrel
- During gravel packing a higher pressure pump should be used for aiding in the placement of the gravel pack and to better overcome "heaving" sands

Conclusions - 5

- Slant well angles can be varied as necessary for site specific conditions
- Instrumented monitoring wells were critical for pumping test analysis
- Analysis of pumping test data is best accomplished by using a three - dimensional ground water flow model

Conclusions - 6

- High yield wells can be constructed on the beach and out under the ocean with minimal environmental impact
- Excellent pretreatment filtration can be achieved in natural alluvial formations
- Slant wells can be constructed in a short time at reasonable cost

Recommended Next Steps

- Extended pumping test to pull in ocean water for longer term evaluation and for pilot plant feedwater supply
- Pilot plant testing objectives
  - Appropriate membrane for a groundwater source
  - Fe/Mn control/removal method
- Metal corrosion coupon testing

Questions/Comments?

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MUNICIPAL WATER DISTRICT OF ORANGE COUNTY

TO: COMMITTEE MEMBERS

FROM: BRUCE BUEL

DATE: AUGUST 1, 2007

AGENDA ITEM 4

AUGUST 8, 2007

SET NEXT SWPD&C COMMITTEE MEETING

ITEM

Set new SWPD&C Committee Meeting [SET TIME/DATE FOR NEXT COMMITTEE MEETING].

BACKGROUND

Boyle Engineering is scheduled to submit its Draft Technical Memorandum #2 on or about September 24, 2007 with the expectation that the Committee will review the draft and forward recommendations to the Board for consideration at the Board's October 10th Meeting. Staff proposes that the Committee schedule its next meeting for 2pm on Monday October 8th to allow for adequate review of the draft TM.

RECOMMENDATION

Staff recommends that the Committee agree on date and time to review the draft TM.

ATTACHMENT

- None

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