EXHIBIT 4-A

PUEBLO
water resources

SUMMARY OF OPERATIONS
PHASE 1 ASR PROJECT

WATER YEAR 2007

Prepared for:
MONTEREY PENINSULA WATER MANAGEMENT DISTRICT

December 2008
DRAFT

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INTRODUCTION

GENERAL STATEMENT

Presented in this report are the principal findings, conclusions, and recommendations resulting from operations at the Phase 1 Aquifer Storage and Recovery (ASR) Project site during Water Year 2007 (WY2007). The Phase 1 ASR Project is part of the Monterey Peninsula Water Management District's (District) ongoing implementation of ASR in the Seaside Groundwater Basin (SGB). The Phase 1 ASR Project site is located on a parcel leased by the District on the former Fort Ord property along General Jim Moore Boulevard in the northeast corner of the City of Seaside, California, and is shown on Plate 1 - Site Location Map.

ASR is a form of managed aquifer storage, or "groundwater banking", that involves the conjunctive use of surface and groundwater resources. In general, ASR on the Monterey Peninsula involves the diversion of excess winter and spring time flows from the Carmel River system for conveyance to ASR wells in the SGB. The water is delivered via California American Water's (CAW) existing distribution system, which connects Carmel Valley to the Seaside/Monterey area. The recharged water is temporarily stored underground in the SGB, utilizing the available storage space within the aquifer system. During periods of high demand, the same ASR wells and/or existing CAW production wells are used to recover the "banked" water. The recharged water essentially increases the annual yield of the SGB, which in turn reduces extractions from the Carmel River system during dry periods.

BACKGROUND

The District has been pursuing an ASR project since 1996. The District's efforts have included various technical feasibility investigations, leading to the construction and testing of both pilot- and full-scale ASR test wells to demonstrate the viability and operational parameters for ASR in the SGB. The first full-scale ASR well in the SGB was the Santa Margarita Test Injection Well No. 1 (SMTIW No. 1) well, which was constructed in the spring of 2001. Since its construction, formal demonstration testing of the well has been performed in Water Years (WY) 2002 through 2006, with a total of approximately 1,279 acre-feet (AF) of water diverted from the Carmel River system and successfully recharged into the SGB. The testing and analyses have confirmed that the design operational injection rate of 1,000 gpm (approximately 4.4 AFD) is sustainable for ongoing injection operations at SMTIW No. 1.

Based on the success of the SMTIW in demonstrating the feasibility and benefits of ASR, in 2004 the District initiated the initial phase of a permanent ASR

- Oversight and field assistance with the injection and water quality testing program implementation.
- Coordination and implementation of formal well rehabilitation of ASR-1 (carried over from WY2006).
- Engineering of below ground and interim facilities at the Phase 1 ASR Project site.
- Preparation of this Summary of Operations Report documenting the recharge program, procedures, and results, including recommendations for further analysis and subsequent ASR test phases.

FINDINGS

RECHARGE OPERATIONS

WY2007 was a very dry hydrologic year, with Carmel River runoff totals only approximately 10 percent of normal[3]. As such, a limited amount of excess Carmel River system water was available for recharge operations. A total volume of approximately 8.2 acre-feet (AF) was diverted for recharge during the period of February 28 to March 2, 2007. The recharge water was injected at the ASR-1 well (formerly known as SMTIW No. 1) into the Santa Margarita Sandstone aquifer of the SGB at an average injection rate of approximately 1,098 gallons per minute (gpm) (approximately 4.9 acre-feet per day).

Recharge Procedures

Recharge of the SGB was accomplished during WY2007 via injection into ASR-1. An as-built schematic of ASR-1 is presented on Plate 2. Injection feed water was potable water provided from the CAW distribution system, and was conveyed from Carmel Valley water sources through the CAW distribution system to the CAW Paralta Well site, and finally to ASR-1 through a temporary aboveground 12-inch-diameter HDPE line that was installed as part of the WY2002 capital improvements program.

Injection water was introduced into ASR-1 via the pump column. Injection rates were controlled by a flow control valve at the Luzern booster pump, two gate valves on the ASR-1 wellhead piping, and a downhole flow control valve (FCV) installed on the pump column. Positive gauge pressures were maintained at the

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[2] A Summary of Operations Report documenting the drilling, construction and production testing of ASR-2 (SMTIW No. 2) was presented in a separate report, dated February 29, 2008.

[3] Based on USGS Carmel River near Carmel Gage annual runoff values.

District monitoring well locations. In addition, the recently constructed MW-1 at the site has been similarly instrumented. The locations of each monitoring well are shown on Plate 1, and water level hydrographs are graphically presented on Plates 5 through 11. A summary of the water level observations during the WY2007 injection period is presented in Table 2 - Summary of Monitoring Well Observations.

Table 2. Summary of Monitoring Well Observations

Well ID	Distance from ASR (feet)	Aquifer Monitored	SWL (feet)		IWL (feet)		Water Level Rise (feet)
			DTW	Elev.	DTW	Elev.	
MW-1	87	Tsm	357.6	-20.6	341.3	-4.3	16.3
PRTIW[1]	335	QTp	--	--	--	--	--
Paralta Test[2]	660	QTp & Tsm	--	--	--	--	--
Ord Grove Test[3]	1,600	QTp & Tsm	--	--	--	--	--
Ord Terrace (Deep)	2,260	Tsm	253.0	-23.0	252.6	-22.6	0.4
FO-7 (Deep)	3,420	Tsm	488.0	-14.1	486.7	-12.8	1.3
FO-7 (Shallow)[4]		QTp	--	--	--	--	--
PCA East (Deep)[5]	6,400	Tsm	--	--	--	--	--
PCA East (Shallow)[6]		QTp	--	--	--	--	--
FO-9 (Deep)	7,280	Tsm	138.5	-19.4	137.3	-18.2	1.2
FO-8 (Deep)	7,580	Tsm	392.1	-13.6	391.3	-12.8	0.8

Notes:
SWL – Static Water Level
IWL – Injection Water Level
DTW – Depth to Water
Tsm – Santa Margarita Sandstone
QTp – Paso Robles Formation
1 – No data. Transducer removed from well by operator due to pump failure and was not reinstalled.
2 – No data. Transducer damaged.
3 – No data. Transducer lodged in well, unable to retrieve.
4 – No data. Transducer malfunction.
5 – No data. Transducer malfunction.
6 – No data. Transducer malfunction.

As shown on the water level hydrographs and in Table 4, water levels in the Santa Margarita Sandstone (Tsm) at the start of the WY2007 injection season ranged between approximately 14 to 23 feet below sea level. Positive response to injection at ASR-1 was observed at five of the monitoring wells. Water level responses ranged between approximately 0.4 to 16.3 feet, generally decreasing with distance from the ASR well. The dampened response to injection at the Ord Terrace well, combined with its apparent response to a nearby pumping well cycle which the other wells did not display, suggests that the Ord Terrace Fault may represent some degree of a hydraulic barrier in the Tsm.

performance over time and at differing flow rates. Decreases in specific capacity are indicative of decreases in the hydraulic efficiency of a well due to the effects of plugging. Both injection and production well performance is tracked at ASR-1, as described below.

Injection Performance

Injection performance has been tracked at ASR-1 (SMTIW No. 1) since the inception of the SMTIW testing program by measurement and comparison of 24-hour injection specific capacities. Injection specific capacity is the ratio of injection rate to water level drawup in the well casing. A summary of injection season beginning and ending 24-hour injection specific capacities for WY2002 through WY2007 is presented in Table 3 - Injection Performance Summary below:

Table 3. Injection Performance Summary

Water Year	Injection Rate (gpm)	24-hour DUP (feet)	Specific Capacity (gpm/ft)
WY2002			
Beginning Period	1,570	81.7	**19.2**
Ending Period	1,164	199.8	**6.4**
WY2003			
Beginning Period	1,070	70.0	**15.5**
Ending Period	1,007	49.7	**20.3**
WY2004			
Beginning Period	1,383	183.4	**7.5**
Ending Period	1,072	67.4	**15.9**
WY2005			
Beginning Period	1,045	46.6	**22.4**
Ending Period	976	94.1	**10.4**
WY2006			
Beginning Period	1,039	71.5	**15.0**
Ending Period	1,008	62.2	**17.5**
WY2007			
Beginning Period	1,098	92.4	**11.9**
Ending Period	--	--	**--**

Water Year	Pumping Rate (gpm)	10-min DDN (feet)	Specific Capacity (gpm/ft)
WY2004			
Pre-Injection	2,000	51.8	**38.6**
Post- Injection	1,700	81.2	**20.9**
WY2005			
Pre-Injection	1,900	49.8	**38.1**
Post- Injection	1,500	87.1	**17.2**
WY2006			
Pre-Injection	1,500	82.4	**18.2**
Post- Injection	1,600	74.1	**21.6**
WY2007			
Pre-Injection	1,500	81.7	**18.4**
Post- Injection	1,500	79.4	**18.9**

As shown in Table 4, the production specific capacity has declined from approximately 63 to 18 gpm/ft over the course of six injection seasons, an overall decline of approximately 70 percent. This compares to the 40 percent overall decline observed in injection performance.

As mentioned previously, most sources of injection water contain some amount of plugging constituents. Routine backflushing is rarely 100 percent effective at removing all plugging materials; therefore, some amount of residual plugging can be expected at any ASR well. Mitigation of residual plugging is accomplished by periodic formal rehabilitation of the well to remove residual plugging material and restore well performance. The procedure is similar to rehabilitation typical for municipal production wells, but specifically tailored to the plugging mechanisms associated with the ASR well. ASR-1 underwent formal rehabilitation as part of the WY2007 program, and is discussed later in the report.

WATER QUALITY

As part of the Phase 1 ASR Project, both the injected and stored waters are routinely monitored for a variety of field and laboratory water quality parameters. During the recharge season, grab samples are collected at the wellhead during injection operations. Following the recharge season, samples are collected from the well to monitor changes in water quality during aquifer storage. Representative aquifer water samples were obtained by starting the well pump and discharging to waste for a period of approximately 45 minutes (purge volume of approximately

- Each aquifer storage sampling event purged approximately 60,000 gallons, or about 16 feet of proximate aquifer purging prior to sample collections.

As a result of the above conditions associated with water quality and geochemical interaction issues, the following qualitative factors are noted:

1. Because of the low volume of water injected, the pore-volume displacement and geographic footprint of the recharge water is necessarily low, and short-term intermixing and diffusion with native and/or "background" waters is therefore expected to be low.
2. The short duration of injection (1.7 days) does not provide for any significant "conditioning" of aquifer minerals as would be present in a 2-4 month injection period. This limited exposure time to "fresh" injectate would limit the redox and/or biological processes normally occurring in ASR operations.
3. The small volume (i.e., mass) of recharge water results in a correspondingly low input of reactants (whether oxidants, minerals, nutrients, or microbiota) to develop a meaningful equilibria between the injectate and background water quality, and aquifer mineralogy.

The short injection period also resulted in a more abbreviated data collection period; the summary results of the WY2007 water quality data collection program are presented in Tables 5 and 6.

The data in Table 5 indicate that the "background" water quality present at the beginning of WY2007 operations was substantially different than the original native Tsm water quality observed when the well was constructed in 2001. The remainder of previous years' stored recharge water shows a "background" water quality of lower salinity, lower hardness, and higher redox potential than the native ground water. Although this water is of higher quality (lower TDS, hardness, & chlorides) than the original Tsm native ground water (NGW), its character is clearly a blend of previous years' Carmel River recharge water and NGW, in an approximate blend ratio of 1:1. Using chloride ion (Cl) as a conservative tracer to differentiate between "background" water and WY2007 injectate, the aquifer storage samples collected after the closure of the recharge period showed only a small (6-8 percent) dilution/intermixing with the in-situ ground water. This is unremarkable when taken in the context of the low recharge volume, short duration, and insignificant gradient alteration caused by the small recharge volume.

Using the dilution factor calculated from the chloride data, other constituents were evaluated with respect to reactivity and geochemical interaction during the storage period of 214 days. Overall, there were little or no changes in recharge (or

- Nutrient levels in the injected water were very low, particularly with respect to Phosphorous, Nitrate, and Ammonia; all of which would enhance anoxic/anaerobic bacterial metabolism.
- The presence of biocidal free chlorine likely further inhibited bioactivity, particularly of anaerobes.

When taken together, the conditions of adding a small volume of nutrient-poor, oxidized water with free chlorine (i.e., biocide) would suggest that conditions for anaerobic bioactivity would be very poor; and therefore metabolic degradation of THM compounds would be similarly low.

Although data for WY2007 do not exist, monitoring of THM levels at a location separated from the injection well (i.e. at MW-1, approximately 90 feet away) would show whether the greater intermixing with native (anaerobic) ground waters resulted in higher THM degradation.

In summary, the evaluation of WY2007 water quality data suggested the following:

- The small injection volume did not migrate or diffuse far from the well.
- No significant geochemical reactions were observed.
- As expected, HAA's degraded quickly and completely (under aerobic conditions)
- Redox conditions did not decline substantially and did not reach anaerobic (i.e., >-150 mV) levels
- Nutrient levels of the recharge water were low with respect to phosphorous and nitrogen species (which may have contributed to low bioactivity and low THM degradation).
- THM's showed characteristic ingrowth in the presence of free chlorine residual, but did not appreciably degrade over the 7-month storage period; likely due to the above-noted factors.

FORMAL REHABILITATION

As previously discussed, the hydraulic performance of ASR-1 has steadily declined over 5 years of operation as a result of residual plugging. The observed decline is to be expected as with most ASR wells. While the well has been consistently capable of maintaining its design injection capacity of 1,000 gpm, formal rehabilitation of the well was recommended in WY2005 to restore its hydraulic efficiency and maintain its service life.

Rehabilitation activities at ASR-1 occurred during the period September 6 through December 20, 2007. Zim Industries, Inc. of Fresno, California, was retained by the District to rehabilitate ASR-1 (SMTIW No. 1) as part of the ASR-2 (SMTIW No. 2) well construction procurement and contract. The rehabilitation work plan and technical specifications were developed by PWR, which consisted of both mechanical and chemical techniques. The rehabilitation work plan included the following sequential activities:

1. Pre-rehabilitation performance testing
2. Pump assembly removal and FCV testing
3. Pre-rehabilitation video survey
4. Nylon brushing
5. Bailing
6. Pre-chemical dual-swab airlifting
7. Chemical treatment
8. Post-chemical dual-swab airlifting
9. Chlorination
10. Post-rehabilitation video survey
11. Post-rehabilitation performance testing

A detailed account of the above rehabilitation activities is presented in Appendix C – Formal Rehabilitation Summary. Following rehabilitation and reinstallation of the pump assembly, a formal performance test was performed to document post-rehabilitation production performance. The test was performed at an average pumping rate of approximately 1,980 gpm and the well displayed a specific capacity of approximately 59.7 gpm/ft. This compares to a pre-rehabilitation specific capacity of approximately 18.6 gpm/ft at 1,420 gpm. These results correspond to an approximate 220 percent improvement in well performance and show that rehabilitation restored approximately 95 of the original well performance (i.e., prior to any injection). The results are considered very the production performance by approximately 220 percent and restored the well to approximately 95 percent of its original performance.

RECOMMENDATIONS

Based on the WY2007 program results, and our experience with similar ASR projects, we offer the following recommendations for continued and future operation of the Phase 1 ASR Project:

- ASR-1 should continue to be operated at a maximum injection rate of approximately 1,000 gpm (4.4 acre-feet per day).
- During the recharge season, routine backflushing should be performed on an approximate weekly basis, or when the amount of water level drawup reaches approximately 100 feet (i.e., equal to the amount of available drawdown for pumping), whichever occurs first.
- Future testing should include ASR-1 and the recently installed ASR-2 operating simultaneously to determine appropriate dual-well operational parameters for the Phase 1 ASR Project.
- Include concurrent water quality sampling of the recently installed MW-1 along with sampling of ASR-1 and -2.
- Perform recovery pumping operations to further assess DBP degradation.
- Formal rehabilitation of the ASR wells should be performed when performance declines by approximately 25 to 50 percent. For planning purposes, rehabilitation should be scheduled on approximately 5 year intervals. For reference, this frequency is similar to that typically recommended for municipal production wells (Driscoll, 1986).

CLOSURE

This report has been prepared exclusively for the Monterey Peninsula Water Management District for the specific application to the District's Phase 1 Aquifer Storage and Recovery Project in the Seaside Groundwater Basin. The findings, conclusions, and recommendations presented herein were prepared in accordance with generally accepted hydrogeologic and engineering practices. No other warranty, express or implied, is made.

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Pueblo Water Resources, Inc. (2007), *Summary of Operations, Water Year 2006 Injection Testing, Santa Margarita Test Injection Well,* prepared for Monterey Peninsula Water Management District.

Pueblo Water Resources, Inc. (2008), *Summary of Operations, Well Construction and Testing, Santa Margarita Test Injection Well No. 2,* prepared for Monterey Peninsula Water Management District.

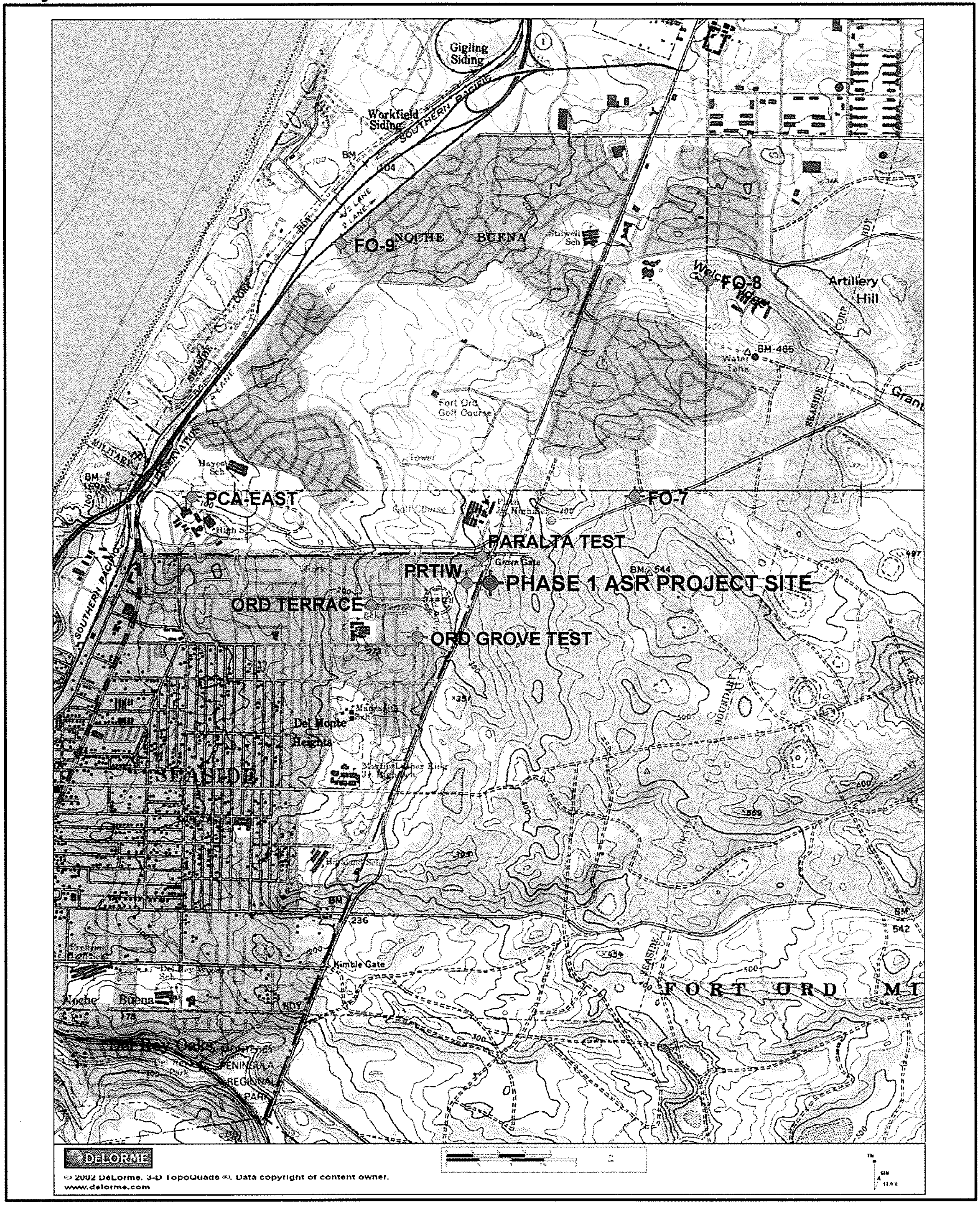
Pyne, R.D. (1994), *Ground Water Recharge and Wells*, Boca Raton, Florida, CRC Press.

Raines, Melton & Carella, Inc. (2002), *Plan B Project Report*, prepared for the Water Division of the California Public Utilities Commission.

Theis, C.V. (1935), *Relationship Between Lowering of Piezometer Surface on the Fate and Duration of Discharge of a Well Using Ground Water Storage*, Transactions of the Geophysical Union, vol. 16, pp. 519-524.

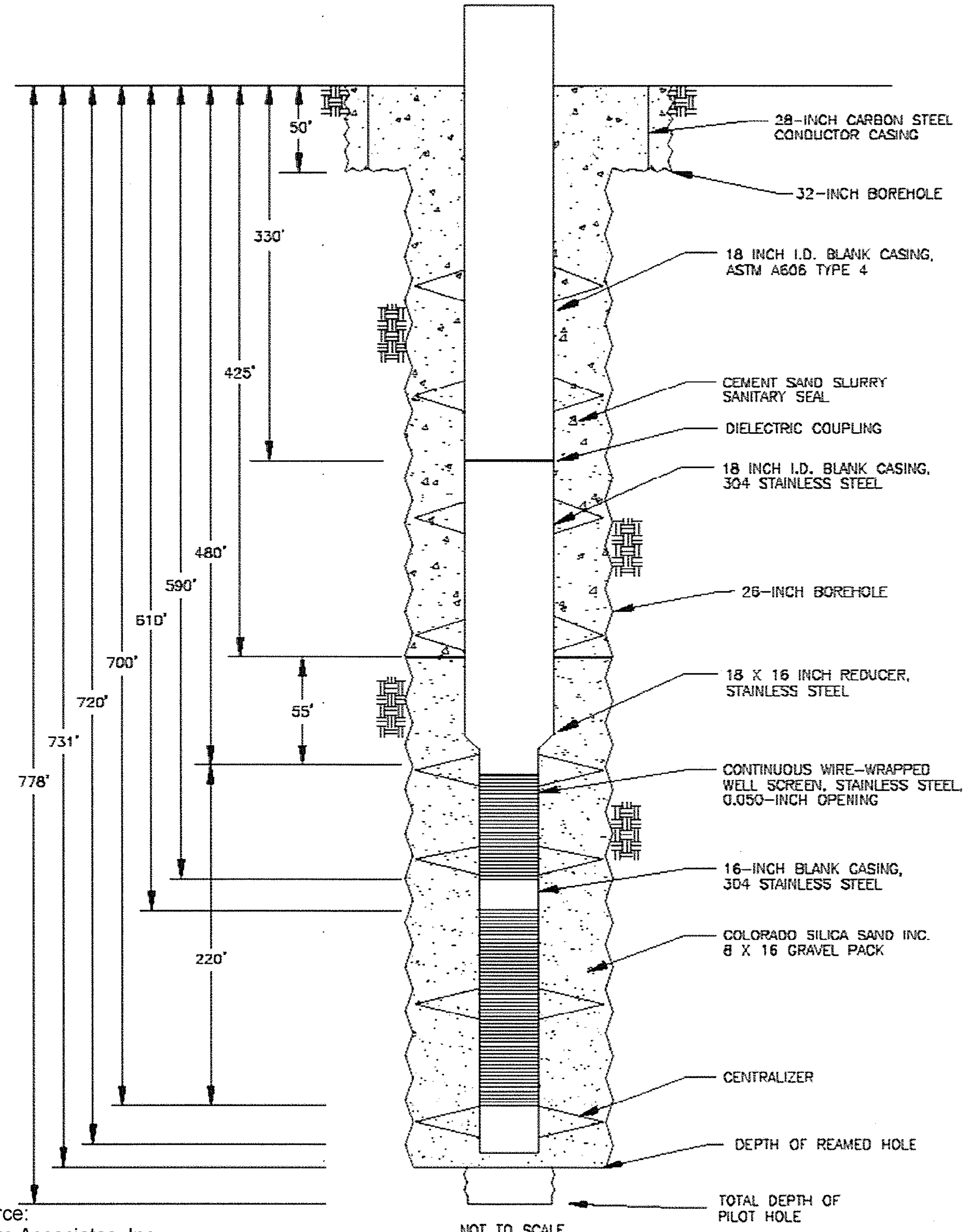
PLATES

December 2008
Project No. 06-0023



PUEBLO water resources

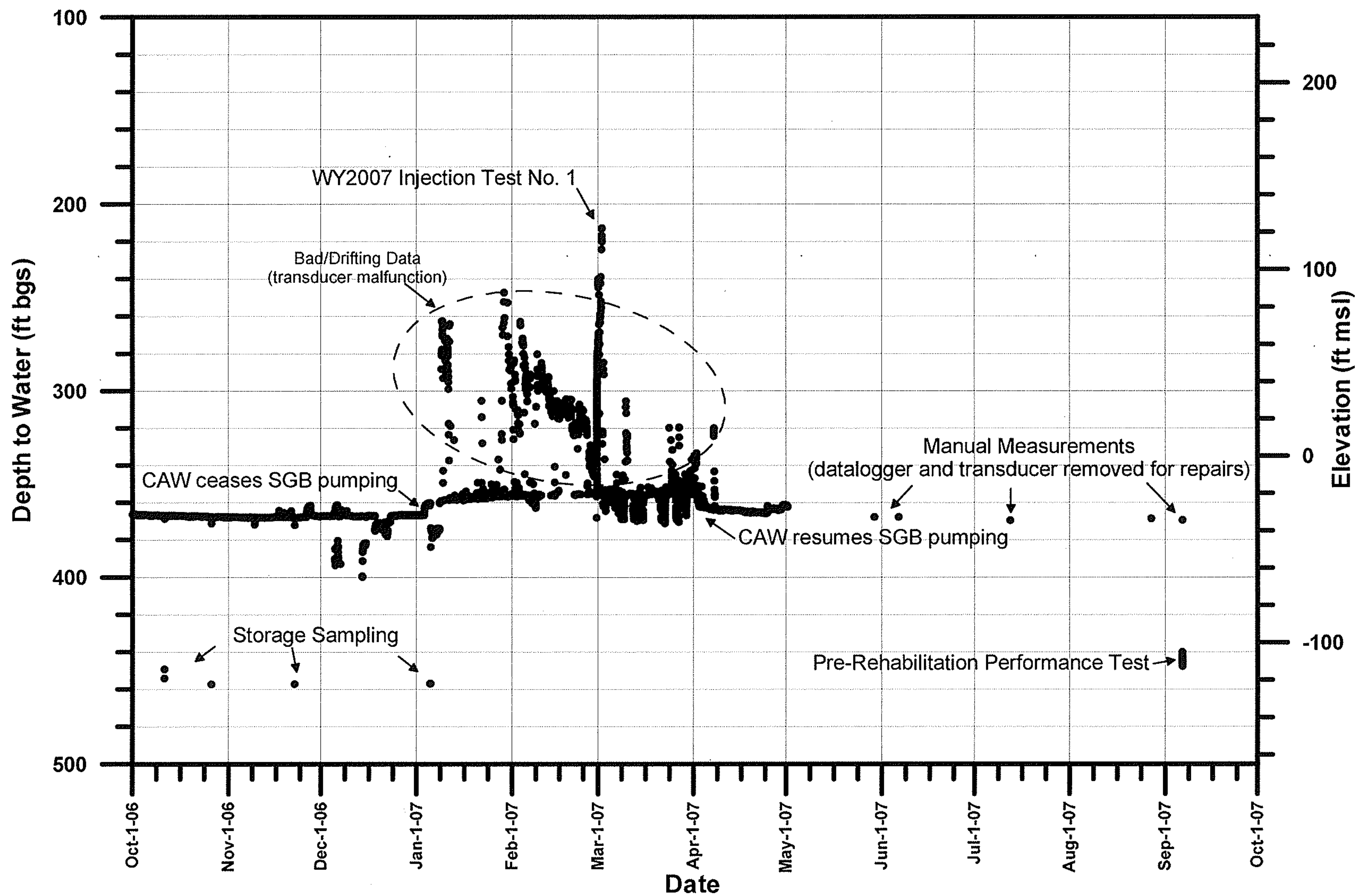
SITE LOCATION MAP
PLATE 1



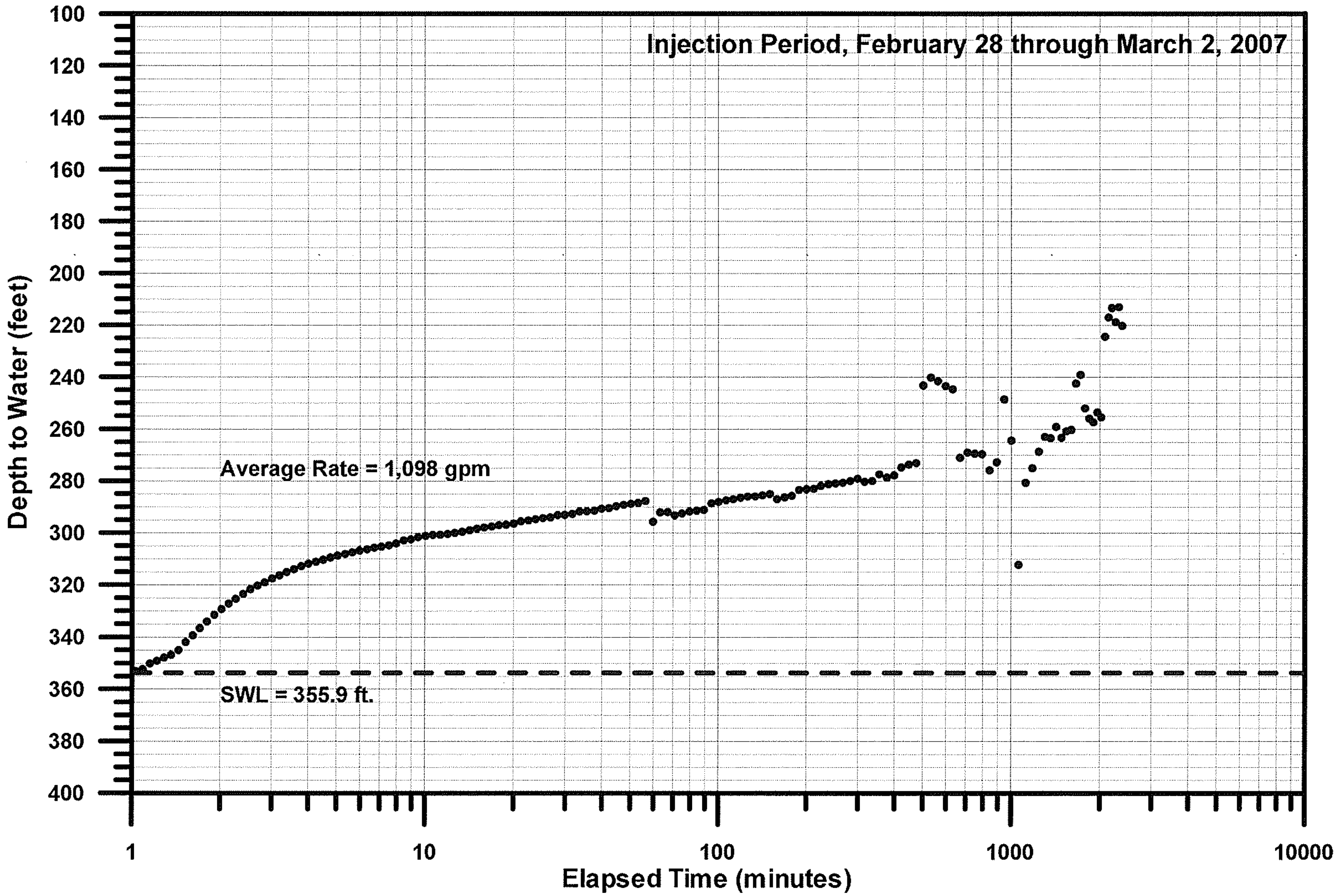
Source:
Padre Associates, Inc.
May 2002

PUEBLO water resources

ASR-1 AS BUILT SCHEMATIC
PLATE 2



WY2007 RECHARGE PROGRAM
ASR-1 WATER LEVEL DATA
PLATE 3



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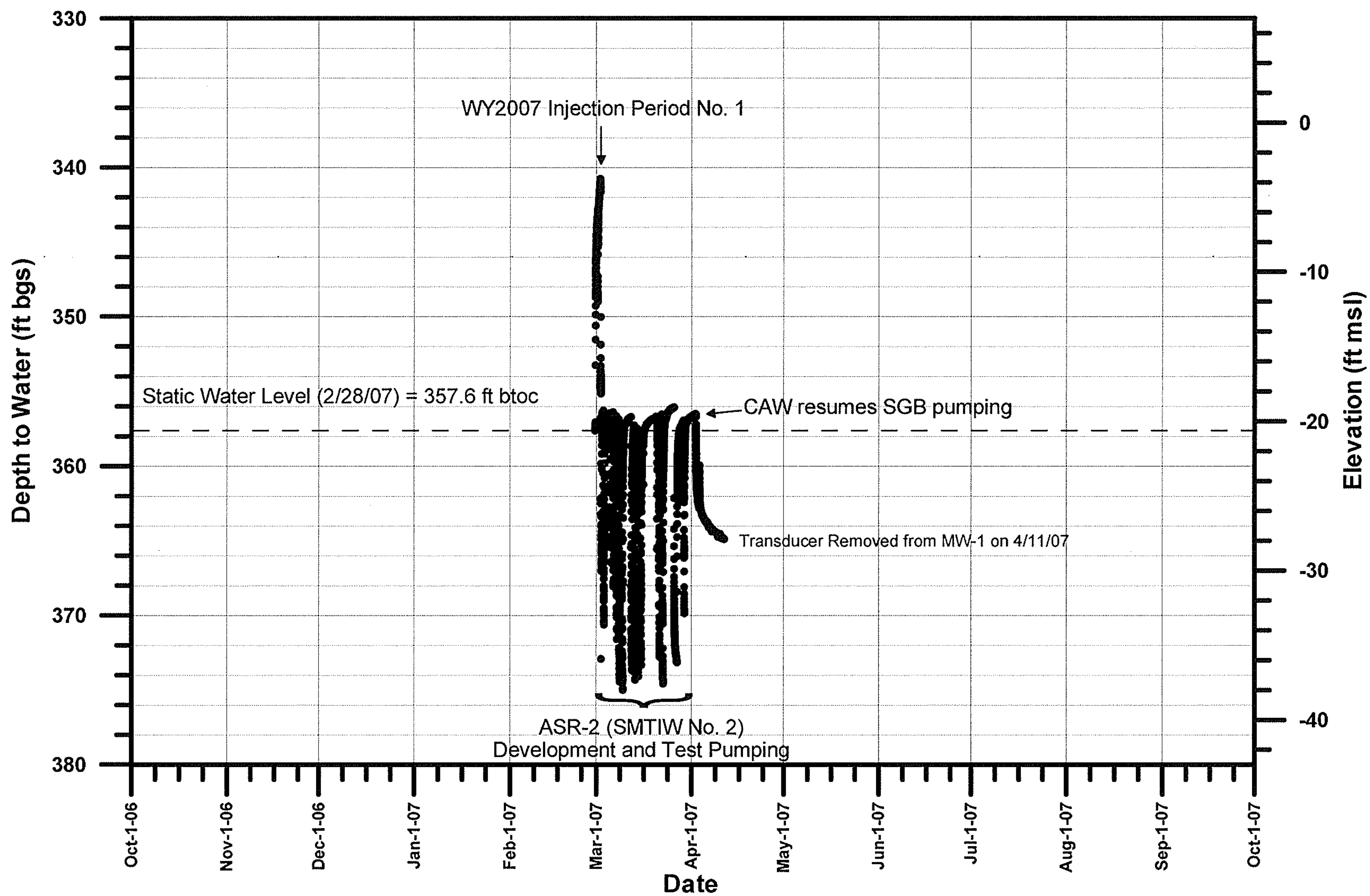
Monterey Peninsula Water Management District - Phase 1 ASR Project

WY2007 RECHARGE PROGRAM
INJECTION PERIOD NO. 1
PLATE 4



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WY2007 RECHARGE PROGRAM
MW-1 WATER LEVEL DATA
PLATE 5

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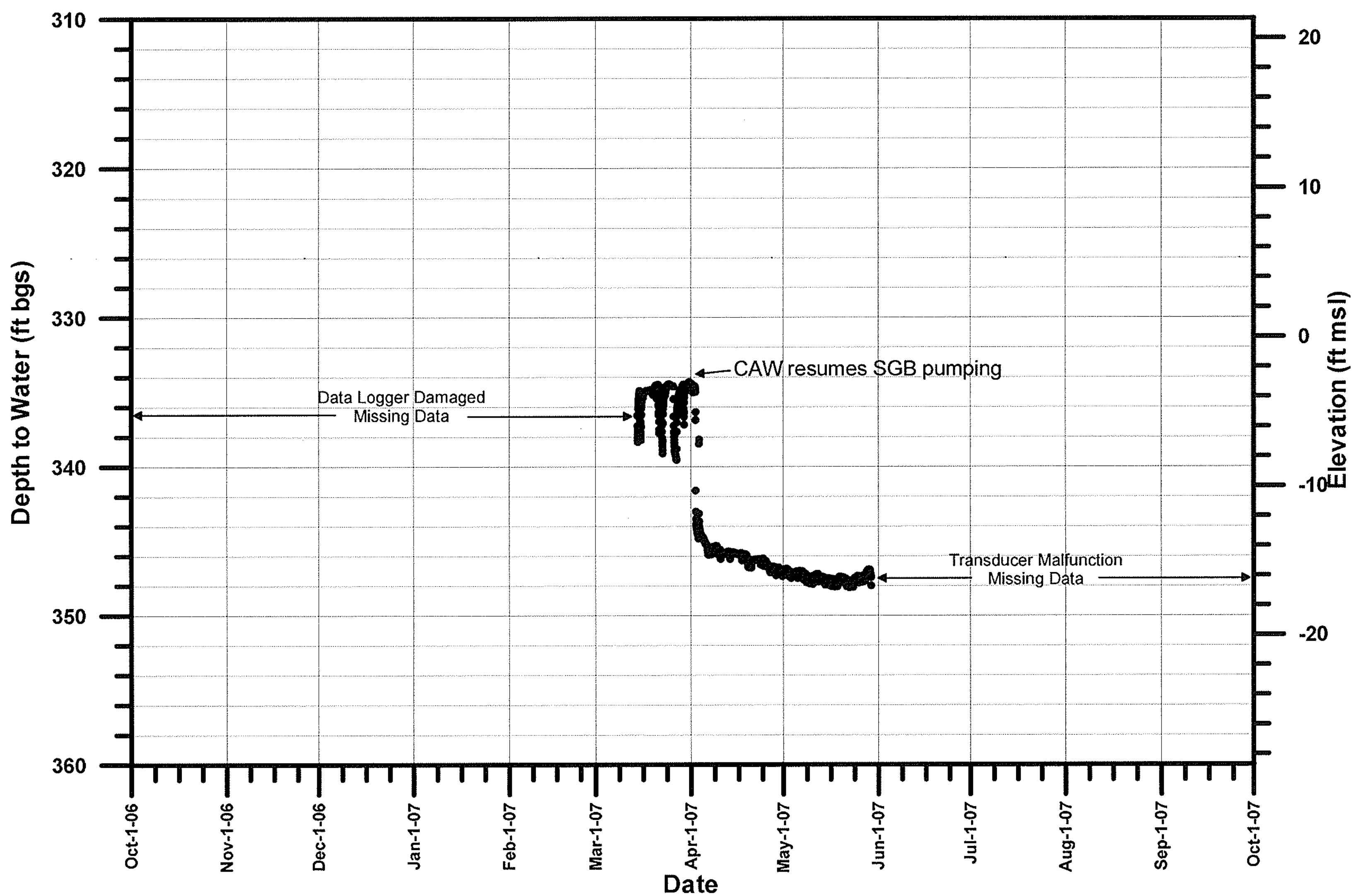
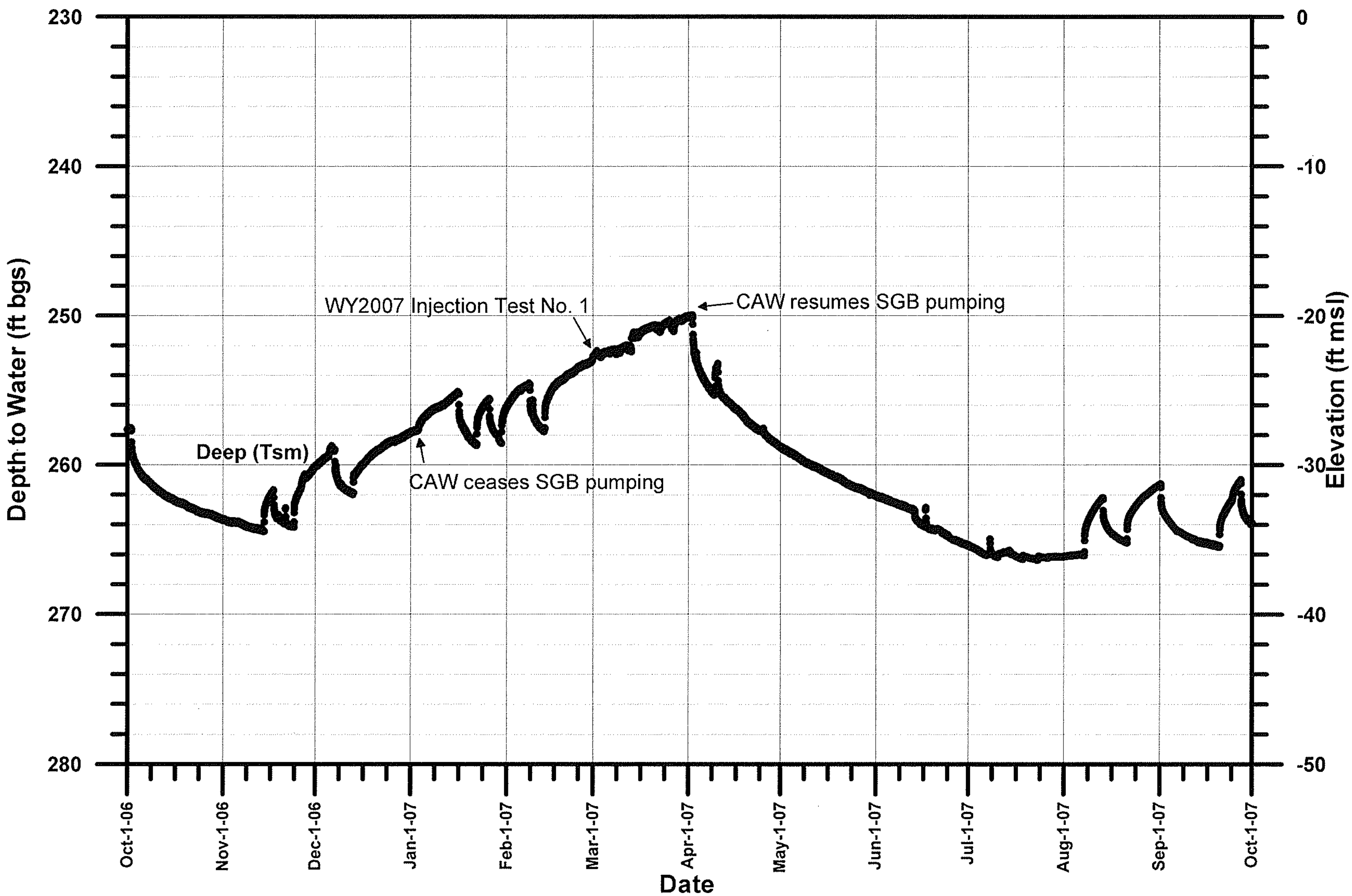


PUEBLO water resources

Monterey Peninsula Water Management District - Phase 1 ASR Project

WY2007 TESTING PROGRAM
PARALTA TEST WATER LEVEL DATA
PLATE 6



PUEBLO water resources

Monterey Peninsula Water Management District - Phase 1 ASR Project

WY2007 TESTING PROGRAM
ORD TERRACE DEEP WATER LEVEL DATA
PLATE 7

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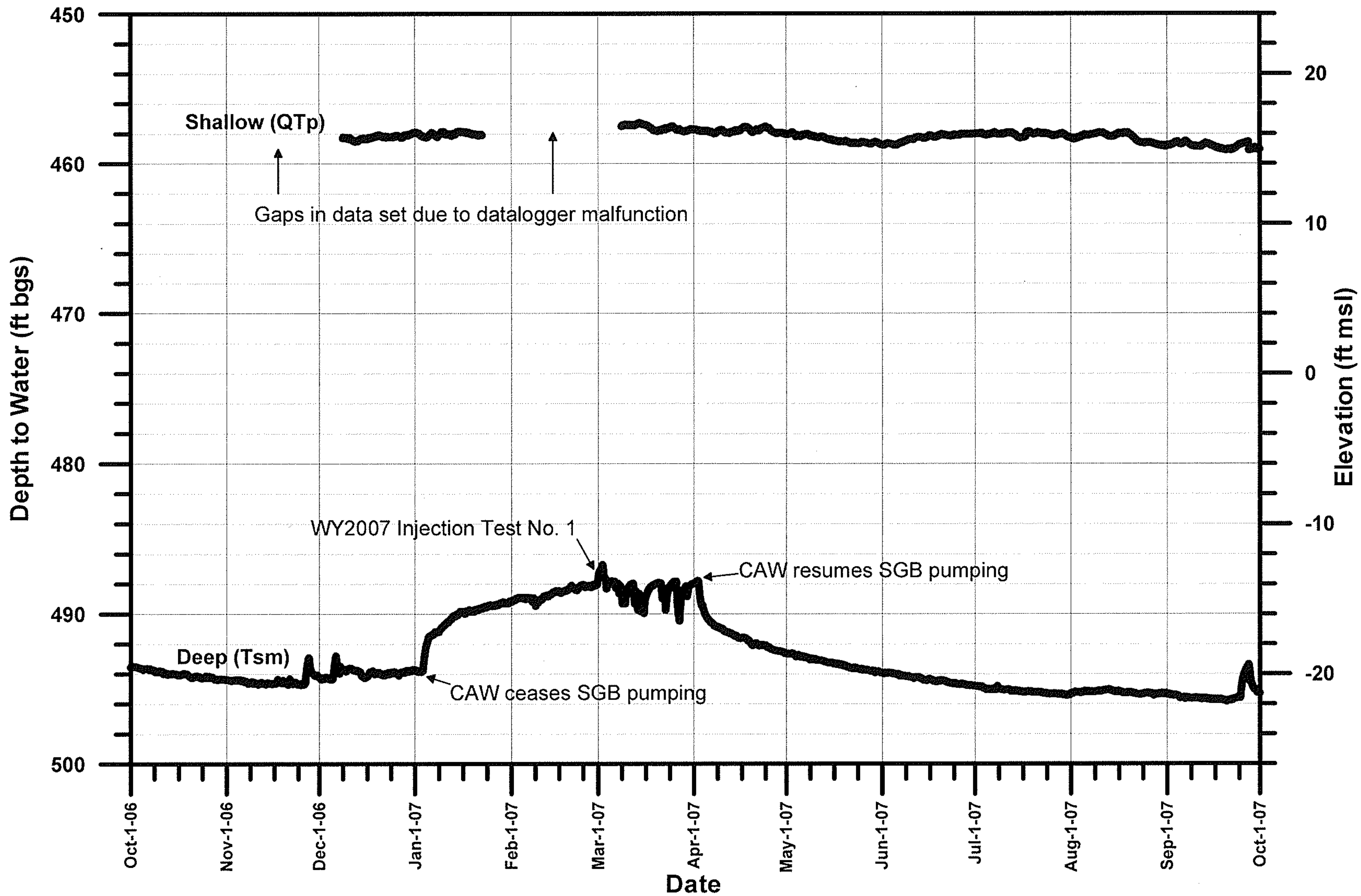
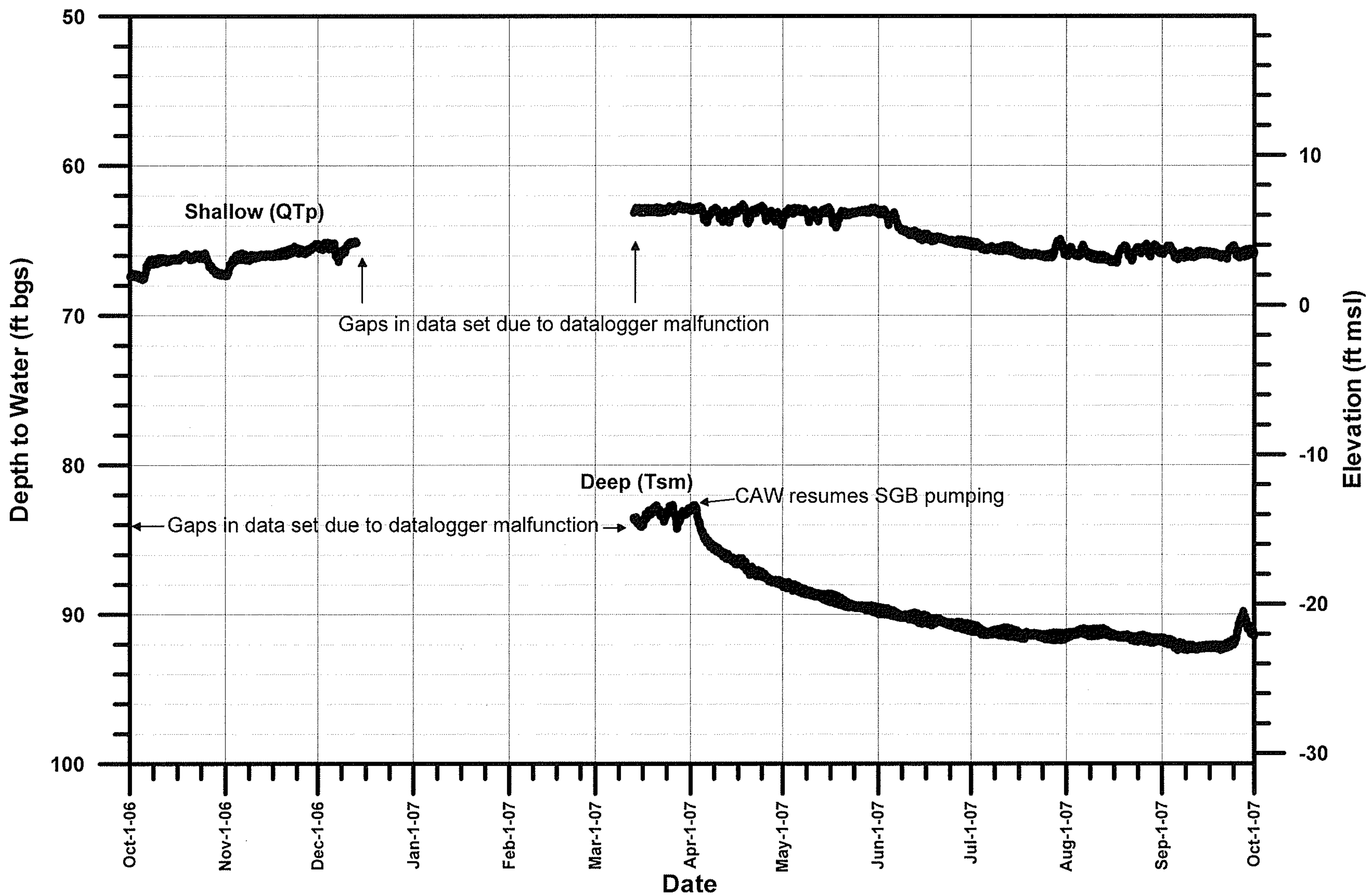


PUEBLO water resources

Monterey Peninsula Water Management District - Phase 1 ASR Project

WY2007 TESTING PROGRAM
FO-7 WATER LEVEL DATA
PLATE 8



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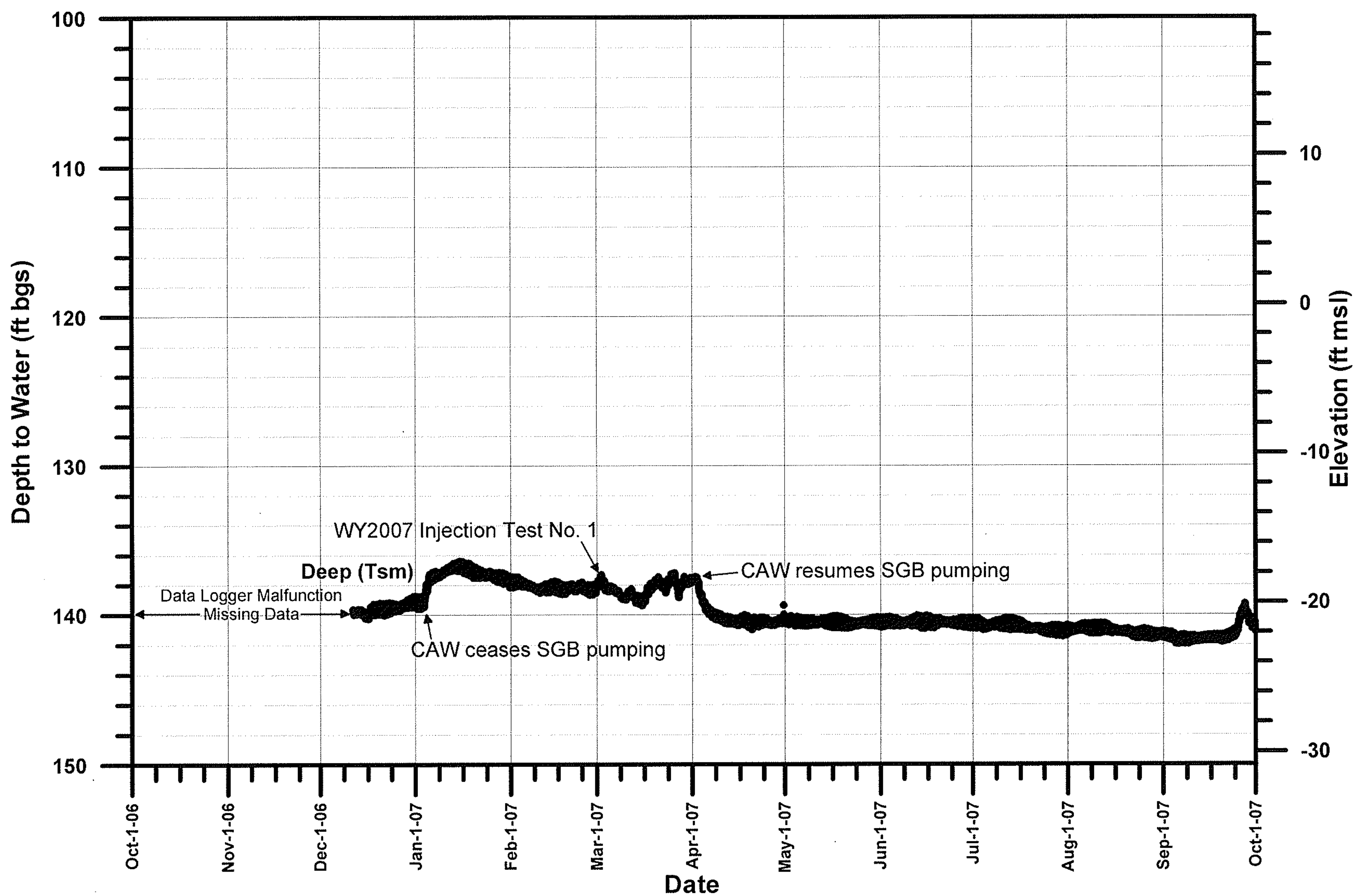
Monterey Peninsula Water Management District - Phase 1 ASR Project

WY2007 RECHARGE PROGRAM
PCA-EAST WATER LEVEL DATA
PLATE 9



WY2007 TESTING PROGRAM
FO-9 WATER LEVEL DATA
PLATE 10

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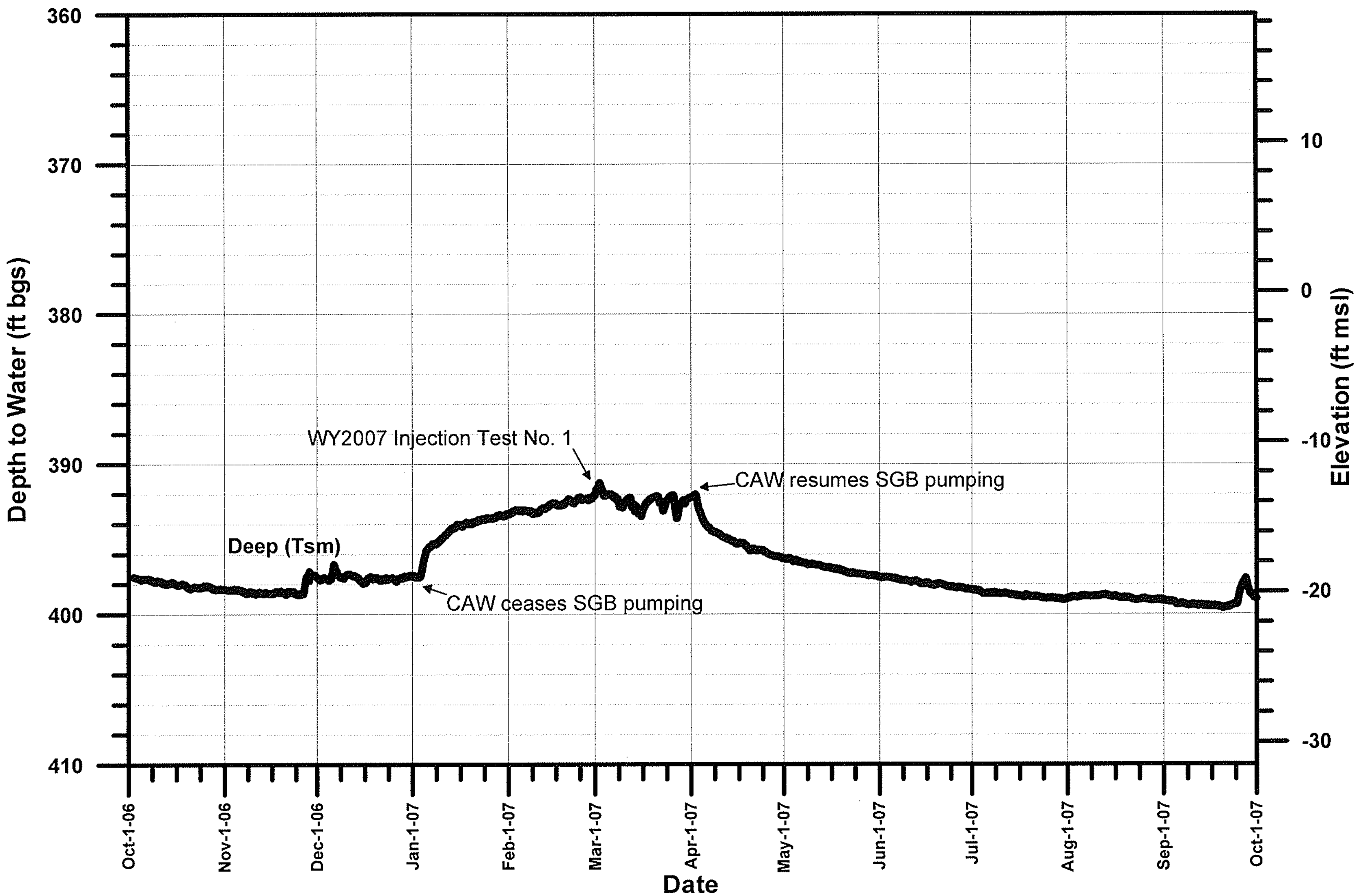

PUEBLO water resources

Monterey Peninsula Water Management District - Phase 1 ASR Project

WY2007 TESTING PROGRAM
FO-8 WATER LEVEL DATA
PLATE 11

APPENDIX A
FIELD DATA SHEETS
(not included in draft)

APPENDIX B
WATER QUALITY DATA
(not included in draft)

APPENDIX C
FORMAL REHABILITATION SUMMARY

FORMAL REHABILITATION

Rehabilitation activities at ASR-1 occurred during the period September 6 through December 20, 2007. Zim Industries, Inc. of Fresno, California, was retained by the District to rehabilitate ASR-1 (SMTIW No. 1) as part of the ASR-2 (SMTIW No. 2) well construction procurement. The rehabilitation work plan and technical specifications were developed by PWR, and consisted of both mechanical and chemical techniques. A summary of the rehabilitation work is presented below:

Pre-Rehabilitation Performance Testing

Prior to initiating rehabilitation, a formal 100-miunute performance test was performed to document baseline production performance. The test was performed on September 6, 2007 at an average pumping rate of approximately 1,420 gpm. Static water level prior to pumping was approximately 369.5 ft bgs, with a 100-minute pumping level of approximately 447.9 ft bgs, corresponding to approximately 78.4 feet of drawdown and a specific capacity of 18.1 gpm/ft.

Pump Assembly Removal and FCV Testing

The contractor mobilized to the site on October 1, 2007 and began removal of the existing pump/motor and FCV assembly. While the FCV was above ground, leak testing was performed by pressurizing the FCV, then inspecting all pressurized connections for leaks with a detector solution[1]. The leak testing identified a significant leak at the control hose fitting connection on the FCV body (the likely source of routine nitrogen gas losses that have occurred since the FCV was originally installed). The fitting was removed, cleaned, and replaced utilizing manufactured recommended thread sealant[2]. Subsequent testing performed at 360 psi pressurization of the FCV showed no leaks or pressure losses over 20 hours of testing.

Pre-Rehabilitation Video Survey

A pre-rehabilitation video survey was performed on October 5, 2007. The video survey revealed that the upper-most perforations were relatively open (approximately 90 percent) with gravel pack visible behind the well screen slots. Plugging of the screen and gravel pack increased gradually with depth until the lower-most 50 feet or so was completed plugged with orange-brown colored biomass.

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[1] "RectorSeek Better Bubble" manufactured by Rector.
[2] V2 Thread Sealant, manufactured by Jet Lube.

Nylon Brushing

Following the video survey and mobilization of additional equipment and supplies, mechanical rehabilitation was initiated on October 17, 2007 with brushing of the well screen. A 16-inch diameter nylon brush assembly was utilized, and each 20-foot section of screen was brushed for approximately 30 minutes. Total brushing time was approximately 5 hours.

Bailing

Bailing of the well was performed on October 18, 2007 with approximately 4 vertical feet of material removed from the well. The bailed material consisted predominantly of an approximate 50/50 mixture of dark orange brown pipe scale/rust and fine grained gravel pack material, with minor amounts of very fine formation sand.

Pre-Chemical Dual-Swab Airlifting

Dual-swab isolation zone airlift pumping of the screen was performed to remove as much material from the screen/gravel pack/near bore aquifer materials as possible prior to injection of the chemicals. The dual-swab assembly consisted of two 16-inch outside diameter rubber swabs separated by approximately 8.5 feet on a perforated spindle. The tool was placed on the end of 5-inch diameter eductor pipe with a 1.25-inch diameter air line.

Dual-swab airlifting operations were initiated on October 23, 2007 from the top of the screen and worked progressively to bottom. Each 20-foot interval of screen was generally worked for a period of approximately 15 to 60 minutes until the discharge became relatively clear. Initial discharge from each interval was typically extremely turbid and of a dark orange brown color. Upon reaching bottom, a second pass was performed. Of note is that the lower most sections of the screen required relatively greater time to become clean. This is consistent with downhole velocity surveys performed on the well which have shown approximately 60 to 70 percent of the total contribution from the well derives from the lowermost 50 feet or so.

Chemical Treatment

Chemical injection was initiated on October 26, 2007. The chemicals were proportionally mixed in approximate 1,000 gallon batches/aliquots of solution containing the following constituents:

- Water: 620 gallons

- Hydrochloric Acid: 330 gallons
- Glycolic Acid: 55 gallons
- NW-440 Surfactant: 2 gallons
- L60B Inhibitor: 1 gallon

A total of 4 batches were prepared and the mixture was proportionally injected into each 20-foot interval of screen (400 gallons each) via the dual swab assembly and then chased with clear water to displace the solution from the assembly into the screen. Each 20-foot section was then "dry" swabbed for a period of 30 minutes to work the solution into the gravel pack and formation.

Following chemical injection, the well was allowed to remain idle over night. The next day samples were retrieved from the well utilizing a "thief" bailer at depths of approximately 490, 590, and 690 feet. The pH of the solution samples were measured at 2.0, 1.9, and 1.9, respectively. Each section of the screen was then "dry" swabbed again for a period of approximately 15 to 20 minutes to agitate the solution. A total of 3 passes of "dry" swabbing the screen were performed over a period of 2 days.

Post-Chemical Dual-Swab Airlifting

Removal of the chemicals was initiated on October 29, 2007 with dual-swab airlifting from the top of the screen and working progressively to bottom. Each section was worked for a period of approximately 30 minutes until reaching a depth of approximately 675 feet. The discharge from each interval was generally initially very turbid, of a deep orange brown color and containing minor amounts of fine gray formation sand, becoming relatively clear to cloudy within 5 to 15 minutes. The pH of the initial discharge ranged from approximately 5.7 to 1.5, decreasing with depth. From a depth of approximately 675 to the bottom (i.e., the bottom 25 feet of screen), the discharge displayed a similar turbidity pattern; however, the pH remained below approximately 3.5 for approximately 13 hours of continuous pumping. A total of approximately 15.5 hours of pumping was required from the lower 25 feet before the pH became close to neutral (i.e., above 6). A second pass was then conducted from the bottom to top, with approximately 30 to 60 minutes spent on each 20-foot interval above 675 feet.

Chlorination

Chlorination of the well was initiated on November 1, 2007. An approximate 1,200 gallon solution of 5,200 parts per million (ppm) available chlorine was prepared and incrementally introduced into each screen section with the dual-swab assembly from the top of the screen working to bottom. Each interval was "dry" swabbed for a period of approximately 20 minutes following introduction of the chlorine solution prior to moving down to the next interval. Following introduction of the chlorine solution to the entire screen, the assembly was raised to the top of the screen and the solution allowed to remain in the well overnight. A final dual-swab airlifting pass of the screen was made from the top of the screen to bottom to remove the chlorine solution.

Post-Rehabilitation Video Survey

A post-rehabilitation video survey was performed on November 11, 2007. The video survey revealed that the stainless steel screen was clean and all of the perforations were open (approximately 90 to 100 percent) with gravel pack visible behind the well screen slots from the top to bottom.

Post-Rehabilitation Performance Testing

Following reinstallation of the pump assembly, a formal performance test was performed to document post-rehabilitation production performance. The test was performed on December 20, 2007 at an average pumping rate of approximately 1,980 gpm. Static water level prior to pumping was approximately 370.6 ft bgs, with a 60-minute[3] pumping level of approximately 447.9 ft bgs, corresponding to approximately 33.2 feet of drawdown and a specific capacity of 59.7 gpm/ft. This compares to a pre-rehabilitation 60-minute specific capacity of approximately 18.6 gpm/ft, and represents an approximate 220 percent improvement. The post-rehabilitation performance is also approximately 95 of the original well performance (i.e., prior to any injection).

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[3] The post-rehabilitation performance test was terminated after 60 minutes due to unusual noise and vibration from the pump/motor.