# Chino Basin Watermaster
# Status Report No. 13

**(Covering September 2004 through December 2004)**

**January 2005**

# OPTIMUM BASIN MANAGEMENT PROGRAM

*In its Order of September 28, 2000, extending the term of the nine-member Watermaster Board, the Court ordered Watermaster to provide semiannual reports regarding the progress of OBMP implementation. In Status Report Number 4, filed with the Court on September 30, 2002, Watermaster notified the Court that Watermaster intended to provide quarterly status reports because of the rapid pace of OBMP implementation. By a subsequent Order of October 17, 2002, the Court added additional reporting items to the quarterly status report. An additional month (December 2004) was added to Status Report No. 13 so that the Watermaster reporting schedule aligns with traditional practice.*

*This Status Report Number 13 is filed pursuant to this revised schedule and reports on the period from September 1, 2004 to December 31, 2004.*

## PROGRAM ELEMENT 1 – DEVELOP AND IMPLEMENT COMPREHENSIVE MONITORING PROGRAM

### Groundwater-Level Monitoring

BACK-GROUND

Watermaster has three active groundwater-level monitoring programs operating in the Chino Basin – a semiannual basin-wide program; an intensive key well monitoring program associated with the Chino I / II Desalter well fields and the Hydraulic Control Monitoring Program (HCMP); and an intensive piezometric monitoring program associated with land subsidence and ground fissuring (see Land Surface Monitoring below) in Management Zone 1 (MZ1).

THIS PERIOD

For the semiannual program, Watermaster staff manually measures water levels in approximately 345 agricultural wells twice per year. In conjunction with the semiannual program, Watermaster staff manually measures water levels at about 107 key wells in the southern portion of the Basin and around the Chino I / II Desalter well fields once per month. Pressure transducers/data loggers are installed in 19 of these key wells to automatically record water levels once every 15 minutes. For the MZ-1 program, Watermaster consultants collect groundwater level data at 35 wells in the southern portion of MZ1. Data are collected manually at MZ1 wells once every two months, and automatically once every 15 minutes using a pressure transducer/data logger installed at each well.

These Watermaster programs also rely on municipal producers, other government agencies, and private entities to supply their groundwater level measurements on a cooperative basis. Watermaster digitizes all these measurements and combines them into a relational database maintained at Watermaster's office.

TO COME

During fiscal year 2004/05, Watermaster staff will expand the use of pressure transducers/data loggers. Watermaster staff will purchase and install about 15-18 additional pressure transducers/data loggers at HCMP wells that are currently being drilled. During fiscal year 2005/06, Watermaster staff will purchase and install about 20 additional pressure

transducers/data loggers at key wells and at selected wells in the northern portions of Chino Basin where highly-detailed groundwater level data are scarce.

## Groundwater-Quality Monitoring

BACK-GROUND

**Prioritizing Wells to Serve Multiple Purposes.** The private wells chosen for the 2004-05 water quality monitoring program are located primarily between Interstate 60 and the Santa Ana River (SAR).

## Water Quality Analyses

- All groundwater samples are analyzed for general mineral and general physical parameters.
- Wells within or near the two volatile organic compound (VOC) plumes south of the Ontario and Chino Airports are being analyzed for VOCs, in addition to the general mineral and general physical parameters.
- All private wells in the key well program are being analyzed for perchlorate because of its widespread occurrence in the 1999-2001 sampling program, and the concerns expressed by appropriators faced with expensive ion exchange treatment costs for perchlorate-contaminated wells.

**Sampling Program of Selected Private Wells**. Watermaster developed its streamlined, key-well water quality monitoring program in which approximately 114 private "key wells" are sampled bi-annually (i.e. once every two years) in the southern portion of Chino Basin. Therefore, approximately 57 wells will be sampled on an annual basis. The steps taken in determining the key wells were:

- The basin was divided into a grid, with each grid cell being 2000 square meters ($m^2$).
- For each grid cell, the average TDS and $NO_3$ values were calculated (using the last five years of available data).
- The water quality data of each individual well were examined. Wells most closely matching the average constituent concentrations were chosen as representative. One to two wells in each grid square were retained (the wells not chosen in the key well program, but still matching these criteria, are the alternate wells for each grid cell). Preference was given to wells with the following characteristics:
  - Known construction;
  - Choice as a groundwater level key well;
  - Likelihood of surviving regional land development.
- Basin-wide TDS and $NO_3$ arithmetic averages were recalculated using just the key wells and compared to the total basin arithmetic averages. New maps were made representing the water quality conditions of the key wells and qualitatively compared to the original basin maps.

Watermaster continues a comprehensive water quality program whereby water quality data from other sources are routinely collected, quality-control checked and loaded into Watermaster's database. Data sources included:

- Appropriators
- Department of Health Services (DHS) – these data are currently downloaded from DHS annually
- Department of Toxic Substance Control (DTSC) for the Stringfellow Acid Pits
- Regional Water Quality Control Board (RWQCB) for water quality data associated with sites under Cleanup and Abatement Orders (CAO).

THIS PERIOD

Watermaster is working closely with the Appropriative Pool members and their state-certified contract laboratories in order to obtain water quality data as an electronic data deliverable (EDD). These data are transmitted either directly from the laboratory or from the Appropriators, after their QA/QC check of the laboratory data. The EDDs will enhance the quality and timeliness of the Watermaster's database.

TO COME

With respect to the recharge of recycled water, Watermaster and IEUA are designing a number of monitoring wells at recharge basins to monitor the influence of recharge on groundwater levels in general, and to monitor the water quality resulting from the recharge of supplemental and storm waters. At least one monitoring well will be installed downgradient of each recharge facility that receives recycled water. The construction schedule will be included in subsequent status reports.

## Groundwater-Production Monitoring

BACK - GROUND

**Monitoring of Agricultural Production Wells.** Initially production monitoring involved the installation of meters on wells operated by members of the Agricultural Pool. As of the end December 2004, Watermaster counted about 482 active agricultural wells and equipped 349 of these wells with operating meters. The other 133 wells have or will become inactive within 18-24 months because of urban development in the south Chino area or have inoperable meters.

ON GOING

**All Producing Wells Are Monitored Quarterly.** Watermaster staff reads the newly installed and/or rehabilitated meters on the agricultural wells quarterly. A "water duty" method is used to estimate production at agricultural wells that do not have meters.

TO COME

**Need For Water Use/Disposal Form To Be Reviewed.** The OBMP Implementation Plan includes a provision that requires the agricultural producers to submit a water use/disposal form describing the sources of water used by each producer and how that water is disposed of after each use. Filling out the water use and disposal form and reporting the results have not been implemented. Watermaster will initiate discussions of the need for this form with the Water Quality Committee.

## Surface-Water Monitoring

BACK-GROUND

**Measure Water Quality and Water Levels In Recharge Basins.** Watermaster conducts a surface water monitoring program to characterize the water quality of water in recharge basins and the water levels in some of these basins. The purpose of this program is to estimate the volume and quality of recharge. This information will be used in subsequent years to estimate the safe yield of the Basin and for other management purposes.

ON GOING

Currently, Watermaster monitors the water quality in 20 basins: Upland, Declez, Etiwanda Spreading Grounds, Victoria, Hickory, Lower Day, Banana, Ely 1, Ely 3, Wineville, San Sevaine 1, San Sevaine 5, Turner 1, Princeton, Montclair 1, Montclair 2, Montclair 3, Montclair 4, Brooks, and Grove. Generally, the water quality samples are taken after storm events, i.e., during the period from November 1 through March 30; however, monitoring of nuisance flows also occurs. Each basin is usually sampled three to five times each year. In fiscal year 2005-06 the sampling rate will increase substantially for basins that are scheduled to receive recycled water.

THIS PERIOD

Watermaster staff sampled the storm water captured on the following dates in the named basins:

- 10/22/04 - Montclair 1-4;
- 10/25/04 - Lower Day, Ely 1-3, San Sevaine, and Turner 1;
- 10/26/04 - DeClez, Banana, Wineville, San Sevaine 5;
- 10/28/04 - DeClez, Wineville, Turner 1, 8th Street;
- 10/29/04 - San Sevaine 5, Brooks, Grove; and
- 11/30/04 - Victoria and Grove.

BACK-GROUND

**Surface Water Monitoring for Santa Ana River Began In June 2003**. One of the goals of the OBMP is to maximize Chino Basin yield. A key component in maximizing yield is to minimize groundwater discharge into the SAR. Watermaster developed a surface water monitoring program for the SAR that, in conjunction with Watermaster groundwater monitoring programs, is used to characterize those reaches of the SAR that are gaining water from the Basin, and to determine if significant discharge of Chino Basin groundwater to the SAR is occurring. A conceptual monitoring plan involving IEUA, OCWD, the RWQCB, and Watermaster was finalized. These agencies determined that the conceptual monitoring plan was adequate and developed a detailed work plan to implement a surface water and groundwater monitoring program. The work plan was completed in June 2003, and year-round water quality sampling and flow monitoring in the SAR have begun.

ON GOING

Watermaster now measures the SAR flow and selected water quality parameters as key elements of the HCMP. Watermaster collects water quality samples and measures flow at four Santa Ana River stations (Van Buren, Etiwanda, Hamner, and River Road) plus another eight locations on tributaries, year round on a bi-weekly basis. In addition, Watermaster obtains discharge data from permanent USGS and OCWD stream gauge locations on the SAR and its tributaries. Discharge and water quality data from publicly owned treatment works (POTWs) that discharge to the SAR in this reach are obtained from the POTWs.

## Land-Surface Monitoring

BACK-GROUND

**Multifaceted Approach.** Watermaster staff developed a multifaceted land surface monitoring program to develop data for a long-term management plan for land subsidence in Management Zone 1 (MZ1). The monitoring program consists of three main elements:

1. An aquifer system monitoring facility is located in the southern portion of MZ1, an area that has experienced concentrated and differential land subsidence and ground fissuring. A major component of the aquifer system monitoring facility is a cluster of multiple depth piezometers that measure water level and pressure changes at 11 different depths. Another major component is a dual borehole extensometer that measures deformation within the aquifer system at deep and shallow levels. Together, the two components correlate the hydraulic and mechanical responses of the aquifer system to different aquifer stresses, such as pumping at wells.

2. Synthetic aperture radar interferometry (InSAR) measures land surface deformation across the entire Chino Basin using remote sensing techniques.

3. Benchmark surveys along selected profiles of the Chino Basin. The benchmark surveys (1) establish a datum from which to measure future land surface deformation, (2) "ground-truth" the InSAR data, (3) allow determination of historical subsidence at any historical benchmarks that can be recovered, and (4) evaluate the effectiveness of the long-term management plan.

ON GOING

**Depth Specific Data.** Permanent transducers and data logging equipment are recording depth specific groundwater level data at the Ayala Park piezometers. Transducers also are recording groundwater level data at wells owned by the cities of Chino and Chino Hills and the California Institution for Men (CIM). These transducers record groundwater levels at all wells once every 15 minutes, and also record "on/off" pumping cycles at the active production wells.

**Deep Aquifer-System Stress Test**.

BACK-GROUND

Controlled aquifer-system stress (pumping) tests in October 2003 and April 2004 provided piezometric response data that revealed a potential groundwater barrier within the sediments below about 300 ft-bgs, as evidenced by a lack of water level response in CH-18 (east of the fissure zone) due to pumping at CH-19 (west of fissure zone). Image-well analysis of pumping-test responses indicates that this barrier approximately coincides with the location of the historic zone of ground fissuring. This spatial coincidence suggests a cause-and-effect relationship between the barrier, the steep gradient of subsidence across the barrier as indicated by InSAR, ground level surveys and the ground fissuring.

THIS PERIOD

Starting on September 1, 2004, Watermaster began a controlled deep aquifer-system stress test. In summary, the test provided constant discharge from two wells owned by the City of Chino Hills (CH-15B and CH-19); while most other wells in the area remain off. These wells have similar perforated intervals from about 300-1,100 ft-bgs and primarily influence water levels in the deep portions of the aquifer system – deeper than about 300 ft-bgs. The pumping test ended on October 6, 2004 {Note: CH-1B was also planned to pump during the test, but high ph levels at this well precluded pumping}

The primary objective of this test was to transition the deformation of aquifer-system sediments from elastic compression to inelastic compaction. It will provide "threshold" piezometric heads at the extensometer location that should not be approached in the future if permanent (inelastic) compaction within the aquifer-system is to be avoided. It defines a key parameter required for estimating the maximum elastic storage capacity of the confined aquifer system. When inelastic

compaction was clearly identified, through analysis of stress-strain diagrams (see discussion below), the pumping test ceased.

Other objectives of the stress test were to (1) estimate key aquifer-system parameters that could be used in later modeling efforts, (2) confirm and elucidate the existence of a groundwater barrier within the sediments below about 300 ft-bgs, and (3) provide data for a proposed injection test at CH-1B.

With regard to CH-15B, groundwater pumped from this well has relatively high concentrations of arsenic that do not permit pumping this well directly into Chino Hills' distribution system. Yet it was imperative that this well participate in the stress test in an attempt to transition the aquifer-system deformation to inelastic compaction. Watermaster and Chino Hills jointly funded the connection of CH-15B to the storm drain system through a "flush line" discharge pipe, which allowed the pumping of CH-15B during the test.

BACK-GROUND

**Deep piezometer rehabilitation**. During the summer drawdown in the 2003 it became evident that some degree of intercommunication was developing among the piezometers in the deep cluster (PB) at Ayala Park, and that the deepest piezometer, **PB-1,** and perhaps others, were also intermittently communicating with the much higher heads in the shallow aquifer system. The leakage apparently was occurring through faulty joints in the two-inch PVC casings, although actual breaks in the casings may also exist. Evidence suggests that many of the problems may have resulted from defects in the casing of PB-1 that allowed leakage directly into the gravel envelopes around the screened intervals of shallower piezometers. To the extent that this is true, repair of PB-1 could solve most of the problems.

Rehabilitation of the PB piezometers was conducted during June/July 2004, using a "well-in-a-well" construction technique. This involved filling the screened interval (5 to 20 ft) of the piezometer casing with coarse, highly permeable sand, which is then topped with about 10 ft of graded medium to very fine sand and silt to form a filter cap of very low permeability. A 1-inch inner pipe, the well within the well, is jetted through the filter cap in an attempt to communicate with the original gravel envelope and surrounding formation. Before final jetting down into position, the inner pipe, temporarily set about 20 ft above the screen, allows water standing in the 2-inch casing to be displaced to the surface while a sealing bentonite grout was pumped down the annulus between the 2-inch casing and the inner pipe.

This technique was tested and refined by experimenting in PB-6, the shallowest of the deep piezometer cluster. Based on the results at PB-6, Watermaster attempted to rehabilitate PB-1 using similar methodologies.

THIS PERIOD

Preliminary evaluation of piezometric data from all piezometers in PB indicates that the rehabilitation procedures were at least partially successful. In particular, PB-2 and PB-4 appear so far to be producing reasonable and accurate data. A comprehensive analysis of the rehabilitation results at PB will commence at the end of the current drawdown season October 2004. Further rehabilitation, if needed, will be recommended at the conclusion of the analysis, along with a detailed description of rehabilitation procedures.

BACK-GROUND

**InSAR.** The objective of this task is to characterize ground surface deformation in Chino Basin using Synthetic Aperture Radar Interferometry (InSAR). This analysis will be performed for a

historical period (1992-2003) and on an on-going basis thereafter. The advantage of InSAR is that it provides a continuous representation of land surface deformation. These data are used to: (1) characterize the time history of land surface deformation in greater spatial and temporal detail than can be accomplished from the available historical ground level survey data, (2) calibrate computer simulation models of subsidence and groundwater flow, and (3) assist in the evaluation of the effectiveness of the long term management plan.

Vexcel Corporation of Boulder, Colorado – a company that specializes in remote sensing and radar technologies conducted a "proof of concept" study of historical synthetic aperture radar data that was acquired over the MZ-1 area. The objective of this study was to generate cumulative displacement maps over relatively short time steps (April to November 1993). The MZ-1 Technical Group deemed the study successful, and approved follow-up study by Vexcel to perform a comprehensive analysis of all historical synthetic aperture radar data (1992-2003) to characterize in detail the time history of subsidence in MZ-1.

THIS PERIOD

Vexcel submitted a cost estimate of $200,000 to complete the comprehensive analysis of all historical synthetic aperture radar data (1992-2003) to characterize in detail the time history of subsidence in MZ-1. Watermaster budgeted the above amount for InSAR analysis in its fiscal year 2004/05 budget. A contract was executed between Watermaster and Vexcel to complete the work by the first quarter of calendar 2005. Part of the contract includes the presentation of the analysis results by Vexcel staff to the MZ-1 Technical Committee in March 2005.

BACK-GROUND

**Benchmark Surveys.** The Interim Monitoring Program (IMP) work plan called for the deep extensometer, which is anchored in sedimentary bedrock at about 1,400 ft bgs, to be used as the "starting benchmark" for all survey loops. To accomplish this, a Class-A benchmark was constructed outside the extensometer building to serve as the practical (*i.e.* actual) starting benchmark. To link this benchmark to the deep extensometer pipe, each survey event is begun by referencing the benchmark to a marked spot on one of the piers that supports the extensometer instrument platform. These piers and the instrument platform represent a stable ground surface datum that is used to measure relative vertical displacement between the ground surface and the deep extensometer pipe (recorded every 15 minutes). The vertical displacement recorded at the deep extensometer between survey events, in addition to any vertical displacement measured between the starting benchmark and the pier, is then used to calculate the elevation at the starting benchmark outside the extensometer building. Then, relative vertical displacement between benchmarks is measured across the entire work to obtain current elevations. These comprehensive surveys are planned to be repeated annually during spring season of highest regional water levels.

A key element of the MZ-1 benchmark network is the array of closely spaced benchmarks that have been established across the historic fissure zone in the immediate vicinity of the Ayala Park extensometers (Ayala Park array). At this array, located along Edison and Eucalyptus Avenues, the IMP work plan calls for the semiannual measuring of both vertical and horizontal displacements. These horizontal and vertical displacements are expected to define two-dimensional profiles of land surface deformation that can be related to the vertical distribution of aquifer system compaction and expansion that is being recorded continuously at the extensometers. These surveys are repeated semi-annually during the late spring and early fall periods of highest and lowest water levels – in an attempt to monitor fissure movement that may be associated with elastic and/or inelastic aquifer deformation.

In late April 2004, AE performed the annual survey event across the entire network of benchmark monuments, including the measurements of horizontal displacements at the Ayala Park Array of monuments. The results of the ground level surveys to date were presented to the MZ-1 Technical Committee at its July 21, 2004 meeting. Also at this meeting, the project manager from AE made a presentation to describe survey methodologies, accuracy, results, and challenges, as well as answered questions.

The vertical displacement at monuments that occurred from April 2003 to April 2004 was presented. Comparing monument elevations over the April to April time period should reveal the inelastic component of compaction, if any, that may be occurring in the region. The assumption here is that in April 2004 water levels in the region have recovered to the April 2003 levels, thus the measured vertical displacement does not include the elastic component of the aquifer system deformation. Water levels measured as part of the IMP (in the vicinity of Ayala Park) support this assumption. The monuments near Ayala Park showed little to no subsidence over this time period. However, the monuments located in the northern portions of the surveyed area consistently showed subsidence of the land surface (on average about 0.04 feet). Maximum subsidence of about 0.08 feet was recorded at monuments located along Philadelphia Street between Pipeline and Ramona Avenues. Water level data have not yet been collected or analyzed as part of the IMP in these northern portions of the survey area that seemingly are experiencing inelastic subsidence.

The subsidence that occurred in the area over the October 1993 to December 1995 period was measured by InSAR. The subsidence indicated by InSAR data has been interpreted as primarily permanent subsidence caused by inelastic aquifer system compaction. If so, the survey data are indicating that the distribution of inelastic compaction in 2003-04 is significantly different compared to that of the early 1990's. In particular, maximum subsidence of about 1 foot in 1993-95 was measured in the vicinity of Ayala Park by InSAR, whereas in 2003-04 the survey data are indicating minimal subsidence, if any, in this same area.

The horizontal displacements at monuments of the Ayala Park Array that occurred from April 2003 to November 2003 and November 2003 to April 2004, respectively were determined through distance measurements between adjacent monuments, and are based on the assumption that the southeastern monument was stable over the period of measurement. The measurements indicate the elastic nature of the land surface displacement over the course of the pumping and recovery seasons, as well as the apparent presence of a groundwater barrier within the deep aquifer system.

Groundwater production and water level data show that pumping of wells perforated within the deep aquifer system (>300 ft-bgs) causes water level drawdowns in the deep aquifer system on the order of 150 feet. However, these large drawdowns do not propagate east of the fissure zone. During the pumping season of 2003 (April to November) vertical displacement of the land surface (*i.e.* subsidence) was generally greater on the west side of the fissure zone where water level drawdown was greatest. During the recovery season of 2003-04 (November to April) vertical displacement of the land surface (*i.e.* rebound) was again greater on the west side of the fissure zone where water level recovery was greatest.

In other words, the groundwater barrier in the deep aquifer system aligned with the fissure zone causes greater water level fluctuations on the west side of the barrier where the pumping is concentrated. These greater water level fluctuations on the west of the barrier, in turn cause

greater deformation of the aquifer-system matrix which, in turn, causes greater vertical land surface deformation on the west side of the barrier. The InSAR data corroborate the existence of the groundwater barrier by showing maximum subsidence west of the barrier (0.2ft) and virtually no subsidence east of the barrier during the course of one pumping season (April-1993 to September 1993).

In addition, the pattern of horizontal displacement of benchmarks over the pumping and recovery seasons, likely reflects, in part, the differential compaction of the aquifer system across the fissure zone. The horizontal movements of benchmarks in the vicinity of the fissure zone merit further monitoring using the same surveying methods for at least one additional year. The next survey of the Ayala Park array of monuments is planned for April 2005.

**Aquifer-System Modeling.** The objectives of aquifer-system modeling in MZ-1 are:

BACK-GROUND

- To evaluate fluid withdrawal as the mechanism of historical land subsidence (forensic tool)
- To predict the effects of potential basin management practices on groundwater levels and land subsidence (forecasting tool)

In other words, if a model can be constructed that simulates past drawdown and associated land subsidence, then the model represents an additional line of evidence that fluid withdrawal was the mechanism of historical and land subsidence. In addition, the model can be used to predict future drawdown and associated land subsidence that would result from potential basin management practices.

Three distinct modeling efforts will take place in sequence:

1. Inverse analytical modeling. This type of modeling will use groundwater level and production data collected as part of the aquifer-system stress testing (pumping tests) that were conducted in 2003 and 2004. The objectives are to determine the hydraulic and mechanical parameters of the aquifer-system and reveal XY-anisotropy. The results will be used in subsequent numerical modeling efforts.

TO COME

2. One-dimensional compaction modeling. This type of modeling will use groundwater level and aquifer-system deformation data collected at the Ayala Park Extensometer facility. The objective is to determine the aquitard properties in the vicinity of Ayala Park. Areal extrapolation of aquitard properties will be based on geology and InSAR data, and the results will be used in the three-dimensional numerical modeling efforts (below).

3. Three-dimensional groundwater flow and subsidence modeling. This type of modeling will use groundwater level and production data at all wells in the area, and historical land subsidence data from ground level surveys and InSAR. Again, this model will serve as a forensic and forecasting tool for MZ-1.

**Development of Long-Term Management Plan**. The objective of the long-term management plan is to minimize or abate permanent land subsidence and ground fissuring in MZ-1. The modeling efforts described above will be key to the development and evaluation of this plan.

The OBMP implementation plan called for the development of the long-term management plan for MZ-1 by June 2005. Because the modeling efforts will not be completed by June 2005, the long-term management plan will not be completed by June 2005. The Special Referee has been notified, and has indicated that the IMP progress and current activities are sufficient to warrant a delay in the development of the long-term management plan for MZ-1. A workshop will be scheduled for the second quarter of 2005 to update the Special Referee on IMP progress.

## Well Construction, Abandonment, and Destruction Monitoring

BACK-GROUND

Watermaster staff monitors the condition of wells on a regular basis. Wells that may be improperly abandoned/destroyed are reported to Riverside and San Bernardino Counties as they are discovered.

Watermaster staff inspected 150 suspect wells during a 2002-03 field inspection and determined that 113 of these wells were properly abandoned and 37 wells will require some modification to meet the standard for a properly abandoned well. A well repair/abandonment program was prepared and approved by Watermaster. Watermaster continues to develop a wellhead protection program and makes recommendations on closure of abandoned wells. Ongoing land development will require continued well abandonment activity by Watermaster.

# PROGRAM ELEMENT 2 – DEVELOP AND IMPLEMENT COMPREHENSIVE RECHARGE PROGRAM

*A centerpiece of the OBMP is enhancement of the Basin recharge capacity, so that high quality storm water and available recycled water can be retained in the Basin.*

## Recharge Facilities Improvement Project (Seven Bid Packages)

### Bid Package No. 1—Reconfiguration of Banana, College Heights, Lower Day, RP3 and Turner Basins

COMPLETED

Bid Package No. 1, which included major earthwork at Banana, College Heights, Lower Day, RP-3, and Turner Basins, was awarded to LTE Excavating on March 24, 2003. Work was scheduled for completion by November 15, 2003, but was delayed while awaiting delivery of sluice gates and their actuator assemblies. These items were received and installed; and the bid package was accepted on May 12, 2004

### Bid Package No. 2 – Basin Improvements (3 ea), Drop Inlets (3 ea), and Rubber Dams (4 ea)

COMPLETED

Bid Package No. 2 consisted of construction of the drop inlet structures for Brooks Street Basin, Turner Basin; and Victoria Basin; rubber dams for College Heights/Upland Basins, Turner No.1 Basin, Lower Day Basin, and RP-3 Basin; and various improvements at Declez Basin, Ely Basins, and 8$^{th}$ Street Basins. This package was awarded to Banshee Construction with work

beginning on July 16, 2003. Work on this contract was scheduled to be completed by March 15, 2004; however, rain delays slowed completion of excavation and soil cement berms. All the work on this bid package was accepted on August 18, 2004.

**Bid Package No. 3 – Jurupa Basin to RP-3 Force Main**

THIS PERIOD

Bid Package No. 3 involves construction of approximately 11,000 linear feet of 36-inch CML&C force main between Jurupa Basin and RP-3 Basin. The force main will be used to convey storm water, imported water, and recycled water between the pump station at Jurupa Basin and the RP-3 Basins. This package was awarded to W. A. Rasic Construction Company with work beginning on August 6, 2003. The contractor has completed 99% of the work, rendering the project "substantially complete" on November 30, 2004.

**Bid Package No. 4 – Jurupa Basin to RP-3 Pump Station**

THIS PERIOD

Bid Package No. 4 consists of construction of the Jurupa Pump Station, 100 feet of 48-inch pipeline, and 400 feet of 36 inch, CML&C steel force main. The package was awarded to LT Engineering with work beginning on February 19, 2004. The contractor has completed 85% of the work, with "substantial completion" estimated by February 1, 2005.

**Bid Package No. 5 – SCADA System**

THIS PERIOD

This bid package includes the SCADA system and electrical improvements at all the basins. The 100 % design was submitted, reviewed, and sent out for bid in January 2004. The package was awarded to Denboer Engineering with construction beginning in March 2004. The contractor is now 90% complete, with substantial completion in February 2005

**Bid Package No. 6 – MWD Turnouts**

THIS PERIOD

This bid package covers the construction of three new MWD turnouts: CB-11TB and CB-15T on the Rialto Pipeline, and CB-18T on the Etiwanda Intertie near San Sevaine Channel. This package was awarded to Griffith Construction with work beginning on February 4, 2004. The contractor is now 95% completion, with substantial completion in January 2005.

**Bid Package No. 7 – Priority, Funding and Scope of Misc. Projects**

This bid package will complete miscellaneous projects not included in the previous bid packages. Among the projects included in this bid package are:

THIS PERIOD

- Habitat Mitigation Area at RP-3
- Upland Basin Improvements
- Victoria Basin Improvements
- Hickory Rubber Dam, Pump Station and Force Main
- Grove Basin SCADA Improvements

This package was bid and awarded to Brutoco Engineering & Construction on July 21, 2004. The construction was estimated to take five months, but rain delays have extended the project 60 days. The package should be "substantially complete" in February 2005.

THIS PERIOD

## Groundwater Recharge Coordinating Committee (GRCC)

The GRCC meets monthly to monitor and coordinate the Recharge Facilities Improvement Project, focusing on design issues, construction management, and operations manuals. Watermaster's FY2004-05 budget provides $413,000 for current operation and maintenance activities.

In addition to design review, the GRCC has prepared draft operations procedures for all the recharge basins, as well as obtained regulatory agency approvals and permits.

Watermaster has been performing "demonstration" recharge of imported and storm water in the basins as they are completed. These demonstration project have been valuable in pointing out shortcomings in the design and construction of the recharge facilities. During this quarter, Watermaster captured 4,600 AF of "new yield" stormwater in the completed basins.

## PROGRAM ELEMENT 3 – DEVELOP AND IMPLEMENT WATER SUPPLY PLAN FOR THE IMPAIRED AREAS OF THE BASIN; AND

## PROGRAM ELEMENT 5 – DEVELOP AND IMPLEMENT REGIONAL SUPPLEMENTAL WATER PROGRAM

*These program elements focus on the shift of production in the southern end of the Basin away from agricultural uses and toward urban uses. Without the OBMP, this land use conversion would result in a decrease in production in the southern end of the Basin, ultimately leading to rising water levels. If groundwater levels in the southern end of the Basin rise too high, then water may "spill" out of the Basin into the Santa Ana River. Such uncontrolled spillage caps the overall Safe Yield of the Basin. The Basin can be managed to avoid this possibility.*

*Directly tied to the threat of rising water levels in the southern area is the diminished desire of appropriators to pump water because of impaired water quality. The ability to balance the loss of agricultural production with increased appropriative production is inhibited because of these water quality concerns. Greater appropriative production in this area therefore requires water treatment, an issue addressed through the construction of desalter facilities.*

## The Chino I/II Desalters

BACK-GROUND

The Chino I Desalter was originally constructed by SAWPA to provide 8.1 million gallons per day (MGD) of product water using reverse osmosis treatment. The project also included extraction wells, raw water pipeline, and product water pipelines and pump stations.

THIS PERIOD

**Chino I Expansion/Chino II Desalter**. This expansion includes the construction of an additional 4.9 MGD of parallel treatment capacity (nitrate removal via ion exchange) at Chino I and 10 MGD of similar ion exchange at the Chino II Desalter. A construction contract was signed and construction is underway with completion scheduled for March 2005. Watermaster staff reviewed the proposed well construction for the new wells for Desalter II and determined that the location and construction were consistent with the OBMP Implementation Plan

ON GOING

**Chino I Desalter Other Improvements**. Other facilities either under design or construction include three new extraction wells (construction completed), a raw water pipeline (construction completed), a Chino Hills pump station and product water pipeline (construction 70% completed), and a volatile organic compound (VOC) treatment system (construction 55% completed) ahead of the ion exchange treatment.

ON GOING

**Chino II Desalter Other Improvements**. Other facilities either under design or construction include nine new extraction wells (seven under construction, two wells completed), three raw water pipeline packages (one in early construction, two in design), two product water pipelines (one completed construction, one completed design), and site improvements (construction 55% completed)

All the projects underway to expand the Chino I/II Desalters should be completed by March 2005. Application has been made for Prop. 50 funds ($1,600,000) to add 8 mgd of ion exchange capacity to the Chino ll Desalter.

## PROGRAM ELEMENT 4 – DEVELOP AND IMPLEMENT COMPREHENSIVE GROUNDWATER MANAGEMENT PLAN FOR MANAGEMENT ZONE 1

*Program Element 4 details the steps undertaken by Watermaster to reduce or abate subsidence and fissuring in Management Zone 1.*

THIS PERIOD

**The MZ1 Technical Committee Meeting – December 8, 2004.** Committee representatives were informed of the status of the various efforts to implement the monitoring program (see Land Surface Monitoring of Program Element 1). The meeting focused on the pumping test results, the Associated Engineers (AE) semi annual survey of the Ayala Park Array of benchmarks, the progress on the Vexcel InSAR studies, and the analysis of piezometric and extensometer data.

**Voluntary Forbearance.** The City of Chino and the City of Chino Hills submitted certifications documenting their respective voluntary participation in forbearance of groundwater production. Through the end of November 2004, the City of Chino submitted documentation of pumping reductions of 482.5 acre-feet toward its forbearance goal of 1,500 acre-feet for 2004/2005. The City of Chino Hills submitted documentation of forbearance of 500 acre-feet through December 2004.

| Agency | Forbearance through December 2004 | Forbearance Goal 2004/2005 |
|---|---|---|
| City Of Chino | 482.5 acre-feet | 1,500 acre-feet |
| City Of Chino Hills | 500.0 acre-feet | 1,500 acre-feet |

TO COME

**Pending Legal Actions Regarding Subsidence.** In its October 17, 2002 Order, the Court ordered Watermaster to keep the Court apprised of any legal actions that could question the Court's jurisdiction over subsidence. Watermaster is not aware at this time of any such actions. The hearing regarding the City of Chino's Paragraph 15 Motion concerning subsidence was continued by the court until September, 2005.

## PROGRAM ELEMENT 6 – DEVELOP AND IMPLEMENT COOPERATIVE PROGRAMS WITH THE REGIONAL WATER QUALITY CONTROL BOARD, SANTA ANA REGION (REGIONAL BOARD) AND OTHER AGENCIES TO IMPROVE BASIN MANAGEMENT; AND

## PROGRAM ELEMENT 7 – DEVELOP AND IMPLEMENT SALT MANAGEMENT PROGRAM

*The "water quality committee" as envisioned in the OBMP Implementation Plan has been formally constituted. Since the development of the OBMP, Watermaster has worked closely with the Regional Water Quality Control Board, the Department of Toxic Substances Control, and others to define water quality challenges and to refine the water quality management criteria in the Chino Basin. Watermaster continues to review water quality conditions in the Basin and to consider future water quality management activities beyond the Chino Basin desalting program.*

BACK-GROUND

**Water Quality Management.** In response to the results of RWQCB and Watermaster's groundwater quality monitoring programs (Program Element 1) Watermaster has refined its water quality monitoring to focus on the following key areas:

- Watermaster is identifying and characterizing water quality anomalies, such as the VOC anomaly south of the Ontario International Airport (OIA). Status Reports on each of the anomalies were developed by Watermaster and were presented to the Water Quality Committee for their review.
- Watermaster staff receives and reviews all reports that are produced by dischargers that are conducting investigations under order by the RWQCB and the Department of Toxic Substances Control (DTSC).
- Watermaster staff assisted the RWQCB with research, monitoring, and the crafting of investigative, and cleanup and abatement orders for potential dischargers involved with the OIA.
- Watermaster staff continues to participate in the process of developing TMDLs for Reach 3 of the Santa Ana River and other water bodies in the lower Chino

Basin. No progress has been made during the last quarter because of the State budget crisis and staffing issues at the RWQCB.

**Water Quality Committee**

BACK-GROUND

Watermaster staff and consultants continue to update our understanding of the contaminants of concern in the various plumes, and the extent of their migration and remediation. In addition, Wildermuth Environmental continued their analysis of the environmental records search performed by EDR. This consisted of a query of state and federal databases of known users and dischargers of potentially hazardous chemicals. Watermaster is analyzing the relationship of potential sources of perchlorate with down gradient impacted production wells. On March 30, 2004, Black & Veatch delivered their "Draft Technical Memorandum –Treatment Technology Review" which analyses current and emerging treatment technologies for specific contaminants of concern in the Chino Basin; including nitrates, perchlorate, arsenic, and specific VOCs.

With respect to the VOC plume at OIA, Wildermuth Environmental completed their data gathering effort at the RWQCB and prepared five draft Letters of Notification/Cleanup and Abatement Orders for review by the RWQCB prior to their mailing to identified potential dischargers. At the Chino Airport VOC plume, Watermaster obtained permission from private well owners to release VOC water quality data to the RWQCB. Tetra Tech, a consulting engineering firm performing quarterly groundwater monitoring of the VOC plume immediately southwest of the airport property in turn obtained these data from the RWQCB to assist in their efforts to model plume movement.

Tetra Tech is under contract to the County of San Bernardino, Department of Architecture and Engineering, the owner and operator of Chino Airport, and is attempting to determine the sources of the VOC plume. Tetra Tech is currently negotiating to install five additional groundwater monitoring wells, and to perform additional soil gas surveys, in order to locate the VOC sources. Watermaster's water level and water quality monitoring programs over the last several years have resulted in a robust database that is being used by Watermaster and other stakeholders in the basin to help answer these kinds of questions.

With respect to perchlorate in MZ-3, a number of wells in the Fontana area of Chino Basin have been impacted and shut down because of relatively low levels of perchlorate (but above the State Action Level of 6 µg/l). Some parties in the basin believe that significant perchlorate sources near the Mid-Valley Landfill (Goodrich, Aerojet, Quickset, Emhart Industries, Denova Environmental, Pyro Spectacular, Rialto Ammunition Storage Point, et al.) in the Rialto-Colton basin may also be sources of perchlorate in Chino Basin. The proposed transport pathway is leakage across the Rialto-Colton Fault. Members of the WQC proposed that Watermaster perform a hydrogeologic investigation of that area to better understand cross basin transport. The investigation may be prohibitively expensive, given the complexity of the fault system and aquifer heterogeneity.

In a related study, the RWQCB has done an extensive historical perchlorate usage literature review and has produced a sizable volume of circumstantial evidence that large quantities of Chilean fertilizer may have been used for citrus in the Fontana area.

TO COME

Neil Sturchio, Professor and Head of the Earth and Environmental Sciences at the University of Illinois at Chicago, has developed a technique for using stable isotope ratios of oxygen and chloride to distinguish the origin of perchlorate (man-made or Chilean fertilizer). Natural perchlorate carries a unique $^{18}O$ and $^{37}Cl$ signature – very robust parameters that can be used to distinguish between man-made and natural sources of perchlorate. Professor Sturchio has

tested several samples of leachate from fertilizer nitrogen (from the Atacama Desert in Chile) and rocket fuel sources. One of the innovations that Professor Sturchio has developed is the use of a flow-through column with an bifunctional anion-exchange resin. This is required to concentrate the typically low levels of perchlorate in groundwater so that the perchlorate can be analyzed isotopically.

Watermaster intends to utilize this isotopic perchlorate analysis to determine if source of the perchlorate in groundwater MZ-3 is anthropogenic or from Chilean fertilizer.

## Watermaster and Regional Board Propose TDS and Nitrogen Objectives to Promote Maximum Benefit of Waters Available to the Chino Basin

BACK-GROUND

Watermaster staff worked with the Total Dissolved Solids (TDS)/ Nitrogen (N) Task Force to revise the sub-basin boundaries, and the TDS and N objectives for the Chino Basin to promote maximum beneficial use of waters in the Basin (as opposed to the Regional Board's current, more rigid anti-degradation based objectives). The maximum beneficial use approach will increase water supplies and lower costs over time while meeting water quality requirements. In December 2002, Watermaster proposed specific water-quality management zone boundaries, and N and TDS objectives for the Chino Basin to the RWQCB. The TDS/N Task Force and the RWQCB incorporated Watermaster recommendations in the TDS/N Basin Plan Amendment dated November 21, 2003.

The Basin Plan Amendment incorporating the sub-basin boundaries and maximum beneficial use concept was adopted by the RWQCB on January 24, 2004 (RWQCB Basin Plan Amendment, and Attachment to Resolution No. R8-2004-001). Watermaster staff immediately developed and submitted surface water and groundwater monitoring programs to the RWQCB on February 21, 2004. These monitoring programs measure the progress of CBWM and IEUA in achieving the "maximum benefit" goal for TDS/N in the Chino and Cucamonga Basins. The Basin Plan amendment was reviewed and approved by the State Water Resources Control Board (SWRCB) on September 8, 2004. It is currently under review by the Office of Administrative Law (OAL) and U.S. Environmental Protection Agency (USEPA).

BACK-GROUND

**Cooperative Effort to Determine State of Hydraulic Control.** One remaining issue regarding the Basin Plan changes was to develop a monitoring plan to evaluate the state of hydraulic control in the southern end of the Basin. Hydraulic control is one tool that can be used to maximize the safe yield of the Basin. Watermaster staff developed a monitoring program for OBMP purposes and described this effort in the Initial State of the Basin Report (October 2002). The execution of this monitoring program is included in Program Element 1. Watermaster and IEUA have collaborated with OCWD and the RWQCB to select existing wells and to site nine new multi-piezometer wells that will be used to monitor and assess the state of hydraulic control.

In addition to being a core element of the OBMP, hydraulic control is a requirement of the Basin Plan Amendment. Watermaster, OCWD, and RWQCB staffs developed a conceptual monitoring program in June 2003 to assess the state of hydraulic control and to provide information to Watermaster to manage future production and recharge. The final work plan for the Hydraulic Control Monitoring Program was completed in May 2004, and implementation is now occurring. This program will change over time as new information is developed and will last for several years. The coordination and review of the hydraulic control monitoring data and the

development of management programs to maintain hydraulic control have been added to Program Elements 6 and 7.

Watermaster, IEUA, OCWD, and the Regional Board have agreed to construct nine new monitoring wells as part of the piezometric monitoring element of the HCMP. These monitoring wells are necessary because existing well locations and well construction are not sufficient to measure the extent of hydraulic control in the vicinity of the Desalter well fields and because of the loss of monitoring use of agricultural wells as these wells are destroyed in the land conversion from agricultural to urban uses. These new wells will document the creation of a regional depression in the piezometric surface, for both the shallow and deep aquifer systems, as a result of Desalter pumping. These wells are being installed during fiscal year 2004/05.

Funding for the construction of the nine monitoring wells will come from Watermaster, IEUA, and other sources. These other sources include $250,000 from the Local Groundwater Assistance Fund, sponsored by the California Department of Water Resources (DWR) and about $400,000 from the U.S. Bureau of Reclamation (USBR). The DWR funding will support the construction of two of the nine piezometric monitoring wells; the USBR funding will support construction of three of the nine piezometric monitoring wells.

THIS PERIOD

The following tasks were performed during September-December 2004 for the nine HCMP wells:

- Completed site acquisition efforts
- IEUA and USBR awarded separate contracts to drilling contractor
- Completed drilling, installation, and development on MW-2/-5/-8/-9

TO COME

The following tasks are projected to be performed during January-March 2005 for the 9 HCMP wells:

- Complete drilling, installation, and development on MW-1/-3/-4/-6/-7
- Complete well heads on all wells (in coordination with property owners who are currently developing the land)
- Equip wells with water level transducers

## Salt Budget Tool To Establish TDS Objectives

COMPLETED

Watermaster has developed a salt budget tool to estimate the current and future salt loads to the Basin and the salt benefits of the OBMP. This tool was used to establish TDS objectives for the northern part of the Basin based on maximum beneficial use of water available to the region. These projections were based on the water supply plan in the Implementation Plan and include alternative recycled water and State Project water recharge scenarios. Watermaster consultants prepared a letter report (February 20, 2004) describing the salt budget and the Chino Basin

Maximum Benefit Commitment. The commitments require Watermaster and IEUA to take specific actions triggered by ambient water quality and other time-certain conditions. An implementation schedule is specified, with the RWQCB responsible for overseeing compliance.

## PROGRAM ELEMENT 8 – DEVELOP AND IMPLEMENT GROUNDWATER STORAGE MANAGEMENT PROGRAM; AND

## PROGRAM ELEMENT 9 – DEVELOP AND IMPLEMENT STORAGE AND RECOVERY PROGRAM

*This section summarizes the work accomplished to date and the work planned over the next few months for the Chino Basin Dry Year Yield (DYY) and Storage and Recovery Programs. The DYY Program is a conjunctive use program between the Metropolitan Water District of Southern California (MWDSC) and several Basin appropriators, which would develop a maximum of 100,000 acre-feet of storage. These Programs also explore the potential for using up to 500,000 acre-feet of storage capacity.*

BACK-GROUND

**Completed Preliminary Design Report.** The first draft of the DYY Preliminary Design Report was completed in July 2003 and submitted to Watermaster. The DYY Program documentation is organized into four volumes: Volumes I and II, prepared by Black & Veatch, comprise the Preliminary Design Report (PDR). Volume I describes the background information and design objectives of the Program, while Volume II describes the facilities to be designed to help the agencies meet their shift obligation. Volume III presents the groundwater modeling report developed by Wildermuth Environmental, Inc., and Volume IV contains the CEQA Findings of Consistency environmental documentation prepared by Tom Dodson and Associates.

ON GOING

**DYY Shift Obligation**. Participants in the DYY Program will be required to reduce (shift) their imported water usage by a predetermined amount during a dry year. Each participating agency will have a specific shift obligation that, when added together, will provide MWDSC with 33,000 acre-feet of dry year yield. The shift obligations were determined through meetings and correspondence among IEUA, Watermaster, Black & Veatch, and representatives from each participating agency.

The eight participating agencies are as follows:

| | |
|---|---|
| • City of Chino | • Monte Vista Water District (MVWD) |
| • City of Chino Hills | • City of Ontario |
| • Cucamonga Valley Water District (CVWD) | • City of Pomona |
| • Jurupa Community Services District (JCSD) | • City of Upland |

**Facility Requirements and Site Selection**. A preliminary screening of potential sites identified the most feasible locations for the DYY Program facilities. The information was presented to the agencies and a final selection was made. The Program facilities consist of five new ion

exchange (IX) facilities, expansion of two existing IX facilities, construction of seven new non-water quality impaired wells, and two new perchlorate wellhead treatment facilities. The new wellhead IX facilities would contribute approximately 18,000 acre-feet of dry year yield, while the new well facilities would contribute approximately 15,000 acre-feet of additional yield. The total capital cost for the facilities is estimated to be $38 million. MWDSC will contribute approximately $27 million. The Groundwater Storage Program Funding Agreement between MWDSC, IEUA, Three Valleys Municipal Water District (TVMWD), and Watermaster was signed in July 2003.

ON GOING

**Design of PDR Facilities**. While some of the designs for the facilities outlined in the PDR are underway (Upland IX design completed, MVWD ASR well design completed, Pomona JCSD Teagarden IX expansion design underway); others such as the IX designs for Chino, Chino Hills, Ontario, and CVWD have yet to be started. These later designs should be completed in 2006.

BACK-GROUND

**Final Approval of DYY Storage Account**. Pursuant to Article X of Watermaster's Rules and Regulations, IEUA submitted an Application to enter into a Storage and Recovery Program Storage Agreement. This Application was approved unanimously by all Pools and received unanimous approval from the Advisory Committee and Board on October 23, 2003. Watermaster and IEUA developed a storage agreement pursuant to the Application and processed that agreement through the Watermaster approval process in March 2004. The agreement was submitted to the Court for approval. Prior to Court approval, MWDSC is utilizing its existing Trust Storage Account with the intention of transferring its water stored in the Trust Account into the DYY account upon approval of the Storage Agreement.

BACK-GROUND

**Groundwater Modeling**. The Chino Basin groundwater model was completed and the draft modeling report was submitted to Watermaster in July 2003. In addition to evaluating the effects of the DYY program on the Basin, the model was used to:

- Develop draft future replenishment and wet water recharge criteria based on requirements described in the Section 7.1b of the Watermaster Rules and Regulations regarding the balance of recharge and discharge. (See Wildermuth, Analysis of Supplemental Water Recharge Pursuant to the Peace Agreement. To be filed with the Court.)
- Evaluate the cumulative effects of transfers among the Parties as described in Section 9.3 of the Watermaster Rules and Regulations. (See Wildermuth, Evaluation of the Cumulative Effects of Transfers Pursuant to the Peace Agreement. To be filed with the Court.)
- Describe pumping patterns in Management Zone 1 that will not reduce piezometric levels below current conditions.

These management criteria were incorporated into the DYY program. The results of this work were presented to the Pool Committees, Advisory Committee, and the Watermaster Board in June and August 2003, and the final report was submitted in September 2003.

BACK-GROUND

**Engineering Review and Determination of the Operational Storage Requirement and Safe Storage.** The Operational Storage Requirement was defined in the Peace Agreement as part of the storage in the Chino Basin "necessary to maintain the safe yield" of the Basin (Peace

Agreement, Exhibit B – Implementation Plan, page 37). Safe storage is the maximum storage in the Basin that can occur without significant water quality and high groundwater related problems. The draft results of this work were presented to the Pool Committees, Advisory Committee, and the Watermaster Board in August 2003.

ON-GOING

**Other Uses of the Groundwater Model in the OBMP Implementation.** The groundwater model is currently being used to investigate alternative management strategies including reduced storage in the eastern part of the basin, expanded storage and recovery programs, and assessing hydraulic control with various appropriator proposed pumping alternatives in the southern Chino Basin. A draft report documenting the modeling effort and related investigations will be submitted to Watermaster during the next reporting period.

## CONCLUSION

THIS PERIOD

This has been an active reporting period for Watermaster, with major activities on a number of issues:

- Construction on Bid Packages 3 is substantially complete, but construction on Bid Packages 4-7 are delayed approximately 60 days by winter rains. Demonstration projects for recharge in College Heights, Montclair, Brooks, Turner and Lower Day Basins were undertaken.
- The groundwater level and quality monitoring programs have been reorganized to better support new initiatives, such as MZ1, HCMP, Nitrogen Loss, and Desalter Expansion. Selected wells are being equipped with automatic measuring and recording devices to continually collect water level data at wells at frequent intervals. Field sampling and laboratory analyses used in FY 2003/04 have transitioned to the new monitoring program for FY 2004/2005.
- Construction of nine new HCMP monitoring wells has begun.
- Data from the Ayala Park Extensometer indicated that deformation within the aquifer system sediments has been primarily elastic compression and expansion during the 2004 pumping season. A pumping test in October 2004 is being evaluated to determine the limits of pumping the deep aquifer to provide elastic compression and expansion.
- Cleanup and Abatement Order (CAO) were prepared for five industrial firms which appear to have discharged relative organic compounds from their activities at Ontario Airport. These orders are being completed by the RWQCB.