SEASIDE GROUNDWATER BASIN WATERMASTER
MEETING AGENDA
WEDNESDAY, FEBRUARY 7, 2007, 1:30 P.M.
SOPER COMMUNITY CENTER, 220 COE AVENUE
SEASIDE, CALIFORNIA

WATERMASTER BOARD:
City of Seaside – Mayor Ralph Rubio, Chairman
Laguna Seca Subarea Landowner – Director Bob Costa, Vice Chairman
Monterey Peninsula Water Management District – Director Michelle Knight, Secretary
City of Monterey – Vice Mayor Jeff Haferman
City of Sand City – Mayor David Pendergrass
California American Water – Director Steve Leonard
City of Del Rey Oaks – Mayor Joseph Russell
Monterey County/Monterey County Water Resources Agency - Supervisor Jerry Smith, District 4
Coastal Subarea Landowner – Director Paul Bruno

I. CALL TO ORDER

II. ROLL CALL

III. APPROVAL OF MINUTES;

The minutes of the Regular Board of Meeting of January 17, 2007 are attached to this agenda. Watermaster Board is requested to approve the minutes.

IV. REVIEW OF AGENDA

If there are any items that arose after the 72-hour posting deadline, a vote may be taken to add the item to the agenda, pursuant to the requirements of Government Code Section 54954.2(b). (A 2/3-majority vote is required.)

V. PUBLIC PARTICIPATION/ ORAL COMMUNICATIONS

Oral communications is on each meeting agenda in order to provide members of the public an opportunity to address the Watermaster on matters within its jurisdiction. Matters not appearing on the agenda will not receive action at this meeting but may be referred to the Watermaster Administrator or may be set for a future meeting. Presentations will be limited to three minutes or as otherwise established by the Watermaster. In order that the speaker may be identified in the minutes of the meeting, it is helpful if speakers would use the microphone and state their names. Oral communications are now open

VI. CONSENT CALENDAR

A. Request approval for payment of January, 2007 bills
B. Approval of checks authorized and in process during January, 2007

VII. OLD BUSINESS

A. COMMITTEE REPORTS

1. TECHNICAL COMMITTEE

a) Report on Seaside Basin Groundwater Modeling Recommended Approach – Martin Feeney

B. BUDGET/FINANCE COMMITTEE

No current reports

VIII. NEW BUSINESS

A. Adopt a Board policy on Reimbursements for Consultants participating in Watermaster Activities.

B. Appointment of Watermaster Treasurer

C. Approve February 15, 2007 Annual Report to Court for Year 2006

D. Consider Authorizing executive officer to send out Replenishment Assessments, (as shown on enclosed exhibit).

E. Consider Approving a Contract and a Budget Increase and Expenditure of approximately $35,000 to retain the firm of RBF Consulting to develop a work plan.

.IX INFORMATIONAL REPORTS (No Action Required

A. Receive Fall 2006 Groundwater Quality Monitoring Report for MPWMD Seaside Basin Coastal Monitor Wells

B. Current Fiscal Year Financial Statements

X. DIRECTOR'S REPORTS

XI. EXECUTIVE OFFICER COMMENTS

XII. NEXT MEETING DATE –MARCH 7, 2007 (Soper Community Center) 1:30 P.M.

XIII. ADJOURNMENT

This agenda was forwarded via e-mail to the City Clerks of Seaside, Monterey, Sand City and Del Rey Oaks; the Clerk of the Monterey Board of Supervisors; the Clerk to the Monterey Peninsula Water Management District; the Clerk at the Monterey County Water Resources Agency and the California American Water Company for posting on February 2, 2007 per the Ralph M. Brown Act. Government Code Section 54954.2(a)..

REGULAR MEETING
Seaside Groundwater Basin Watermaster
January 17, 2007

MINUTES

I. CALL TO ORDER

Chairman Rubio called the meeting to order at 3:01 p.m. in the Seaside Community Center at Soper Field, 220 Coe Avenue, Seaside.

II. ROLL CALL

City of Seaside – Mayor Ralph Rubio, Chairman
Laguna Seca Subarea Landowner – Bob Costa, Vice Chairman
Monterey Peninsula Water Management District – Judi Lehman, (Alternate)
City of Monterey – Vice Mayor Jeff Haferman
City of Sand City – Mayor David Pendergrass
California American Water Co. – Steve Leonard
City of Del Rey Oaks – Mayor Joseph Russell
Monterey County/Monterey County Water Resources Agency – Jerry Smith, District 4 Supervisor
Coastal Subarea Landowner – Paul Bruno

Absent: None

III. APPROVAL OF MINUTES OF December 6, 2006 Regular Meeting

There were no questions or comments from the Board.

> **Moved by Mayor Pendergrass, seconded by Mayor Russell, and carried, to approve the Watermaster December 6, 2006 Regular Meeting minutes, with Director's Haferman and Bruno both abstaining from voting due to non attendance.**

IV. REVIEW OF AGENDA

Chair Rubio requested that item IX Informational Reports be taken out of order and moved after item VI Consent Calendar. The summary oral report on the petition filed with the Superior Court is information pertinent to board discussion relating to other agenda items. The board concurred with the requested change to the agenda.

V. PUBLIC PARTICIPATION/ORAL COMMUNICATIONS

There were no questions or comments from the public.

VI. CONSENT CALENDAR

Contract Compensation—CEO	$4,650.00
Reimbursable—General	1,612.74

Moved by Director Costa, seconded by Director Bruno, and unanimously carried to approve the payment of bills.

VII. INFORMATIONAL REPORTS

Attorney Don Freeman, representing the City of Seaside, orally reviewed the submitted written Summary of Seaside Basin Groundwater Adjudication Post-judgment Hearing on January 12, 2007.

VIII. OLD BUSINESS

1. COMMITTEE REPORTS

AD HOC ADMINISTRATIVE COMMITTEE
No current report.

AD HOC RULES AND REGULATIONS COMMITTEE
No current report.

COMBINED TECHNICAL and BUDGET/FINANCE COMMITTEES
Management and Implementation of the Basin Monitoring and Management Program (BMMP)
Prior to the discussion and recommendation on award of contracts for providing consulting services for managing and implementing the BMMP as per the agenda, Director Leonard submitted a *Summary of Proposal to Refine Scope of Work Regarding Basin Monitoring Wells*. Per Director Leonard, the aim of the submitted proposal is to expedite the installation of sentinel wells, the most time-sensitive element of the BMMP as was identified at the post-judgment hearing.

Attorney Robinson supported the submitted proposal and requested the court be furnished additionally with information as to why northern wells will most likely be used for monitoring for saltwater intrusion, as well as subsequent monitoring data to substantiate that monitoring is providing information on the condition of the basin to the court's satisfaction.

The Board requested that the Technical Committee:

1) Provide a recommendation as to the approach to be taken in consideration of the proposal submitted by Director Leonard on order to gain Watermaster approval for new well sites by June 11, 2007;
2) Review the two proposed contracts submitted by MPWMD/MCWRA and RBF Consulting for managing and implementing the BMMP to see how they tie in with Director Leonard's proposed refined scope of work;

3) Together with CEO Evans, obtain input from Mr. Martin Feeney to perform the work outlined in the refined scope of work and report the cost of these services at a later meeting; and
4) Submit any necessary alternatives to accomplish the tasks set out by the Court at the hearing of January 12, 2007.

Moved by Director Bruno, seconded by Mayor Russell, and unanimously carried to authorize Watermaster to retain a team of technical experts to refine scope of work, to determine location of wells, and to identify permitting requirements and actual construction costs for new basin monitoring wells. Team members could include Martin Feeney, Joe Oliver, and others from trial experts. Approach would be similar to what was done with groundwater model.

Further,

Authorize Watermaster to enter into an agreement with Martin Feeney to perform work outlined in the Summary of Proposal to Refine Scope of Work Regarding Basin Monitoring Wells, Section III, with costs to be brought back to the Board at a later time for authorization to expend funds. All other participants appointed to participate with Feeney to provide input to the report shall not be reimbursed by Watermaster and shall be paid solely by the respective parties that they represent.

The Board scheduled a special meeting for Wednesday, January 31, 2007 at 1:30 p.m. to hear and consider acting on the Technical Committee recommendations.

TECHNICAL COMMITTEE

Per Attorney Freeman's interpretation, at the January 12, 2007 hearing the court felt it prudent for the Watermaster Board to authorize payment of expenses for the HydroFocus firm representative who attended the groundwater modeling meeting on behalf of the Laguna Seca Subarea Landowners. Chair Rubio requested that CEO Evans present Board policy on payment of expenses for contracted services at the next regularly scheduled Board meeting.

Moved by Director Smith, seconded by Director Leonard, and unanimously carried, to approve a budget increase and expenditure of $2,370 to reimburse HydroFocus for participating in the consulting group developing the groundwater flow model for the Seaside Basin.

BUDGET/FINANCE COMMITTEE

CEO Evans orally reviewed the submitted Fiscal Year 2006 Financial Reports and Year-to-date Fiscal Year 2007 Financial Report. There were no questions or comments from the public.

Moved by Mayor Russell, seconded by Director Smith, and unanimously carried, to accept the Fiscal Year 2006 Financial Reports and the Year-to-date Fiscal Year 2007 Financial Report.

IX. NEW BUSINESS

CEO Evans reviewed orally his submitted memo regarding the summary of monthly paid requests for payment and recommendation on approval of future requests for payment. The budget committee concurred with the CEO's proposal; the Technical Committee Chair was absent. The Board concurred to not require a threshold payment limit on the CEO/Technical Committee chair payment authorization.

Moved by Director Smith, seconded by Director Lehman, and unanimously carried, to authorize the CEO to approve payments to vendors for goods and services included within, and to the limits of, Board-approved contracted services, with additional Technical Committee chair approval of payments for technical services.

X. STAFF INFORMATIONAL REPORTS

Covered under item V. above.

XI. DIRECTOR'S REPORTS

There were no reports from directors.

XII. NEXT SPECIAL MEETING DATE – January 31, 2007, 1:30 P.M., LOCATION TO BE DETERMINED.

NEXT REGULAR MEETING DATE – FEBRUARY 7, 2007, 1:30 P.M., SOPER FIELD, SEASIDE, CALIFORNIA.

XIII. ADJOURNMENT

There being no further business, Chairman Rubio adjourned the meeting at 4:02 p.m.

SEASIDE GROUNDWATER BASIN
WATERMASTER

To: Board of Directors

From: Dewey D Evans, CEO

Date: February 7, 2007

Subject: Payment of January, 2007 Bills

Recommendation:

That the Board of Directors approve the payment of bills as listed on the attached schedule

Comments:

Contract Compensation—For the period January 1, 2007 through January 27, 2007 I recorded a total of 76 direct hours working on Watermaster related business. During this period there were two Board meeting to prepare for with the related staff reports and meetings to attend. The major focus of this billing period was the billing and collection of the assessments for the Administrative, Monitoring and Management Operating and Capital Funds. Collecting pumping data needed to submit the annual report to the court and for calculating the over pumping assessments. Setting up payment procedures for consultants, attending technical committee meetings, and attending the January 12, 2007 court hearing on the Watermaster petition.

Reimbursables—Direct costs that I am requesting to be reimbursed for include: monthly rent of office space at 2600 Garden Road, Suite 228 for the month of February; 2007. Administrative support with the recording and preparation of Board minutes and assistance with data entry into the QuickBooks accounting system. Telephone and internet services for a month and the replacement of ink printer cartridges in the office printer.

Thanks, Dewey

SEASIDE GROUNDWATER BASIN
WATERMASTER
January, 2007

Request for Payment of Bills

Request for Payments:

Contract Compensation:

Chief Executive Officer-Dewey D Evans

76 hours worked January 1 through January 27, 2007

At $75.00 per hour-- $5,700.00

Reimbursables:

Pay to Dewey D Evans for personal expenses paid on behalf of Watermaster program:

Office rental-2600 Garden Road, Suite 228 (February, 2007)	$280.00
Administrative Support Services-preparation of Board meeting minutes and data entry in QuickBooks	725.00
Telephone and Internet Services (Jan. 13 thru Feb. 12)	93.34
Computer Printer Ink Cartridges	45.02
Total Reimbursable	$1,143.36

SEASIDE GROUNDWATER BASIN
WATERMASTER

To: Board of Directors

From: Dewey D Evans, CEO

Date: February 7, 2007

Subject: Summary of Bills Paid Directly in January, 2007

Check Issued To:	Purpose and Description of Payment:	Amount	Total Check
Martin Feeney	Seaside Basin Modeling-Hydrogeologic		
	Consulting 52.5 hrs @ $150.00	$7,950.00	
	Insurance Premium	1,000.00	
	Reimburse-Durbin	2,889.45	
	Markup	288.95	
	Total		$12,128.40
Martin Feeney	Seaside Basin Modeling-Hydrogeologic		
	Consulting 38.33 hrs @ $150.00	$5,749.50	
	Reimburse-HydroFocus	2,354.30	
	Reimburse-Scalamini	3,356.54	
	Reimburse-Foreman	5,005.99	
	Markup	1,077.29	
	Lunch-Modeling Meeting	56.09	
	Total		17,599.71
	Total Checks Authorized to be paid in January, 2007		$29,728.11

Martin B. Feeney
Consulting Hydrogeologist

P.G. 4634
C.E.G. 1454
C.Hg 145

December 31, 2006

Seaside Groundwater Basin Watermaster
c/o Diana Ingersoll
City of Seaside
440 Harcourt Avenue
Seaside, CA 93955

Subject: Seaside Groundwater Basin Watermaster, Seaside Basin Monitoring and Management Program: Groundwater Modeling Component – Report on Groundwater Modeling Meeting and Recommended Approach.

Dear Ms. Ingersoll:

One of the many conditions of the Seaside Groundwater Basin Adjudication judgment requires the Seaside Groundwater Basin Watermaster (Watermaster) to develop a groundwater model of the Seaside Basin. Although a groundwater model of the basin was developed by one of the parties as part of the court proceedings, this modeling effort was the source of some controversy between interested parties. Because of this controversy, the Watermaster Board determined to convene a panel of technical experts to discuss the modeling efforts and develop guidance for the development of the required model. This letter documents the efforts and discussions of the technical experts and presents a recommended approach to fulfilling the demands of the court and the needs of the Watermaster.

BACKGROUND

The court decision entered into on March 27, 2006 provides for the adjudication of the Seaside Groundwater Basin and sets up the Watermaster to manage the groundwater resources of the Seaside Basin. One of the requirements of the judgment is that that Watermaster, within one year of the judgment, "*develop a suitable groundwater model of the Seaside Basin and appropriate adjacent areas.*" A groundwater model of the basin was developed for the plaintiff (California-American Water Company) for use in the trial; however, there was criticism of this model from other experts participating in the trial. Although there are some identified shortcomings of the model, much of this criticism arose from the lack of documentation; documentation that was not prepared due to the tight time constraints of the trial schedule. The criticism and trial environment created an aura of controversy around this model. The convening of the panel of modeling experts is an attempt to get past the controversy and move forward with the required modeling.

PANEL PROCEEDINGS

Technical Panel

A panel of technical experts was convened to discuss previous and future ground water modeling of the Seaside Basin. The technical panel was comprised of experts who had previously represented a party in the trial, or experts invited at the suggestion of a party to the judgment. The panel members were compensated by the Watermaster for their participation and were not there as representatives of their prior clients.

P.O. Box 23240, Ventura, CA 93002 ♦ **Phone: 805/643-7710** ¨ e-mail mfeeney@ix.netcom.com

The Panel included:

Mr. Terry Foreman
Mr. Joe Scalmanini
Mr. John Fio
Mr. Tim Durbin
Mr. Gus Yates
Mr. Martin Feeney (moderator)

In addition, the panel was joined by Mr. Derrik Williams. Mr. Williams is a groundwater modeler and a member of the RBF Consulting Team selected to move forward with implementing the technical portions of the Seaside Basin Management Plan. As a member of the RBF Team, Mr. Williams's role would be to lead future modeling efforts, regardless of the direction or scope of these modeling efforts.

Prior to the meeting, the committee members were provided with review materials summarizing previous modeling efforts in and adjacent to the Seaside Basin modeling efforts as well as limited details on the model utilized at the trial. This background memorandum is included in Appendix A.

The meeting was held in Seaside in late November 2006. The meeting agenda is included in Appendix B – Meeting Agenda and Minutes. The meeting was moderated by the undersigned and minutes were taken and prepared by Mr. Mark Dias. Following the meeting, minutes were circulated to all attendees for correction and comments. The corrected minutes are attached.

The attached minutes are very complete and capture most of the relevant discussions. Presented below is a summary of the points and comments expressed by the panel.

Need For Model/Approach to Modeling

The question of the need for a model was discussed at some length. The following relevant comments were offered:

- Given that the basin is 30 to 40 percent out of balance and the water budget of the basin is the critical issue, a simple model may be the best approach.
- If the primary goal is to address the basin's water imbalance, then a model may not be strictly needed.
- A simple model could be useful to evaluate the impacts of moving pumping, but water budget could be addressed independently.
- A state of the art groundwater model is not necessary to answer the fundamental water management questions in the near term.
- A groundwater model cannot improve water balance. Can only help with optimizing management actions.

Why Model

The above discussions aside, it was mutually agreed that groundwater models can have great utility and can provide the following benefits:

- Models provide for objective, intellectually honest evaluation of water management issues.
- Models allow better resolution of spatial variations such as water levels in multi-layered aquifer systems, as compared to more simple water budget approaches.
- Models can be useful to estimate/calibrate water budget components.
- Models can be used to develop better understanding of leakance, boundary conditions and basin geometry.
- Models allow the optimization of different management alternatives.
- Models provide a test of the understanding of a system.

Potential Uses for Model (Or Modeling)

During the discussion, uses that a groundwater model of the Seaside Basin might have in managing the basin were outlined. These included:

- Evaluation of Management Alternatives
    - Impacts and effectiveness of moving pumping inland.
    - Optimization of moving pumping as in how much? And how far?
    - Impacts of continued mining for specified periods of time, 3 years, 5 years, etc…
    - Effectiveness of ASR or other artificial recharge projects.
- Potential seawater intrusion pathway/travel time investigations

During these discussions a distinction developed between use of "The Model" and modeling. It was acknowledged that evaluation of some of these alternatives might require a differing modeling approach and more detailed modeling than would be available in the regional model.

Limitations of Models in the Seaside Basin

Compared to most groundwater basins, the understanding of the hydrogeology of much of the basin is poor. The poor understanding is the result of the surficial geology which masks the underlying geologic structure. This masking is compounded due to the past land use (Fort Ord) of most of the basin which has resulted in limited wells and boreholes and resultant subsurface data. Additionally, the understanding of the offshore geology is relatively poor providing little guidance in modeling a critical boundary condition. Regardless of model integrity and robustness, a groundwater model's utility in the basin will be limited by the lack of hydrogeologic understanding.

Additionally, this relatively poor understanding of the basin structure, boundaries and the heterogeneity of the aquifer systems will limit the utility of any model of the basin to the evaluation of intermediate and large scale scenarios (like moving pumping). Smaller scale questions could be subject to significant errors. Expectations for the model should be limited and openly expressed.

Groundwater models, even models with large assumptions regarding the hydrogeologic conditions, are good for evaluating management alternatives. However, the hydrogeologic management alternatives for Seaside are limited, and the feasible alternatives, at least in the short term, are even more limited. A groundwater model of the basin, while useful for evaluating the alternatives, may not necessary, if options are few.

Existing Models of the Seaside Basin

Multiple groundwater modeling efforts have been undertaken in the Seaside Basin over the last couple of decades. One of the possible approaches to modeling the basin was considered to be the "enhancement" of one of several existing models of the basin. The previous modeling efforts in the basin are summarized below. The models are more fully described in the Model Memo contained in Appendix A.

	Project	Author	Focus Area of Modeling
1	MPWMD desalination	Staal, Gardner & Dunne, Inc. (1992)	Coastal area near Sand City
2	Monterey Bay Shores	Feeney (1999)	Coastal area near SNG project site
3	Sand City desalination	Feeney & Williams (2002)	Coastal area near Sand City
4	Laguna Seca Phase III report	Yates and others (2002)	Laguna Seca subarea
5	MPWMD desalination	CDM (2004)	Coastal area near Sand City
6	Cal-Am Coastal Water Project, ASR	ASR Systems (2005)	Coastal and inland area near ASR wellfield
7	Seaside Basin adjudication trial	Durbin (2005)	Basinwide area

Most of these models were developed to evaluate the impacts of proposed projects within the basin and are not of regional scale. However, the existing smaller-scale models can still provide useful data that will facilitate the refinement of larger-scale models.

Of these previous modeling efforts only the Durbin model includes the entire Seaside Basin and the "appropriate adjacent areas" as specified in the judgment. The Durbin model was used in court and several parties to judgment had some criticism of the model results. However, some of the criticism was simply the result of a poor understanding of the modeling approach as the model was undocumented.

Limitations of Existing Model

Based on review of the material presented in court and the materials provided by Mr. Durbin for the meeting the following limitations were identified:

- Poor calibration for Santa Margarita Aquifer. The predicted hydrographs for the Santa Margarita Aquifer do not adequately replicate the historical trends in this aquifer system.
- Domain does not exactly match mapped boundaries and geology. While relatively minor, the model domain does not follow the trace of the Chupines Fault, the most defined boundary of the basin.
- Some structural features need refinement. Some structural features appear not to be implemented in a manner consistent with the current understanding of the hydrogeology. This may be a function of the lack of documentation.
- No documentation. This limitation has been the source of much of the controversy. Presentation of a model development narrative, hydrostratigraphy, model assumptions, and calibration results will allow for peer review and provide a basis for future refinement and possible re-platforming at a later date.
- The model utilizes the FEMWATER3D numerical code. This USGS code, while fully documented and in the public domain, is in limited use and has less third party support than other codes such as the USGS's MODFLOW code.

Possible Approaches

The panel discussed the various approaches for moving forward with the modeling effort. Much discussion was devoted to geologic, hydrogeologic and boundary conditions specific to the hydrogeologic conceptual model. Additional discussions were focused on differing approaches to developing a suitable model of the basin. Several differing approaches were discussed and are summarized below:

Use Existing Model. This approach would adopt and refine the existing model (Durbin) to become an interim model of the basin. The Watermaster could utilize the interim model to evaluate management scenarios, as necessary, while allowing concurrent exploration activities to develop data improving the understanding of the basin. This approach would reduce costs over development of a new model because much of the development, calibration, testing and peer review has been completed. More importantly, the use of the existing model would result in the completion of a model with the period specified by the court. When required, the model could be revised to include new hydrogeologic data and possibly be re-platformed to a more commonly-used code.

Develop New Model. This approach would develop a new model of the Seaside Basin. It is assumed that this model would be developed utilizing the MODFLOW code, perhaps increasing its usability. The model would derive its conceptual model from existing documents and previous modeling efforts. As such, the conceptual hydrogeologic model would be similar to that used in the existing model. This model would also need to be refined and updated at a later date to include new hydrogeologic data.

Return to Court. Although not universally supported, there was support for approaching the court with a request to have the modeling requirement removed, or extended, as the model is not considered necessary to move forward with the initial steps of managing the basin. While it is acknowledged that the model could be a useful tool, the need for the model is premature.

Continue Modeling Panel. It was suggested that the technical panel be continued to review future modeling efforts. This idea might be particularly useful if the selected approach is to move forward with refining the existing model.

All of the above approaches have pros and cons. However, when considering the non-technical issues such as funding, schedule and jurisdiction hurdles and balancing these with the utility and limitations of even the best possible model it was generally conceded by the panel that the goals of the Watermaster would likely best be served by refining the existing model. This model could be utilized for an interim period until the need and uses of an improved model are more apparent.

RECOMMENDATION

While the above discussion attempted to capture all the voices of the panel, the follow section is the opinion of the undersigned, and not necessarily shared by all panel members.

Discussion

The judgment language requires within a year of the date of the judgment the Watermaster to *"develop a suitable groundwater model of the basin and appropriate adjacent areas."* This is the only reference to the groundwater model in the entire judgment. The requirement begs

several questions. What does suitable mean? Suitable for what? It is interpreted that the model would be used to evaluate management alternatives that might be considered by the Watermaster.

Although the judgment requires the Watermaster to develop a groundwater model of the basin, it is instructive to consider the factors that might be weighed in deciding, in absence of the requirement, whether to develop a groundwater model of the basin. Before undertaking the development of a groundwater model several fundamental questions need to be evaluated to guide the decision to, and if, how to model the basin. These questions are interrelated and iterative, and are presented below:

- The adequacy of the understanding of the hydrogeology and the availability supporting data needs to be evaluated within the context of the questions that the modeling effort is helping to answer.
- The potential questions that the model will be expected to help answer need to be clarified prior to developing the model. This allows the selection of the appropriate modeling approach consistent with the understanding of the basin and the availability of data. Simple problems might be answered easily with less complicated tools. Complex questions might not be adequately answered with a more sophisticated tool which, due to limited hydrogeologic understanding, incorporates numerous assumptions. One modeling approach does not fit all questions. The appropriate model for one question might not be the best for others.
- Is the development of a model a cost-effective way of providing answers to the relevant questions? A groundwater model may help illuminate the best technical solution. However, are the potential solutions so constrained by non-technical issues that the best technical answer is not relevant?

In a perfect case, the above questions could be considered and would allow the balancing of political, jurisdictional, financial and technical issues in deciding to, and how to model a groundwater basin.

The requirement to develop a model within the judgment presupposes the adequacy of the current understanding of the basin and also forces the development of a modeling approach that may or may not be appropriate to assist in answering the management questions that will later emerge. In absence of the judgment, and in consideration of the current understanding of the basin, the Watermaster might be better off waiting to develop a model that fully captures the data from Watermaster's exploration efforts and that is most appropriate for evaluating the management alternatives that emerge.

Recommended Approach

However, given the requirement of the judgment, the Watermaster does not have the flexibility to wait until there is a better understanding of the basin and the relevant water management questions. Fortunately, there exists a *"suitable groundwater model of basin and appropriate adjacent areas."* It is believed that, with minor refinements, the existing groundwater model (Durbin) can serve the Watermaster's immediate needs and meet the requirements of the judgment. After completing these refinements, the Durbin model could be adopted as the "interim groundwater model." The recommended course of action to modify the existing Durbin model into the "interim groundwater model" and meeting the requirements of the court are as follows:

- Fund limited refinement to the model to resolve currently identified limitations.

- Fund documentation of the model. This will provide guidance to model users, provide closure to the existing model effort, and provide a basis for future review and revision.
- Fund Peer Review of Model Refinements Panel. This panel could meet by teleconference thereby significantly reducing the costs of meeting.
- Fund completion of model. After refinement of the model, completion of the documentation and peer review, the model would be "completed" for use as the interim model.

Based on discussions with Mr. Durbin and considering other costs associated with peer review and management, it is estimated that the above work could be completed for under $50,000 dollars. If the Watermaster can move quickly, it is possible that the model could be completed by the required deadline – March 27, 2007.

Adoption of the revised Durbin Model as an interim model serves many purposes and meets the goals of the Watermaster. The reasons, advantages and limitations of the adoption of the Durbin Model as the "interim" model are as follows:

- The model can be quickly completed to the point where it is a useful tool for a relatively minor expenditure of money. It is therefore a cost-effective solution while meeting project goals. The Watermaster can report to the court that the requirement to develop the model has been met.
- The Watermaster can use the freed up funds to move forward with more critical management activities.
- With use, the limitations of the interim model will become evident. These limitations will provide guidance for revision of the model at a later date. Some of these limitations will point to the limited understanding of the hydrogeology of the basin. Others limitations will identify specific data gaps that might be cost-effectively filled. Concurrently, exploration and data collection within the basin will improve the understanding of the hydrogeology allowing updating of the conceptual hydrogeologic model. At some latter date, when deemed necessary and cost-effective, the groundwater model can be revised to incorporate the accumulated data and improved understanding.
- All groundwater models are works-in-progress. The models are progressively revised as understanding of the hydrogeology of an area improves. Utilizing the existing model for an interim period allows moving forward with other management efforts until sufficient new hydrogeologic data are developed to justify the reworking of the model.
- Currently, the understanding of the Seaside Basin is such that boundary conditions of 3 of the 4 sides of the model are poorly understood and are represented by assumptions. Until these boundary conditions are better understood, all modeling efforts will simply reflect these assumptions. Regardless of The Model's numerical integrity and robustness, the model's utility is limited by the lack of hydrogeologic understanding.
- "The Model" vs. Modeling. While development of a regional groundwater model is an appropriate long-term goal, a regional groundwater model is not always the best tool for modeling specific hydrogeologic problems. For example, given the variety of assumptions regarding the geometry of the sea floor and aquifer outcrop patterns, the analysis of the seawater-aquifer interface is better performed with 2-D slices. The use of the Durbin Model as an interim model would free-up funds for more relevant specific hydrogeologic modeling.
- The questions and issues that will need to be evaluated by modeling or the model have likely not yet emerged. These will change over time. It may be more appropriate to update the model when there is a better understanding of the relevant questions. The

management options that might be evaluated will likely be determined by primarily non-hydrogeologic considerations.

- Finishing the Durbin Model into the interim model is a good balance of effort and expenditure with the utility of a groundwater model in the basin. Spending more time and money on the modeling effort would suggest an importance to the model above its utility.
- Groundwater models, even simple or limited models, are good for comparing management alternatives. However, the hydrogeologic management alternatives for Seaside Basin are limited and the basin is out of balance by 30 to 40%. Additionally, the feasible alternatives, at least in the short term, are even more limited. It is unlikely that any model would significantly assist with the evaluation of the potential short-term solutions for the basin.

Alternative Approach

An alternative approach, one consistent with the conclusions presented in this document, should also be considered. A groundwater model of the basin is not a critical path need in order for the Watermaster to perform the initial steps toward basin management. A reasonable and defensible alternative would be to return to the judge and make the case that, given the limited number of management alternatives, the model is not really necessary at this time.

I trust the above is useful. I look forward to meeting with the TAC to discuss these recommendations.

Sincerely,

Martin B. Feeney

Attachments:

Appendix A – Model Memo Background Materials
Appendix B – Agenda and Minutes

APPENDIX A

Martin B. Feeney
Consulting Hydrogeologist

P.G. 4634
C.E.G. 1454
C.Hg 145

November 15, 2006

Seaside Model Panel Attendees:

In anticipation of our meeting, I have prepared this memo summarizing the existing modeling efforts of the Seaside Basin and suggesting topics to be discussed at our meeting. The intent of this document is to generate consideration of the issues and provide a basis for discussion.

MODEL PURPOSE

As an outcome of the adjudication judgment, the Seaside Groundwater Basin Watermaster Board is tasked with developing a groundwater model of the Seaside Groundwater Basin. Although it is not specified what the model use will be it is assumed that its use would include evaluation of various management and augmentation schemes.

It is hoped that the proposed model could be developed from existing modeling efforts. Whether this would be by enhancing an existing model or using bits and pieces of existing modeling efforts as templates is yet to be determined. The intent of the process is to review the previous modeling efforts and evaluate the appropriateness of any of the previous efforts to be used as a starting point for the development of "the groundwater model" of the Seaside Basin.

MODEL INVENTORY

Multiple groundwater modeling efforts have been undertaken in the Seaside Basin over the last couple of decades. Most of these models were developed to evaluate the impacts of proposed projects within the basin and are not of regional scale. However, even if one of the existing models is not "enhanced" to become the new model, the existing models provide useful data that will facilitate the development of a new model if that is the more appropriate approach.
The previous modeling efforts in the basin are summarized on the attached table and shown on the attached map.

Seaside Basin Adjudication Model

Attached please find the graphics documenting the Seaside Basin Adjudication Model (Durbin). These are presented not necessarily for critical review but rather to form a basis for discussion of modeling issues. Modeling issues that should be discussed include those summarized below.

MODEL DISCUSSION ITEMS

Hydrostratigraphy

- Literature – established hydrogeologic units
- Sequence stratigraphy
- Number of model layers?
- Base of fresh water aquifer system
- Offshore stratigraphy

Geologic Features to be included

- Faulting – other structural features? Which ones? Basis?
- Consistent with current mapping?
- Greene vs. Clark/Rosenberg vs. Wagner

P.O. Box 23240, Ventura, CA 93002 ♦ **Phone: 805/643-7710** ♦ e-mail mfeeney@ix.netcom.com

Aquifer Parameters
- Sources
- Conductivity, Storage, Leakage, Porosity, Dispersivity

Boundary Conditions
- Constant Heads – Density and Depth Corrections?
- Specified/General Heads – Tied to historical records?
- No-Flow – Where appropriate?
- Ocean Boundary
    - Sensitivity to geometry
    - Tidal fluctuation data
- Salinas Valley Boundary

Seawater Intrusion
- Location of seawater in model scenarios
- In QTp overlying Tsm?
- In Tsm as in never flushed?

Pumpage
- Seaside proper MPWMD records
- What about in Marina? MCWD records?
- Laguna Seca, El Toro
- Salinas Valley Pumpage – reflected in specific heads?

Recharge
- Appropriate methods of estimating
- Soil Moisture?
- MODFLOW Farm package?
- Calibration?

Calibration
- Sources and Distribution of Observed Data
- Uniqueness of solution
- Sensitivity

Model Code
- Defensible/Proven
- Public Domain
- Acceptability
- Portability between technical users
- Compatibility with GIS systems
- Interface with SVIGSM
- Flow? Flow and Transport?

Potential Model Uses
- ASR Programs
- Relocating Pumpage – Impacts on safe yield
- Inverse modeling of seawater interface?
- Develop better estimates of recharge
- Develop better estimates of groundwater storage

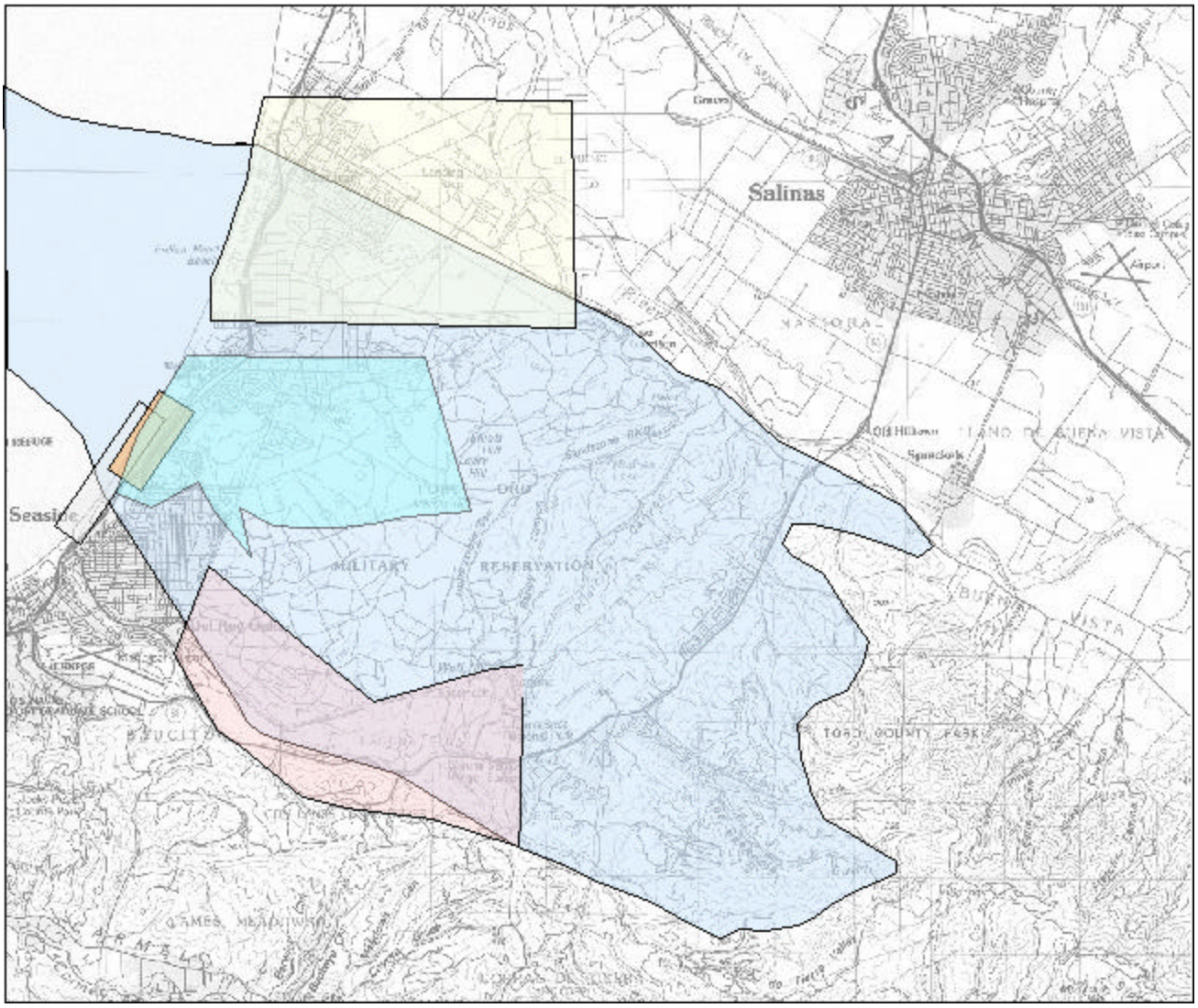
Previous Efforts at Numerical Ground Water Flow Modeling in the Seaside Basin

	Project	Focus Area of Modeling	CODE	Modeled Units	Model Layers	Source of Hydrostratigraphy /Geology	Source of Aquifer Parameters	Boundaries				Recharge Rates (ft/yr)
								north	south	east	west	
1	MPWMD Desalination	Coastal area near Sand City	MODFLOW/MT3D	Qa/Qal	1	Project	Project	NF	NF	CH	CH	0
2	Monterey Bay Shores	Coastal area near SNG project site	MODFLOW	QTp	1	SGD, Kaiser, HLA	SGD, MPWMD	NF	NF	GH	CH	0
3	Sand City Desalination	Coastal area near Sand City	SWIFT	Qa/Qal	1	SGD	SGD, Project	NF	NF	CH	CH	0
4	Laguna Seca Phase III report	Laguna Seca subarea	MODFLOW	QTp, Tsm	2	SGD, Rosenberg/Clark	SGD	NF	NF	CH	GH	0.16 (avg)
5	MPWMD Desalination	Coastal area near Sand City	MODFLOW	Qa/Qal	1	SGD, Project	SGD, Project	NF	NF	CH	CH	0.33
6	Cal-Am Coastal Water Project, ASR	Coastal and inland area near ASR wellfield	MODFLOW	QTp, Tsm	2	Fugro West, Padre	Fugro West, Padre	CH (L1) NF (L2)	CH (L1) NF (L2)	CH (L1) NF (L2)	CH (L1) NF (L2)	0
7	Seaside Basin Adjudication Trial	Basinwide area	FEMFLOW3D	Qal/Qa, Qtp, Tp/Tsm	3	CH2MHill, Feeney/Rosenberg, Greene	CH2MHill, SGD	SP	NF	NF	SH	0.3
8	Fort Ord Model	Fort Ord, North of GW Divide	MODFLOW	Qal, U180,L180, 400	4	HLA, SGD	HLA, SGD	CH/NF	CH/NF	CH/NF	CH	0.39
9	MPWMD ASR	Fort Ord area near ASR wellfield	MODFLOW	Qa/QTp, Tsm	4	Fugro West, Padre	Fugro West, Padre	NF	NF	CH	CH	0

SOURCE DOCUMENTS:

1. Staal, Gardner & Dunne, Inc., 1992. *Feasibility Study, Saline Ground Water Intake/Disposal System, Sand City, California* . Prepared for MPWMD, September 1992 (see Appendix G).
2. Feeney, Martin, 1999. *Ground Water Operations and Monitoring Plan, Monterey Bay Shores Resort.* Prepared for SNG Development Company, August 1999.
3. Feeney, Martin, and Derrik Williams, 2002. Desalination Feedwater/Concentrate Disposal System, Sand City, California. Prepared for City of Sand City, July 2002 (see Appendix C of Sand City Water Supply Project Environmental Impact Report, June 2004).
4. Yates, Eugene, Martin Feeney, and Lewis Rosenberg, 2002. *Laguna Seca Subarea Phase III Hydrogeologic Update* . Prepared for MPWMD, November 2002 (see Appendix 2).
5. CDM, 2004. *MPWMD Sand City Desalination Project Feasibility Study* . Prepared for MPWMD, April 16, 2004 (see Appendix G).
6. ASR Systems, LLC, 2005. *Technical Memorandum, ASR Wellfield Conceptual Design, Modeling Analysis and Preliminary Environmental Assessment for California-American Water Company Coastal Water Project* . Prepared for California American Water, April 30, 2005.
7. Timothy J. Durbin, Inc., 2005. *Declaration of Timothy J. Durbin in Support of Motion for Entry of Stipulated Judgment* . Prepared for Somach, Simmons & Dunn and California American Water, submitted October 27, 2005.
8. Harding Lawson Associates, *Fort Ord Groundwater Model,* in *Draft Final Basewide Hydrogeologic Characterization, Vol. II Appendix D, 1994.* Periodic updates by MACTEC, 1999, 2003.
9. CDM, 2003. Monterey Peninsula Water Supply Project Phase 1 Technical Memorandum. Appendix D: Technical Memorandum – Part 3: Aquifer Storage and Recovery for Seaside Basin – Plan B. March 17, 2003.

Location of Ground Water Modeling Efforts in Seaside Basin



HLA (8)

Yates (4)

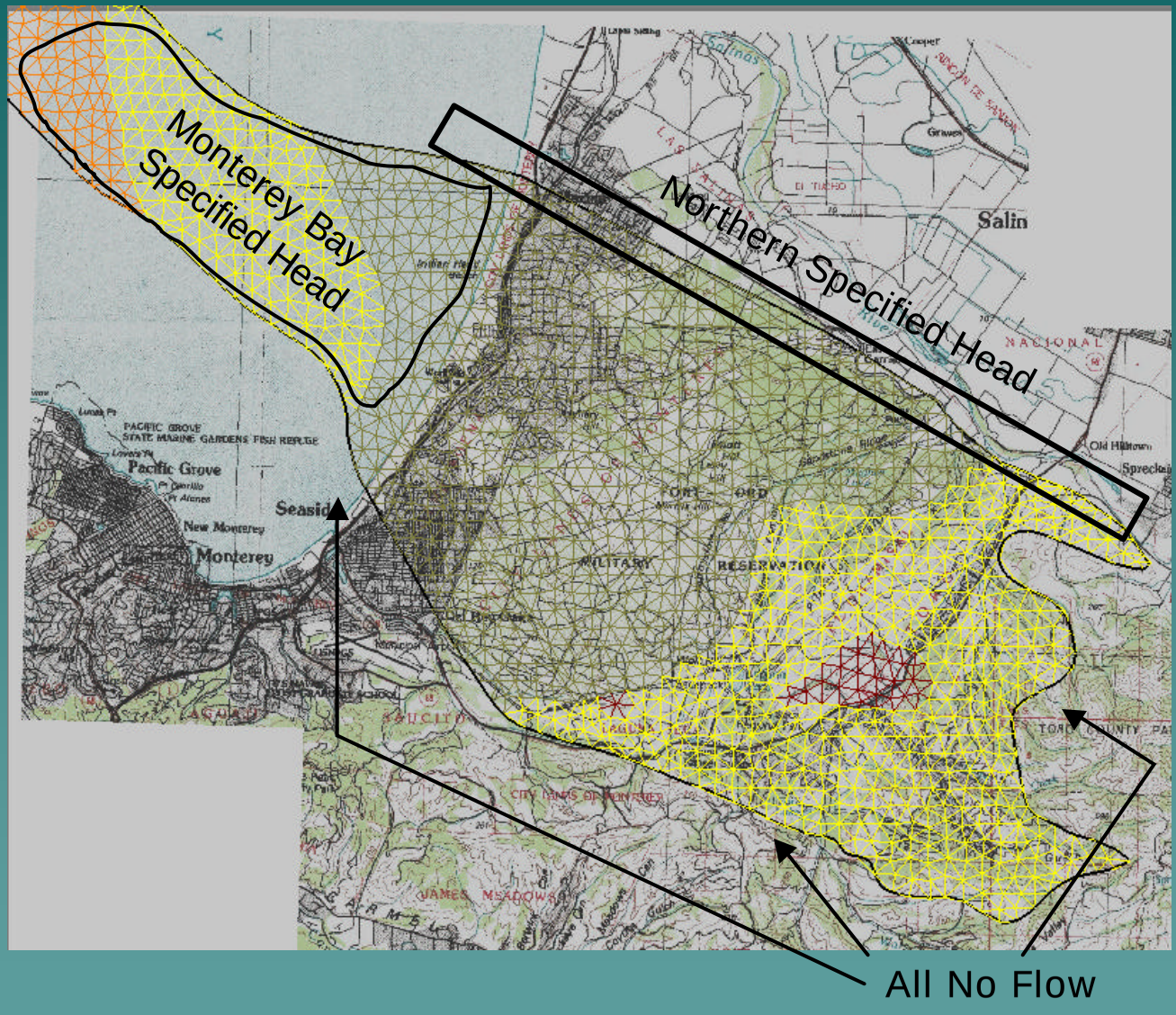
Durbin (7)

D. Williams and Feeney (3) CDM (5), SGD (1)

D. Williams (6)

Feeney (2)

Boundary Conditions



Model Boundary Area

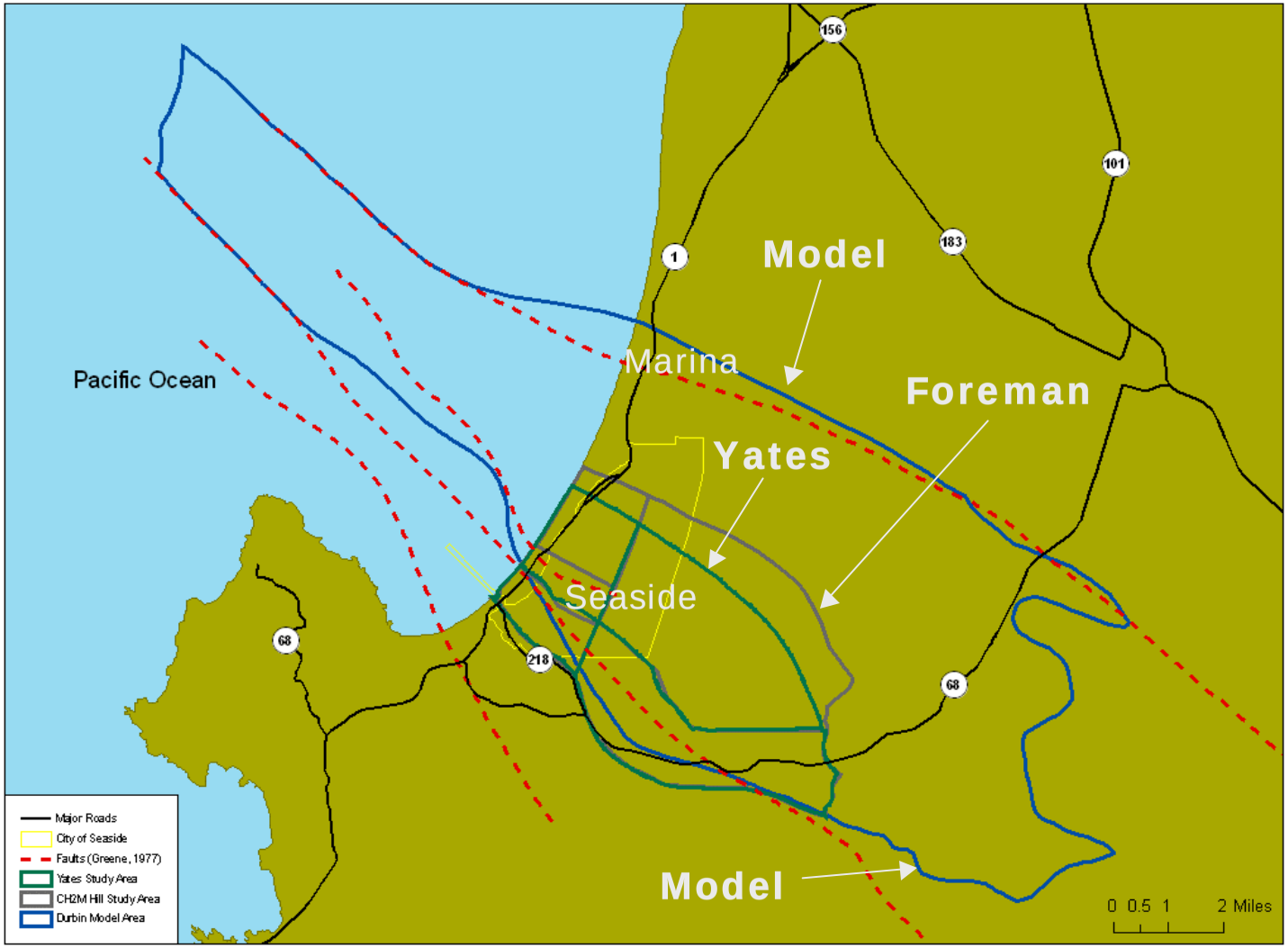


Exhibit 279

Mesh Plan View

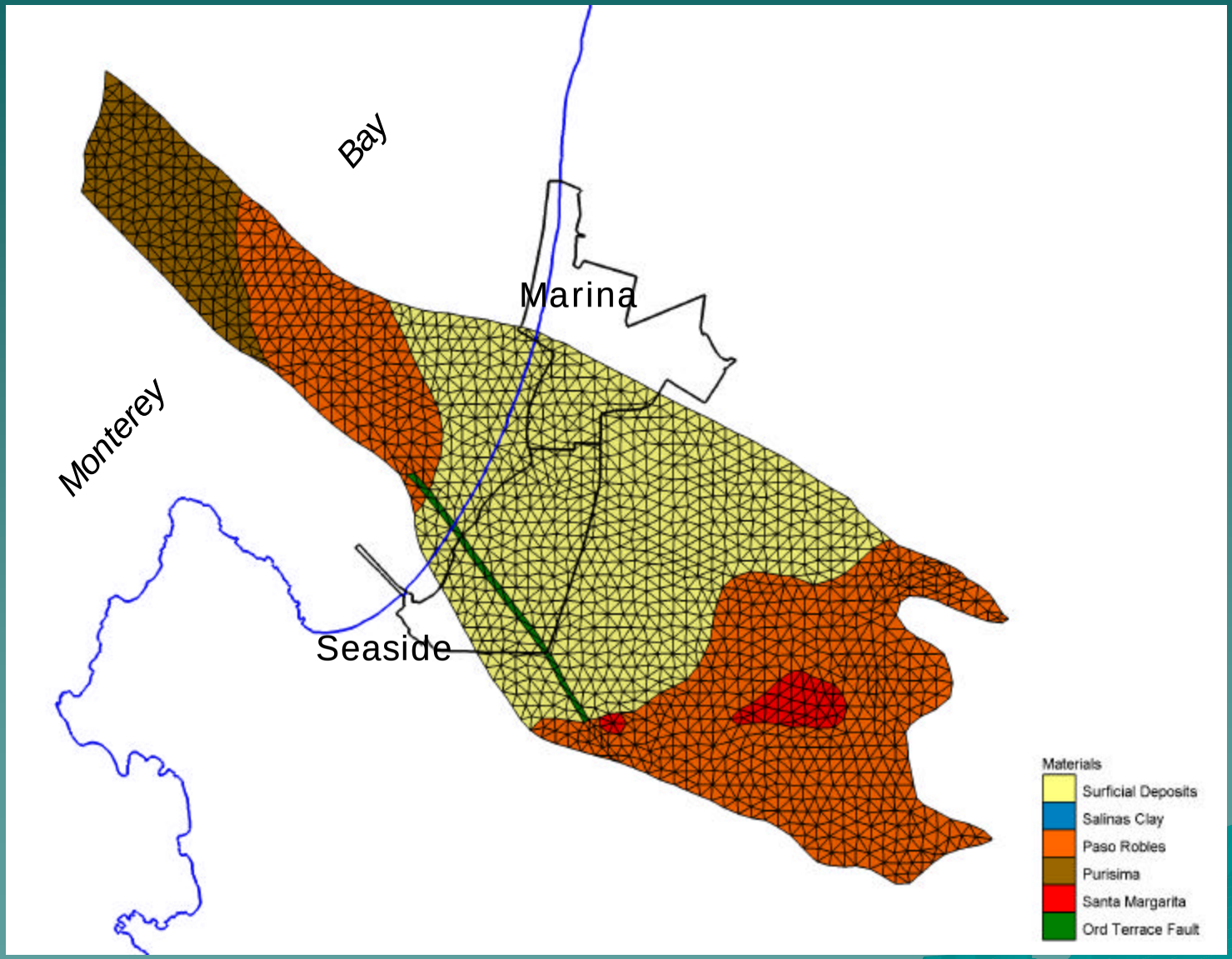


Exhibit 292.1

Recharge and Pumping

Recharge:

Terry Forman	0.31 ft/yr
Gus Yates	0.29 ft/yr
Used 1956-2002	0.3 ft/yr

Pumping:

Used 1956-2002	Terry Foreman

Calibrated Parameters

Hydraulic Conductivity:	
Horizontal conductivity	0.25 to 7.4 ft/d
Vertical conductivity	1:32 anisotropy
Storage properties:	
Specific Storage	10^{-6} to 10^{-4} 1/ft
Specific Yield	0.10
Specified-Head Leakance	10^{-4} ft^2/d
Transport Paramaters:	
Effective porosity	0.15
Longitudinal dispersivity	600 ft
Transverse dispersivity	200 ft

Exhibit 282

APPENDIX B

SEASIDE GROUNDWATER BASIN WATERMASTER

Groundwater Modeling Approach Meeting

Tuesday, November 28, 2006 - 11:00 to 2:00
Bayonet Room -- Oldemeyer Multi-Use Center
986 Hilby Avenue, Seaside CA 93955 (map attached)

~AGENDA~

Introductions

Purpose
- Discuss modeling issues and approaches relevant to Seaside Basin
- Receive input toward selection of an appropriate approach

Previous Modeling Efforts
- Review previous efforts

Potential Model Uses
- Need for and use of model

Moving Forward
- **Hydrogeologic Issues**
  - Geology – Relevant Features, Sources
  - Hydrostraitigraphy
  - Boundary Conditions – Ocean/Salinas Valley/"bedrock"
  - Data Sources/Gaps – Critical Gaps

- **Modeling Issues**
  - Code
  - Layers/Domain
  - Boundaries
  - Uncertainty
  - Critical Data Gaps – Approaches to "bracketing"
  - Ease of Use/Multiple Users
  - Ability to Link to Solute Transport Co

Recap
- **Critical Hydrogeologic issues**
- **Critical Modeling Issues**

Recommended Approaches

- Recommended Improvements over Previous Approaches

Adjournment

SEASIDE GROUNDWATER BASIN WATERMASTER
Groundwater Modeling Approach Meeting

November 28, 2006
Oldemeyer Multi-Use Center, Seaside CA

MINUTES

Attendees:
Martin Feeney (MF)
Tim Durbin (TD)
John Fio (JF)
Terry Foreman (TF)
Joe Scalmanini (JS)
Derrik Williams (DW)
Gus Yates (GY)

Introduction

Introductions were made, with each attendee giving a brief summary of their previous roles in the adjudication proceedings and/or their current role as a group participant.

Background

MF emphasized that following the court decision today's attendees were no longer necessarily representing individual clients, and instead everyone is essentially working for the Water Master (WM). Therefore the group can focus on developing the best model possible.

Regarding the reason for the mornings meeting, MF stated that the specific purposes are not clear, but in his opinion the court proceedings had created a sense of controversy about the existing model and the WM board believed that this should be defused prior to moving forward with complying with the courts requirement for a new model. MF stated that it was his belief that much of the perceived controversy was the result of TD not having enough time to both build *and* document the model which led to a perception of less transparency.

Regarding the administration of the new modeling effort, MF said that the WM issued a two-part RFP, with three responders. WM chose to give the "management" component to the County/MPWMD team, with "implementation" component to RBF team of which Derrik Williams is a part. Initially, MF's task was to first develop a document that would be used as a direction for the modeler(s), but given the court mandated timelines, the WM has already hired RBF and DW is now engaged in today's process.

TD asked about the role of County/District team given they are both stakeholders *and* a consultant to the WM. MF responded that it is not clear what their role is, and they have not been specifically tasked with anything yet; but since the WM does not have any staff, this will probably continue. The WM's RFP was prepared in a short amount of time and is a collection of individual scopes written by different parties and quickly assembled. MF's contract is with the Water Master (WM) which has been established as an "entity." The WM's Executive Officer is Dewey Evans, who was the previous CFO/risk manager for City of Monterey.

Purpose

MF said the purpose of this meeting was to receive input on how the model should be built, why a model was needed and where the model should go from here. MF highlighted that the only reference in the judgment was a single line of text which reads, *"Develop suitable groundwater model of Seaside Basin and appropriate adjacent areas."*

DW emphasized that the model development process is open ended and is still wide open to suggestions and that he did not have preconceived notions about what needs to be done. DW said he is seeking input from this group.

Model Uses

MF asked the group what the purpose of the model should be and why build a model and opened the discussion to the group for their thoughts.

TD suggested that because the water budget is the critical issue, a simple model, such as the existing model would be appropriate with focus on determining how to maintain a positive gradient at the coast. As long as pumping stays near the coast it will be difficult to figure out what the impacts will be given the lack of data of offshore. It was anticipated that pumping may be moved inland. Model should be focused on improving and helping understand the water budget, and therefore encouraged a more minimal modeling approach.

MF generally agreed given the poor understanding offshore geologic data and boundary conditions. TD added that there will likely *always* be poor offshore data. JS agreed, adding that if the goal is to manage the basins water balance, a model might not even be needed. A simple review of hydrographs shows the basin is out of balance and that if he worked for the water master he would find a way go back to court and lobby to have the need for a model removed. Even moving the pumping inland will not improve the water budget. TD partially countered that even if there was a positive water budget, continued pumping at the coast could still cause a problem. JS generally agreed saying some kind of a model could be a useful tool to show impacts of moving pumping, but that a water budget could be addressed independently of a model. Inland conditions are not well known either. Therefore JS encouraged more discussion by the group to first figure determine "why," before jumping into a modeling effort

GY discussed six shortcomings of solely implementing a water budget approach: 1) a water balance is too "lumped," i.e., that a positive water balance could show a positive flow to the ocean, yet there could still be intrusion because a budget can not analyze localized hydraulics next to boundaries. 2) A water budget can not address spatial variations such as different water levels in the Santa Margarita and Paso Robles. 3) A model could be useful for estimating/calibrating recharge estimates especially to match up actual recharge and rainfall patterns. 4) A model could also be useful for determining alternative scenarios such as how *far* and how *much* pumping should be moved inland. 5) A model could also be used to quantify leakance, by using vertical conductivities and use onshore data and extrapolating offshore, and, 6) a model could refine estimates of where the aquifers are effectively connected to the ocean.

Regarding leakance, TD responded that when trying to model leakance near the coast that the materials are fairly heterogeneous, especially horizontal conductivities. TD cited a week long pumping test for MPWMD wells in the area where the responses in different monitoring wells were very different, even at that smaller scale. Models are good at estimating averages, but estimating responses at individual wells can be off by a great extent. Because it is not likely this can be resolved, the expectations for the model will have to be lowered to only being able to predict intermediate and large scale scenarios (like moving pumping), but not small scales. For example, for a specific well near the coast, the model will not be able to predict specific timelines

and estimates for when that well would be intruded. Therefore we should limit expectations for model.

GY basically agreed, but noted that the heterogeneity might be addressed by using probability fields to estimate the presence of preferred pathways. An alternative approach could be to assume that the pumping will be moved far enough inland so that local heterogeneity at the coast is effectively "dissolved" at that larger scale. Gus suggested the model could be used for scenarios where the pumping is moved inland and some target water level is established at the coast. Then again, this could be problematic because it may not be possible to establish 15 feet of head at the coast anywhere in the basin. TD offered that 15 feet of head may not be needed since salt water is not likely present as a single large wedge just offshore, but as a series of little wedges in the upper layer. GY partially agreed that layering and anisotrophy can "trump" the Hertzberg Relationship, but that leakance estimates would still be needed near the coast. TD noted that he prepared cross sectional models using a model simulating density effects and came to conclusion that density effects were small and that most of the water would be fresh. The modeling assumed steady-state, predevelopment conditions. TD listed/described other assumptions used in that modeling. Before discussing density effects further, the group agreed more discussion was needed on *why* a model would be developed.

TF recommended modeling in that a model was a useful tool for four reasons: 1) for the same reasons that GY listed. 2) Even if only to tie together issues such as water level fluctuations in two the different aquifer units. 3) It will help to bring to light, think about and determine the significance of inconsistent observations. 4) The need to model different management scenarios.

JF agreed models are extremely useful for testing whether you understand the system or not. He encouraged providing a lot of context for users so they understand the limitations and expectations of the model. This included explaining what the sensitivity analysis means in terms of limitations.

Level of Modeling

DW asked that if it was agreed the model was a good tool, the next question was what guidance did the group have on the *level* of modeling needed? MF again highlighted the quoted judgment text. JS emphasized that the underlying reason for the adjudication was due to declining water levels. This was/is a chronic condition occurring decades before the Paralta well. Given that pumping exceeds estimates of recharge by 40-50 percent, the general goal should be to stop declining water levels. Therefore the objectives become: 1) how to (re)distribute pumping and keep water levels at the coast at some given level on an interim basis, and then, 2) how to get new water into the basin and/or reduce pumping to stop the declining groundwater levels. While the model is a good intellectual tool, the court has mandated a 15% decrease in three years if no solution is implemented. So, the model should focus on becoming a useful tool for analyzing scenarios to achieve the preceding objectives.

TF suggested the model could be useful in modeling sub-scenarios for optimizing interim steps. The court may want to know the implications of allowing interim steps to continue for say, 3, 5 or 10 years, and how the WM came to that conclusion. It could also be useful in assessing impacts from moving capture zones to edge of basin near other jurisdictions.

TD added that there are a very large combinations of recharge values, gradients and transmissivities from inland, through the basin, and down to the coast that would yield the same results, and that the model will not be able to discriminate between these combinations. Therefore he suggested that if investigations are done to refine/improve earlier work, this should be independent of the modeling effort.

JS recommended a conclusion statement on "why model." MF and the group agreed this was appropriate. The following collective statement of the purposes of model were listed:

- To test the understanding of basin. Any model should include upfront statement of caveats re: level of discrimination, sensitivity and limitations of model.
- To allow evaluation of impacts of alternative management scenarios/schemes (at a larger scale)
- To evaluate/coordinate data collection and analysis, especially to track how future data which may change/conflict with current data. Allow prioritization of data collection efforts such that data critical to understanding and management are collected. Models can provide consistent tool for interpretation of collected data.

Discussion

Regarding moving pumping inland, MF acknowledged that moving pumping inland may be institutionally very difficult due to land ownership by BLM, however he thought that this effort should focus on the most hydrogeologically viable solution. Discussion turned to model time-frame given that drilling new wells inland would generate significant new information. MF would consider whether a model for the long term was be premature and if an interim modeling effort might be more appropriate until that new information was available. Derrik noted that WM may very well want to consider *other* management options (other than moving pumping inland) such as mining for a given amount of time, recharge, ASR, plus model will help with local/spatial water budgets. TD recommended that until new data is developed, to just update the existing model and "sit with it" for a few years, and use it until we have new data and then decide whether to start a new model. This would be a less expensive approach and could meet the court requirements. The group agreed this was a possible approach should be discussed further.

JS reemphasized his standing concern that the model did not adequately replicate *historical* trends therefore could not be relied upon to predict *future* trends (within Santa Margarita). TD suggested that this could be corrected with a minimal effort by this team and thought it was a fixable problem. JS also emphasized that it is very unlikely that any kind of drilling/testing and/or shifting of pumping could occur within a three year time frame especially given that one year has already passed. JS doesn't feel that the WM "needs" a model to address interim scenarios.

Regarding adjacent modeling efforts, the western "boundary" of the SVISGM in the Fort Ord area did not truly model boundary conditions but was only a placeholder used as an accounting cell and the geology is completely lumped. TD noted that some of the water recharging the SV basin was from the Seaside/Marina basin into the pressure area of the SV and suggested that the interconnection was reason to consider moving more water from the SR diversion into the pressure area. Discussion ensued on the political difficulties of doing this within the timeframe and thoughts on how shifting pumping inland may or may not will shift GW divide and alter capture area.

MF stated that a lot of good ideas had been offered and suggested that the second half of the meeting focus on the old model.

Lunch Break

Previous Modeling Efforts and Geology

JS asked about the extent of the next model. MF responded that model would definitely cover the entire basin and the "appropriate adjacent areas," which needs to be discussed. There would not be a need to further subdivide the basin. It was noted that there were structural features (anticlines) that need to be accounted for. Terry noted that LS sub-area had a yield of its own, and perhaps should be addressed separately. Brief discussion of whether water at the coastal end of the Southern Seaside sub-area would otherwise flow north. MF noted the saturated area above the shale was only 30-40 feet, with groundwater surfacing at shallow coastal lakes and then migrating through dune sands to ocean.

Regarding the geology, MF stated there are a number of sources for geology data and therefore need to agree and whether the geology matters such as faulting and some inconsistencies. JS asked whether it will matter to DW since he will be doing the modeling. DW responded he was more interested in hydrostratigraphy. MF noted that given the lack of real boundaries on three sides, it makes sense to use the boundaries where known. DW also emphasized that it was more important to ensure the model was internally consistent. JS suggested that there are a range of ideas how to set up conceptual model, so discuss that first and *then* discuss geology. TF noted that when his team did their report they did not try to recreate the geology and had no major disagreements with previous interpretations. TD suggested that the approach should be to label each unit and then develop maps, which show the geographic extent of each unit and generate contour maps for each unit relying on existing data; then by committee review them to try and come up with a consensus.

Hydrostratigraphy

MF shifted the discussion to hydrostratigraphy. GY noted that since the Paso Robles unit was very thick that the model might still need to have additional layers versus actual two units. GY asked TD about coarse- and fine-mesh modeling efforts. Tim responded that in terms of groundwater flow it did not make any difference and that he did not learn much from testing two versions of layering. TD thought either approach could be used.

DW asked if there was a lot of depth dependent (i.e. production zone) data that could result in a 'layer' in a model to help identify the source and type of data. MF responded that given the Paso Robles depositional environment there is too much variability. Data is also more variable here due to various completion depths of wells. Following discussion, group generally agreed there would probably not be enough data to generate a separate layer. MF suggested that model might emphasize likely depths were new wells would typically be screened.

TD asked if there will be additional geophysical data collected. Group discussed evolution of specific judgment language in the monitoring plan and that specifies studies along the northern boundary of basin and requirements to be calibrated against test borehole data. It was noted that while required and useful the data will not be available in time to complete this model in the expected time frame. DW questioned whether the geophysical work was within the current RBF scope.

Boundary Conditions

MF shifted discussion to boundary conditions, which are problematic given that only one boundary is actually mapped (Chupines Fault on southern boundary). There is some kind of unknown interface with the Salinas Valley.

TD noted that a flow boundary can also be changed *vertically* (not just north/south) and change outflows, therefore it is more important to determine area of influence of relocated wells. GY suggested setting model boundary far enough on the other side of an estimated flow boundary divide to let the model determine where effective divide is located. MF asked TD about his boundary assumptions. MF summarized that both north and east divide will actually be modeled with focus being on monitoring water level data. DW said he liked the way the existing model worked since it modeled the groundwater divide. The model could be tied to MCWRA water level data and/or the Ft. Ord 'accounting unit' of SVIGM.

JS noted that goals of stakeholders on either side of model the flow divide may be different with Salinas Valley stakeholders wanting to raise water levels, and this group wanting to just balance the Seaside basin by shifting pumping. But this may change the SV baseline/GW levels. This may be another reason to extend this model to the SV boundary. TD suggested that perhaps two models (SVIGSM and his FEMFLOW3D model) could be run alternatively/iteratively. JS cautioned against suggesting scenarios that induced changes in gradients away from Salinas Valley.

MF said the ocean boundary is critical given that seawater intrusion is a driving factor behind adjudication. DW said to not even try to suggest that we can answer the question of when intrusion will occur since it will be very difficult to predict its timing. There are better questions to ask such as what kind of water level would be needed onshore to keep SW intrusion at a given distance from the shore. This would be possible by using cross-sectional models of shoreline/ocean interface.

TD summarized some alternative assumptions used in his model which depended on three key questions: 1) whether there is a "skin" on the bottom of the Bay, and 2) the unknown vert/horz transmissitivities; 3) the geometry of the units offshore. His modeling suggested that what happens far offshore does not affect near shore intrusion. Since salt water heads are higher far offshore this tends to set up little shallow vertical circulation cells due to undulating bottom surface. The last/closest cell near the beach shows some SWI leakance but model suggests that there is essentially fresh water in the aquifer. GY asked TD about changing his model's leakance and other variables during the adjudication process. TD responded that there was not much effect from the changes and that the only way to test for that is by doing a sensitivity analysis. DW asked whether that TD used equivalent fresh water heads. GY commented that this would be the expected result in 'short-circuiting' between layers of cells… [inaudible…multiple conversations]. TD said that if there is pumping right near the coast there could be shallow intrusion depending on assumption. Team generally agreed that if this approach was used, the only practical approach is to do a sensitivity analysis.

Discussion

TD said that conceptually the projection of the series of faults offshore need to be agreed upon. GY said we might need to reconsider offshore projections.

DW reiterated that the questions should not be where the intrusion front is and when will it get here. This cannot be answered with any accuracy. DW asked whether a series of small density dependent models based on cross-sections right at the coast might be useful since using a regional density depend model will not work due to short circuiting offshore. An approach could be to have two models; one being inland and one starting at some point off the shore and just using a series of 2-D cross-sections to analyze the front. MF thought this had some merit.

GY noted that known differences in water levels onshore in the two units can be used to bracket a range of leakance values in water level differences offshore areas.
GY asked if the existing model could be adapted to include changes in geologic unit surfaces surface elevations and footprint. TD replied that this could be done relatively easily.

JS noted that given that 5,000 AFY is pumped from a small number of wells in a small basin, and that the range of alternatives to balance basin is small, maybe only 2-3 options, it is therefore appropriate that the model should focus on how to model the options. Basic purpose should be to test scenarios of practical solutions, which should cover future decisions from 5-20 years. He therefore urged the group to focus on potential immediate utility of the existing model.

Regarding the timing of the model, MF noted that a most basic MODFLOW model might be running within a week assuming all factors were known. DW responded that since a more complex model will be needed in the future it seems appropriate to start moving in that direction sooner rather than later. MF noted that the court timeline is a key, driving factor. DW said that missing factor is input from client. DW said that although this group provides good technical basis for the model, the model must also be based on non-technical issues that come from but the WM Board is not able to provide a high level of technical input. MF needs to balance time, cost, effort and results. JS offered that in the short term the highest priority should be to test alternative management schemes. Evaluating data, technical assumptions and other items will be of lesser importance to court and therefore recommended using existing model. MF noted that cost and time will be lost replatforming to a new model. Plus by modifying the existing model it also saves time and costs since that it also does not need a round of review by a technical review committee like a new model would.
TD agreed that that 80%+ of the effort is the water budget, with the rest being modifying existing model after resolving questions/issues with its calibration, most notably the replication of historical groundwater levels in the Santa Margarita Fm.

CONCLUSIONS AND RECOMMENDATIONS

MF suggested that there appears to be a consensus within the group toward using, at least in the short-term, the Durbin model after refinement/recalibration efforts to resolve the questions/issues, real or perceived, as discussed above. TD suggested that that a recommendation be given to the WM Board to keep this group going to review the model.

JS urged a second recommendation be made to the WM Board, especially those with technical knowledge of modeling efforts. Specifically to encourage them to understand that while the shorter-term aspects of the court order could be met by modifying the existing model, there will also be a need for a focused effort to have a non-political, scientific group/person to assess the impacts of importation projects to resolve bigger issues like how to actually manage the basin. MF generally agreed that was the direction the model was moving.

JS also urged that at some point there be a deliverable (report) that collects all information about how model was assembled and calibrated and how the conceptual model was put together. This will help in making the information accessible for future users. TD also suggested that the report include a collection/appendix of all data (and the interpretations) put into model so future

modelers can have the data that can be added to in the future. JS agreed. TD reemphasized, that it will be important to assemble data base and conceptual model description ASAP and have the stakeholders be active participants in that process.

Specific Technical Comments

TF offered the following:

- The recharge estimates used in their efforts matched Yates' estimates very closely. TD suggested that they might need to reevaluate ET and NDVI numbers. Some technical discussion occurred. He would send the basic plots to the group for use as they see fit.
- Regarding bedrock issue, they used 2002 study and wants to make sure they are all using the same data.
- Regarding the Wolf Hill well in the Laguna Seca sub-area it is odd in that water levels seem unusually low. This in combination with the interpretation of water levels in that area near the anticline they recommend revisiting the flow assumptions in that area. MF felt that the water level effects (separation) from the anticline are quite defensible.
- Pumping record comparisons are very difficult to match up from Cal-Am and MPWMD. Group agreed this was very difficult to match.
- Regarding overall water balances there is question of whether there is an overall net import/export into/out-of the basin by Cal-Am from the Carmel River. They could not determine it but it may be that there is a net import which could affect the water balance.

Adjournment

Martin thanked the group for their participation. Group agreed that the meeting was very helpful and that a lot of progress was made despite a vague scope and tight timeline. The approach agreed to today may allow the model to be produced sooner than mandated which the WM Board will appreciate. No future meeting dates or agendas were discussed. Meeting adjourned.

SEASIDE GROUNDWATER BASIN
WATERMASTER

To: Board of Directors

From: Dewey D Evans, CEO

Date: February 7, 2007

Subject: Board Policy on Reimbursements for Consultants participating in Watermaster Activities

Recommendation:

That the Board adopt a policy that only allows reimbursement of expenses for consultants, agents or any outside persons only with the previous approval of the Board of Directors or their designated representative.

Comments:

This recommended policy more clearly states the position of the Watermaster Board of Directors regarding the participation of other consultants, agents or other outside persons on Watermaster business.

The official approval of the Seaside Groundwater Basin Board of Directors or their designated representative will be required for all reimbursements involving any and all collaborative and contractual outside services.

If anyone has any questions please let me know

Thanks,

Dewey D Evans

SEASIDE GROUNDWATER BASIN
WATERMASTER

To: Board of Directors

From: Dewey D Evans, CEO

Date: February 7, 2007

Subject: Appointment of Watermaster Treasurer

Recommendation:

The Board of Directors consider appointing a replacement official "Treasurer" for the Seaside Basin Watermaster.

Comments:

When Mayor Albert from the City of Monterey retired from the Board last month the position of Treasurer became officially vacated. It is not necessary that the position be filled by a member of the Board of Directors.

To Quote the Court Decision; The Watermaster Board "shall elect a chairman and a vice-chairman from its membership. It shall also select a secretary, a treasurer and such assistant secretaries and assistant treasurers as may be appropriate, any of whom may, but need not, be representatives appointed to the Watermaster."

It would seem appropriate to select a Board member to fill this vacant position.

Thanks, Dewey

D R A F T

SEASIDE GROUNDWATER BASIN
WATERMASTER

ANNUAL REPORT – 2006

An integral part of the Superior Court Decision rendered by Judge Roger D. Randall filed on March 27, 2006 was the requirement for the filing of an **Annual Report**. The recent ruling of the Court requires that the annual report will be prepared and filed with the Court and mailed to all the parties on or before the 15th day of November every year for the preceding Water Year. This 2006 annual report is being filed on or before February 15, 2007, in accordance with the prior provisions of the Decision. In accordance with the terms of the Decision, this annual report addresses the following Watermaster functions:

A. Groundwater Extractions

The following schedule summarizes the 2006 Water Year reporting results from all the producers included in the Seaside Groundwater Basin. For the purposes of this report the Water Year is defined as beginning October 1, 2005 and ending on September 30, 2006. As the schedule indicates some of the producers have not yet reported the results for each of the quarters for 2006 Water Year, but all producers have reported their annual pumping quantities either to the Watermaster or to the Monterey Peninsula Water Management District. The Watermaster will continue to actively pursue and emphasize the importance of submitting quarterly reports on a timely and routine basis. For the sake of this report for those producers who did not submit all the required quarterly reports the quarterly information they did submit will be used. If the producers were only able to submit annual information that production figure was used and for those producers that have not yet submitted any information the annual production submitted to the Monterey Peninsula Water Management District was used. Refer to the **attached** "Seaside Groundwater Basin Watermaster, Reported Quarterly and Annual Water Production From the Seaside Groundwater Basin For All Producers Included in the Seaside Basin Adjudication During Water Year 2006" report.

B. Groundwater Storage

There has been no reported groundwater storage into the Seaside Basin for the 2006 Water Year.

C. Amount of Artificial Replenishment, if any, performed by Watermaster

No artificial replenishment of water was performed by the Watermaster for the 2006 Water Year.

D. Leases or sales of Production Allocation

There have been no water leases or sales during the 2006 Water Year.

E. Use of imported, reclaimed, or desalinated Water as a source of Water for Storage or as a water supply for lands overlying the Seaside Basin

There has been no imported, reclaimed or desalinated water used as a source of water for storage or as a water supply for lands overlying the Seaside Basin known to the Watermaster during the 2006 Water Year.

F. Violations of the Decision and any corrective actions taken;

The City of Seaside reported an annual pumping quantity that exceeds its Standard Production Allocation by 45 acre feet. The Watermaster recommends that no corrective action be taken against the City of Seaside, except that Seaside will pay a Replenishment Assessment for the Operating Yield Over Production. The decision not to pursue further corrective action is warranted because the total pumping for Water Year 2006 did not exceed the Operating Yield; Seaside's Over Production was a small quantity used for municipal purposes; and the Court's Decision was issued in late March, 2006, midway through the Water Year.

G. Watermaster administrative costs

The total Administrative costs for Fiscal Year 2006 amounted to $36,651.07. This included the total cost of setting up an office and paying a part time administrator and some part time staff to take and transcribe minutes of the Watermaster Board meetings for a period of four months of the fiscal year. Refer to **attached** "Fiscal Year 2006 Administrative Fund Report".

H. Replenishment Assessments

A complete schedule of the replenishment assessments is **attached** for review

I. All components of the Watermaster budget

Copies of both Fiscal Year 2006 and 2007 Watermaster adopted budgets are **attached** for the Court's review. For both Fiscal Years, the Watermaster established three separate funds; Administrative Fund; Monitoring & Management –Operations; Monitoring and Management – Capital Fund. The executive officer provides monthly financial status reports to the Watermaster Board on all financial activities for each month with year to date totals. Refer to attached copies of fiscal year 2006 & 2007 adopted budgets.

J. Recommendations

The Seaside Basin Watermaster Board has taken an aggressive approach to meet all of the Court's established deadline dates. This point has been made clear to all participants, chosen administrative staff, consultants, and the public. At the last Watermaster Board meeting held on January 31, 2007 the Board adopted a work plan pertaining to the implementation of monitoring wells to ensure that the sentinel monitoring wells would be chosen and in place by the Court imposed deadline of June 11, 2007. With this commitment, it is expected that the sentinel wells would be up and operating within a reasonable time after locating the best sites for drilling. If I had to estimate the operational component of the well testing I would say that if site selection, required permitting, drilling and placement of necessary equipment is in place as optimistically hoped, the initial data from the wells would be available by the summer of 2008. Many variables go into this objective, but; the Watermaster Board is actively working hard to see that the Court order is completely adhered to by the Fall of 2008. In the meantime, information from Monterey Peninsula "Water Management District's existing monitoring program will be utilized to detect any seawater intrusion.

Seaside Groundwater Basin Watermaster

Reported Quarterly and Annual Water Production From the Seaside Groundwater Basin For All Producers Included in the Seaside Basin Adjudication During Water Year 2006 (All Values in Acre-Feet)

Producer	Quarters				Water Year
	Oct 05-Dec 05	Jan 06-Mar 06	Apr 06-Jun 06	Jul 06-Sep 06	2006
Security National Guaranty	---	2	2	2	**8**
M.E. Calabrese 1987 Trust	---	0	0	0	**0**
Sand City	---	---	---	---	**0**
Alderwoods Group	---	---	---	---	**22**
Pasadera Country Club	---	---	---	---	**151**
Laguna Seca/Bishop	---	2	81	148	**265**
York School	---	---	---	---	**29**
Granite Rock Company	---	---	---	---	**0**
DBO Development No. 27	0	0	0	0	**0**
Seaside (Municipal)	---	---	---	---	**332**
Seaside (Golf)	---	---	---	---	**465**
Cal-Am (Coastal Subareas)	---	51	641	1,422	**3,263**
Cal-Am (Inland Subareas)	---	63	118	159	**446**
Laguna Seca Park (County)	6	5	11	16	**38**
Total					**5,019**

Notes:

1. The water year begins October 1and ends September 30 of the following calendar year. For example, WY 2006 began on October 1, 2005, and ended on September 30, 2006.

2. For the first reporting year, i.e., Water Year (WY) 2006, annual production values from the Monterey Peninsula Water Management District's *Well Reporting Program* were used for all producers. For the producers who submitted reports to the Watermaster for all quarters in WY 2006, i.e., DBO Development No. 27 and Laguna Seca County Park, the annual values are the same as reported to the District. For the producers who did not submit reports for all quarters in WY 2006, the quarterly production that was reported to the Watermaster is shown and the annual production reported to the District is shown.

3. Values shown in the table are based on reports received by the Watermaster by February 1, 2007.

Seaside Groundwater Basin Watermaster
Budget vs. Actual
Administrative Fund
January through December 2006

	Expenses	Budget	Variance	% of Budget
Assessment				
Administrative Fund	100,000.00	77,800.00	22,200.00	128.54%
Total Assessment	100,000.00	77,800.00	22,200.00	128.54%
PRA processing fee	15.40			
Total Assessment	100,015.40	77,800.00	22,215.40	128.55%
Expense				
Administrative				
Computer Maint. & Supplies	489.97	1,000.00	-510.03	49.0%
Contract Staff	26,685.00	35,000.00	-8,315.00	76.24%
Employee Benefits	0.00	800.00	-800.00	0.0%
Equip. Maint. & Rental	0.00	500.00	-500.00	0.0%
Furniture and Equipment	8,783.78	10,000.00	-1,216.22	87.84%
Legal Notice	0.00	1,000.00	-1,000.00	0.0%
Meetings, Travel & Membership				
Publications & Memberships	34.16	500.00	-465.84	6.83%
Travel, Conf. & Meetings	0.00	1,000.00	-1,000.00	0.0%
Total Meetings, Travel & Membership	34.16	1,500.00	-1,465.84	2.28%
Mileage Reimbursement	0.00	500.00	-500.00	0.0%
Office Consumables & Other				
Insurance	0.00	500.00	-500.00	0.0%
Office Supplies, Postage	745.07	500.00	245.07	149.01%
Printing	92.86	1,000.00	-907.14	9.29%
Total Office Consumables & Other	837.93	2,000.00	-1,162.07	41.9%
Office Rental	1,680.00	3,000.00	-1,320.00	56.0%
Part-time	0.00	2,000.00	-2,000.00	0.0%
Professional Services	2,362.50	20,000.00	-17,637.50	11.81%
Utilities	275.59	500.00	-224.41	55.12%
Total Administrative	41,148.93	77,800.00	-36,651.07	52.89%
Total Expense	41,148.93	77,800.00	-36,651.07	52.89%
Rollover to 2007	**58,866.47**	**0.00**	**58,866.47**	**100.0%**

Water Year 2006 Replenishment Assessment Calculation

Basin-Wide Operating Yield		**5,600**	**Natural Safe Yield (NSY)**		**3,000**
Basin-Wide Operating Yield Available to SPA		**4,213**	**NSY Available to SPA**		**2,022**
2007 Replenishment Assessment		**$ 1,132.00**			

Division of Available SPA Component of Operating Yield					
Cal Am Coastal	3,504	90.60%	Cal Am Laguna Seca	345	100%
Seaside Muni	287	7.43%			
Granite Rock	27	0.70%			
DBO	49	1.27%			
Total Coastal SPA	**3,868**				

Division of Cummulative SPA Component of Operating Yield		
Cal Am	3,849	91.38
Seasdie Muni	287	6.81
Granite Rock	27	0.64
DBO	49	1.16
Total Basin SPA	**4,212**	100.00

2007 Production

Actual Coastal Alternative Production		**Actual Coastal Standard Production**	
Seaside Golf	465	California American Water	3263
Security National Guaranty	8	Seaside (Municipal)	332
Calabrese	0	DBO Development	0
Alderwoods Group (Mission Mem)	22	Granite Rock	0
Sand City	0		
Total Coastal AP	**495**	**Total Coastal SP**	**3595**

Actual Laguna Seca Alternative Production		**Actual Laguna Seca Standard Production**	
Pasadera Country Club	151	California American	446
Laguna Seca/Bishop	265		
York School	29		
Laguna Seca County Park	38		
Total Laguna Seca Alternative Production	**483**	**Total Laguna Seca SP**	**446**

Basin-Wide	Total production	SPA Share of NSY	Individual Share of Overproduction	Replenishment Assessment
Coastal APA	495			
Laguna Seca APA	483			
Cal Am	3,709	1848	1,861	$2,106,987.52
Seaside (Municipal)	332	138	194	$219,950
Granite Rock	0	13	0	$0.00
DBO	0	23	0	$0.00
Basin Total Production	**5,019**	**2022**	**2,056**	**$2,326,937.16**
Total NSY Over-Production	**2,019**			

SEASIDE GROUNDWATER BASIN WATERMASTER
PROPOSED ADMINISTRATIVE BUDGET

Salary-Contract Staff	Part-time Director (20 hours per week @ $75 per hour) 21 weeks	$35,000
Salary-Part-time	Part-time Admin. Asst. (16 hrs. per mo. @$23 per hr.) 5 months. Take & transcribe minutes, assist in preparing Board agenda, etc.	2,000
Employee Benefits	Retirement, health, dental, vision, etc.	800
Office Supplies, Postage	General office, admin. Supplies and postage	500
Printing	Copies, brochures, maps, enlargements, etc.	1,000
Insurance	Workers Comp., liability and property insurance	500
Legal Notices	Newspaper and legal notices	1,000
Publications & Memberships	Water and related misc. publications and memberships (details unknown at this time).	500
Travel, Conferences & Meetings	Water related for Board and Admin. Staff	1,000
Mileage Reimbursement	Reimbursement for staff	500
Computer Maintenance/Supplies	Maintenance services, printer ink, paper, etc.	1,000
Equipment Maintenance/Rental	Misc. office and postage machines	500
Office Rental	Est. 400psf @$1.50 per psf per month for five months.	3,000
Utilities	Office-power, gas, phones, water, waste, etc.	500
Professional Services	Legal counsel, audit, special studies, fees. Etc.	20,000
	Sub Total	$67,800
Furniture & Equipment	Est. office set-up costs for desk, chairs, locking file cabinets, computer, fax, copier, recorder, etc.	10,000
	Total	$77,800
Reserve	To allow for unexpected and unanticipated expenses incurred during the year. All reserve funds will be used only with the approval of the Board and will be evaluated each year at the time of budget adoption.	22,200
	Total	$100,000

SEASIDE GROUNDWATER BASIN WATERMASTER
PROPOSED
PLANNING AND MONITORING PLAN - OPERTIONAL BUDGET
ADMINISTRATIVE YEAR 2006

Professional Services	$100,000
Computer Software & Supplies	100,000
Total	$200,000

SEASIDE GROUNDWATER BASIN WATERMASTER
PROPOSED
PLANNING AND MONITORING PLAN - OPERTIONAL BUDGET
ADMINISTRATIVE YEAR 2006

SEASIDE GROUNDWATER BASIN WATERMASTER
PROPOSED
CAPITAL REPLENISHMENT BUDGET
ADMINISTRATIVE YEAR 2006

Exploratory Drilling, Geophysical Surveying and Monitor Well Drilling	$1,000,000
Total	$1,000,000

SEASIDE GROUNDWATER BASIN WATERMASTER

PROPOSED
ADMINISTRATIVE BUDGET
Administrative Year 2007
(January 1 through December 31, 2007)

CEO-Compensation	$60,000
Professional Services:	
Legal—(6 mo. @ $1,000 and 6 mo. @ $500)	10,000
Administrative Support—(Minutes, agendas, filing, etc.)	8,000
Total Personnel Budget	$78,000
Office Consumables and Other Expenses (Supplies, postage, printing, insurance, etc.)	6,000
Office Rental	3,500
Computer Maintenance and Supplies	3,000
Meetings, Travel, Publications and Memberships	2,000
Mileage Reimbursement	1,500
Utilities (Power, Gas, Water, Waste, Telephone, Internet, etc.)	1,000
Office Equipment Maintenance	1,000
Total Budget	$96,000

Note:

Budget and Finance Committee recommends that a separate reserve account of $25,000 be established that will only be used with the approval of the Watermaster Board of Directors

SEASIDE GROUNDWATER BASIN WATERMASTER

MONITORING AND MANAGEMENT PLAN BUDGET OPERATING

PLANNING AND MONITORING
Administrative Year 2007
(January 1 through December 31, 2007)

Original Judgment Assessment (collected in March, 2006)	$200,000
Watermaster Board Assessment for 2007	200,000
Total Available	$400,000
Consulting costs:	
Martin Feeney Contract	$14,600
Modeling Consultants Meeting expenses	16,370
Basic groundwater resource database	
Annual maintenance: 40 hours/quarter	11,200
Develop/populate: 200 hours	14,000
Monitoring of coastal "sentinel" monitor wells	48,240
Monitoring of inland monitor wells	2,240
Total current estimated costs	$106,650
Projected to Reserve	$293,350

Notes:

1. Cost estimates are at the preliminary "order of magnitude" level, with estimated accuracy of +/-40% (an industry standard)

2. Mr. Feeney is tasked with bringing the parties' hydrologic experts together to discuss, and if necessary, improve upon the Basin groundwater flow modeling that was previously performed, and to issue a recommendation to Watermaster concerning additional modeling work. As indicated in the Budget, Mr. Feeney's expenses are anticipated to be approximately $14,600. Mr. Feeney will collaborate with Gus Yates, Joe Scalmanini, Terry Foreman, and Tim Durbin in assessing the model and future modeling work. An additional expense of roughly $14,000 is necessary to reimburse these four experts for their participation and contributions to this collaborative process.

3. Watermaster staff has received three responses to its Requests for Proposals (RFP) to manage and administering the monitoring component of the Basin Monitoring and Management Program, including the drilling and construction of the additional monitoring wells. A recommendation will be made to the Watermaster Board, and the Board is scheduled to select a consultant to perform this work at a special meeting, set for November 15, 2006. The costs for this work will be included in a revised budget once the consultant is selected.

4. As indicated in the Budget, Watermaster presently possesses $200,000 in this Budget, which was assessed in 2006. The Watermaster Board approved a 2007 assessment of an additional $200,000 for this budget for Administrative (Calendar) Year 2007, and instructed that this assessment be collected on or before January 15, 2007. The collective surplus of $309,720, which is in addition to the known expenses that are itemized in the Budget, will be used to fund the still-uncertain expenses noted above, including those arising from the groundwater flow modeling work, and the administrative and preparatory cost of the monitoring work.

5. In approving this Budget, Watermaster acknowledged the uncertainty of several anticipated expenses. Accordingly, Watermaster agreed to a quarterly review of the Budget to revise the Budget as more accurate costs are determined.

SEASIDE GROUNDWATER BASIN WATERMASTER

MONITORING AND MANAGEMENT PLAN BUDGET

CAPITAL IMPROVEMENT
Administrative Year 2007
(January 1 through December 31, 2007)

Judgment Assessment	$1,000,000
Monitor Well Construction—(4 to 6) well sites per adopted Seaside Groundwater Basin Monitoring and Management Plan @ approximately $180,000 per well site (based on 5 well sites)	$900,000
Coastal Well sites Dataloggers (22)—(6 existing wells & 16 new wells)	44,000
Inland Well sites Dataloggers (2 existing well sites)	4,000
Total estimated expense	$948,000
Projected Reserve	$52,000

Notes:

1. Cost estimates are preliminary "order of magnitude" level, with estimated accuracy of +/-40% (an industry standard)

2. The number of well sites and cost estimates are subject to change as plans and scope are refined by Watermaster. The budgeted $900,000 figure is based on the approximate cost of constructing 5 well sites at the estimated cost of $180,000 per well site. In approving this Budget, Watermaster acknowledged the uncertainty of the estimates relating the capital elements of this Budget. Accordingly, Watermaster agreed to a quarterly review of the Budget to revise the Budget as more accurate costs are determined.

3. The Watermaster Board has approved an assessment of $1,000,000 during the Administrative (Calendar) year 2006 to fund the capital projects set forth within this Budget. Watermaster adopted a phased collection of the $1,000,000 assessment. One quarter of the full $1,000,000 or $250,000, will be due on or before January 15, 2007. The remaining $750,000 will be assessed and be due approximately 30 days before the execution of contracts for the drilling and construction of the monitoring wells. This proposed schedule will be reviewed regularly by the Watermaster Board, and changed , as appropriate, to ensure that funds are received by Watermaster with sufficient time to pay all anticipated expenses set forth is this Budget.

H. Replenishment Assessments

Using the Basin-wide methodology approved by the Court on January 12, 2007, and as shown in detail on the spreadsheet attached hereto, Watermaster calculated the Water Year 2006 Replenishment Assessments as follows:

Natural Safe Yield: 3000 acre-feet

Cumulative Alternative Production Allocations: 978 acre-feet

Natural Safe Yield Available to Standard Producers: 2022 (3000 minus 978)

Standard Producers' Allocation of Natural Safe Yield:

California American – 1848 acre-feet (91.38 percent)
Seaside Municipal – 138 acre-feet (6.81 percent)
DBO – 23 acre-feet (1.16 percent)
Granite Rock – 13 acre-feet (.64 percent)

Standard Producers' Natural Yield Overproduction:

California American – 1861 acre-feet
Seaside Municipal – 194 acre-feet
DBO – 0
Granite Rock – 0

Natural Yield Over Production Replenishment Assessments:

California American – $2,106,987.52 (1861 acre-feet of Over Production multiplied by the $1132 per acre-foot replenishment assessment approved by Watermaster)

Seaside Municipal - $219,950 (194 acre-feet of Over Production multiplied by the $1132 per acre-foot replenishment assessment approved by Watermaster)

Operating Yield Over Production Replenishment Assessment:

The City of Seaside produced 45 acre-feet in excess of its Standard Production Allocation. Watermaster is imposing an additional replenishment assessment on this Over Production.

Seaside Municipal - $50,940

Total Water Year 2006 Replenishment Assessments: $2,377,877.52.

To: Watermaster Committee

From: Dewey Evans

Re: Replenishment Assessment- WR 2006

The Court's decision issued on March 27, 2006, as modified by the Court's recent ruling on the Joint Motion of the City of Seaside and California American, requires that Standard Producers pay a replenishment assessment for all production in excess each producers' respective entitlement to that portion of the natural safe-yield that remains after accounting for the Alternative Producers' allocations. The Court determined that the natural safe yield is 3,000 acre-feet. For water year 2006, the Alternative Producers' total production was 878 acre-feet. Therefore, the remaining natural safe-yield available to the Standard Producers is 2,022 acre-feet.

According to the methodology approved by the Court the Standard Producers' respective share the available safe-yield are:

California American	91.38%	1848 acre- feet
Seaside (Municipal)	6.81%	138 acre-feet
Granite Rock	.64 %	13 acre-feet
DBO	1.16%	38 acre-feet

Production records for WR 2006 demonstrate that over-production by each Standard Producer is as follows:

Producer	Actual Production	Actual Over-Production
California American	3709 acre-feet	1,861 acre-feet
Seaside	332 acre-feet	194 acre-feet
Granite Rock	0 acre-feet	0 acre-feet
DBO	0 acre-feet	0 acre-feet

The Replenishment Assessment previously set by the Watermaster Committee is $1, 132. California-American's Replenishment Assessment is $2,106,987.52 and Seaside's Replenishment Assessment is $219.950.

The Decision also requires that any Producer, which pumps in excess of the allocation established in the Decision, must pay on Operating-Yield Over Production Replenishment Assessment. The City of Seaside exceeded its Standard Production Allocation of 287 acre-feet by 45 acre-feet. Therefore, the City of Seaside is also required to pay an Operating-Yield Over Production Replenishment Assessment of $50,940.

SEASIDE GROUNDWATER BASIN
WATERMASTER

To: Board of Directors

From: Dewey D Evans, CEO

Date: February 7, 2007

Subject: Contract with RBF Consulting to Develop Work Plan on Revised Approach to Seaside Basin Monitoring and Management Program

Recommendation:

That the Board approve entering into a contract and allow a budget increase, not to exceed $35,000, to develop a work plan to revise the approach to the Seaside Basin Monitoring and Management Program.

Comments:

This action will allow the firm, RBF Consulting, to develop a revised approach to the Seaside Basin Monitoring and Management Program. This will allow a phased in approach to achieve the priorities established by Judge Randall's recent direction at the January 12, 2007 court hearing.

Please refer the attached "Scope of Work" document from RBF Consulting for further details.

Dewey D Evans

RBF CONSULTING

M E M O R A N D U M

To: Diana Ingersoll JN 70100076

From: Larry Gallery & Sarah Hardgrave

Date: February 2, 2007

Subject: Scope of Work to Identify Revised Seaside Basin Management and Monitoring Program Priorities and Key Tasks, as well as Schedule and Phasing Recommendations

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Per direction of the Seaside Watermaster Board on January 31, 2007, RBF Consulting is providing this memorandum to identify a scope of work to recommend a revised approach to Seaside Basin Management and Monitoring Program ("MMP"). This recommendation will be reviewed and considered by the Seaside Basin Watermaster Board at the March monthly meeting, in advance of hearings before the Adjudication Judge in mid-March.

RBF Consulting will work with the Technical Advisory Committee (TAC) and TAC subcommittee to perform the following tasks under this work order:

- Recommend revised approach to that identified in the September 29, 2006 Request for Proposals to manage and implement the MMP, given recent direction from the Judge and the Board.
- Identify key program components and phased approach to achieve the priorities established in the Seaside Basin Adjudication Order ("Order") and Judge's recent direction.
- Develop a schedule to implement key program component tasks to meet the Order's requirements for Seaside Basin monitoring and management, specifically, achieving the physical solution for achieving equitable and efficient management of groundwater.
- Coordinate with Martin Feeney to incorporate coastal sentinel well construction, data collection and results into overall program tasks and schedule.

The deliverables for this effort are:

- Draft Revised MMP
- Schedule Analysis for Revised MMP

As discussed and recommended at the Technical Advisory Committee (TAC) and presented to the Watermaster Board, the above scope would be performed at a not-to-exceed amount of $35,000.

SEASIDE GROUNDWATER BASIN
WATERMASTER

To: Board of Directors

From: Dewey D Evans, CEO

Date: February 7, 2007

Subject: Report from MPWMD on Fall 2006 Groundwater Quality Monitoring for Seaside Basin Coastal Monitoring Wells

Recommendation:

Report for informational purposes only. No official Board action is required.

Comments:

No action by the Board is required. Monterey Peninsula Water Management District (MPWMD) Staff members Joe Oliver and Tim Lindberg are available to make a presentation and answer questions.

Dewey D Evans

MONTEREY PENINSULA
WATER MANAGEMENT DISTRICT

5 HARRIS COURT, BLDG. G
POST OFFICE BOX 85
MONTEREY, CA 93942-0085 • (831) 658-5600
FAX (831) 644-9560 • http://www.mpwmd.dst.ca.us

SEASIDE BASIN WATERMASTER MEMORANDUM 2007-01

Date: **February 2, 2007**
To: **Seaside Basin Watermaster**
From: **Joe Oliver, PG, CHg, Senior Hydrogeologist**
Tom Lindberg, Associate Hydrologist
Subject: **Results of Ground Water Quality Samples Collected in Fall 2006 from MWPMD Coastal Monitor Wells in and Near the Seaside Ground Water Basin**

Summary

This memorandum transmits and summarizes ground water quality data collected in Fall 2006 by the Monterey Peninsula Water Management District (MPWMD) from its network of coastal monitor wells in and near the Seaside Ground Water Basin. This information is being provided to the Seaside Basin Watermaster Board for information purposes, and is in compliance with the monitoring protocols described in the Watermaster's *Seaside Basin Monitoring and Management Program* (revised September 5, 2006), which was prepared in response to the March 27, 2006 court decision in the Seaside Basin adjudication case. The chemical data from the Fall 2006 sampling of MPWMD's existing monitor well network do not indicate evidence of seawater intrusion at the locations monitored in and near the coastal area of the Seaside Basin.

MPWMD Seaside Basin Coastal Monitor Well Network

The MPWMD initiated a ground water quality monitoring program in the coastal portion of the Seaside Basin in 1990, and the network has been expanded since that time. The water quality data collected from the monitor wells are utilized for the purposes of: (1) characterizing the chemical nature of the ground water, (2) establishing long-term ground water quality trends, and (3) monitoring of seawater intrusion potential into the Seaside Basin. The chemical data reported herein provide information about present water quality conditions in the coastal portion of the basin, and serve as background water quality data for comparison in future studies. Currently, the MPWMD collects water quality data annually from 12 monitor wells at 6 separate sites, as shown on **Figure 1**. At each site, a "shallow" and "deep" monitor well have been installed (either in separate boreholes or as multiple completions in a single borehole), generally corresponding to well completions within the two principal aquifer units in the Seaside Basin,

known as the Paso Robles Formation (QTp) and Santa Margarita Sandstone (Tsm), respectively. The Pliocene/Pleistocene-Age QTp is a continental formation comprised of a fluvial mix of clay, silt, sand and gravel, deposited as ancestral valley fill sediments. The Miocene-Age Tsm is a marine and brackish-marine, fine- to coarse-grained arkosic sandstone, which overlies the shales of the Monterey Formation. The monitor wells are constructed of 2-inch PVC casing, with screens isolated in sand "packages" within each aquifer unit. The aquifer units are separated from each other in the wells by cement strata isolation seals. A summary of the monitor well completion data is provided in **Table 1**.

Water Sample Collection

Water sample collection is accomplished by "air-lift" pumping. The method utilizes a 3/4-inch PVC dedicated airline in the well, which is coupled to an air compressor. The wellhead configuration is fashioned after that shown in **Figure 2**. Due to the small diameter of the monitor wells, the well casing is used as the "eductor" pipe, rather than a separate eductor pipe inside the well. Through experience, it has been determined that acceptable pumping results can be achieved if the bottom of the airline is placed at a depth that gives approximately 50 percent pumping submergence (i.e., the ratio of the length of the airline below the pumping water level to the total length of the airline). The air-lift method can be inappropriate for certain water quality constituents due to chemistry changes brought about by air entrainment in the purged water; however, it is considered appropriate for the suite of inorganic constituents that are currently analyzed from the collected samples.

The volume of water removed from each well prior to sampling is generally three casing volumes, consistent with standard sampling protocol. Sampling is supplemented by field measurement of several indicator parameters that are collected during pumping, which ensures that water quality has stabilized prior to sample collection. An example of the recordation of field data is provided on the field ground water sampling form in **Figure 3**. Once the samples are collected, they are taken to a State-certified laboratory for analysis.

Fall 2006 Water Quality Results

Water chemistry analytical results for the ground water samples collected from the MPWMD's existing coastal monitor wells on October 24 and 25, 2006, are provided in **Table 2**. Historical water chemistry analytical results from samples collected at each monitor well are provided in the tables in **Appendix A**. The chemical data from the depth intervals sampled at these monitor wells do not indicate evidence of present or past seawater intrusion at these locations in and near the coastal area of the Seaside Basin. This is most clearly expressed by review of graphs showing Specific Electrical Conductance (SEC) and Chloride (Cl^-) concentration for the period of record at each well, as shown on the long-term plots provided in **Figures 4, 5 and 6**, for the three sites that are closest to the coastline: PCA West, MSC, and FO-09. These two parameters were selected because identification of saline water intrusion is always associated with an increase in SEC (which is an indicator of Total Dissolved Solids concentration) and Cl^- concentration (which is the most-used tracer for seawater intrusion analysis). For all three graphs, the scales are similar to facilitate relative comparisons from each aquifer unit and well location. As shown in these figures, ground water sampled from the shallower QTp aquifer unit

is generally less mineralized than the deeper Tsm aquifer unit, but water quality for both aquifer units is well below the typical seawater concentration of approximately 50,000 micromhos per centimeter for SEC, and 19,000 milligrams per liter for Cl^-. Most importantly, little overall change has occurred in terms of any trends in increasing SEC or Cl^- concentration in the zones monitored at these coastal locations. It should be noted that the data plots shown in **Figures 4, 5 and 6** do not include the first water quality sample results collected at each well after construction. These initial data were not included based upon the poor comparison of these early data with subsequent analyses. It has been our experience that even though each well undergoes rigorous development subsequent to construction and before initial sample collection, the results are not representative of the native aquifer chemistry, presumably due to the limited ability in these small-diameter monitor wells to completely flush residual drilling fluids in the vicinity of the borehole. Additional information regarding assessment of the ground water quality analytical results from the coastal monitor wells is available from the MPWMD.

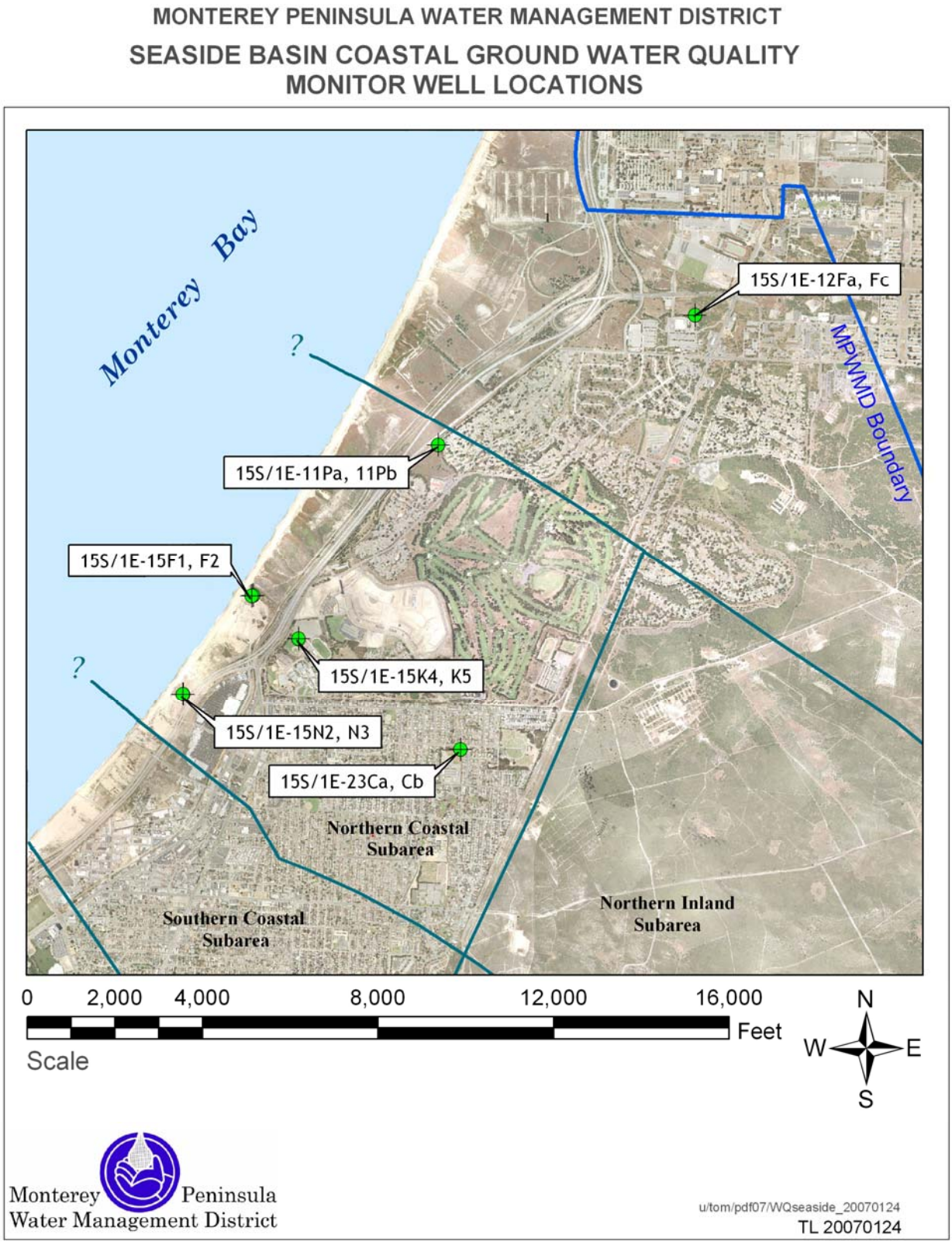


Figure 1. Seaside Basin Coastal Ground Water Quality Monitor Well Locations.

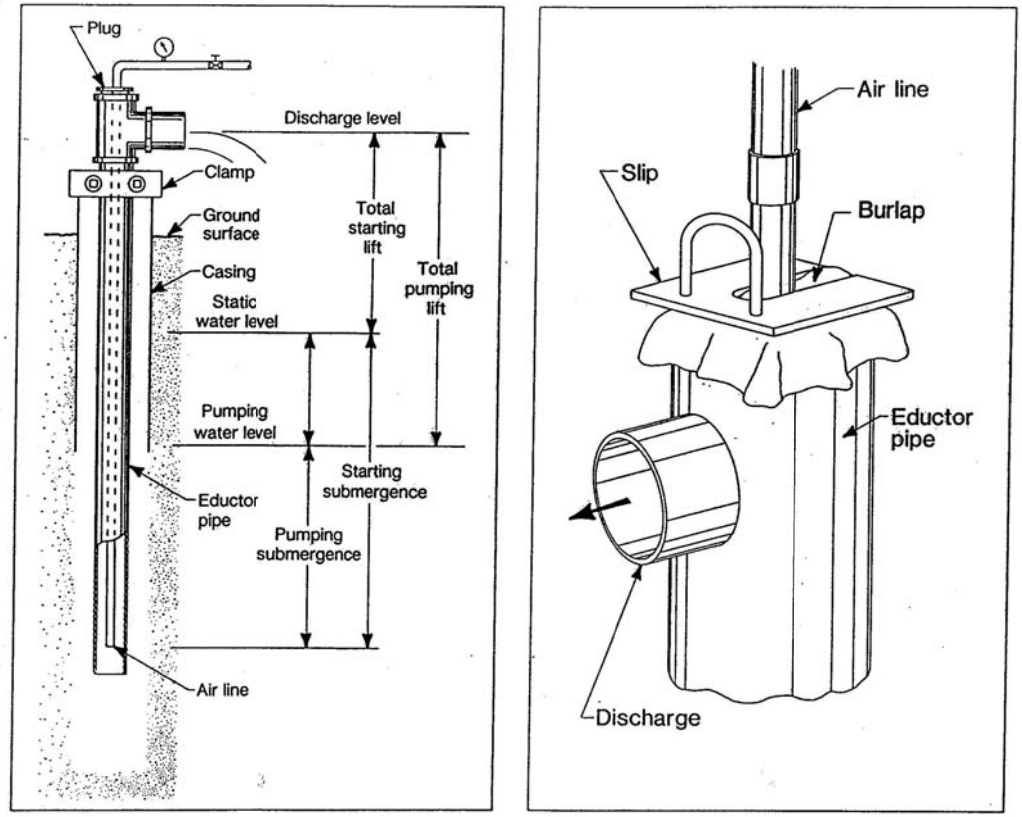
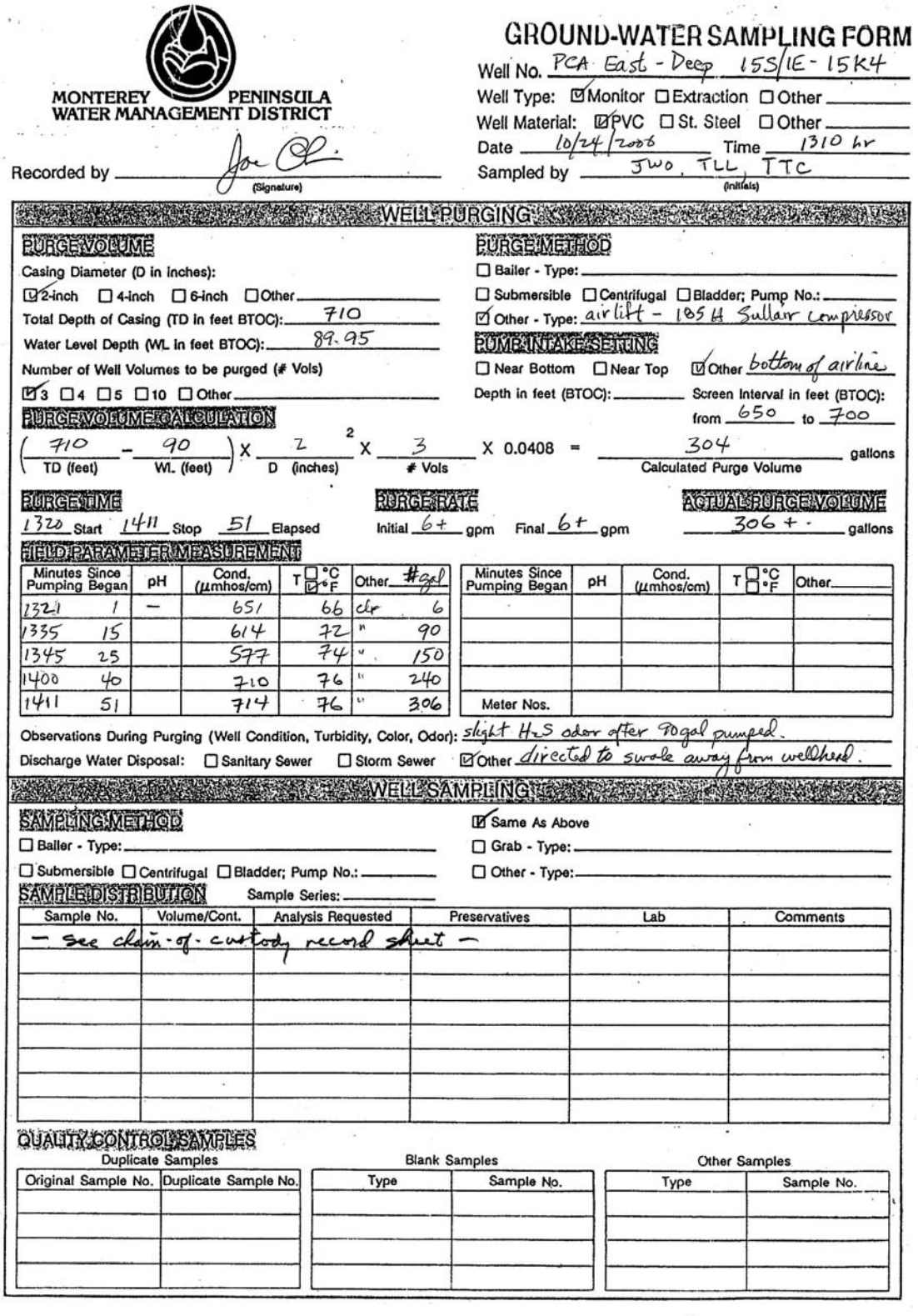


Figure 2. Diagrams illlustrating the airlift-pumping method for water sample collection (from Driscoll, 1986, Figure 15.10)



MONTEREY PENINSULA WATER MANAGEMENT DISTRICT

GROUND-WATER SAMPLING FORM

Well No. PCA East - Deep 15S/1E-15K4

Well Type: ☑ Monitor ☐ Extraction ☐ Other

Well Material: ☑ PVC ☐ St. Steel ☐ Other

Date 10/24/2006 Time 1310 hr

Recorded by Joe (Signature) Sampled by JWO, TLL, TTC (Initials)

WELL PURGING

PURGE VOLUME

Casing Diameter (D in inches):

☑ 2-inch ☐ 4-inch ☐ 6-inch ☐ Other

Total Depth of Casing (TD in feet BTOC): 710

Water Level Depth (WL in feet BTOC): 89.95

Number of Well Volumes to be purged (# Vols)

☑ 3 ☐ 4 ☐ 5 ☐ 10 ☐ Other

PURGE METHOD

☐ Bailer - Type:

☐ Submersible ☐ Centrifugal ☐ Bladder; Pump No.:

☑ Other - Type: airlift - 185 H Sullair compressor

PUMP INTAKE SETTING

☐ Near Bottom ☐ Near Top ☑ Other bottom of airline

Depth in feet (BTOC): Screen Interval in feet (BTOC): from 650 to 700

PURGE VOLUME CALCULATION

(710 TD (feet) − 90 WL (feet)) X 2 D (inches)^2 X 3 # Vols X 0.0408 = 304 gallons Calculated Purge Volume

PURGE TIME

1320 Start 1411 Stop 51 Elapsed

PURGE RATE

Initial 6+ gpm Final 6+ gpm

ACTUAL PURGE VOLUME

306 +- gallons

FIELD PARAMETER MEASUREMENT

Minutes Since Pumping Began		pH	Cond. (µmhos/cm)	T ☐ °C ☑ °F	Other #gal
1321	1	—	651	66	clr 6
1335	15		614	72	" 90
1345	25		577	74	" 150
1400	40		710	76	" 240
1411	51		714	76	" 306

Minutes Since Pumping Began	pH	Cond. (µmhos/cm)	T ☐ °C ☐ °F	Other
Meter Nos.				

Observations During Purging (Well Condition, Turbidity, Color, Odor): slight H_2S odor after 90 gal pumped.

Discharge Water Disposal: ☐ Sanitary Sewer ☐ Storm Sewer ☑ Other directed to swale away from wellhead.

WELL SAMPLING

SAMPLING METHOD

☑ Same As Above

☐ Bailer - Type:

☐ Submersible ☐ Centrifugal ☐ Bladder; Pump No.:

☐ Grab - Type:

☐ Other - Type:

SAMPLE DISTRIBUTION

Sample Series:

Sample No.	Volume/Cont.	Analysis Requested	Preservatives	Lab	Comments
— See chain-of-custody record sheet —					

QUALITY CONTROL SAMPLES

Duplicate Samples

Original Sample No.	Duplicate Sample No.

Blank Samples

Type	Sample No.

Other Samples

Type	Sample No.

Figure 3. Example Ground Water Data Collection Form, Fall 2006 Water Quality Sampling.

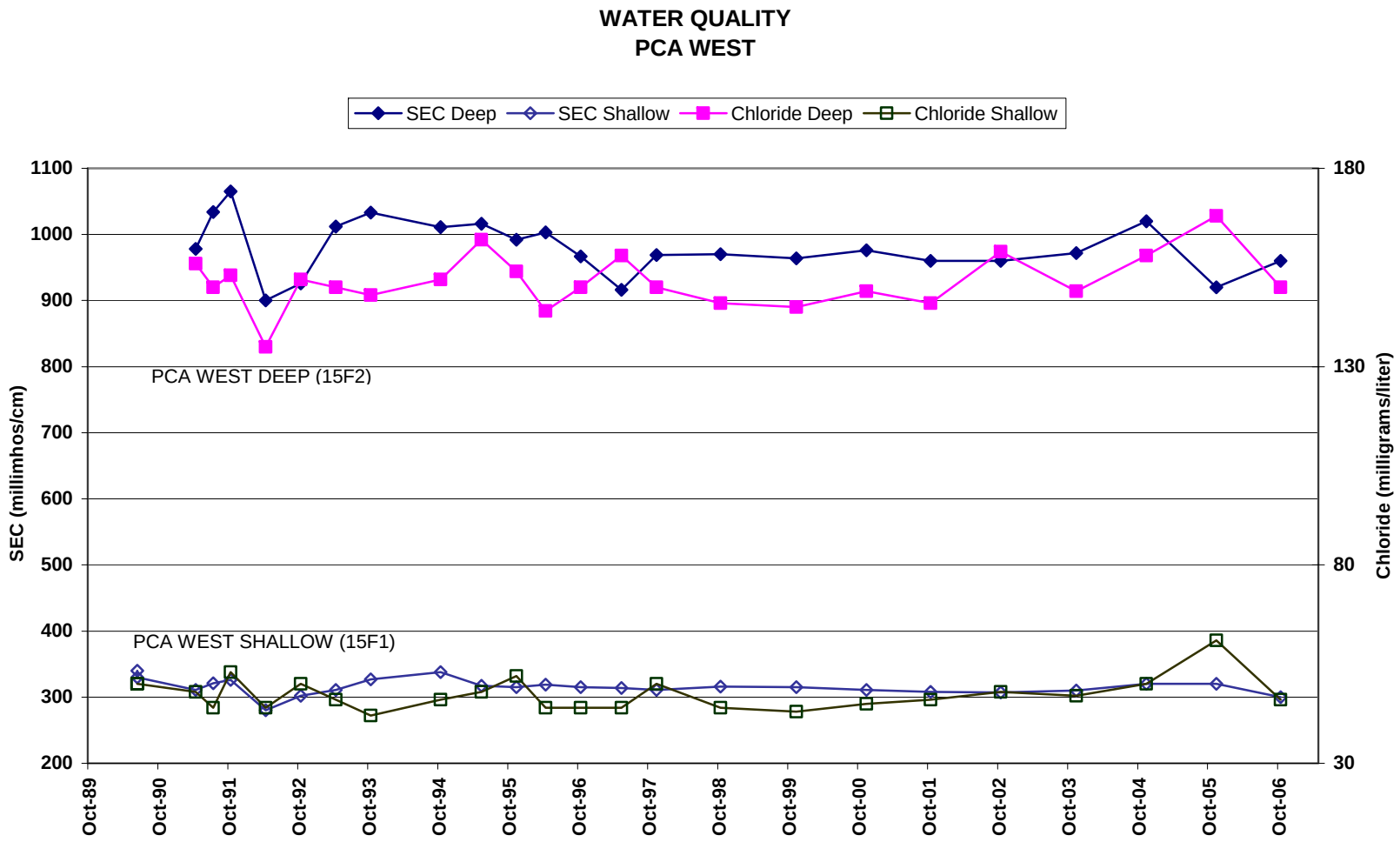


Figure 4. MPWMD PCA West Monitor Well Site: Historical Specific Electrical Conductance and Chloride Concentration.

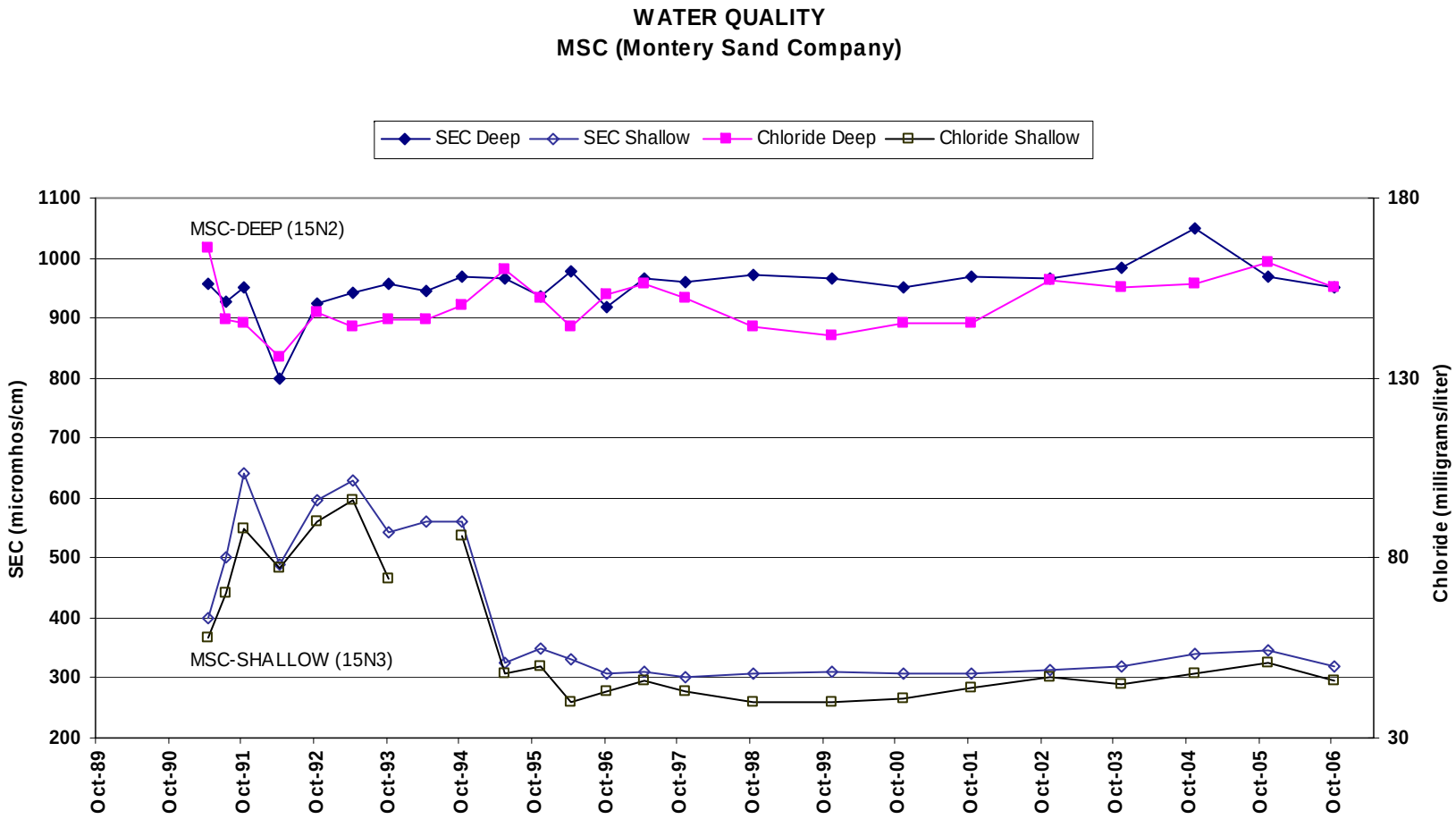


Figure 5. MPWMD MSC Monitor Well Site: Historical Specific Electrical Conductance and Chloride Concentration.

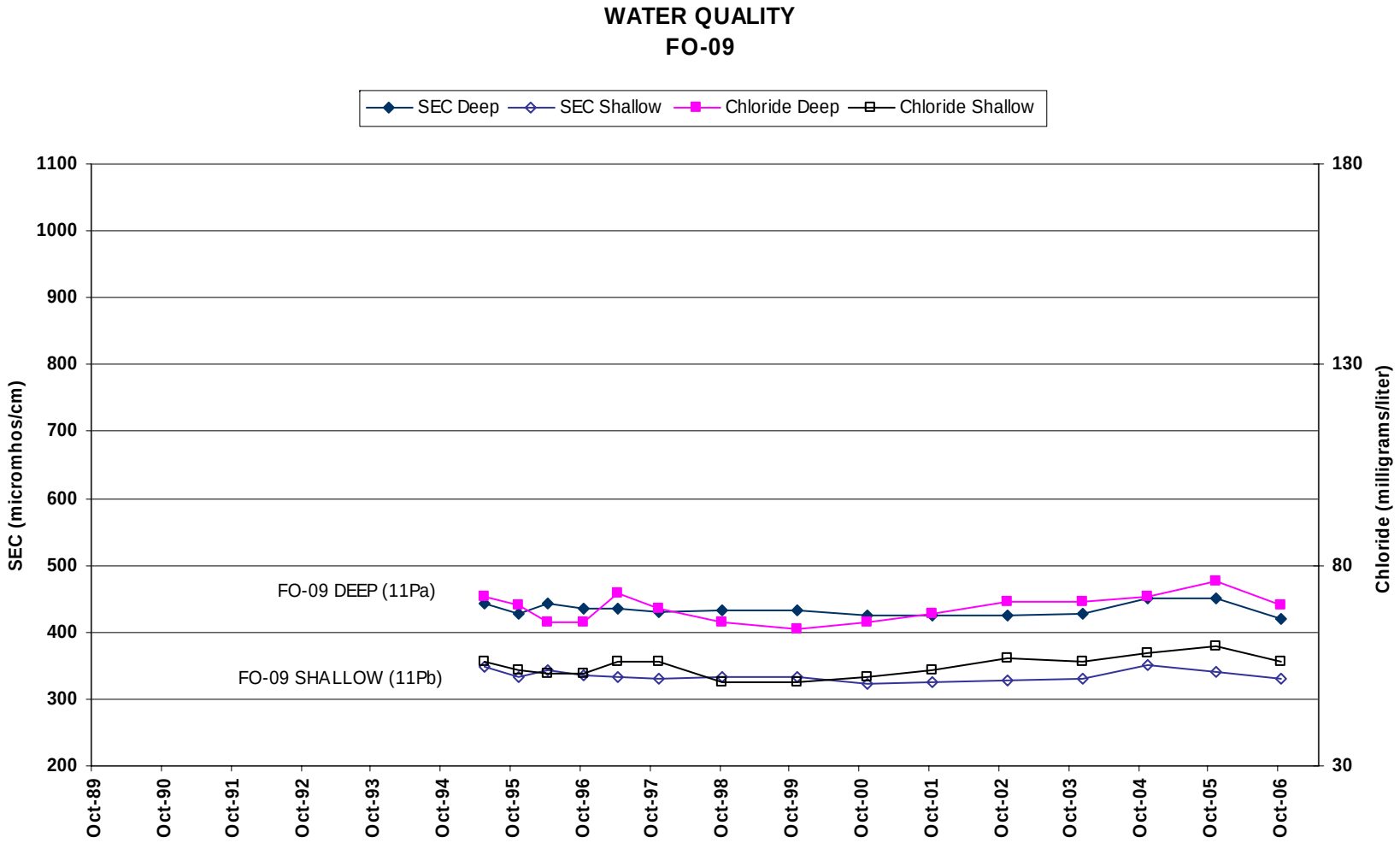


Figure 6. MPWMD FO-09 Monitor Well Site: Historical Specific Electrical Conductance and Chloride Concentration.

Table 1.

SUMMARY OF MPWMD COASTAL SEASIDE BASIN GROUND WATER QUALITY MONITOR WELLS

Site	Well Name	Location Description	Well Number	Date Drilled	DWR Drillers Log	Hole Depth (feet)	Well Depth (feet)	Screened Interval (feet)	Strata Seal (feet)	Casing Type	Geologic Unit	E-Log	Elevation (feet AMSL)
MSC		***former MSC mine north of Playa Ave. and west of Hwy. 1***											
	MSC-Shallow	approx. 10' S of north property line	15S/1E-15N3	5/25/1990	338413	720	695	490 - - 680	95 - 275	2" pvc	QTp	- - -	80.58 (s1)
	MSC-Deep	approx. 7' E of MSC-Shallow	15S/1E-15N2	5/25/1990	338425	920	865	810 - 850	725 - 775	2" pvc	Tsm	yes	80.78 (s1)
PCA WEST		***former PCA mine W of Hwy. 1***											
	PCA-W Shallow	approx. 200' SE of ocean bluff	15S/1E-15F1	3/28/1990	338400	600	585	525 - 575	120 - 150	2"pvc	QTp	- - -	64.64 (s1)
	PCA-W Deep	approx. 50' E of PCA-W Shallow	15S/1E-15F2	3/90	338401	900	885	825 - 875	760 - 790	2" pvc	Tsm	yes	65.60 (s1)
PCA EAST		***vacant lot NE of Seaside High baseball field***											
	PCA-E Shallow	approx. 300' E Monterey Rd, 50" N fence	15S/1E-15K5	4/16/1990	338402	863	410	350 - 400	110 - 150	2" pvc	QTp	- - -	69.31 (s1)
	PCA-E Deep	(same borehole as shallow well)	15S/1E-15K4	4/16/1990	338402	863	710	650 - 700	580 - 620	2" pvc	Tsm	yes	69.31 (s1)
ORD TERRACE		***Ord Terrace School property south of Ord Grove Ave.***											
	OT-Shallow	1700 block Ord Grove Ave.	15S/1E-23Ca	8/5/1999	- - -	530	340	280 - 330	0 - 260	2" pvc	upper Tsm	- - -	230 (e)
	OT-Deep	(same borehole as shallow well)	15S/1E-23Cb	8/5/1999	- - -	530	450	390 - 440	350 - 377	2" pvc	lower Tsm	yes	230 (e)
MPWMD #FO-09		***E of Hwy.1, SE of Okinawa Rd.***											
	#9-Shallow	50' east of utility service rd.	15S/1E-11Pa	8/16/1994	- - -	1,110	660	610 - 650	500 - 540	2" pvc	QTp	- - -	119.11 (s2)
	#9-Deep	(same borehole as shallow well)	15S/1E-11Pb	8/16/1994	- - -	1,110	840	790 - 830	700 - 765	2" pvc	Tsm	yes	119.15 (s2)
MPWMD #FO-10		***south of Light Fighter Drive, behind Barker Theater Building***											
	#10-Shallow	20' north of access road curb	15S/1E-12Fa	9/3/1996	- - -	1,500	650	620 - 640	480 - 500	2" pvc	QTp	- - -	201.19 (s2)
	#10-Deep	(same borehole as shallow well)	15S/1E-12Fc	9/3/1996	- - -	1,500	1,420	1380 - 1410	1280 - 1300	2" pvc	Tsm (?)	yes	201.10 (s2)

NOTES:

1. Official State well numbers end with a numeral; unofficial MPWMD well numbers end with a small case letter.
2. Geologic Unit refers to the unit adjacent to the screened interval: QTp = Paso Robles Formation; Tsm = Santa Margarita Sandstone.
3. Elevation refers to the reference point elevation: (s1) = surveyed by Land Data Services (1990 and 1992); (s2) = surveyed by Sandis Humber Jones (1995); (e) = altimeter estimate.
4. Well completion data at site MSC are documented in "Installation of Monitoring Well Cluster, Monterey Sand Company", Staal, Gardner & Dunne, Inc. (SGD), July 1990.
5. Well completion data at sites PCA West and PCA East are documented in "Hydrogeologic Investigation, PCA Well Aquifer Test", SGD, July 1990.
6. Well completion data at site MPWMD FO-09 are documented in "Summary of 1994 Fort Ord Monitor Well Installations", MPWMD Tech. Mem. 94-07.
7. Well completion data at site MPWMD FO-10 are documented in "Summary of 1996 Seaside Basin Monitor Well Installations", MPWMD Tech. Mem. 97-04.
8. Two dashes (i.e., "- -") indicate multiple screened intervals.
9. Three dashes (i.e., "- - -") indicate not applicable or not available.

Table 2.

MONTEREY PENINSULA WATER MANAGEMENT DISTRICT

GROUND WATER QUALITY MONITORING RESULTS

Seaside Basin Sample Collection Date: October 24 and October 25, 2006

Units are milligrams per liter unless otherwise noted.

Water Quality Constituent	Specific Conductance (micromhos/cm)	Total Alkalinity (as CACO3)	pH	Chloride	Sulfate	Ammonia Nitrogen (as NH3)	Nitrate Nitrogen (as NO3)	Total Organic Carbon	Calcium	Sodium	Magnesium	Potassium	Iron	Manganese	Orthophosphate	Boron
Drinking Water Standard (1)	900 1600 2200 (2)	NA	NA	250 500 600 (2)	250 500 600 (2)	NA	45	NA	NA	NA	NA	NA	0.3	0.05	NA	NA
Sampling Location																
15S/1E-15N3 (shal)	320	72	7.8	46	17	0.06	<1	<0.20	17	39	4.8	3.8	<0.10	<0.0005	0.04	0.39
15S/1E-15N2 (deep)	950	240	8.2	155	45	0.09	<1	<0.20	73	105	16	5.0	<0.10	0.051	<0.03	0.29
15S/1E-23Ca (shal)	800	212	8.3	106	37	<0.05	6	0.35	68	79	17	4.4	1.080	0.077	<0.03	0.29
15S/1E-23Cb (deep)	1280	318	8.2	181	89	0.47	<1	0.84	107	132	26	7.1	0.169	0.026	<0.03	0.58
15S/1E-15F1 (shal)	300	68	7.8	46	10	<0.05	4	<0.20	19	33	5.6	2.5	<0.10	<0.0005	<0.03	0.32
15S/1E-15F2 (deep)	960	246	7.7	150	42	0.08	<1	0.27	77	109	18	5.4	0.541	0.085	<0.03	0.34
15S/1E-15K5 (shal)	330	68	7.9	50	10	<0.05	3	<0.20	20	39	6.2	2.9	2.390	0.068	<0.03	0.28
15S/1E-15K4 (deep)	790	208	8.2	109	35	<0.05	<1	<0.20	57	93	12	4.2	0.216	0.092	<0.03	0.33
15S/1E-11Pa (shal)	330	64	7.8	56	12	<0.05	<1	0.42	22	34	4.5	4.1	<0.10	<0.0005	0.04	0.28
15S/1E-11Pb (deep)	420	92	7.9	70	14	<0.05	<1	0.31	26	53	3.7	3.7	<0.10	<0.0005	<0.03	0.31
15S/1E-12Fa (shal)	350	76	7.9	53	19	<0.05	<1	<0.20	22	40	5.7	2.2	<0.10	<0.0005	<0.03	0.23
15S/1E-12Fc (deep)	360	78	7.8	55	17	<0.05	<1	<0.20	22	40	5.5	2.8	<0.10	0.034	<0.03	0.32

NOTES:

(1) Maximum contaminant levels are from California Domestic Water Quality and Monitoring Regulations, Title 22, 1977.

(2) The three values listed for certain constituents refer to the "recommended" level, the "upper" level, and "short-term use" level, respectively.

SEASIDE BASIN WATERMASTER
MEMORANDUM 2007-01

APPENDIX A

Historical Ground Water Quality Monitoring Results
Seaside Coastal Monitor Wells

MONTEREY PENINSULA WATER MANAGEMENT DISTRICT

GROUND WATER QUALITY MONITORING RESULTS

WELL NO.: T15S/R1E-15N2 WELL NAME: MSC - Deep

Units are milligrams per liter unless otherwise noted.

Date	Specific Conductance (micromhos/cm)	Total Alkalinity (as CACO3)	pH (pH units)	Chloride	Sulfate	Ammonia Nitrogen (as NO3)	Nitrate Nitrogen (as NO3)	Total Organic Carbon	Calcium	Sodium	Magnesium	Potassium	Iron	Manganese	Orthophos-phate	Boron
DWS [1]	900 1600 2200 [2]	NA	NA	250 500 600	250 500 600	NA	45	NA	NA	NA	NA	NA	0.3	0.05	NA	NA
5/31/1990	2500	488	7.3	420	371		<0.4		179	260	84		<0.05	<0.02		
4/26/1991	958	180	7.8	166	58	<0.5	0.5	2.6	58	121	9.4	5.9				
7/24/1991	928	186	7.9	146					55	112	10	5.6	<0.10	<0.03		
10/23/1991	952	200	7.5	145					57	116						
4/28/1992	800	216	7.2	136	40				70	116	12	5.2	<0.03			
6/3/1992				122	46		1.4		64	98	13	4.7	<0.01			
10/20/1992	925	216	8.4	148	46	<0.10	<0.05	0.4	69	112	11	5.0	<0.10	0.07		
4/28/1993	943	212	8.3	144	42	<0.10	<0.05	0.5	59	110	12	5.1	<0.10	<0.05		
10/28/1993	957	186	8.2	146	34	<0.01	<1.0	0.3	54	108	11	4.9	<0.10	0.09		
4/29/1994	944	150	8.2	146	38	<0.05	<1.0	1.7	66	121	13	5.1	<0.10	<0.03		
10/28/1994	968	218	8.2	150	70	<0.05	<1.0	0.4	70	109	12	5.0	<0.01	0.05		
5/3/1995	966	210	8.4	160	40	0.13	<1.0	0.8	70	112	12	4.7	<0.01	0.05		
11/30/1995	935	202	8.3	152	38	0.12	<1.0	1.3	62	105	13	4.9	<0.10	0.08	<0.03	
4/25/1996	978	219	7.8	144	45	<0.05	<1.0	0.7	62	107	14	4.8	<0.10	0.07	<0.03	
10/11/1996	917	205	7.8	153	43	0.28	1.0	1.5	57	109	13	5.1	<0.10	0.08	0.04	
4/24/1997	965	229	8.0	156	43	0.13	<1	0.4	54	107	13	4.9	<0.1	<0.03	<0.03	
11/19/1997	960	234	7.6	152	47	0.14	<1	1.3	72	104	16	4.9	<0.1	0.09	<0.03	
10/27/1998	972	234	7.8	144	42	0.08	<1	<0.2	73	112	15	5.2	<0.1	0.08	<0.03	
11/2/1999	967	236	8.4	142	42	0.11	<1	na	69	103	15	4.8	<0.1	0.06	<0.03	
11/1/2000	950	219	7.9	145	41	0.16	<1	1.0	75	105	15	4.7	<0.1	0.07	0.22	
10/26/2001	968	238	8.4	145	43	<0.05	<1	0.4	86	103	15	4.7	0.03	0.07	<0.03	
11/1/2002	965	238	8.3	157	45	0.10	<1	0.7	69	100	15	3.7	<0.1	0.07	<0.03	
11/6/2003	985	242	7.7	155	43	0.10	<1	0.5	75	103	14	4.8	0.13	0.05	<0.03	
11/8/2004	1050	221	7.9	156	45	0.15	<1	0.5	73	106	15	4.4	0.11	0.072	<0.03	0.28
11/2/2005	970	252	8.0	162	43	0.13	<1	0.5	76	111	15	4.6	<0.05	0.054	<0.03	0.51
10/25/2006	950	240	8.2	155	45	0.09	<1	<0.2	73	105	16	5.0	<0.10	0.051	<0.03	0.29

NOTES:

1 DWS = Drinking Water Standard; maximum contaminant levels are from California Domestic Water Quality and Monitoring Regulations, Title 22, 1977.

2 The three values for each constituent refer to the "recommended" level, the "upper" level and the "short-term use" level, respectively.

MONTEREY PENINSULA WATER MANAGEMENT DISTRICT

GROUND WATER QUALITY MONITORING RESULTS

WELL NO.: T15S/R1E-15N3 WELL NAME: MSC - Shallow

Units are milligrams per liter unless otherwise noted.

Date	Specific Conductance (micromhos/cm)	Total Alkalinity (as CACO3)	pH (pH units)	Chloride	Sulfate	Ammonia Nitrogen (as NO3)	Nitrate Nitrogen (as NO3)	Total Organic Carbon	Calcium	Sodium	Magnesium	Potassium	Iron	Manganese	Orthophos-phate	Boron
DWS [1]	900 1600 2200 [2]	NA	NA	250 500 600	250 500 600	NA	45	NA	NA	NA	NA	NA	0.3	0.05	NA	NA
5/31/1990	1190	96	7.2	210	271		<0.4		34	138	62	7.8	<0.05	<0.02		
4/26/1991	400	97	7.9	58	22	<0.5	0.5	0.3	25	44	6.8	3.7				
7/24/1991	500	108	8.0	70					31	55	8.0	4.5	<0.10	<0.03		
10/23/1991	642	146	7.7	88					36	74						
4/27/1992	490	130	7.4	77	23		1.0		36	68	9.2	5.5	<0.01			
6/4/1992									40	77	10.4	6.2	<0.01			
10/20/1992	595	140	8.4	90	57	<0.10	<0.5	0.2	37	72	9.0	5.6	<0.1	<0.05		
4/28/1993	630	150	8.3	96	26	<0.10	<0.5	0.1	37	74	10.0	5.8	<0.1	<0.05		
10/28/1993	542	118	8.1	74	29	<0.10	2.0	0.2	30	59	8.0	4.9	1.1	0.09		
4/29/1994	560	128	8.2	230	28	<0.05	2.0	0.1	33	65	9.0	5.3	0.8	0.04		
10/28/1994	560	128	8.2	86	28	<0.05	2.0	0.2	36	68	9.0	5.2	0.4	0.04		
5/3/1995	325	66	8.3	48	10	<0.05	2.0	0.3	21	35	5.0	2.7	0.24	<0.03		
11/30/1995	350	78	7.7	50	14	<0.05	1.0	1.0	18	39	6.0	3.3	0.40	0.08	0.03	
4/25/1996	331	65	7.1	40	21	<0.05	1.0	1.1	16	39	5.0	3.1	0.19	0.07	0.03	
10/11/1996	306	61	7.8	43	19	<0.05	1.0	0.4	15	38	4.0	3.1	0.10	<0.03	0.11	
4/24/1997	311	63	8.0	46	14	<0.05	2.0	0.2	17	34	5.0	2.9	0.20	<0.03	<0.03	
11/19/1997	301	64	7.9	43	17	<0.05	<1	0.3	18	33	53	2.9	0.21	<0.03	<0.03	
10/27/1998	306	64	7.7	40	18	<0.05	<1	<0.2	17	36	5.0	3.5	<0.1	<0.03	0.03	
11/2/1999	309	63	8.1	40	17	0.07	<1	na	16	35	5.0	3.3	<0.1	<0.03	<0.03	
11/1/2000	308	64	8.0	41	16	0.11	<1	<0.2	16	36	5.0	3.4	<0.1	<0.03	0.24	
10/26/2001	308	66	8.1	44	17	0.06	<1	<0.2	21	37	4.0	3.8	0.05	<0.03	<0.03	
11/1/2002	313	70	8.0	47	18	0.08	<1	0.3	16	35	5.0	2.5	<0.1	<0.03	<0.03	
11/6/2003	318	66	7.2	45	17	0.10	<1	0.5	17	36	4.6	3.3	<0.05	<0.0005	0.03	
11/8/2004	340	71	7.9	48	18	0.11	<1	<0.2	17	36	4.0	3.1	<0.05	<0.0005	<0.03	0.21
11/2/2005	345	74	7.9	51	18	0.09	<1	<0.2	17	40	4.6	3.5	<0.05	<0.0005	0.04	0.32
10/25/2006	320	72	7.8	46	17	0.06	<1	<0.2	17	39	4.8	3.8	<0.10	<0.0005	0.04	0.39

NOTES:

1 DWS = Drinking Water Standard; maximum contaminant levels are from California Domestic Water Quality and Monitoring Regulations, Title 22, 1977.

2 The three values for each constituent refer to the "recommended" level, the "upper" level and the "short-term use" level, respectively.

MONTEREY PENINSULA WATER MANAGEMENT DISTRICT

GROUND WATER QUALITY MONITORING RESULTS

WELL NO.: T15S/R1E-15F2 WELL NAME: PCA West - Deep

Units are milligrams per liter unless otherwise noted.

Date	Specific Conductance (micromhos/cm)	Total Alkalinity (as CACO3)	pH (pH units)	Chloride	Sulfate	Ammonia Nitrogen (as NO3)	Nitrate Nitrogen (as NO3)	Total Organic Carbon	Calcium	Sodium	Magnesium	Potassium	Iron	Manganese	Orthophos-phate	Boron
DWS [1]	900 1600 2200 [2]	NA	NA	250 500 600	250 500 600	NA	45	NA	NA	NA	NA	NA	0.3	0.05	NA	NA
4/26/1990	1080	200	7.2	144	214		<0.40		51	81	64	24.0	0.08	0.06		
4/26/1991	978	236	7.7	156	60	<0.5	1.3	1.2	63	114	17	6.8				
7/24/1991	1034	244	7.9	150					57	110	18	6.7	<0.10	<0.03		
10/21/1991	1065	252	7.9	153					68	114						
4/29/1992	900	247	7.5	135	38		0.5		76	117	18	5.9				
6/2/1992									73	113	18	6.1	<0.01			
10/20/1992	926	204	8.1	152	68	<0.1	<0.5	0.6	66	113	17	5.9	<0.1	<0.05		
4/28/1993	1012	238	8.0	150	42	<0.1	<0.5	0.6	64	108	19	6.0	<0.1	<0.05		
10/28/1993	1033	202	7.8	148	41	<0.1	<1.0	0.3	65	108	17	5.5	0.2	0.07		
10/28/1994	1011	238	7.9	152	71	<0.05	<1	0.5	72	107	17	5.6	0.8	0.11		
5/3/1995	1016	186	7.9	162	44	0.12	<1	0.4	73	112	18	5.3	0.98	0.14		
11/30/1995	992	228	8.0	154	42	0.10	<1	0.6	68	102	18	5.4	0.40	0.10	0.05	
4/25/1996	1003	247	7.8	144	46	<0.05	<1	1.0	66	107	18	5.3	0.11	0.08	<0.03	
10/11/1996	967	232	7.6	150	39	0.08	<1	0.5	63	107	17	5.6	<0.10	0.07	0.34	
5/21/1997	916	251	6.9	158	42	<0.05	<1	0.5	64	109	17	5.4	0.20	0.06	0.04	
11/19/1997	969	256	7.7	150	46	0.10	<1	0.3	71	106	20	5.3	0.18	0.05	<0.03	
10/30/1998	970	237	7.7	146	42	0.06	<1	0.4	79	109	18	5.4	<0.1	0.08	<0.03	
11/2/1999	964	234	8.0	145	43	0.13	4	na	75	105	12	5.8	0.49	0.11	<0.03	
11/1/2000	976	241	7.9	149	43	0.09	<1	<0.2	76	103	18	5.1	<0.1	0.09	0.21	
10/25/2001	960	224	8.2	146	42	<0.05	<1	0.5	90	103	17	5.2	1.25	0.11	<0.03	
10/31/2002	960	252	7.9	159	44	0.12	<1	0.7	75	98	17	4.1	0.88	0.11	<0.03	
11/6/2003	972	242	7.8	149	43	0.14	<1	1.1	75	102	16	5.3	0.49	0.08	0.23	
11/9/2004	1020	266	7.9	158	44	0.10	<1	0.90	78	104	16	5.0	1.192	0.131	0.47	0.28
11/3/2005	920	240	7.9	168	43	0.11	<1	0.54	76	111	17	4.9	0.200	0.088	<0.03	0.41
10/24/2006	960	246	7.7	150	42	0.08	<1	0.27	77	109	18	5.4	0.541	0.085	<0.03	0.34

NOTES:
1 DWS = Drinking Water Standard; maximum contaminant levels are from California Domestic Water Quality and Monitoring Regulations, Title 22, 1977.
2 The three values for each constituent refer to the "recommended" level, the "upper" level and the "short-term use" level, respectively.

MONTEREY PENINSULA WATER MANAGEMENT DISTRICT

GROUND WATER QUALITY MONITORING RESULTS

WELL NO.: T15S/R1E-15F1 WELL NAME: PCA West - Shallow

Units are milligrams per liter unless otherwise noted.

Date	Specific Conductance (micromhos/cm)	Total Alkalinity (as CACO3)	pH (pH units)	Chloride	Sulfate	Ammonia Nitrogen (as NO3)	Nitrate Nitrogen (as NO3)	Total Organic Carbon	Calcium	Sodium	Magnesium	Potassium	Iron	Manganese	Orthophos-phate	Boron
DWS [1]	900 1600 2200 [2]	NA	NA	250 500 600	250 500 600	NA	45	NA	NA	NA	NA	NA	0.3	0.05	NA	NA
4/26/1990	340	28	7.3	68	57		4.0		19	16	23.0	7.7	<0.05	<0.01		
6/14/1990	340			50												
6/17/1990	330			50												
4/26/1991	311	68	7.8	48	21	>.5	4.0	>0.2	19	33	5.4	2.7				
7/24/1991	321	66	7.9	44					21	33	5.2	2.5	<0.10	<0.03		
10/21/1991	326	66	8.2	53					19	36						
4/29/1992	280	65	7.7	44	11		4.4		20	35	5.1	2.4	<0.01			
6/3/1992									20	35	5.2	2.3	<0.01			
10/20/1992	302	66	8.2	50	16	<0.10	4.6		20	36	5.0	2.3	<0.10	<0.05		
4/28/1993	311	68	8.2	46	13	<0.10	4.6	0.3	19	34	5.0	2.2	<0.10	<0.05		
10/28/1993	327	64	8.2	42	20	<0.10	6.0	0.2	19	32	5.0	2.3	1.1	<0.05		
10/28/1994	338	66	8.2	46	20	<0.05	5.0	0.3	23	35	5.0	2.0	<0.10	<0.03		
5/3/1995	317	68	8.6	48	12	0.12	6.0	0.3	21	34	5.0	2.7	1.1	<0.03		
11/30/1995	315	64	8.3	52	6	<0.05	4.0	1.0	20	33	5.0	2.2	0.20	<0.03	<0.03	
4/25/1996	319	61	7.9	44	11	<0.05	5.0	1.3	19	33	5.0	2.2	0.11	<0.03	<0.03	
10/11/1996	315	63	7.8	44	9	<0.05	4.0	0.5	17	32	4.0	2.2	<0.10	<0.03	0.04	
5/21/1997	314	65	6.3	44	10	<0.05	4.0	0.3	18	34	5.0	2.1	<0.1	<0.03	<0.03	
11/19/1997	311	65	8.0	50	12	<0.05	4.0	0.2	20	33	6.0	2.2	<0.1	<0.03	<0.03	
10/30/1998	316	68	8.0	44	13	0.06	4.0	<0.2	20	35	5.0	2.3	<0.1	<0.03	0.04	
11/2/1999	315	66	8.2	43	11	<0.05	4	na	20	33	5.0	2.3	<0.1	<0.03	<0.03	
11/1/2000	311	63	8.2	45	10	<0.05	4.0	<0.2	19	34	5.0	2.2	<0.1	<0.03	0.19	
10/25/2001	308	66	8.1	46	11	<0.05	4.0	0.3	24	34	5.0	2.7	<0.1	<0.03	<0.03	
10/31/2002	307	66	8.0	48	11	0.12	<1	0.4	18	28	5.0	1.6	<0.1	<0.03	<0.03	
11/6/2003	310	64	7.3	47	11	0.36	4	0.6	20	31	5	2.2	<0.05	<0.0005	<0.03	
11/9/2004	320	70	8.1	50	11	<0.05	5	<0.2	19	32	5	2.1	0.107	<0.0005	<0.03	0.29
11/3/2005	320	72	8.1	61	11	<0.05	4	<0.2	19	34	5.0	2.3	<0.05	<0.0005	<0.03	0.23
10/24/2006	300	68	7.8	46	10	<0.05	4	<0.20	19	33	5.6	2.5	<0.10	<0.0005	<0.03	0.32

NOTES:
1 DWS = Drinking Water Standard; maximum contaminant levels are from California Domestic Water Quality and Monitoring Regulations, Title 22, 1977.
2 The three values for each constituent refer to the "recommended" level, the "upper" level and the "short-term use" level, respectively.

MONTEREY PENINSULA WATER MANAGEMENT DISTRICT

GROUND WATER QUALITY MONITORING RESULTS

WELL NO.: T15S/R1E-11Pb WELL NAME: FO-09 - Deep

Units are milligrams per liter unless otherwise noted.

Date	Specific Conductance (micromhos/cm)	Total Alkalinity (as CACO3)	pH (pH units)	Chloride	Sulfate	Ammonia Nitrogen (as NO3)	Nitrate Nitrogen (as NO3)	Total Organic Carbon	Calcium	Sodium	Magnesium	Potassium	Iron	Manganese	Orthophos-phate	Boron
DWS [1]	900 1600 2200 [2]	NA	NA	250 500 600	250 500 600	NA	45	NA	NA	NA	NA	NA	0.3	0.05	NA	NA
8/19/1994	822	190	8.1	102	62	<0.05	6.0		51	88	10.0	4.5	0.57	0.07	0.05	
5/3/1995	442	103	8.3	72	12	<0.05	<1.0	0.3	27	52	4.0	3.4	<0.10	<0.03		
11/30/1995	427	80	8.3	70	17	<0.05	<1.0	1.1	27	51	4.0	3.6	0.30	<0.03	0.03	
4/25/1996	443	89	8.0	66	15	<0.05	<1.0	0.6	25	51	4.0	3.5	0.63	<0.03	0.03	
10/11/1996	436	91	7.7	66	13	<0.05	<1.0	1.3	27	53	4.0	3.9	0.29	<0.03	0.35	
4/21/1997	436	91	7.3	73	15	<0.05	<1.0	0.3	26	51	4.0	3.5	0.19	<0.03	0.05	
11/19/1997	429	90	8.0	69	15	<0.05	<1.0	0.1	28	50	4.0	3.6	<0.10	<0.03	<0.03	
10/27/1998	432	88	7.4	66	16	<0.05	<1.0	<0.2	27	49	4.0	3.6	<0.10	<0.03	0.04	
11/2/1999	432	92	8.2	64	14	<0.05	<1.0	na	26	50	4.0	3.5	<0.10	<0.03	<0.03	
11/2/2000	425	87	8.1	66	14	<0.05	1.0	<0.2	26	50	4.0	3.5	<0.10	<0.03	0.18	
10/25/2001	425	92	8.2	68	14	<0.05	<1.0	0.2	32	49	4.0	3.8	<0.10	<0.03	<0.03	
11/1/2002	426	92	8.1	71	15	0.06	<1.0	0.4	25	45	4.0	2.7	<0.10	<0.03	<0.03	
12/6/2003	428	88	8.4	71	15	<0.05	<1	0.5	26	50	4.5	3.4	<0.05	<0.0005	<0.03	
11/8/2004	450	94	8.1	72	15	<0.05	<1	<0.2	25	50	3.0	3.3	0.100	<0.0005	<0.03	0.19
11/2/2005	450	94	8.2	76	15	<0.05	<1	0.29	27	54	3.7	3.6	<0.05	<0.0005	0.06	0.35
10/25/2006	420	92	7.9	70	14	<0.05	<1	0.31	26	53	3.7	3.7	<0.10	<0.0005	<0.03	0.31

NOTES:

1 DWS = Drinking Water Standard; maximum contaminant levels are from California Domestic Water Quality and Monitoring Regulations, Title 22, 1977.

2 The three values for each constituent refer to the "recommended" level, the "upper" level and the "short-term use" level, respectively.

MONTEREY PENINSULA WATER MANAGEMENT DISTRICT

GROUND WATER QUALITY MONITORING RESULTS

WELL NO.: T15S/R1E-11Pa WELL NAME: FO-09 - Shallow

Units are milligrams per liter unless otherwise noted.

Date	Specific Conductance (micromhos/cm)	Total Alkalinity (as CACO3)	pH (pH units)	Chloride	Sulfate	Ammonia Nitrogen (as NO3)	Nitrate Nitrogen (as NO3)	Total Organic Carbon	Calcium	Sodium	Magnesium	Potassium	Iron	Manganese	Orthophos-phate	Boron
DWS [1]	900 1600 2200 [2]	NA	NA	250 500 600	250 500 600	NA	45	NA	NA	NA	NA	NA	0.3	0.05	NA	NA
8/19/1994	315	154	9.5	55	47	0.11	2.0		12	57	4.0	5.8	0.31	<0.03	<0.03	
5/3/1995	348	62	8.4	56	19	0.08	<1.0	0.3	23	34	4.0	3.6	<0.10	<0.30		
11/30/1995	334	62	8.4	54	12	0.05	<1.0	0.8	23	35	4.0	3.7	<0.10	<0.03	0.07	
4/25/1996	343	63	7.9	53	11	<0.05	<1.0	0.5	22	33	4.0	3.7	<0.10	<0.03	0.05	
10/11/1996	336	61	7.8	53	13	<0.05	<1.0	0.4	22	35	4.0	4.0	<0.10	<0.03	0.29	
4/21/1997	333	59	6.9	56	13	<0.05	<1.0	0.4	22	35	4.0	3.7	<0.10	<0.03	0.06	
11/19/1997	330	60	8.0	56	13	<0.05	<1.0	0.2	23	33	5.0	3.7	<0.10	<0.03	0.05	
10/27/1998	334	60	7.4	51	16	<0.05	<1.0	0.2	23	36	4.0	3.9	<0.10	<0.03	0.03	
11/2/1999	333	61	8.1	51	13	<0.05	<1.0	na	21	32	4.0	3.6	<0.10	<0.03	0.05	
11/2/2000	322	59	8.1	52	12	<0.05	<1.0	<0.2	22	34	4.0	3.7	<0.10	<0.03	0.28	
10/25/2001	325	64	8.1	54	12	<0.05	<1.0	0.3	23	40	4.0	3.6	<0.10	<0.03	0.05	
11/1/2002	328	66	8.1	57	13	0.12	<1.0	0.4	21	30	4.0	2.9	<0.10	<0.03	0.04	
12/6/2003	330	62	7.6	56	13	0.06	<1	0.5	22	33	4.2	3.7	<0.05	<0.0005	<0.03	
11/8/2004	350	67	7.9	58	13	0.08	<1	0.20	21	33	4.0	3.4	<0.05	<0.0005	<0.03	0.24
11/2/2005	340	66	8.1	60	12	<0.05	<1	0.29	23	36	4.4	3.7	<0.05	<0.0005	0.05	0.31
10/25/2006	330	64	7.8	56	12	<0.05	<1	0.42	22	34	4.5	4.1	<0.10	<0.0005	0.04	0.28

NOTES: 1 DWS = Drinking Water Standard; maximum contaminant levels are from California Domestic Water Quality and Monitoring Regulations, Title 22, 1977.

2 The three values for each constituent refer to the "recommended" level, the "upper" level and the "short-term use" level, respectively.

MONTEREY PENINSULA WATER MANAGEMENT DISTRICT

GROUND WATER QUALITY MONITORING RESULTS

WELL NO.: T15S/R1E-12Fc WELL NAME: FO-10 - Deep

Units are milligrams per liter unless otherwise noted.

Date	Specific Conductance (micromhos/cm)	Total Alkalinity (as CACO3)	pH (pH units)	Chloride	Sulfate	Ammonia Nitrogen (as NO3)	Nitrate Nitrogen (as NO3)	Total Organic Carbon	Calcium	Sodium	Magnesium	Potassium	Iron	Manganese	Orthophos-phate	Boron
DWS [1]	900 1600 2200 [2]	NA	NA	250 500 600	250 500 600	NA	45	NA	NA	NA	NA	NA	0.3	0.05	NA	NA
9/20/1996	1447	467	7.8	136	27	0.12	<1		148	107	25	7.2	1.22	0.84	0.04	
4/24/1997	652	165	7.7	78	12	0.77	<1	1.1	41	55	8	4.2	<0.10	0.20	<0.03	
11/19/1997	469	130	7.9	70	12	0.31	<1	0.5	36	46	10	3.1	0.76	0.15	0.03	
10/27/1998	442	108	7.5	66	46	0.09	<1	0.3	30	46	8	4.2	<0.10	0.20	<0.03	
11/2/1999	394	84	8.2	61	11	0.10	<1	na	24	39	6	2.6	0.97	0.09	0.04	
11/2/2000	380	77	8.1	60	16	0.09	1	0.5	23	41	6	2.6	0.84	0.04	0.20	
10/26/2001	372	80	8.2	60	13	<0.05	1	0.4	25	46	6	2.6	0.48	0.09	0.04	
11/1/2002	372	78	8.2	64	13	0.17	<1	0.7	21	36	6	1.8	0.33	0.04	<0.03	
12/16/2003	374	74	8.2	63	13	<0.05	<1	0.6	22	40	5.9	2.6	0.41	0.11	<0.03	
11/8/2004	400	86	8.0	62	15	0.07	<1	0.50	23	40	6.0	2.4	0.573	0.139	<0.03	0.33
11/3/2005	380	80	8.1	66	13	0.06	<1	0.41	23	42	5.6	3.0	0.560	0.053	0.05	0.33
10/25/2006	360	78	7.8	55	17	<0.05	<1	<0.20	22	40	5.5	2.8	<0.10	0.034	<0.03	0.32

NOTES:

(1) Maximum contaminant levels are from California Domestic Water Quality and Monitoring Regulations, Title 22, 1977.

(2) The three values listed for certain constituents refer to the "recommended" level, the "upper" level, and "short-term use" level, respectively.

MONTEREY PENINSULA WATER MANAGEMENT DISTRICT

GROUND WATER QUALITY MONITORING RESULTS

WELL NO.: T15S/R1E-12Fa WELL NAME: FO-10 - Shallow

Units are milligrams per liter unless otherwise noted.

Date	Specific Conductance (micromhos/cm)	Total Alkalinity (as CACO3)	pH (pH units)	Chloride	Sulfate	Ammonia Nitrogen (as NO3)	Nitrate Nitrogen (as NO3)	Total Organic Carbon	Calcium	Sodium	Magnesium	Potassium	Iron	Manganese	Orthophos-phate	Boron
DWS [1]	900 1600 2200 [2]	NA	NA	250 500 600	250 500 600	NA	45	NA	NA	NA	NA	NA	0.3	0.05	NA	NA
9/20/1996	910	303	7.7	73	9	<0.05	<1		91	45	18	4.4	4.69	1.01	0.41	
4/24/1997	430	95	7.5	71	25	0.13	<1	0.7	28	43	8	2.4	0.15	0.06	<0.03	
11/19/1997	386	74	7.9	72	14	<0.05	1	0.5	24	40	8	2.2	<0.1	<0.03	<0.03	
10/27/1998	389	74	7.5	64	14	<0.05	<1	0.2	24	40	7	2.3	<0.1	<0.03	<0.03	
11/2/1999	387	72	8.1	64	13	<0.05	1	na	23	38	7	2.2	<0.1	<0.03	<0.03	
11/2/2000	375	69	8.1	62	12	<0.05	2	<0.2	23	40	7	2.3	<0.1	<0.03	0.16	
10/26/2001	365	72	8.1	57	16	<0.05	1	0.2	24	44	6	2.0	<0.1	<0.03	<0.03	
11/1/2002	353	72	8.2	58	17	<0.05	1	0.5	20	34	5	2.1	<0.1	<0.03	<0.03	
12/16/2003	340	62	8.2	58	13	<0.05	1	0.5	22	35	5.8	2.6	<0.05	<0.0005	<0.03	
11/8/2004	370	75	7.9	57	17	0.06	<1	0.20	21	38	5.0	1.8	0.108	<0.0005	<0.03	0.39
11/3/2005	350	70	8.1	65	12	<0.05	<1	0.20	21	39	5.2	2.0	<0.05	<0.0005	<0.03	0.27
10/25/2006	350	76	7.9	53	19	<0.05	<1	<0.20	22	40	5.7	2.2	<0.10	<0.0005	<0.03	0.23

NOTES:

(1) Maximum contaminant levels are from California Domestic Water Quality and Monitoring Regulations, Title 22, 1977.

(2) The three values listed for certain constituents refer to the "recommended" level, the "upper" level, and "short-term use" level, respectively.

MONTEREY PENINSULA WATER MANAGEMENT DISTRICT

GROUND WATER QUALITY MONITORING RESULTS

WELL NO.: T15S/R1E-15K4 WELL NAME: PCA East - Deep

Units are milligrams per liter unless otherwise noted.

Date	Specific Conductance (micromhos/cm)	Total Alkalinity (as CACO3)	pH (pH units)	Chloride	Sulfate	Ammonia Nitrogen (as NO3)	Nitrate Nitrogen (as NO3)	Total Organic Carbon	Calcium	Sodium	Magnesium	Potassium	Iron	Manganese	Orthophos-phate	Boron
DWS [1]	900 1600 2200 [2]	NA	NA	250 500 600	250 500 600	NA	45	NA	NA	NA	NA	NA	0.3	0.05	NA	NA
4/27/1990	1080	216	7.4	142	214		<0.4		59	81	60	24.0	<0.05	0.30		
4/28/1992	900	241	7.2	135	41		0.3		77	114	16	5.0	<0.08			
6/2/1992									75	110	15	4.9				
6/4/1992				134	40		<0.1		74	114	16	5.3	<0.08			
11/30/1995	968	236	8.0	142	45	0.05	<1.0	2.5	65	105	15	4.7	0.10	0.11	0.07	
4/21/1997	*no access*															
11/19/1997	*no access*															
10/27/1998	*no access*															
11/2/1999	941	230	8.1	132	44	0.06	<1	na	73	103	15	4.8	0.50	0.15	<0.03	
11/1/2000	900	225	8.0	130	42	0.08	<1	<0.2	72	102	14	4.6	0.87	0.13	0.22	
10/26/2001	880	224	8.3	126	43	<0.05	<1	0.4	78	99	13	4.6	0.46	0.12	<0.03	
10/31/2002	*not sampled Fall 2002*															
11/6/2003	845	224	7.6	118	40	0.06	<1	1.7	64	93	12	4.6	1.13	0.06	0.32	
11/9/2004	880	236	8.1	115	40	0.06	<1	0.70	60	93	12	4.1	0.812	0.124	0.13	0.28
11/2/2005	800	222	8.2	126	38	0.07	<1	0.57	59	97	12	4.2	0.240	0.090	0.04	0.42
10/24/2006	790	208	8.2	109	35	<0.05	<1	<0.20	57	93	12	4.2	0.216	0.092	<0.03	0.33

NOTES:
1 DWS = Drinking Water Standard; maximum contaminant levels are from California Domestic Water Quality and Monitoring Regulations, Title 22, 1977.
2 The three values for each constituent refer to the "recommended" level, the "upper" level and the "short-term use" level, respectively.

MONTEREY PENINSULA WATER MANAGEMENT DISTRICT

GROUND WATER QUALITY MONITORING RESULTS

WELL NO.: T15S/R1E-15K5 WELL NAME: PCA East - Shallow

Units are milligrams per liter unless otherwise noted.

Date	Specific Conductance (micromhos/cm)	Total Alkalinity (as CACO3)	pH (pH units)	Chloride	Sulfate	Ammonia Nitrogen (as NO3)	Nitrate Nitrogen (as NO3)	Total Organic Carbon	Calcium	Sodium	Magnesium	Potassium	Iron	Manganese	Orthophos-phate	Boron
DWS [1]	900 1600 2200 [2]	NA	NA	250 500 600	250 500 600	NA	45	NA	NA	NA	NA	NA	0.3	0.05	NA	NA
4/27/1990	350	48	7.3	62	71		2.2		27	16	19.0	8.0	<0.05	<0.01		
4/28/1992	290	61	7.9	46	8		2.1		16	39	3.8	1.9	<0.02			
6/1/1992				45	8		2.0		16	39	3.8	2.3	<0.02			
11/30/1995	306	74	8.5	46	<5	<0.05	3.0	0.4	17	40	4.0	1.8	0.10	<0.03	0.04	
4/21/1997	*no access*															
11/19/1997	*no access*															
10/27/1998	*no access*															
11/2/1999	384	92	8.2	51	14	<0.05	<1	na	40	40	10.0	3.1	4.8	0.26	0.05	
11/1/2000	314	79	8.2	49	8	<0.05	2.0	0.6	20	40	4.0	2.1	38	0.74	0.22	
10/26/2001	302	64	8.1	49	8	<0.05	2.0	<0.2	22	38	5.0	2.7	2.07	0.06	0.03	
10/31/2002	*not sampled Fall 2002*															
11/6/2003	307	68	7.7	50	8	0.06	2	0.6	20	35	6	1.8	3.27	0.13	0.88	
11/9/2004	370	89	7.7	56	13	<0.05	<1	2.50	27	40	7	2.7	4.071	0.213	0.44	0.15
11/2/2005	330	70	8.0	56	9	<0.05	2	0.53	26	40	9.7	3.5	2.760	0.229	0.08	0.30
10/24/2006	330	68	7.9	50	10	<0.05	3	<0.20	20	39	6.2	2.9	2.390	0.068	<0.03	0.28

NOTES:

1 DWS = Drinking Water Standard; maximum contaminant levels are from California Domestic Water Quality and Monitoring Regulations, Title 22, 1977.

2 The three values for each constituent refer to the "recommended" level, the "upper" level and the "short-term use" level, respectively.

MONTEREY PENINSULA WATER MANAGEMENT DISTRICT

GROUND WATER QUALITY MONITORING RESULTS

WELL NO.: T15S/R1E-23Cb WELL NAME: Ord Terrace - Deep

Units are milligrams per liter unless otherwise noted.

Date	Specific Conductance (micromhos/cm)	Total Alkalinity (as CACO3)	pH (pH units)	Chloride	Sulfate	Ammonia Nitrogen (as NO3)	Nitrate Nitrogen (as NO3)	Total Organic Carbon	Calcium	Sodium	Magnesium	Potassium	Iron	Manganese	Orthophos-phate	Boron
DWS [1]	900 1600 2200 [2]	NA	NA	250 500 600	250 500 600	NA	45	NA	NA	NA	NA	NA	0.3	0.05	NA	NA
11/2/1999	1255	294	8.3	147	123	0.21	<1	na	105	118	23	7.2	<0.1	0.09	<0.03	
11/2/2000	1241	303	8.3	156	115	0.82	<1	1.3	109	118	24	6.8	<0.1	0.09	0.21	
10/25/2001	1240	310	8.4	163	115	<0.05	<1	1.2	108	111	25	7.1	<0.1	0.09	<0.03	
11/1/2002	1235	300	8.2	170	122	0.52	<1	1.5	103	111	24	5.3	0.12	0.09	<0.03	
12/16/2003	1243	296	8.1	170	116	0.53	<1	1.3	104	113	24	6.4	0.12	0.08	<0.03	
11/9/2004	1300	298	8.2	178	107	0.45	<1	1.1	106	120	23	6.3	0.155	0.082	<0.03	0.38
11/2/2005	1230	326	8.2	194	95	0.57	<1	1.2	113	138	25	7.0	<0.05	0.055	<0.03	0.67
10/24/2006	1280	318	8.2	181	89	0.47	<1	0.84	107	132	26	7.1	0.169	0.026	<0.03	0.58

NOTES:

(1) Maximum contaminant levels are from California Domestic Water Quality and Monitoring Regulations, Title 22, 1977.

(2) The three values listed for certain constituents refer to the "recommended" level, the "upper" level, and "short-term use" level, respectively.

MONTEREY PENINSULA WATER MANAGEMENT DISTRICT

GROUND WATER QUALITY MONITORING RESULTS

WELL NO.: T15S/R1E-23Ca WELL NAME: Ord Terrace - Shallow

Units are milligrams per liter unless otherwise noted.

Date	Specific Conductance (micromhos/cm)	Total Alkalinity (as CACO3)	pH (pH units)	Chloride	Sulfate	Ammonia Nitrogen (as NO3)	Nitrate Nitrogen (as NO3)	Total Organic Carbon	Calcium	Sodium	Magnesium	Potassium	Iron	Manganese	Orthophos-phate	Boron
DWS [1]	900 1600 2200 [2]	NA	NA	250 500 600	250 500 600	NA	45	NA	NA	NA	NA	NA	0.3	0.05	NA	NA
11/2/1999	824	220	8.5	100	43	<0.05	3	na	65	94	12	5.0	0.68	0.08	<0.03	
11/2/2000	848	233	8.4	112	40	0.05	<1	1.5	73	86	15	4.3	0.99	0.10	0.36	
10/25/2001	780	220	8.6	106	39	<0.05	5	0.6	106	74	15	4.6	0.75	0.11	<0.03	
11/1/2002	798	222	8.4	111	41	0.07	6	0.6	66	72	16	3.3	1.84	0.23	<0.03	
12/16/2003	917	240	8.3	130	45	<0.05	<1	1.0	77	85	18	4.5	0.79	<0.0005	<0.03	
11/9/2004	990	248	8.3	127	51	<0.05	<1	1.50	85	90	18	4.2	0.556	0.185	0.35	0.18
11/2/2005	805	236	8.2	125	42	<0.05	6	0.82	82	86	20	5.6	1.080	0.280	<0.03	0.60
10/24/2006	800	212	8.3	106	37	<0.05	6	0.35	68	79	17	4.4	1.080	0.077	<0.03	0.29

NOTES:

(1) Maximum contaminant levels are from California Domestic Water Quality and Monitoring Regulations, Title 22, 1977.

(2) The three values listed for certain constituents refer to the "recommended" level, the "upper" level, and "short-term use" level, respectively.

Seaside Groundwater Basin Watermaster
Budget vs. Actual
Administrative Fund
January 2007

	Budget	Expenses	Balance
Assessment			
FY 2006 Rollover	58,866.47		
Assessment 2007	64,000.00		64,000.00
Total	122,866.47		122,866.47
Total			
Expense			
Administrative			
Computer Maint. & Supplies	3,000.00	0.00	3,000.00
Contract Staff	60,000.00	5,700.00	54,300.00
Meetings, Travel & Membership	2,000.00	0.00	2,000.00
Mileage Reimbursement	1,500.00	0.00	1,500.00
Office Consumables & Other	6,000.00	45.02	5,954.98
Office Equip. Maint. & Rental	1,000.00	0.00	1,000.00
Office Rental	3,500.00	280.00	3,220.00
Administrative Support	8,000.00	725.00	7,275.00
Legal	10,000.00	0.00	10,000.00
Utilities	1,000.00	93.34	906.66
Total Administrative	96,000.00	6,843.36	89,156.64
Total	96,000.00		
Total Available	26,866.47		
Less Dedicated Reserve	25,000.00		
Net Available	1,866.47		

Seaside Groundwater Basin Watermaster
Budget vs. Actual
Monitoring Management - Operations Fund
January 2007

	Budget	Encumbrance	Expense	Balance
Assessment				
Monitoring & Mgmt Fund - Ops	400,000.00			400,000.00
Total Assessment	400,000.00			400,000.00
Expense				
Monitoring & Management - Ops				
Groundwater Modeling				
Feeney, Martin B.	14,600.00	0.00	14,755.59	-155.59
GW Modeling Consultants Travel	16,370.00	0.00	14,972.52	1,397.48
Total Groundwater Modeling	30,970.00	0.00	29,728.11	1,241.89
GW Resource Database				
Annual Maintenance 40 hours/qtr	11,200.00	0.00	0.00	11,200.00
Develop/Populate 200 hrs	14,000.00	0.00	0.00	14,000.00
Total GW Resource Database	25,200.00	0.00	0.00	25,200.00
Monitoring of wells				
Coastal well monitoring	48,240.00	7,080.00 (1)	0.00	41,160.00
Inland well monitoring	2,240.00		0.00	2,240.00
Total Monitoring of wells	50,480.00	7,080.00	0.00	50,480.00
Total Monitoring & Management - Ops	106,650.00	7,080.00	29,728.11	69,841.89
Total Expense	106,650.00	7,080.00	29,728.11	69,841.89
Total Assessment Available	293,350.00			

Notes:

(1) Contract awarded to MPWMD to record, monitor, and analyze well water extractions for first two quarters (six months) of calendar year 2007.

Seaside Groundwater Basin Watermaster
Budget vs. Actual
Monitoring Management - Capital Fund
January 2007

	Budget	Encumbrance	Income/ Expense	Balance
Assessment				
Monitoring & Mgmt Fund - Capit	1,000,000.00		250,000.00	750,000.00
Total Assessment	1,000,000.00		250,000.00	750,000.00
Expense				
Monitoring & Management - Cap				
Coastal Wells Dataloggers (22)	44,000.00	0.00	0.00	44,000.00
Inland Wells Dataloggers (2)	4,000.00	0.00	0.00	4,000.00
Monitor Well Construction (5)	900,000.00	850,000.00	0.00	50,000.00
Total Monitoring & Management - Cap	948,000.00	850,000.00	0.00	98,000.00
Reserve Available	52,000.00			
Balance of Assessment after Expenses	98,000.00			
Total Assessment Available	150,000.00			