

EXHIBIT 3-A

November 25, 2003  
Project No. 2005-3354

Monterey Peninsula Water Management District  
Post Office Box 85  
Monterey, California 93942

Attention: Mr. Joe Oliver

Subject: Proposal for Hydrogeologic and Engineering Services, Santa Margarita Test Injection Well, Water Year 2004 Testing Program

Dear Joe:

In accordance with your request, Padre is pleased to present this scope of work for additional hydrogeologic and engineering services associated with the Santa Margarita Test Injection Well (SMTIW) project. We understand that the Monterey Peninsula Water Management District (District) anticipates that it will be able to obtain water for injection testing through the Cal-Am distribution system this winter, beginning as early as January 2004 (depending on the timing of permit approval from SWRCB and flow conditions in the Carmel River). The District therefore desires to amend Padre's existing contract to develop and implement a test program for Water Year 2004 (WY2004) to further investigate the capacity and limitations of injection and extraction at the site.

### **Background**

The District has undertaken a Water Supply Augmentation Plan, which includes the evaluation of the feasibility of implementing an Aquifer Storage and Recovery ([ASR] a.k.a. injection/recovery) program on the Monterey Peninsula. The concept involves injecting 'excess' filtered and treated water originating from the Carmel River and Carmel Valley aquifer system into the aquifer system in the Seaside Basin. ASR is also being evaluated as a possible component of an alternative water supply project for the Monterey Peninsula (currently known as the Coastal Water Project).

As part of the investigation of ASR, the SMTIW was constructed and preliminarily tested in the spring of 2001. The well is constructed to a total depth of 720 feet, and is perforated solely in the Santa Margarita Sandstone aquifer to accurately assess the hydrogeologic conditions for injection/recovery of this formation. The design injection rate of the SMTIW is approximately 1,000 gallons per minute (gpm), i.e., approximately 4.4 acre-feet per day.

Formal testing of the SMTIW was performed in WY2002 and WY2003. During the past two injection seasons, a total of approximately 343 acre-feet (AF) of water has been successfully injected into the Seaside Groundwater Basin with the SMTIW. While the well has been tested at injection rates ranging between approximately 900 up to 1,700 gpm

(approximately 4 to 7 acre-feet per day), evaluation of the wells hydraulic performance indicates that an operational injection rate of 1,000 gpm is recommended in order to maintain long-term capacity and performance. The injection capacity of the SMTIW is constrained primarily by its internal casing diameter (18-inches in the upper section), which controls the downhole velocity and the amount of plugging due to gas entrainment (entrained/evolved gas has been found to be present in the injectate to various degrees during injection testing). Based on observed water level increases and available freeboard in the well casing during injection testing, a second well could feasibly be constructed at the site and operated simultaneously with SMTIW. It is likely that another well constructed with a larger casing diameter (20- to 22-inches) would be capable of a greater injection capacity (up to 1,500 to 2,000 gpm) without inducing undesirable effects (i.e., water 'daylighting' at the ground surface).

During WY2003, recovery testing was also conducted, with a total volume of approximately 440 AF (approximately 130 percent of the total volume injected) of potable water extracted and delivered into the Cal-Am distribution system. Observation of water level response at various monitoring wells in the basin showed that during both injection and recovery/pumping seasons, water levels in the Santa Margarita Sandstone remained *below* sea level at most locations. At the end of the summer/fall recovery season, when both the SMTIW and Cal-Am's other wells in the basin were pumping, water levels in the basin declined to between 20 to 50 feet below sea level. Under these hydraulic conditions in the basin, it is considered unlikely that any significant 'loss' of water from the basin to the Pacific Ocean could occur as a result of injection operations at the SMTIW. Rather, the injected water temporarily fills available storage in the aquifer created by the existing water level depression (i.e., 'pumping trough').

The collected water quality data suggest that the recovered water was a mixture of injected and native groundwater; however, volumetric recovery efficiency by the SMTIW (as defined by the State Drinking Water Standards) was essentially 100 percent (i.e., for each acre-foot of potable water injected into the basin, one acre-foot was recovered); however, it is possible that some of the injected water drifted outside the capture zone of the SMTIW itself towards the pumping depression. Under the basin's current hydraulic conditions, this water was either captured by the SMTIW and Cal-Am's wells and/or remained in the aquifer to fill depleted groundwater storage.

Reductions in disinfection-byproducts ([DPBs] i.e., trihalomethanes [THMs] and haloacetic acids [HAAs]) and hydrogen sulfide (i.e., rotten egg odor) were also observed during recovery pumping; however, the available data are inconclusive as to how much of the observed reductions in these constituents were due to mixing/dilution versus biodegradation/adsorption in the subsurface. Unfortunately, the variability of injected water quality (as a result of Cal-Am's utilization of numerous water sources during the injection period) prevented accurate quantification of these subsurface reactions. The issue of mixing versus biodegradation is particularly important in the fate of DBPs in the subsurface, and deserves additional investigation during WY2004.

## **Purpose and Scope**

The overall purpose of the ongoing testing of the SMTIW is to evaluate the capabilities and limitations of injection, storage, and recovery of treated Carmel River system water in the Santa Margarita Sandstone aquifer of the Seaside Groundwater Basin. The purpose of the testing can be further categorized into issues generally associated with: 1) injection well hydraulics and performance; 2) groundwater basin response to injection; and 3) water quality issues associated with geochemical interaction and mixing of injected and native ground waters.

The focus of the previous WY2002 and WY2003 testing was on evaluation of injection well hydraulics in order to determine the best operational parameters for the SMTIW and monitoring of the groundwater basin response to injection. While evaluation of injection well hydraulics and groundwater basin response to injection will continue to be an important part of the testing program, the focus of the WY2004 program will be primarily on issues of water quality.

Issues related to water quality are important because both intermixing with native groundwater, biodegradation, and geochemical interaction with aquifer minerals can affect the potability (i.e., DBPs, hydrogen sulfide, etc.) of the recovered water and the plugging rate of the injection well. Important aspects of the water quality investigative program during WY2004 include the following:

- Monitor injectate water quality versus plugging rates;
- Identify water quality changes during subsurface storage associated with mixing and geochemical interactions;
- Track water quality improvement over successive injection/storage/recovery cycles;
- Analysis of DBPs to assess the stability and fate of these compounds during aquifer storage;
- Analysis of both water quality and dissolved gas parameters for the major contributing source waters of injectate supply in the Carmel Valley to evaluate and rank the sources for injectate stability, DBP formation, and assess the cause(s) of entrained gas formation.

## **Scope of Services**

Based on our understanding of the District's needs and our experience with the SMTIW and similar projects, we have prepared a scope of services to assist the District with the development and implementation of a test program for WY2004, which focuses primarily on water quality stability and long-term operational strategies.

**Task 1 - Test Program Development.** Padre will review existing conditions at the site and meet with District staff and Cal-Am to discuss test program goals and scheduling. Padre will provide the following services associated with program development.

- Project kickoff meeting(s) with District and Cal-Am.
- Develop hydrogeologic and water quality test program and data needs.
- Develop analytic laboratory testing schedule.

**Task 2 - Test Program Implementation and Assistance.** Padre will assist District staff with the implementation of the test program. Padre assistance is envisioned to include the following.

- Supervision of test initiation.
- Periodic field observation of critical phases of the test.
- Ongoing assistance and training of District staff in operation of test facilities (i.e., FCV, water level transducers, tracer injection and monitoring, etc.).
- Provision of test logs and procedures to District staff.

It is estimated that Padre staff will assist with the initiation of each test phase (i.e., injection and recovery start-up), and provide on-going site visits on approximately a monthly basis, depending on program needs. Our budget estimate assumes a total of six (6) 2-day site visits by Padre staff over the course of the testing program. This task assumes that Padre will be supported by District staff in the ongoing operation, data collection, and water sampling for the test program. At this time, it is estimated that District staff involvement may include approximately 1 hour per day for routine monitoring/sampling and up to 6 hours per week for backflushing operations.

**Task 3 - Water Quality Investigations.** One of the significant remaining unknown factors in the District's ASR program is the stability and fate of injected waters in the subsurface environment. This is particularly important for the SMTIW; which, like other wells completed in the Santa Margarita Sandstone aquifer, is aesthetically demerited for potable use due to the presence of hydrogen sulfide gas. Issues regarding the fate and transport of DBPs in the subsurface can also affect the potability of the recovered water. It has been successfully demonstrated at the SMTIW and at other sites in California that successive injection/storage/recovery cycles (when properly implemented) can yield fully potable water upon recovery.

Additional information must be gathered, however, to determine to what extent DBP declines at the SMTIW are the result of bioactivity and/or adsorption-degradation and/or dilution-mixing with native groundwater. Potential increases or changes in subsurface bioactivity are also important issues to be investigated.

Specific testing and analyses to be performed in this task related to these issues include the following:

- Monitoring of and tracking of field water quality parameters during various phases of injectate, storage, and recovery (including chloride ion).

- Periodic grab sampling and analysis for characterization and assessment of injectate and recovered waters to supplement field water quality data.
- Bioassay of injected, native, and backflush waters.
- Nutrient screening of injectate and native waters.
- Sampling and analysis of disinfection by-products (THMs and HAAs) for the injectate, recovered water, and the treated product water from the Seaside Ozone Treatment Plant.
- Sampling and analysis of both water quality and dissolved gas parameters for the major contributing source waters of injectate supply to evaluate injectate stability and assess the cause(s) of entrained gas formation in the Lower Carmel Valley wells.

It is assumed that District staff will assist with portions of the grab sampling program and delivery to courier/laboratories. It is also assumed that lab testing for certain analyses (e.g., general mineral and general physical parameters) will be provided by the District through the Monterey County Consolidated Laboratory. This testing will occur during both injection operations and recovery of injected waters. At this time, it is assumed recovery water will be pumped into the Cal-Am distribution system.

**Task 3.1 – Tracer Testing (Optional)** – As presented above, during WY2003 the variability of injected water quality (as a result of Cal-Am's utilization of numerous Carmel Valley system water sources during the injection period) prevented accurate quantification of the various subsurface reactions (i.e., mixing/dilution versus biodegradation) which affect the fate of the injected water in the aquifer. This optional task includes the analysis and comparison of injected and recovered waters utilizing a chemical tracer (e.g., iodide ion) to 'tag' the injectate, which would be used to assess the degree of intermixing within the aquifer and monitor recovery efficiency (i.e., the percentage of injected water molecules recovered by an ASR well in a given volume of extracted water).

**Task 4 - Capital Improvements Design Services.** This task includes the preliminary design and cost estimation for a variety of capital improvements necessary for on-going and expanded operations at the SMTIW well site. Specific work items for this task include the following:

- Prepare the basis-of-design report and Engineer's Estimate for a second well at the SMTIW site.
- Evaluate the various opportunities and constraints of the Cal-Am and PG&E systems, and provide recommendations and cost estimates for modifications to the systems to provide up to 2,000 gpm of additional flow capacity for a second well at the SMTIW site.
- Provide recommendations and cost estimates for various minor site improvements and routine maintenance for continued operations at the SMTIW site, including:

1. Minor site landscaping.
2. Improvements at the Luzern booster station to remedy on-going ground vibration issues.
3. Improvements to the noise attenuation barriers at the well pump.
4. Maintenance of the backflush pit and subsurface pull boxes/valults.
5. Minor site improvements to improve sampling, data collection, site access, and rainfall runoff control.

**Task 4.1 – Implement Minor Site Improvements (Optional).** We have included as an optional task item the coordination and implementation of the above minor site improvements. Under this optional task, Padre would purchase the necessary equipment and secure the services of an outside contractor (e.g. Monterey Peninsula Engineering) to implement the site improvements.

**Task 5 - Data Analysis and Reporting.** A summary of operations report will be prepared documenting the test program, procedures, and results. Conclusions regarding the relative success of the testing and recommendations for further analysis, modeling, or subsequent test phases will be provided. Much of the data and information developed in this task will be directly applicable to large-scale ASR programs in the Seaside Basin.

The report will also the present the basis-of-design recommendations and cost estimates for construction and operation of a second well at the SMTIW site. This will include recommendations for improvements to the Cal-Am distribution system to provide additional flow to the site for dual-well injection testing.

### **Services Not Included**

Completion of the test program may require the services of other entities as well as additional costs or fees, which are not included in our scope of services. These items are assumed to be provided by District staff, contractors retained by the District, or others. Work items that are not a part of our services include the following.

- Hermit and Mini-Troll transducers/data-loggers (assumed District provided)
- Analytic laboratory fees for analyses that can be performed by Monterey County Consolidated Laboratory
- Permit fees (if any)
- Cost of water, electricity, or other utilities
- Any others' items not specifically included in Padre's scope of services

## Schedule

The general schedule anticipated for the WY2004 test program is presented below:

- Injection Operations - January 1 through May 31, 2004 (depending on flow conditions in the Carmel River).
- Recovery Operations - June 1 through September 15, 2004.
- Summary of Operations Report (draft) - October 15, 2004.

Based on our current workload, we believe that we can commence work within 14 days of your authorization. We understand that in order to authorize this work, a formal contract amendment must first be approved by your Board, and signed with the District.

## Estimated Fees

Based on the scope of services presented herein, we estimate the fees for our services (not including optional tasks) will be approximately \$70,440, which will be billed on a time-plus-expenses basis in accordance with our current Fee Schedule (attached). A summary of costs by task is also attached. A 10 percent contingency has been noted in the attached budget summary (total w/contingency is \$77,848) in the event that unforeseen project complications or constraints arise. We recommend the contingency be held by the District, to be authorized for release by District staff upon appropriate justification and written notice by Padre.

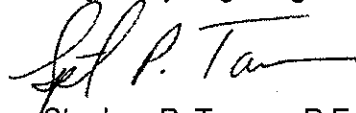
We appreciate the opportunity to work with the District on this important project, and look forward to a timely and successful completion of the work. As always, if you have any questions or would like to modify the scope of services, please call us.

Sincerely,

PADRE ASSOCIATES, INC.



Robert C. Marks, R.G.  
Project Hydrogeologist



Stephen P. Tanner, P.E.  
Principal Engineer

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Attachments: Cost Summary  
Fee Schedule

**COST SUMMARY  
SANTA MARGARITA TEST INJECTION WELL  
WY2004 TEST PROGRAM**

Task 1 - Develop Test Program	\$ 5,574
Task 2 - Test Program Implementation and Assistance	\$ 23,104
Task 3 - Water Quality Investigations	\$ 19,342
Task 4 - Capital Improvements Design Services	\$ 11,140
Task 5 - Data Analysis and Reporting	<u>\$ 11,280</u>
<b>Subtotal:</b>	<b>\$ 70,440</b>
Recommended 10% Budget Contingency*:	\$ 7,044
<b>Total:</b>	<b>\$ 77,484</b>

Task 3.1 (Optional) -- Tracer Testing	\$ 24,437
Task 4.1 (Optional) -- Implement Minor Site Improvements	<u>\$ 9,020</u>
Optional Task Subtotal:	\$ 33,457
<b>Total w/ Optional Tasks:</b>	<b>\$ 103,897</b>

- We recommend this contingency be held by District staff/management to be utilized in the event that additional services are required or unforeseen project constraints or requirements arise.

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