


TO: James L. App, City Manager
FROM: Doug Monn, Public Works Director 
SUBJECT: Sherwood Wells Treatment Technology and Design Contract
DATE: August 15, 2006

NEEDS: For the City Council to consider arsenic treatment technology alternatives and award a contract for design to install water well treatment facilities.

- FACTS:**
1. The US Environmental Protection Agency drinking water standard for arsenic has been revised from 50 parts per billion to 10 parts per billion. The City's Sherwood wells number nine and eleven exceed the new drinking water standard and will require well head treatment to meet the new standard by May 2007. The approved Capital Improvement Program anticipated the need to install the treatment equipment.
 2. In mid-2005 proposals were solicited for the pilot testing of arsenic removal equipment/technology. After reviewing the pilot testing results the treatment technology/equipment manufactured by Mobile Process Technology appears most cost effective and best suited for the City's needs. MPT utilizes adsorption technology to capture arsenic onto a media that can be regenerated at their central facility and then returned to the customer.
 3. The City needs to prepare plans and specifications for the infrastructure (i.e., concrete pads, piping and valves) to support the MPT arsenic removal equipment.
 4. Boyle Engineering proposes to prepare the treatment facility design for \$117,167.

**ANALYSIS
AND**

CONCLUSION: The technology to reduce arsenic in drinking water supplies has rapidly evolved as a result of the revised US EPA drinking water standards. In mid-2005, a Request for Qualifications for arsenic removal equipment was issued. The prequalification process required interested vendors to complete a pilot study where they actually filtered the water at the City's Sherwood number nine and eleven wells. Firms completing pilot studies included: Filtronics, Layne Christiansen, Severn Trent and Mobile Process Technology. All firms successfully demonstrated that their respective treatment technology could effectively remove arsenic to levels below the new Federal standard. However, based on the pilot study results, that included a twenty year life cycle cost comparison, an annualized operating cost and consideration of potential long-term liability issues, the MPT process is best suited to achieve overall City treatment objectives. An overall cost summary comparison and recommendations from Boyle's pilot study evaluation is provided as an attachment.

Boyle Engineering established the testing criteria and evaluated the pilot studies performed by the vendors. At the conclusion of their analysis Boyle was asked to provide a proposal for design services for installation of recommended arsenic removal equipment at Sherwood wells nine and eleven.

POLICY

REFERENCE: General Plan; Water Master Plan; adopted Capital Improvements Program

FISCAL

IMPACT: Funding for the Sherwood well treatment improvement has been appropriated in the current Capital Improvement Program under Budget No. 220.910.5452.765 which has a current estimated balance of 1.9 million dollars.

- OPTIONS:**
- a. Adopt Resolution No. 06-xx which recognizes Mobile Process Technology as the City's preferred arsenic treatment vendor and authorizing the City Manager to engage the services of Boyle Engineering to prepare construction/bid documents for the project in the amount of \$117,167.00.
 - b. Amend, modify, or reject the above option.

Prepared by:
Brad Hagemann, PE, Water Resources Manager 

Attachments (3)

- 1) Excerpts from Boyle's Pilot Study Analysis
- 2) Scope of Work and Fee Proposal
- 3) Resolution

6.3 Estimated Total System Cost

Using the information provided by the suppliers, Boyle performed an analysis on the overall relative costs of each type of system including approximate costs for equipment, O&M, design, construction, etc. The goal was to compare the relative costs of the MPT system with a typical coagulation/filtration system and a typical adsorbent media system. Boyle has compared the Sherwood Well Treatment project with a variety of similar projects, estimated the relative costs associated with these two filtration systems, and presented an estimated net present value.

Table 4 below shows the results of the comparative analysis. The costs presented in **Table 4** assume the filtration systems treat 187 MG per year, and are shown to provide a relative comparison between vendors.

Table 4 – Overall System Cost Comparison

Manufacturer	Manufacturer's Estimate of Equipment Cost	Installation Cost ²	Installed Cost of Omitted Items	Estimated Design Cost	Project Cost	Estimate of Annualized Operating Cost	Total NPV of Cost, \$ (x1000) ³					
							0 Years	2 Years	5 Years	10 Years	15 Years	20 Years
MPT	\$482,000	\$137,000	\$36,000	\$80,000	\$735,000	\$42,000	\$735	\$815	\$928	\$1,094	\$1,237	\$1,361
Severn Trent	\$347,000	\$279,000	\$79,000	\$80,000	\$785,000	\$37,000	\$785	\$855	\$953	\$1,098	\$1,223	\$1,331
Filtronics	\$299,000	\$329,000	\$173,000	\$120,000	\$920,000	\$31,000	\$920	\$979	\$1,062	\$1,184	\$1,290	\$1,381

¹ STS proposed a system with 23% bypass. Increased equipment and installation cost by 20% to estimate a no-bypass system.

² Installation cost was assumed to be 110% of equipment cost for CF, 75% of the equipment cost for Severn Trent, and 40% of the equipment cost for MPT

³ The NPV calculations assume 3% inflation and a 4.5% discount rate.

7. Summary/Recommendations

- Mobile Process Technology (MPT) is capable of supplying treatment equipment that can remove arsenic from Sherwood Well waters to levels below the new MCL for arsenic (10 µg/l).
- The MPT system did not require the addition of chemicals to remove arsenic
- The MPT system did not require pH adjustment to achieve acceptable arsenic reduction.
- For the proposed equipment, media life is estimated to be 165 MG and 198 MG respectively for Wells #9 and #11. The media would require regeneration every year during the off-season (after 122 MG for Well #9, and 187 MG for Well #11). Additional filter vessels or standby media inventory would allow uninterrupted operation and would allow taking the media to full exhaustion.
- The coagulation and filtration technologies are more complex, but may include significant automation, reducing the required level of operator input. However, coagulation filtration technology will typically require a more highly skilled operator than is needed for adsorption technologies.
- Over a 20-year project life, in today's dollars, the City could save as much as \$30,000 by selecting disposable adsorption technology (compared to the MPT process, and assuming treatment of 187 MGY).
- When compared to disposable adsorption media systems, MPT offers a system that may limit the City's exposure to risks associated with disposal of arsenic laden media. np-RIO media and/or maintenance agreements may further improve the economic status of the MPT system.

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Ditas Esperanza
Capital Projects Engineer
CITY OF PASO ROBLES
1000 Spring St
Paso Robles, CA 93446-2599

July 20, 2006

Proposal for Design Services - Sherwood Wells #9 and #11 Arsenic Remediation Equipment

Project Understanding

The Sherwood Wells #9 and #11 provide the City of El Paso de Robles with approximately 16 percent of the City's total water supply.¹ The wells are typically operated heavily during the dry months (May through October), and are operated to a lesser extent for the remainder of the year. The City's existing groundwater supply wells will remain a vital component of the City's potable water supply in the future.

Well Designation	Typical Production Capacity (gpm)
Sherwood Well #9	700 - 900
Sherwood Well #11	800 - 900

In response to the promulgation of a new MCL for arsenic (10 µg/L, effective January 26, 2006), the City intends to construct facilities to reduce the levels of arsenic in water from the Sherwood wells. Arsenic removal equipment vendors completed pilot studies to demonstrate the capabilities of their equipment to remove arsenic from Sherwood Well water. The pilot study was to identify equipment vendors who would be allowed to propose on providing the equipment to remove arsenic from the Sherwood Well water. The prequalification pilot testing process was open to all interested parties, and those completing pilot studies (Filtronics, Layne Christensen, Severn Trent, and Mobile Process Technology (MPT)) sufficiently demonstrated the effectiveness of their arsenic

¹ Average of the 2002-2004 production records

ARSENIC PROPOSAL.DOC

removal technologies. The results of the pilot testing are summarized in a report dated November 2005², and in an addendum dated June 2006³.

Based on the pilot studies, the City concluded that the MPT process is best suited to achieve overall treatment objectives. In July 2006, City staff selected Mobile Process Technology (MPT) to propose on providing equipment for two individual treatment systems for Sherwood Wells #9 and #11.

Project Approach

Boyle will attend a project kickoff meeting with MPT and City staff to discuss equipment configurations and operational preferences. Once the City receives a formal proposal from MPT, Boyle will prepare a Technical Memorandum evaluating vendor recommendations. Additionally, Boyle will assist in coordinating with the City's surveyor and geotechnical consultant.

Upon approval of the Technical Memorandum, plans and specifications for the adsorption treatment equipment will be prepared. Technical Plans and specifications will be prepared for civil site work, and performance specifications will be prepared for MPT process equipment for Wells #9 and #11.

This proposal has been prepared with the understanding that the City will be responsible for all permitting and CEQA compliance. The City will also be responsible for identification of existing utilities, geotechnical exploration, and topographical and boundary survey. Boyle will not be responsible for the design of any telemetry modifications and/or changes (aside from relocating panels if necessary). If desired, the City shall provide all the required telemetry equipment, software, programming etc. It is assumed construction administration and observation will be a future phase of this project, and therefore is not included in this scope of work.

These services can be performed by Boyle at the City's request, but are not included in the proposed budget for engineering services.

Scope of Work

1.0 Preliminary Engineering

1.1 Kick-off Meeting

Prepare agenda and attend a project kick-off meeting with MPT and City staff to review project scope, schedule, responsibilities of the project team, equipment configuration, and project deliverables. A list of anticipated

² See Boyle Report, November 2005, "Pilot Study Evaluation: Arsenic Treatment Suppliers for Sherwood Wells #9 and #11"

³ See Boyle Report, June 2006, "Addendum to Pilot Study Evaluation"

questions and topics of discussion will be provided to MPT before the meeting.

1.2 Data Gathering and Project Coordination

Obtain and review existing information relative to the project. Assist City in obtaining long term service agreements with MPT; and data pertaining to MPT design drawings, details, and parts lists. Work with the City's surveyor and soils consultant to prepare scope of work and serve as point of contact in directing their field work activities.

2.0 Preliminary Design Review

2.1 Process and Contractual Options Meeting

Boyle will attend one (1) meeting with City staff to discuss equipment configuration alternatives, and to discuss contractual options. It is assumed that the City will enter into an agreement with MPT to provide treatment equipment to the City's contractor for a pre-determined price. Since schedule is critical, Boyle recommends that the City work with MPT to begin manufacturing long-lead equipment before a contractor is selected for the project.

2.2 Proposed Equipment Evaluation Memorandum (Technical Memo #1)

Upon receipt of a formal proposal from MPT, Boyle will prepare a Technical Memorandum evaluating vendor recommendations. Boyle will evaluate proposed equipment in relation to costs, operational strategy, redundancy, and performance. As part of the Technical Memorandum, Boyle will evaluate vendor's proposed equipment cost and compare to previous cost estimates provided by vendor.

2.3 Technical Design Memorandum / Design Review Meeting (Technical Memo #2)

Boyle will prepare a preliminary site plans showing locations of major process equipment and piping. A technical memorandum will be prepared that will identify site constraints, describe system layout, and recommend any required easements or property acquisitions. Boyle will attend one (1) meeting with City staff to review the Technical Memorandum and to discuss the vendor proposal.

2.4 Meeting with Department of Health Services (DHS)

Boyle will attend one (1) meeting with City staff at the Carpinteria, CA office of DHS to assist the City in identifying the tasks necessary to fulfill DHS permitting requirements.

3.0 Design Phase Services

Following the completion of Task 2.3 Boyle will prepare the project drawings, specifications, and opinion of cost. Technical specifications will be prepared for civil site work, while treatment process specifications will be performance based.

Project Plans - Boyle will provide site plans at a scale of 1" to 10'. Detail plans shall be provided at a scale that clearly indicates the work to be completed. All sheets will be 22" by 34" with City standard title block and border. Plans will be prepared in AutoCAD format with City conventional layering, symbols, and text format. It is assumed that no sewer connection will be required for either site, and the well sites existing storm drain connections can be used for all backwash and waste water. The City will be responsible for the coordination of associated discharge permits.

3.1 It is anticipated that the plans for each site will include:

- Title sheet, drawing index, vicinity map and legend (2 sheets)
- Grading plan (1 sheet)
- Site plan (1 sheet)
- Onsite piping plan and details (1 sheet)
- Structural (1 sheet)
- Electrical (1 sheet)
- Process Flow Diagram (1 sheet)
- Miscellaneous details and sections (1 sheet)

3.2 Construction Specifications

Boyle will provide contract documents incorporating the City's standard contract language. The technical project specifications will be prepared in accordance with Boyle's standard specifications for construction. The City's standard contract documents are to be reviewed by Boyle to verify that the specific needs of the project are satisfied. The technical specifications will be prepared in CSI format.

3.3 Performance Specifications

Performance specifications will be prepared for the process equipment supplied by MPT. The performance specifications will be prepared in the CSI format.

3.4 Opinion of Cost

Boyle will provide an opinion of probable construction cost following the completion plans and specifications.

❖ **Deliverables**

Boyle will provide the City with draft plans and specifications for City review at the 50% and 95% benchmarks. Upon approval of the 95% submittal, Boyle will prepare final plans, specifications, and opinion of probable construction cost. Original mylars and one set of reproducible specifications will be provided to the City for reproduction.

4.0 Quality Control / Project Management

Boyle will provide internal quality control reviews by senior personnel not otherwise involved in the project prior to submittal of documents to the City. Boyle will provide monthly budget and project status updates.

5.0 Additional Services

Services not included above, but which Boyle could provide for additional fee include:

- Survey and Geotechnical Investigation;
- Construction Phase Services – Pre-construction meeting, shop drawings, change orders, RFI review and processing, construction observation, record drawings;
- CEQA Compliance;
- DHS Permitting; and
- Water Treatment Plant Operation Plan.

City's Responsibilities

- Permitting and CEQA compliance
 - Provide a geotechnical report for each project site.
- Provide topographical and boundary survey for each site. Survey should include:
 - Topographical and boundary survey for each project site
 - Identification of existing utilities and substructures. Boyle may recommend that the City pothole existing underground utilities to determine their horizontal and vertical locations.
- Contract with equipment supplier to provide process equipment to contractor
- Negotiate and obtain all required rights-of-way and easements
- Provide full-time construction observation
- Provide access to existing reference material available in City files
- Provide the required telemetry software programming at the main control facility

- Potholing to locate existing underground pipelines, conduits, and cables (as needed)
- Traffic control

Budget for Engineering Services


The attached Project Budgets has been prepared based on Boyle's Standard Fee Schedule (attached). We propose to perform the scope of work outlined above on a time-and-materials basis with a not-to-exceed budget of \$117,167.

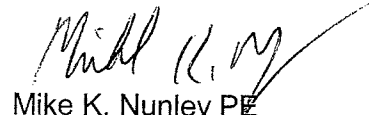
Schedule

Work will begin following receipt of a written notice to proceed (NTP). A preliminary schedule of Deliverables is given below:

- | | |
|---|---|
| 2.2 Equipment Evaluatio memorandum (TM#1) | 10 Days following NTP |
| 2.3 Technical Design Memorandum (TM#2) | 15 Days following receipt of survey |
| 3.0 Plans and Specs | |
| 50% Submittal | 35 days after acceptance of TM#2 Task # 2.3 |
| 90% Submittal | 20 days after acceptance of 50% Submittal |
| 100% Submittal | 20 days after acceptance of 90% Submittal |

Boyle Engineering Corporation


Christopher Alakel, PE
Senior Engineer


Mike K. Nunley PE
Branch Manager

Attachments:
Project Budget
Boyle Fee Schedule

Project Budget

**Sherwood Wells #9 and #11 Arsenic Treatment
Separate Treatment Facilities**

City of El Paso de Robles

Task Description	Personnel Hours						Budget			
	Principal Engineer	Senior Engineer I	Associate Engineer	Assistant Engineer	Drafter	Administrative Staff	Total Hours	Labor	Non-Labor Cost	Total
Task Group 1 - Preliminary Engineering										
Project kickoff meeting - Discussion of Equipment Alternatives		6	6				12	\$ 1,470	\$ 118	\$ 1,588
Data gathering/ Project Coordination		20	36				56	\$ 6,660	\$ 533	\$ 7,193
Subtotal		26	42	-	-	-	68	\$ 8,130	\$ 650	\$ 8,780
Task Group 2 - Preliminary Design										
Process and contractual options meeting		12	12				24	\$ 2,940	\$ 235	\$ 3,175
Equipment Evaluation / Memorandum	5	10	16				31	\$ 4,035	\$ 323	\$ 4,358
Tech Memorandum / Design Review	5	15	40		30	2	92	\$ 10,334	\$ 827	\$ 11,161
Meeting with DHS to assist City with Permitting Requirements		10	10				20	\$ 2,450	\$ 196	\$ 2,646
Subtotal	10	47	78	-	30	2	167	\$ 19,759	\$ 1,581	\$ 21,340
Task Group 3 - Design Phase Services										
Cover and Legend (4 sheets)		4	8		12		24	\$ 2,560	\$ 205	\$ 2,765
Grading Plan (2 sheets)	2	8	24		32		66	\$ 7,130	\$ 570	\$ 7,700
Site Plan (2 sheets)		8	24		32		64	\$ 6,760	\$ 541	\$ 7,301
Onsite piping (2 sheets)		12	16		40		68	\$ 7,180	\$ 574	\$ 7,754
Structural (2 sheets)	12	8	16		16		52	\$ 6,580	\$ 526	\$ 7,106
Process flow diagram (2 sheets)	4		8		16		28	\$ 3,140	\$ 251	\$ 3,391
Electrical (2 sheets)	8		4	16	16		44	\$ 5,040	\$ 1,480	\$ 6,520
Miscellaneous Sections and Details (2 Sheets)		8	16		56		80	\$ 8,160	\$ 653	\$ 8,813
Engineer's opinion of probable construction cost		4	40				44	\$ 4,940	\$ 395	\$ 5,335
Review meetings with City staff (50%, 90%)		8	8			4	20	\$ 2,228	\$ 178	\$ 2,406
Technical Specifications (Civil site work)		15	40			16	71	\$ 7,497	\$ 600	\$ 8,097
Performance Specifications (Process)		8	20				28	\$ 3,280	\$	\$ 3,280
Subtotal	26	83	224	16	220	20	589	\$ 64,495	\$ 5,974	\$ 70,469
Task Group 4 - Quality Control / Project Management										

Project Budget

Sherwood Wells #9 and #11 Arsenic Treatment
Separate Treatment Facilities

City of El Paso de Robles

Task Description	Personnel Hours							Budget		
	Principal Engineer	Senior Engineer I	Associate Engineer	Assistant Engineer	Drafter	Administrative Staff	Total Hours	Labor	Non-Labor Cost	Total
Project management	30	20					50	\$ 6,250	\$ 500	\$ 6,750
QC	20	40					60	\$ 9,100	\$ 728	\$ 9,828
Subtotal	20	70	20	-	-	-	110	\$ 15,350	\$ 1,228	\$ 16,578
Total	56	226	364	16	250	22	934	\$ 107,734	\$ 9,433	\$ 117,167

**BOYLE ENGINEERING CORPORATION
(BAKERSFIELD AND SAN LUIS OBISPO OFFICES)**

**FEE SCHEDULE FOR PROFESSIONAL SERVICES
Effective January 1, 2006**

Engineers, Planners, Architects, Scientists:

Principal	\$185.00 per hour
Senior II	\$150.00 per hour
Senior I	\$135.00 per hour
Associate	\$110.00 per hour
Assistant	\$100.00 per hour
Construction Observer	\$100.00 per hour

Technical Support Staff:

Design/CADD Supervisor	\$105.00 per hour
Senior Designer/Design CADD Operator	\$100.00 per hour
Drafter/CADD Operator	\$95.00 per hour
Assistant CADD Operator	\$75.00 per hour
Clerical/General Office	\$67.00 per hour

General Project Expenses ⁽¹⁾ 8% of Labor

Direct Project Expenses

Other Reproduction (8-1/2 x 11/11x17 Color)	\$1.15/1.50 per page
Plan Sheet Printing – In House Bond / Mylar	\$3.00/7.00 per sheet
Subcontracted Services/Reproduction	Cost + 10%
Subcontracted or Subconsultant Services	Cost + 10%
Auto Mileage for Construction Phase Services	\$0.60 per mile
Travel & Subsistence (other than mileage)	Cost
Miscellaneous Supplies/Services	Cost + 10%

If authorized by the Client, an overtime premium multiplier of 1.5 may be applied to the billing rate of hourly personnel who work overtime in order to meet a deadline which cannot be met during normal hours.

Applicable sale taxes, if any, will be added to these rates. Invoices will be rendered monthly. Payment is due upon presentation.

Fee schedule is subject to change.

⁽¹⁾ Includes mail, telephone, fax, office photo copies, personal computers and mileage (except as noted).



RESOLUTION NO. 06-

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF PASO ROBLES
AWARDING THE TECHNOLOGY AND DESIGN CONTRACT FOR
ARSENIC REMOVAL FROM SHERWOOD WELLS NINE AND ELEVEN

WHEREAS, the US Environmental Protection Agency drinking water standard for arsenic has been revised from 50 parts per billion to 10 parts per billion; and

WHEREAS, the City's Sherwood wells number nine and eleven exceed the new drinking water standard and will require well head treatment to meet the new standard; and

WHEREAS, after reviewing the pilot testing results of arsenic removal equipment/technology conducted in mid-2005, staff recommends the City employ treatment technology/equipment manufactured by Mobile Process Technology; and

WHEREAS, the City needs to prepare plans and specifications for the infrastructure to support the MPT arsenic removal equipment; and

WHEREAS, a Scope of Work and Fee Proposal, dated July 20, 2006, in the amount of \$117,167 was submitted by Boyle Engineering to conduct preliminary engineering, preliminary design, and design phase services for arsenic removal from Sherwood wells nine and eleven; and

WHEREAS, funding for the Sherwood well treatment improvement is available in the current Capital Improvement Program under Budget No. 220.910.5452.765.

NOW, THEREFORE, BE IT RESOLVED, AS FOLLOWS:

SECTION 1. The City Council of the City of El Paso de Robles does hereby recognize Mobile Process Technology as the City's preferred arsenic treatment vendor.

SECTION 2. The City Council does hereby authorize the City Manager to engage the services of Boyle Engineering to conduct preliminary engineering, preliminary design, and design phase services for arsenic removal from Sherwood wells nine and eleven, as documented in their Scope of Work and Fee Proposal, in the amount of \$117,167.

PASSED AND ADOPTED by the City Council of the City of Paso Robles this 15th day of August 2006 by the following vote:

AYES:

NOES:

ABSTAIN:

ABSENT:

Frank R. Mecham, Mayor

ATTEST:

Deborah D. Robinson, Deputy City Clerk