

Assessment of Osmotic Mechanisms Pairing Desalination Concentrate and Wastewater Treatment

PREPARED FOR: Dr. Saqib Shirazi, Texas Water Development Board
PREPARED BY: Robert Huehmer, CH2M HILL
COPIES: Dr. Jorge Arroyo, Texas Water Development Board
DATE: June 24, 2009
TWDB CONTRACT NUMBER: 0804830852

Dear Dr. Shirazi,

Please find attached the project update and invoice for activities up to June 24, 2009.

We have substantially completed Task 1 and Task 2 of our scope of work, while maintaining a small allowance for revision work. Exhibits 1 and 2 summarize the progress to date and financials for the project. To date, no expenses have been incurred on outside contractor's services or travel. An invoice for the TWDB portion, less retainage, is appended to this report.

Please contact me if you have any questions regarding this progress report.

Sincerely,



Robert P. Huehmer
Principal Investigator
CH2M HILL
703.376.5143 (direct)

Section A - Summary of Total Expenses

(1)	CONTRACTOR's Vendor Identification Number:	
(2)	TWDB Contract Number:	0804830852
(3)	Total expenses for the billing period:	\$2,708.49
(4)	Total Inkind Services:	
(5)	Total Services for this period:	\$2,708.49
(6)	Less LOCAL SHARE OF THE TOTAL STUDY COSTS for the billing period:	\$1,444.83*
(7)	Total BOARD's SHARE OF THE TOTAL STUDY COST for the billing period:	\$1,263.66
(8)	Amount of Retainage to be withheld for the billing period:	\$126.66
(9)	Total Costs to be Reimbursed by the BOARD for the billing period:	\$1,137.29

* Local share represents indirect overhead and profit based on CH2M HILL's rate structure.

An invoice for the value in Line (9) is appended to this project update.

I hereby certify that the expenses submitted for the billing period are a true and correct representation of amounts paid for work performed directly related to this contract.



Robert Huehmer
Principle Investigator
CH2M HILL

Section B - Direct Costs

EXHIBIT 1.

Direct Cost Summary Spent this billing period.

Task Budget (Billing Period 4)

Task	Applicant/Grantee	TWDB	Total
Task 1:	\$0.00	\$0.00	\$0.00
Task 2:	\$1,444.83	\$1,263.66	\$2,708.49
Task 3:	\$0.00	\$0.00	\$0.00
Task 4:	\$0.00	\$0.00	\$0.00
Task 5:	\$0.00	\$0.00	\$0.00
Task 6:	\$0.00	\$0.00	\$0.00
Total	\$1,444.83	\$1,263.66	\$2,708.49

Expense Budget (Billing Period 4)

Category	Applicant/Grantee	TWBD	Total
Salaries and Wages	\$0.00	\$905.85	\$905.85
Fringe	\$0.00	\$357.81	\$357.81
Travel	\$0.00	\$0.00	\$0.00
Expendable	\$0.00	\$0.00	\$0.00
Subcontract Services	\$0.00	\$0.00	\$0.00
Tech/Comp	\$0.00	\$0.00	\$0.00
Communications	\$0.00	\$0.00	\$0.00
Reproduction	\$0.00	\$0.00	\$0.00
Overhead	\$1,091.55	\$0.00	\$1,091.55
Profit	\$353.28	\$0.00	\$353.28
Total	\$1,444.83	\$1,263.66	\$2,708.49

EXHIBIT 2.
Direct Cost to Date.

Task Budget (Cumulative to End of Billing Period)

Task	Applicant/Grantee	TWDB	Total	% Spent	% Complete
Task 1:	\$5,114.16	\$4,474.17	\$9,588.33	96%	95%
Task 2:	\$4,120.45	\$3,603.78	\$7,724.23	85%	86%
Task 3:	\$0.00	\$0.00	\$0.00	0%	0%
Task 4:	\$0.00	\$0.00	\$0.00	0%	0%
Task 5:	\$0.00	\$0.00	\$0.00	0%	0%
Task 6:	\$0.00	\$0.00	\$0.00	0%	0%
Total	\$9,234.61	\$8,077.95	\$17,312.55		

Expense Budget (Cumulative to End of Billing Period)

Category	Applicant/Grantee	TWBD	Total	% Spent
Salaries and Wages	\$0.00	\$5,789.59	\$5,789.59	20%
Fringe	\$0.00	\$2,288.36	\$2,288.36	20%
Travel	\$0.00	\$0.00	\$0.00	0%
Expendable	\$0.00	\$0.00	\$0.00	0%
Subcontract Services	\$0.00	\$0.00	\$0.00	0%
Tech/Comp	\$0.00	\$0.00	\$0.00	0%
Communications	\$0.00	\$0.00	\$0.00	0%
Reproduction	\$0.00	\$0.00	\$0.00	0%
Overhead	\$6,976.45	\$0.00	\$6,976.45	20%
Profit	\$2,258.16	\$0.00	\$2,258.16	20%
Total	\$9,234.61	\$8,077.95	\$17,312.55	13%

Section C – Outside Contractors

Nothing to Report.

Section D – Travel and Subsistence

Nothing to Report.

Agenda

1. Invoicing and Contract Language
2. Subcontracting
3. Project Status
 - a. Draft Table of Contents – Report

PROGRESS REPORT

1. Invoicing and Contract Language

Questions arose regarding invoice back-up and the contract language, and amount payable from Ms. Sharon Moore of TWDB. CH2M HILL provided back-up regarding the methodology with which the invoices have been prepared. In summary, CH2M HILL had invoiced TWDB only for their share of the study, with CH2M HILL's in-kind contribution tracked on the monthly report. Ms Moore indicated that this methodology appeared to be in conflict with the contract language. Ms Moore indicated that:

“In Section I, (L), (M), and (N) it defines the Total Study Costs, the Board Share and the Local Share. For the Board Share it states "the *lesser* of \$90,000 *or* 66 percent of the total study costs *or* individual payment submission". So I tried determine how you arrived at \$4,474.17 as our portion of this individual payment submission. And I can not arrive at the figures using the percentages outlined in the contract with the information provided. I also noticed that the percentage for Local Share that is in the contract is incorrect. The contract has it at 33 percent of each voucher submission, but it should be 34 percent.”

I requested that my contracts officer review the contract language once again. On review of the contract language, it appeared that Section I and Attachment C of the contract would not be reconcilable.

Following this discussion, Ms. Phyllis Moore of TWDB indicated that a contract modification of section I, removing the "...*or* individual payment submission" language would be sought to ensure that invoicing will be transparent in the accounting system. CH2M HILL has agreed to modify the invoice to match the information currently in the reports.

The CH2M HILL accounting office has held invoices pending resolution. They are making the requested modifications and will issue with status reports. These will be issued this week.

2. Subcontracting

CH2M HILL does not yet have a contract in place. I have been advised that Colorado School of Mines has proceeded with work and needs this in place. I have been struggling to get this completed for many months.

The issue at hand is an internal issue within my subcontracting department. Our policies and procedures require that, in the event that a competitive bid is not performed, extensive back-up of proposals, on a task by task basis be completed, so that we can “back-up” that we are charging a government entity a fair price for their services. In the back-up that we have received, my subcontracts officers have challenged items that I am accustomed to seeing in University research contracts. They are requesting an hourly rate, with fringe and overhead included for the GA (with the understanding that they would bill based on hours worked and this rate). They have also challenged inclusion of fringe, and GA tuition during the period of work. It has been my experience that these costs are routinely included as fringe in the research contracts.

In discussions with the Colorado School of Mines has indicated that they are capable only of billing lump sum or cost reimbursable. Their accounting system does not allow them to track expenses and time to specific tasks (though they can estimate them).

I have suggested to both parties, that in order to facilitate getting this subcontract complete and approved by TWDB, we do the following:

- (i) Provide a detailed task break-down of work to be completed, under Task 3 of CH2M HILL’s contract
- (ii) Provide a rough estimate for each of their task items as sub-tasks of CH2M HILL’s task 3.
- (iii) Provide an estimated break-down of expenses for each task to satisfy my subcontracts officer, included an equivalent hourly rate (with fringe and overhead) based upon the GA’s normal working hours as a salaried employee.
- (iv) In terms of billing, use cost reimbursable assigned to CH2M HILL’s task 3, but provide a report on status of each of their tasks

My subcontracts officer indicates that if this is acceptable to TWDB, they will be satisfied.

3. Project Status

3.1 Draft Table of Contents.

CH2M HILL submits the following Table of Contents for the final report.

Front Cover
Inside Cover
Executive Summary
Table of Contents
Table of Figures
Table of Tables
Acknowledgements
Section 1. Introduction
Desalination in Texas
Concentrate Disposal in Texas
Forward Osmosis

Objectives

Section 2: Background

- Fundamentals of Desalination
- Osmosis
- Desalination
- Forward Osmosis
- Costs of Forward Osmosis

Section 3: Characterization of Waters in Texas

- Desalination in Texas
- Wastewater treatment facilities in proximity of desalination plants
- Characteristics of brackish water concentrate
- Characteristics of seawater concentrate
- Characteristics of treated wastewater
- Osmotic Potential of various waters in Texas

Section 4: Performance of Spiral Wound Forward Osmosis Membranes

- Introduction
- Methodology
- Results
- Discussion

Section 5: Development of a Forward Osmosis Cost Model

Section 6: Feasibility Analysis of Osmotic Mechanisms

Section 7: Conclusions and Recommendations

References

Glossary

Acronyms and Symbols

Appendices

CD-ROM

We are currently working on Section 1, 2 and 3 which correspond to Task 1 and Task 2 of our contract.

Progress by Task

Task 1. Survey of Water Categories and Quality

An initial review of desalination facilities in the State of Texas was conducted. This task is substantially complete. A small budget reserve is being maintained.

Task 2. Screening and Selection of Hybrid Forward Osmosis System Configurations

This task is substantially complete. A small budget reserve is being maintained.

Task 3. Testing of the Novel Forward Osmosis Spiral Wound Membrane Element

We are working to get the CSM contract in place to conduct their portion of the work. CSM is ready to start testing the required water qualities identified under Task 1 and Task 2, once contract is in place.

Task 4. System and Process Modeling

We are anticipating beginning to prepare our RO process modeling for the non-forward osmosis system components. We can not begin the FO module until after the data from Task 3 is developed.

Task 5. Cost Modeling

We are beginning to prepare our cost curves for the non-forward osmosis system components. We can not begin the FO module until after the data from Task 3 is developed.

Task 6. Final Report Preparation

We have prepared a draft Table of Contents for TWDB review.



CH2M HILL
 322 E. Front Street Suite 200
 Boise, ID 83702

REMIT TO: Dept. #925
Denver, CO 80271-0925

Texas Water Development Board
 Attn: Accounts Payable
 P O Box 13231
 Austin, TX 78711-3231

Date: July 15, 2009
 Invoice No.: 3708615
 Customer No.: 029060
 Project No.: 383140

INVOICE

TWDB Assess Osmotic Mech

Invoice Period: Through June 26, 2009

PROFESSIONAL SERVICES

<u>Class</u>	<u>Employee Name</u>	<u>Title</u>	<u>Raw Rate</u>	<u>Hours</u>	<u>Amount</u>
CA26	Black, Erin	Contracts Manager	\$50.22	2.0	\$100.44
PA13	Derrick, Cheryl	Project Accountant	\$24.19	2.0	\$48.38
TX04	Gomez, Juan	Sr. Technologist	\$45.02	1.0	\$45.02
IS21	Huehmer, Robert	Project Manager	\$54.77	13.0	\$712.01

Subtotal Raw Labor	18.00	\$905.85
Direct Cost applied to Raw Labor @ 39.5%		\$357.81
OH Cost applied to Raw Labor @ 120.5%		\$1,091.55

Subtotal Burdened Labor	\$2,355.20
Profit of 15%	\$353.28

TOTAL PROFESSIONAL SERVICES	\$2,708.49
Deduct LOCAL Contribution Share of Total Study Costs (OH and Profit)	(\$1,444.83)

TOTAL DUE BOARD SHARE PROFESSIONAL SERVICES	\$1,263.66
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EXPENSES

<u>Description</u>	<u>Amount</u>
No Current Expenses	
TOTAL EXPENSES	\$0.00

TOTAL PROFESSIONAL SERVICES AND EXPENSES	\$1,263.66
Less 10% Retention	\$126.37

Total Amount Task 01	\$1,137.29
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TOTAL AMOUNT DUE THIS INVOICE	\$1,137.29
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BILLING SUMMARY - TWDB SHARE

Total Contract Amount	\$90,000.00
Total Billed to Date	\$8,076.48
Percent Total Contract Billed to Date	8.97%
Remaining Contract Balance	\$81,923.52
Total Billed Prior to this Invoice	\$6,812.82

If you have any questions or concerns regarding this invoice, please call Robert Huehmer (703) 376-5143

383140
7/15/09

PAYMENT SUMMARY 7/15/2009

INVOICE #	DATE	INVOICE AMOUNT	RETENTION AMOUNT	AMOUNT NOW DUE	AMOUNT PAID	OUTSTANDING INCL RETENTION
3698939R	4/28/2009	\$ 4,472.69	\$ 447.27	4,025.42	0.00	\$ 4,472.69
3702657	5/29/2009	\$ 1,288.30	\$ 128.83	1,159.47	0.00	\$ 1,288.30
3708610	7/15/2009	\$ 1,051.83	\$ 105.18	946.65	0.00	\$ 1,051.83
				-		\$ -
				-		\$ -
				-		\$ -
				-		\$ -
				-		\$ -
				-		\$ -
TOTALS		\$ 6,812.82	\$ 681.28	\$ 6,131.54	\$ -	\$ 6,812.82