STWA

SOUTH TEXAS WATER AUTHORITY
P. O. BOX 1701
KINGSVILLE, TEXAS 78364-1701

MEMORANDUM

TO: South Texas Water Authority Board of Directors
FROM: Kathleen Lowman, President
DATE: February 20, 2018
SUBJECT: Meeting Notice and Agenda for the South Texas Water Authority

A Regular Meeting of the STWA Board of Directors is scheduled for:

Tuesday, February 27, 2018
5:30 p.m.
South Texas Water Authority
2302 East Sage Road, Kingsville, Texas

The Board will consider and act upon any lawful subject which may come before it, including among others, the following:

Agenda

1. Call to order.

2. Citizen comments. This is an opportunity for citizens to address the Board of Directors concerning an issue of community interest that is not on the agenda. Comments on the agenda items must be made when the agenda item comes before the Board. The President may place a time limit on all comments. The response of the Board to any comment under this heading is limited to making a statement of specific factual information in response to the inquiry, or, reciting existing policy in response to the inquiry. Any deliberation of the issue is limited to a proposal to place it on the agenda for a later meeting.

3. Approval of Minutes. (Attachment 1)

4. Treasurer's Report/Payment of Bills. (Attachment 2)

5. TCEQ Enforcement Action and State Office of Administrative Hearings. (Attachment 3)

6. Assessment of STWA's 42" waterline – Russell Corrosion Projects (Attachment 4)
   - Examination of Section 0 – 5000 LF – Report on Cathodic Protection Evaluation

7. Driscoll Pump Station LAS Chemical Feed System Addition. (Attachment 5)

8. Revised Water Supply Contract with the City of Bishop. (Attachment 6)

9. Report on Surplus Sale. (Attachment 7)

10. Incremental Increase Charges for Customers without a Long-Term Contract. (Attachment 8)

(361) 592-9323 Or (361) 692-0337 (C.C. line)
Fax: (361) 592-5965

11. Quote from Mercer Controls for elimination of repeater on Driscoll elevated storage tank. (Attachment 9)

12. Kleberg County Extension Agency funding request for private water well screening. (Attachment 10)

13. Adjournment.

The Board may go into closed session at any time when permitted by Chapter 551, Government Code. Before going into closed session a quorum of the Board must be assembled in the meeting room, the meeting must be convened as an open meeting pursuant to proper notice, and the presiding officer must announce that a closed session will be held and must identify the sections of Chapter 551, Government Code, authorizing the closed session.

KL/CGS/fdl
Attachments

This meeting notice was posted on STWA's website, www.stwa.org, and on indoor and outdoor bulletin boards at STWA's administrative offices, 2302 East Sage Road, Kingsville, Texas at 2:30 am/pm on 02/23/2018

Frances De Leon
Assistant Secretary

ATTACHMENT 1

Approval of Minutes

SOUTH TEXAS WATER AUTHORITY
Regular Board of Directors Meeting
January 23, 2018
Minutes

Board Members Present:

Kathleen Lowman
Rudy Galvan
Lupita Perez
Patsy Rodgers
Charles Schultz
Filiberto Treviño
Steven Vaughn

Board Members Absent:

Dr. Albert Ruiz

Staff Present:

Carola G. Serrato
Frances De Leon
Jo Ella Wagner
Jacob Hinojosa
Dony Cantu

Guests Present:

Luke Womack, John Womack & Co., P.C.

1. Call to Order.

Ms. Kathleen Lowman, Board President, called the Regular Meeting of the STWA Board of Directors to order at 5:30 p.m. A quorum was present.

2. Citizen Comments.

Ms. Lowman opened the floor to citizen's comments. No citizen comments were made.

3. Proposed Fiscal Year 2017 Audit.

Mr. Luke Womack, John Womack & Co., P.C., reviewed the Fiscal Year 2017 Audit with the Board and reported that all records were in order and the Authority's financial position remains stable. He added that the Authority's Fund Balance increased by about $128,000.

4. **Resolution 18-01.** Resolution accepting the Fiscal Year 2017 Audit prepared by John Womack & Co., P.C. of Kingsville, Texas.

Mr. Galvan made a motion to approve Resolution 18-01. Mr. Schultz seconded the motion. All voted in favor.

5. Approval of Minutes.

Mr. Treviño made a motion to approve the minutes of the December 5, 2017 Regular Meeting as presented. Ms. Rodgers seconded. The motion passed by unanimous vote.

6. Quarterly Report/Treasurer's Report/Payment of Bills.

The following reports were presented for the Board's consideration:

STWA Investment Report for Quarter ended December 2017
Treasurer's Report for period ending November 30, 2017
Revenue Fund Income Statement for period ending November 30, 2017
Tax Fund Income Statement for period ending November 30, 2017
Special Services Income Statement for period ending November 30, 2017
STWA Revenue Fund Balance Sheet – November 30, 2017
STWA Revenue Fund GL Account Summary Report as of November 30, 2017
STWA Debt Service Fund Income Statement for period ending November 30, 2017
STWA Debt Service Fund Balance Sheet – November 30, 2017
STWA Debt Service Fund GL Account Summary Report as of November 30, 2017
STWA Capital Projects Fund Income Statement for period ending November 30, 2017
STWA Capital Projects Fund Balance Sheet – November 30, 2017
STWA Capital Projects Fund GL Account Summary Report as of November 30, 2017
Treasurer's Report for period ending December 31, 2017
Revenue Fund Income Statement for period ending December 31, 2017
Tax Fund Income Statement for period ending December 31, 2017
Special Services Income Statement for period ending December 31, 2017
STWA Revenue Fund Balance Sheet – December 31, 2017
STWA Revenue Fund GL Account Summary Report as of December 31, 2017
STWA Debt Service Fund Income Statement for period ending December 31, 2017
STWA Debt Service Fund Balance Sheet December 31, 2017
STWA Debt Service Fund GL Account Summary Report as of December 31, 2017
STWA Capital Projects Fund Income Statement for period ending December 31, 2017
STWA Capital Projects Fund Balance Sheet – December 31, 2017
STWA Capital Projects Fund GL Account Summary Report as of December 31, 2017
STWA 2012 Bond Election Report
Anticipated vs. Actual Water Rate Charged
Maintenance & Technical Report from O&M Supervisor

Ms. Wagner also presented the following outstanding invoices for Board approval:

• Praesidium Systems, Inc.	$ 2,092.99
• City of Corpus Christi	$ 87,667.19
• John Womack & Co., P. C.	$ 8,670.00
• Walker Partners	$ 5,920.00
• HDR Engineering, Inc.	$ 900.00
• HDR Engineering, Inc.	$ 6,840.00
• Kevin Kieschnick-NC Tax Assessor	$ 2,229.29
• Mercer Controls, Inc.	$ 21,900.00
• Willatt & Flickinger, PLLC	$ 481.80
• Walker Partners	$ 3,800.00
• Russell Corrosion	$ 300.00

- City of Corpus Christi $ 86,343.97

A motion was made by Mr. Schultz to approve the Treasurer's Report and payment of the bills as presented. Ms. Rodgers seconded. The motion carried.

7. TCEQ Enforcement Action and State Office of Administrative Hearings.

Ms. Serrato reported that the conference call scheduled for January with TCEQ has been postponed to January 30th. She also presented the Engineering Report which was submitted to TCEQ a well as an approval letter from TCEQ for the design of the sample sites. She added that the two bacteriological samples are scheduled for collection during January under the new Monitoring Plan.

8. Assessment of STWA's 42" Waterline – Russell Corrosion Projects
   - Examination of Section 0 – 5000 LF
   - Pipeline Crossings and Interference

Ms. Serrato reported that the final interference testing has been completed and no interference was detected. She added that a technical memorandum for the Section 0 – 5000 project has not been received but she expects it to arrive next month.

9. Driscoll Pump Station LAS Chemical Feed System Addition.

Ms. Serrato reported that the Driscoll LAS station has been placed online; however, it is being monitored due to problems with bubbles in the tubing which may eventually require changing out all of the tube fittings. A few items on the punch list remain to be addressed. Training on the system was conducted as scheduled. No pay request has been received.

10. Revised Water Supply Contract with the City of Bishop.

Ms. Serrato stated that the City of Bishop has not responded regarding the revised Water Supply Contract. The City's legal counsel has been experiencing medical issues preventing him from addressing the matter at this time. She also noted that the City's invoice reflecting the Incremental Increase was mailed out on Friday, January 19th, and she has received no feedback as of today.

11. Quotes and Purchase of Pipeline Locator Equipment manufactured by Vivax – Metrotech.

Ms. Serrato stated that as previously reported Field Technicians recently viewed and participated in a pipeline locator equipment demonstration of a Vivax-Metrotech vLoc 5000 device and were impressed by the demonstration. However, Indepth representatives indicated that the vLoc 5000 device is limited in locating discontinuous bonds and cannot be depended on to locate anodes. Russell Corrosion has since returned and confirmed that the vLoc DM2 device will locate discontinuous bonds as well as the presence of sacrificial anodes. Indepth Utility Solutions provided a quote for the vLoc 5000 in the amount of $5,675. A quote was also provided for a vLoc DM2 unit in the amount of $10,287 plus an additional $1,855 and $233 for an optional Loc-

10 Transmitter and Hard Case for a total of $12,375. Ms. Serrato pointed out that $15,400 remains available from the SmartBall project since no repairs to the 42 inch waterline were necessary. Mr. Schultz made a motion to authorize purchase of the vLoc DM2 unit with the options in the amount of $12,375. Ms. Rodgers seconded. All voted in favor.

12. Declaration of surplus property, authorization to approve sale of surplus property to the highest bidder, declaration of unsold items as salvage property and authorization to dispose of salvage items.

Ms. Serrato presented a list of items to be included in the next surplus sale. She said she discussed the surplus sale with Mr. Flickinger and asked whether the entire process could be conducted in one meeting by having the Board declare the items on the list as surplus, authorize sale of the items, approve the sale to the highest bidder, declare items not receiving any bids as salvage property and instruct staff to dispose of the salvage items. This would eliminate the need to bring the matter before the Board several times while still providing opportunity for the public to bid on items. Mr. Flickinger advised that approval of one motion authorizing the various steps would be sufficient. Ms. Rodgers made a motion to declare the items on the attached list as surplus, authorize sale of the attached list, approve the sale to the highest bidder, declare any items not receiving a bid as salvage property and instruct staff to dispose of salvage items. Ms. Perez seconded. All voted in favor. Ms. Serrato said she would present a follow-up report on the sale upon completion of the process.

13. Incremental Increase Charges for Customers without a Long-Term Contract.

Ms. Serrato reported that invoices including the Incremental Increase charges were mailed out on January 19th to the three customers without a long-term contract. The calculated charges for Bishop, Driscoll and Banquete are $1,707.68, $1,564.45 and $867.19 respectively. Since it is possible that they have not yet received the bills, this item will be included in next month's agenda as well.

14. Adjournment.

With no further business to discuss, Ms. Lowman adjourned the meeting at 6:25 p.m.

Respectfully submitted,

Frances De Leon

Frances De Leon
Assistant Secretary

ATTACHMENT 2

Treasurer's Report/Payment of Bills

SOUTH TEXAS WATER AUTHORITY
Treasurer's Report
For Period Ending January 31, 2018

STWA Water Sales:

Entity	Water Usage (1,000 g)	Cost of Water from City of Corpus Christi $2.397528 per 1000 g	Handling Charge @ $0.426386/1000g	Incremental Increase @ $0.426386/1000g	Out of District Surcharge and Pass-Thru Credit	Total Due
Kingsville	7,519	$18,027.01	$3,206.00	$0.00	$0.00	$21,233.01
Bishop	4,873	$11,683.15	$2,077.78	$2,077.78	$0.00	$15,838.71
Agua Dulce	2,152	$5,158.78	$917.46	$0.00	$0.00	$6,076.24
RWSC	6,986	$16,749.13	$2,978.73	$0.00	$0.00	$19,727.86
Driscoll	3,925	$9,410.78	$1,673.65	$1,673.65	-$41.35	$12,716.73
NCWCID #5	2,289	$5,486.89	$975.81	$975.81	$731.47	$8,169.98
NWSC	13,263	$31,798.97	$5,655.26	$0.00	$0.00	$37,454.22
TOTAL	41,007	$98,314.71	$17,484.68	$4,727.24	$690.12	$121,216.75

Water Cost and Usage for Period of:	**12/31/17**	**to**	**01/31/18**
City of Corpus Christi Invoice for Cost of Water Purchased:			$93,024.09
Gallons of Water Recorded by City of Corpus Christi:			38,800,000
Gallons of Water Recorded by STWA from Customer's Master Meters:			41,006,700
Water Loss Percentage:			-5.69%

Annual Usage for FY 2018	**Annual**
Gallons of Water Recorded by City of Corpus Christi:	161,000,000
Gallons of Water Recorded by STWA from Customer's Master Meters:	168,921,690
Water Loss Percentage: (year to date)	-4.92%

REVENUE FUND
INCOME STATEMENT
FOR PERIOD ENDING JANUARY 31, 2018

33.33%

	MONTHLY	YEAR TO DATE	2018 ADOPTED BUDGET	% OF 2018 ADOPTED BUDGET	2017 YEAR TO DATE	2017 FINAL BUDGET
REVENUES						
Water Service Revenue	98,315	395,125	1,257,962	31%	407,136	1,240,206
Handling Charge Revenue	17,485	71,932	220,170	33%	74,960	228,517
Premium Incremental Increase	4,727	8,867	0	0%	0	0
Surcharge - Out of District	552	2,206	6,619	33%	1,926	5,778
Interest Income	2,118	7,034	10,000	70%	2,590	13,500
Other Revenue						
Operating & Maintenance Fees	0	0	0	0%	0	0
Miscellaneous Revenues	517	1,155	5,000	23%	5,864	6,750
TOTAL REVENUES	123,713	486,319	1,499,751	32%	492,476	1,494,751
EXPENDITURES						
Water Service Expenditures:						
Bulk Water Purchases	93,024	377,098	1,257,962	30%	408,854	1,233,414
Payroll Costs						
Salaries & Wages - Perm. Employees	28,055	101,126	328,813	31%	98,000	285,123
Salaries & Wages - Part-Time	123	446	1,607	28%	2,351	5,851
Overtime - NWSC	0	0	0	0%	0	0
Stand-by Pay - NWSC	0	0	0	0%	0	0
Overtime - RWSC	0	0	0	0%	0	0
Stand-by Pay - RWSC	0	0	0	0%	0	0
Overtime - STWA	1,528	6,531	21,000	31%	4,530	17,910
Stand-by Pay - STWA	100	400	1,300	31%	400	1,300
Employee Retirement Premiums	3,510	15,448	44,452	35%	13,997	36,612
Group Insurance Premium	14,855	52,235	169,122	31%	51,974	147,404
Unemployment Compensation	414	489	874	56%	972	300
Workers' Compensation	(778)	7,719	6,498	119%	322	7,252
Car Allowance	500	1,900	4,800	40%	1,600	4,800
Hospital Insurance Tax	249	967	3,757	26%	999	3,388
Supplies & Materials						
Repairs & Maintenance	5,761	21,573	80,000	27%	47,353	126,500
Meter Expense	0	3,375	5,000	68%	4,125	7,140
Tank Repairs	4,300	4,300	20,000	22%	0	7,800
Major Repairs	0	0	25,000	0%	0	25,000
Other Operating Expenditures:						
Professional Fees						
Legal	935	3,493	40,000	9%	9,977	30,000
Auditing	525	9,369	9,500	99%	9,155	9,155
Engineering	5,354	46,646	90,000	52%	0	60,000
Management & Consulting	0	278	10,000	3%	748	14,550
Inspection	2,725	2,725	5,500	50%	0	1,600
Leak Detection	0	55,440	75,000	74%	0	20,000
Consum Supplies/Materials						
Postage	0	288	11,500	3%	2,684	8,950
Printing/Office Supplies	4,997	12,279	19,000	65%	5,086	18,650
Janitorial/Site Maintenance	1,051	2,043	5,000	41%	779	4,350
Fuel/Lubricants/Repairs	3,246	9,132	33,000	28%	5,862	24,335
Chemicals/Water Samples	8,072	16,899	58,000	29%	21,232	49,900
Safety Equipment	0	0	1,500	0%	650	1,500
Small Tools	232	761	1,000	76%	134	1,000

	MONTHLY	YEAR TO DATE	2018 ADOPTED BUDGET	% OF 2018 ADOPTED BUDGET	2017 YEAR TO DATE	2017 FINAL BUDGET
Recurring Operating Costs						
Telephone/Communications	1,324	6,958	21,100	33%	5,399	23,700
Utilities	8,225	27,599	115,000	24%	32,917	108,500
D & O Liability Insurance	0	1,164	3,500	33%	1,164	2,100
Property Insurance	0	33,247	33,247	100%	33,247	33,247
General Liability	0	1,247	2,750	45%	1,247	2,750
Auto Insurance	0	2,050	2,050	100%	2,050	2,050
Travel/Training/Meetings	557	2,013	10,000	20%	1,775	6,300
Rental-Equipment/Uniforms	(64)	714	5,000	14%	602	3,500
Dues/Subscriptions/Publication	636	2,376	15,000	16%	2,270	9,300
Pass Through Cost	41	185	500	37%	137	780
Educational Materials	0	0	660	0%	0	0
Miscellaneous						
Miscellaneous Expenditures	519	2,508	7,500	33%	5,138	9,000
Total Administrative & Operations Exp.	190,015	833,025	2,545,492	33%	777,730	2,355,011
Capital Outlay						
Capital Acquisition	0	36,226	79,000	46%	97,804	114,500
Engineering	0	0	0	0%	798	1,000
TOTAL EXPENDITURES (w/o D.S. exp.)	190,015	869,251	2,624,492	33%	876,332	2,470,511
Excess (Deficiencies) of Revenue Over Expenditures	(66,302)	(382,933)	(1,124,741)	34%	(383,856)	(975,760)
OTHER FINANCE SOURCE (USES)						
Transfer to Other Funds						
Transfer from Tax Account	(804,228)	(804,228)	(1,054,566)	76%	(386,268)	(991,729)
Extra Ordinary Income			(1,500)			
Disposition of Assets (Surplus Sale)	0	0	0	0%	0	0
TOTAL OTHER FINANCING SOURCES (USES)	(804,228)	(804,228)	(1,056,066)	76%	(386,268)	(991,729)
EXCESS (DEFICIENCES) OF REVENUES OVER OTHER SOURCES (USES)	737,926	421,296	(68,675)		2,412	15,969
NET INCOME	737,926	421,296	(68,675)		2,412	15,969

TAX FUND
INCOME STATEMENT
FOR PERIOD ENDING JANUARY 31, 2018

33.33%

	MONTHLY	YEAR TO DATE	2018 ADOPTED BUDGET	% OF 2018 ADOPTED BUDGET	2017 YEAR TO DATE	2017 FINAL BUDGET
REVENUES						
Ad-Valorem - Current	397,046	819,922	1,070,008	77%	804,069	989,500
Delinquent Tax Revenue	3,342	14,730	27,500	54%	13,319	33,850
Penalty & Interest - Tax Accounts	1,318	5,239	16,000	33%	4,709	22,050
Miscellaneous	0	0	0	0%	0	0
TOTAL TAXES & INTEREST	401,707	839,891	1,113,508	75%	822,097	1,045,400
EXPENDITURES						
Tax Collector Fees	4,232	30,579	37,165	82%	30,323	35,371
Appraisal Districts	0	5,084	21,777	23%	3,792	18,300
TOTAL EXPENDITURES	4,232	35,663	58,942	61%	34,115	53,671
Transfer to General Fund	804,228	804,228	1,054,566	76%	386,268	991,729
EXCESS REVENUES & OTHER FINANCING SOURCES OVER(UNDER) EXPENDITURES AND OTHER USES	(406,754)	(0)	0		401,713	0

SPECIAL SERVICES
INCOME STATEMENT
FOR PERIOD ENDING JANUARY 31, 2018

33.33%

	MONTHLY	YEAR TO DATE	2018 ADOPTED BUDGET	% OF 2018 ADOPTED BUDGET	2017 YEAR TO DATE	2017 FINAL BUDGET
REVENUES						
Ricardo Water Supply Corporation	17,729	80,912	293,020	28%	80,154	271,554
Nueces Water Supply Corporation	20,908	79,472	275,134	29%	83,450	250,665
TOTAL REVENUES	38,637	160,384	568,154	28%	163,604	522,219
EXPENDITURES						
Personnel	25,276	100,957	304,185	33%	92,225	288,626
Overhead	22,610	82,281	263,969	31%	62,761	233,593
TOTAL EXPENDITURES	47,886	183,238	568,154	32%	154,986	522,219
EXCESS REVENUES & OTHER FINANCING SOURCES OVER(UNDER) EXPENDITURES AND OTHER USES	(9,249)	(22,854)	0		8,618	0

South Texas Water Authority
Balance Sheet
January 31, 2018

ASSETS

Current Assets			
STWA - General	$	70,657.48	
STWA - Payroll		26,406.98	
STWA - Operations		47,204.74	
Petty Cash		150.00	
TexPool - STWA General		2,010,316.38	
Due From Capital Projects Fund		276,443.21	
Due from Debt Service Fund		5,962.94	
Due from D.S .-Collect Service		11,846.90	
Tax Accounts Receivable		165,274.52	
Allowance for Uncollect Taxes		(66,653.05)	
Service accts receivable		180,251.46	
Interlocal Rec-Ricardo		3,090.70	
Interlocal Rec-Nueces		7,648.33	
Interlocal Rec. - Tax Assessor		114,518.00	
Inventory		17,836.50	
Total Assets			$ 2,870,955.09

LIABILITIES AND FUNDS EQUITY

Current Liabilities			
Trade Accounts Payable	$	135,242.93	
Salaries & Wages Payable		22,396.00	
Unemployment Comp. Pbl.		844.25	
Miscellaneous Payables		706.05	
Compensated Absences		17,620.65	
Deferred tax revenue		98,621.47	
Total Liabilities			275,431.35
Fund Equity			
Unassigned Fund Balance		2,179,245.44	
Assigned Fund Bal. - Inventory		17,836.50	
Current Earning		398,441.80	
Total Fund Equity			2,595,523.74
Total Liabilities & Fund Equity			$ 2,870,955.09

South Texas Water Authority
Gl Account Summary Report
As of: January 31, 2018

Account Description	Beginning Balance	Debit Change	Credit Change	Net Change	Ending Balance
Current Assets					
STWA - General	164,058.87	$ 276,316.39	$ (369,717.78)	$ (93,401.39)	$ 70,657.48
STWA - Payroll	20,244.10	35,006.63	(28,843.75)	6,162.88	26,406.98
STWA - Operations	35,391.54	50,114.39	(38,301.19)	11,813.20	47,204.74
Petty Cash	150.00	0.00	0.00	0.00	150.00
Transfers	0.00	85,000.00	(85,000.00)	0.00	0.00
TexPool - STWA General	1,684,834.98	325,481.40	0.00	325,481.40	2,010,316.38
Due From Capital Projects Fund	276,443.21	0.00	0.00	0.00	276,443.21
Due from Debt Service Fund	5,883.80	259.03	(179.89)	79.14	5,962.94
Due from D.S .-Collect Service	10,466.71	1,380.19	0.00	1,380.19	11,846.90
Tax Accounts Receivable	165,274.52	0.00	0.00	0.00	165,274.52
Allowance for Uncollect Taxes	(66,653.05)	0.00	0.00	0.00	(66,653.05)
Service accts receivable	282,529.15	149,546.11	(251,823.80)	(102,277.69)	180,251.46
Interlocal Rec-Ricardo	11,828.35	3,424.64	(12,162.29)	(8,737.65)	3,090.70
Interlocal Rec-Nueces	11,907.49	7,761.23	(12,020.39)	(4,259.16)	7,648.33
Interlocal Rec. - Tax Assessor	36,329.99	114,518.00	(36,329.99)	78,188.01	114,518.00
Inventory	17,836.50	0.00	0.00	0.00	17,836.50
Total Assets	**2,656,526.16**	**1,048,808.01**	**(834,379.08)**	**214,428.93**	**2,870,955.09**
Current Liabilities					
Trade Accounts Payable	(249,945.63)	298,632.05	(183,929.35)	114,702.70	(135,242.93)
Salaries & Wages Payable	(15,660.40)	15,660.40	(22,396.00)	(6,735.60)	(22,396.00)
Hospital Ins Tax Payable	0.00	1,195.44	(1,195.44)	0.00	0.00
Withholding Taxes Payable	0.00	4,361.68	(4,361.68)	0.00	0.00
Emply Retire Prem Payable	0.00	10,292.82	(10,292.82)	0.00	0.00
Unemployment Comp. Pbl.	(411.09)	6.46	(439.62)	(433.16)	(844.25)
Miscellaneous Payables	(666.41)	9,857.36	(9,897.00)	(39.64)	(706.05)
Compensated Absences	(17,620.65)	0.00	0.00	0.00	(17,620.65)
Deferred tax revenue	(98,621.47)	0.00	0.00	0.00	(98,621.47)
Total Liabilities	**(382,925.65)**	**340,006.21**	**(232,511.91)**	**107,494.30**	**(275,431.35)**
Fund Equity					
Unassigned Fund Balance	(2,179,245.44)	0.00	0.00	0.00	(2,179,245.44)
Assigned Fund Bal. - Inventory	(17,836.50)	0.00	0.00	0.00	(17,836.50)
Total Fund Equity	**(2,197,081.94)**	**0.00**	**0.00**	**0.00**	**(2,197,081.94)**
Totals	**76,518.57**	**$ 1,388,814.22**	**$ (1,066,890.99)**	**$ 321,923.23**	**$ 398,441.80**

DEBT SERVICE FUND
INCOME STATEMENT
FOR PERIOD ENDING JANUARY 31, 2018

33.33%

	MONTHLY	YEAR TO DATE	2018 ADOPTED BUDGET	% OF 2018 ADOPTED BUDGET	2017 YEAR TO DATE	2017 FINAL BUDGET
REVENUES						
Ad-Valorem - Current	129,491	267,416	366,174	73%	288,029	354,529
Delinquent Tax Revenue	1,050	4,705	7,000	67%	4,146	10,400
Penalty & Interest - Tax Accounts	312	1,362	5,500	25%	1,052	5,675
Out-of-District Surcharge	180	720	2,159		690	2,070
Intererest on Temporary Investments	231	445	900	49%	160	1,450
Miscellaneous	0	0	0	0%	0	0
TOTAL TAXES & INTEREST	131,265	274,647	381,733	72%	294,077	374,124
OTHER FINANCING SOURCES						
Excess Bond Proceeds	0	0	0	0%	0	0
TOTAL OTHER FINANCE SOURCES	0	0	0		0	374,124
TOTAL REVENUE AND OTHER FINANCE SOURCES	131,265	274,647	381,733	72%	294,077	374,124
EXPENDITURES						
Fiscal Agent Fees	0	0	200	0%	0	200
Bond Interest Expense	0	0	126,750	0%	0	131,050
Bond Principal Payments	0	0	220,000	0%	0	215,000
Tax Collector Fees	1,380	10,026	12,121	83%	10,862	12,676
Appraisal District Fees	0	1,821	7,103	26%	1,358	6,555
Miscellaneous	0	0	0	0%	0	0
TOTAL EXPENDITURES	1,380	11,847	366,174	3%	12,221	365,481
EXCESS REVENUES OVER(UNDER) EXPENDITURES AND OTHER USES	129,884	262,800	15,559		281,856	8,643

STWA Debt Service Fund
Balance Sheet
January 31, 2018

ASSETS

Current Assets		
Debt Service Acct. - TexPool	$ 265,957.26	
Due from Other Governments	200.83	
Taxes Receivable	67,333.79	
Allowance for Uncollectibles	(8,581.46)	
Total Current Assets		**324,910.42**
Other Assets		
Total Other Assets		**0.00**
Total Assets		**$ 324,910.42**

LIABILITIES AND FUNDS EQUITY

Current Liabilities		
Deferred Tax Revenue	$ 21,610.10	
Due to General Fund	17,809.85	
Total Current Liabilities		**39,419.95**
Long-Term Liabilities		
Total Long-Term Liabilities		**0.00**
Total Liabilities		**39,419.95**
Funds Equity		
Fund Balance	22,690.35	
Net Income	262,800.12	
Total Funds Equity		**285,490.47**
Total Liabilities & Funds Equity		**$ 324,910.42**

STWA Debt Service Fund
Gl Account Summary Report
As of: January 31, 2018

Account Number	Account Description	Beginning Balance	Debit Change	Credit Change	Net Change	Ending Balance
10400	Debt Service Acct. - TexPool	160,113.67	$ 105,843.59	$ 0.00	$ 105,843.59	$ 265,957.26
13100	Due from Other Government	200.83	0.00	0.00	0.00	200.83
13300	Taxes Receivable	41,833.70	37,343.06	(11,842.97)	25,500.09	67,333.79
13301	Allowance for Uncollectibles	(8,581.46)	0.00	0.00	0.00	(8,581.46)
21700	Deferred Tax Revenue	(21,610.10)	0.00	0.00	0.00	(21,610.10)
24000	Due to General Fund	(16,350.52)	179.89	(1,639.22)	(1,459.33)	(17,809.85)
39100	Fund Balance	(22,690.35)	0.00	0.00	0.00	(22,690.35)
	Totals	132,915.77	$ 143,366.54	$ (13,482.19)	$ 129,884.35	$ 262,800.12

CAPITAL PROJECTS FUND
INCOME STATEMENT
FOR PERIOD ENDING JANUARY 31, 2018

33.33%

	MONTHLY	YEAR TO DATE	2018 ADOPTED BUDGET	% OF 2018 ADOPTED BUDGET	2017 YEAR TO DATE	2017 FINAL BUDGET
REVENUES						
Bond Proceeds	0	0	0	0%	0	0
Interest Income	1,448	5,098	12,500	41%	2,892	11,750
TOTAL REVENUE AND OTHER FINANCE SOURCES	1,448	5,098	12,500	41%	2,892	11,750
EXPENDITURES						
Right of Way Acquisition	0	0	7,264	0%	0	0
Engineering Fees	0	4,500	228,320	2%	22,525	125,000
Construction Costs	0	160,919	643,232	25%	155,583	678,066
Pipeline Condition Assessment	0	0	194,100	0%	5,295	5,295
Legal & Administrative Fees	0	0	181,712	0%	0	0
Cost of Bond Issuance	0	0	0	0%	0	0
Miscellaneous Fees	0	0	0	0%	0	0
TOTAL EXPENDITURES	0	165,419	1,254,628	13%	183,403	808,361
EXCESS REVENUES OVER(UNDER) EXPENDITURES AND OTHER USES	1,448	(160,321)	(1,242,128)		(180,511)	(796,611)

STWA Capital Projects Fund
Balance Sheet
January 31, 2018

ASSETS

Current Assets		
TexSTAR - Construction Fund	$ 1,322,785.85	
Total Current Assets		1,322,785.85
Property and Equipment		
Total Property and Equipment		0.00
Other Assets		
Total Other Assets		0.00
Total Assets		$ 1,322,785.85

LIABILITIES AND FUNDS EQUITY

Current Liabilities		
Due to General Fund	$ 276,443.21	
Total Current Liabilities		276,443.21
Long-Term Liabilities		
Total Long-Term Liabilities		0.00
Total Liabilities		276,443.21
Fund Balance		
Fund Balance	1,206,663.20	
Net Income	(160,320.56)	
Total Fund Balance		1,046,342.64
Total Liabilities & Fund Balance		$ 1,322,785.85

STWA Capital Projects Fund
GI Account Summary Report
As of: January 31, 2018

Account Number	Account Description	Beginning Balance	Debit Change	Credit Change	Net Change	Ending Balance
11300	TexSTAR - Construction	1,321,338.40	$ 1,447.45	$ 0.00	$ 1,447.45	$ 1,322,785.85
2400	Due to General Fund	(276,443.21)	0.00	0.00	0.00	(276,443.21)
39100	Fund Balance	(1,206,663.20)	0.00	0.00	0.00	(1,206,663.20)
	Totals	(161,768.01)	$ 1,447.45	$ 0.00	$ 1,447.45	$ (160,320.56)

OUTSTANDING INVOICES FOR BOARD APPROVAL

INV DATE	VENDOR	INV #	DESCRIPTION	STATUS	AMOUNT
1/16/2018	Kevin Kieschnick-NC Tax Assessor		December per parcel fees	pending	$2,140.45
1/31/2018	Willatt & Flickinger, PLLC		January Legal	pending	$934.50
2/1/2018	Russell Corrosion Consultants	2233	Corrosion Testing/ examine stations 0-5000	pending	$3,935.87
2/1/2018	Russell Coorosion Consultants	2234	Corrosion Assessment/Stray currents	pending	$1,417.98
2/6/2018	City of Corpus Christi		January water usage	pending	$93,024.09
2/7/2018	Kevin Kieschnick-NC Tax Assessor		January per parcel fees	pending	$3,471.64
					$104,924.53

Nueces County Courthouse
901 Leopard, Suite 301
Corpus Christi, TX 78401

Kevin Kieschnick
Assessor and Collector of Taxes

Administration
(361) 888-0307
(361) 888-0308

January 16, 2018

South Texas Water District
C/O Carola Serrato
P.O. Box 1701
Kingsville, TX 78363

Fees for Collection of Ad Valorem Taxes
during the month of December 2017

Total collected parcels	1,542
Collection Fee per Parcel	$1.3881
Total for DECEMBER	$2,140.45

Please Make Checks Payable To:
Nueces County Tax Assessor-Collector

For information contact:	*Motor Vehicle*	*Property Tax*	*Voter Registration*
voice	*(361) 888-0459*	*(361) 888-0230*	*(361) 888-0404*
fax	*(361) 888-0482*	*(361) 888-0218*	*(361) 888-0339*

WILLATT & FLICKINGER, PLLC
ATTORNEYS AT LAW

12912 HILL COUNTRY BLVD., SUITE F-232 • AUSTIN, TEXAS 78738 • (512) 476-6604 • FAX (512) 469-9148

January 31, 2018

Ms. Carola Serrato
Executive Director.
South Texas Water Authority
P.O. Box 1701
Kingsville, Texas 78364-1701

FOR PROFESSIONAL SERVICES RENDERED since the date of last billing:

GENERAL

BILL FLICKINGER

01/04/18 Finalize auditor's letter. (0.2 Hours).

01/05/18 Receive and begin review of Disinfectant Management Engineering Report sent to TCEQ by Aaron Archer, pursuant to enforcement order. (0.5 Hours).

01/06/18 Receive, review and respond to email from Carola Serrato on form of invoice including premium charge. (0.3 Hours).

01/08/18 Telephone conference with Carola Serrato on S.B. 625, and send email to her with copy of recent notice from the Comptroller on same. (0.2 Hours).

01/15/18 Telephone conference with Carola Serrato on surplus property that may not sell at auction. (0.2 Hours).

01/19/18 Emails with Carola Serrato on Monday's conference call with the TCEQ. (0.2 Hours).

01/22/18 Receive, review and respond to emails on rescheduling the conference call with the TCEQ. (0.2 Hours).

01/29/18 Receive and review agenda for tomorrow's conference call with TCEQ sent by Joel Klumpp. (0.2 Hours).

01/30/18 Continue preparation for and participate in conference call with TCEQ on enforcement order deadlines. (0.7 Hours). Telephone conference with Carola Serrato on today's conference call with TCEQ. (0.2 Hours).

Attorney BF: 2.9 Hours

ALLISON NIX

01/04/18 Finalize and send letter to auditor. (0.2 Hours).

01/29/18 Receive and review copy of the annual audit report. Draft and send email to Jo Ella Wagner regarding filing of same with the Comptroller. Receive and review her response. (0.2 Hours).

Legal Assistant AN: 0.4 Hours

Attorney BF: 2.9 Hours @ $300.00 per hour	$870.00
Attorney MM: 0 Hours @ $300.00 per hour	
Legal Assistant AN: 0.4 Hours @ $95.00 per hour	$38.00

CLIENT EXPENSES

50 Photocopies @ $.20 each	$10.00		
33 Color Photocopies @ $.50 each	$16.50		
		Total Client Expenses	$26.50
		TOTAL AMOUNT DUE	$934.50

POSTED

Invoice

February 1, 2018
Project No: 1795027.01
Invoice No: 0002233

Project Manager: Karl Norred
Ref. Number:
Invoice Total: $3,935.87

POSTED

Russell Corrosion Consultants, LLC
Remit to: P.O. Box 6266
Carol Stream, IL 60197-6266
(P) (410) 997-4481
ACH - ABA #071925334, Acct #5741230227
Lake Forest Bank & Trust

South Texas Water Authority
P.O. Box 1701
Kingsville, TX 78364

Project 1795027.01 STWA Corrosion Assessment and Testing Examin Stations 0-5000
mcgserrato@stwa.org.

Professional Services from January 1, 2018 to January 27, 2018

Professional Personnel

	Hours	Rate	Amount	
Corrosion Project Manager				
Norred, Karl	2.00	150.00	300.00	
Corrosion: Sr. Corrosion Technician				
Maynard, Matthew	14.00	87.00	1,218.00	
Corrosion: Corrosion Technician				
Keller, Ryan	12.00	75.00	900.00	
Serafin, Agustin	12.00	75.00	900.00	
Totals	40.00		3,318.00	
Total Labor				**3,318.00**

Reimbursable Expenses

Travel - Auto - Reimb				
1/9/2018	Serafin, Agustin	Fuel	30.56	
1/9/2018	Serafin, Agustin	Fuel	33.30	
1/9/2018	Serafin, Agustin	Fuel	4.31	
Meals - Reimb				
1/9/2018	Serafin, Agustin	Breakfast	16.94	
1/9/2018	Serafin, Agustin	Lunch	47.49	
1/9/2018	Serafin, Agustin	Dinner	90.96	
	Total Reimbursables		**223.56**	**223.56**

Unit Billing

1/8/2018	2017 Mileage	247.0 miles @ 0.535	132.15	
1/9/2018	2017 Mileage	20.0 miles @ 0.535	10.70	
1/9/2018	2017 Mileage	237.0 miles @ 0.535	126.80	
1/10/2018	2017 Mileage	233.0 miles @ 0.535	124.66	
	Total Units		**394.31**	**394.31**

Billing Limits	**Current**	**Prior**	**To-Date**	
Total Billings	3,935.87	26,178.77	30,114.64	
Limit			65,000.00	
Remaining			34,885.36	
		Total this Invoice		**$3,935.87**

Billing Backup

Thursday, February 1, 2018

Russell Corrosion Consultants, LLC Invoice 0002233 Dated 2/1/2018 8:46:30 AM

Project 1795027.01 STWA Corrosion Assessment and Testing Examin Stations 0-5000

Professional Personnel

			Hours	Rate	Amount	
Corrosion Project Manager						
50079	Norred, Karl	1/11/2018	2.00	150.00	300.00	
	Review data and start working on report					
Corrosion: Sr. Corrosion Technician						
12102	Maynard, Matthew	1/9/2018	8.00	87.00	696.00	
	Located line with Vivax defect mapper to find discontinuities. Utilized ACVG for locating anodes.					
12102	Maynard, Matthew	1/10/2018	4.00	87.00	348.00	
	Demobilized to Houston from Kingsville.					
12102	Maynard, Matthew	1/18/2018	2.00	87.00	174.00	
	Worked on final report					
Corrosion: Corrosion Technician						
50104	Keller, Ryan	1/9/2018	8.00	75.00	600.00	
	Located line with vivax, utilized ACVG for locating anodes.					
50104	Keller, Ryan	1/10/2018	4.00	75.00	300.00	
	Demobilized to Houston from Kingsville.					
50105	Serafin, Agustin	1/9/2018	8.00	75.00	600.00	
	Located Line with Vivax defect mapper to find discontinuitis and utilized ACVG for locating anodes					
50105	Serafin, Agustin	1/10/2018	4.00	75.00	300.00	
	Demobilized from kingsville to Houston					
	Totals		40.00		3,318.00	
	Total Labor					**3,318.00**

Reimbursable Expenses

Travel - Auto - Reimb					
EX 0095374	1/9/2018	Serafin, Agustin / Fuel / Fuel for company vehicle	30.56		
EX 0095374	1/9/2018	Serafin, Agustin / Fuel / Fuel for company vehicle	33.30		
EX 0095374	1/9/2018	Serafin, Agustin / Fuel / Fuel for Generator	4.31		
Meals - Reimb					
EX 0095374	1/9/2018	Serafin, Agustin / Breakfast / Breakfast	16.94		
EX 0095374	1/9/2018	Serafin, Agustin / Lunch / Lunch	47.49		
EX 0095374	1/9/2018	Serafin, Agustin / Dinner / Dinner	90.96		
	Total Reimbursables		**223.56**		**223.56**

Unit Billing

1/8/2018	2017 Mileage	247.0 miles @ 0.535	132.15	
1/9/2018	2017 Mileage	20.0 miles @ 0.535	10.70	
1/9/2018	2017 Mileage	237.0 miles @ 0.535	126.80	
1/10/2018	2017 Mileage	233.0 miles @ 0.535	124.66	
	Total Units		**394.31**	**394.31**

Total this Project **$3,935.87**

Total this Report **$3,935.87**

Invoice

RUSSELL CORROSION CONSULTANTS
A wholly owned subsidiary of EN Engineering, LLC

February 1, 2018
Project No: 1795027.03
Invoice No: 0002234

Project Manager: Karl Norred
Ref. Number:
Invoice Total: $1,417.98

Russell Corrosion Consultants, LLC
Remit to: P.O. Box 6266
Carol Stream, IL 60197-6266
(P) (410) 997-4481
ACH - ABA #071925334, Acct #5741230227
Lake Forest Bank & Trust

South Texas Water Authority
P.O. Box 1701
Kingsville, TX 78364

Project 1795027.03 STWA Corrosion Assessment and Testing Stray Current Testing
mcgserrato@stwa.org.

Professional Services from January 1, 2018 to January 27, 2018

Professional Personnel

		Hours	Rate	Amount	
Corrosion: Sr. Corrosion Technician					
Maynard, Matthew		8.00	87.00	696.00	
Corrosion: Corrosion Technician					
Keller, Ryan		8.00	75.00	600.00	
	Totals	16.00		1,296.00	
	Total Labor				**1,296.00**

Unit Billing

1/8/2018	2017 Mileage	228.0 miles @ 0.535	121.98	
	Total Units		**121.98**	**121.98**

Billing Limits	**Current**	**Prior**	**To-Date**	
Total Billings	1,417.98	9,956.51	11,374.49	
Limit			11,403.00	
Remaining			28.51	
		Total this Invoice		**$1,417.98**

POSTED

Billing Backup

Thursday, February 1, 2018

Russell Corrosion Consultants, LLC Invoice 0002234 Dated 2/1/2018 8:46:33 AM

Project 1795027.03 STWA Corrosion Assessment and Testing Stray Current Testing

Professional Personnel

		Hours	Rate	Amount	
Corrosion: Sr. Corrosion Technician					
1140 - Maynard, Matthew	1/12/2018	4.00	87.00	348.00	
Worked on report with field data					
1140 - Maynard, Matthew	1/15/2018	2.00	87.00	174.00	
Worked on final report					
1140 - Maynard, Matthew	1/16/2018	2.00	87.00	174.00	
Worked on final report					
Corrosion: Corrosion Technician					
1110 - Keller, Ryan	1/8/2018	8.00	75.00	600.00	
Mobilized to Kingsville from Houston, collected foreign data for interference test.					
Totals		16.00		1,296.00	
Total Labor					**1,296.00**

Unit Billing

1/8/2018	2017 Mileage	228.0 miles @ 0.535	121.98	
	Total Units		**121.98**	**121.98**

Total this Project **$1,417.98**

Total this Report **$1,417.98**

CITY OF CORPUS CHRISTI

Monthly Statement of Utility Services
City of Corpus Christi
P.O. Box 9257 • Corpus Christi, TX 78469-9097
(361)826-CITY • www.cctexas.com

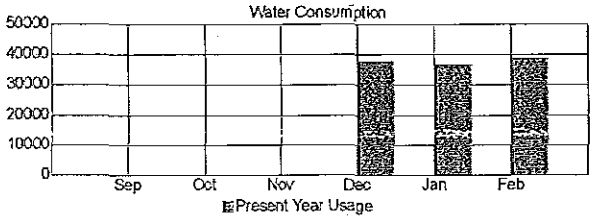
Account Name: SOUTH TX WATER AUTH
Account Number: 20004093
Service Address: 0 END DR WTR5 RAW
Account Type: PA
Bill Date: 02/06/2018

METER INFORMATION

Meter ID	Service Type	Current Read	Previous Read	Consumption 1/2018
WT200006	WA	4068000	4029200	38800

SERVICE PERIOD: 12/30/17 1/31/18 32 DAYS

CONSUMPTION HISTORY



ACCOUNT ACTIVITY

LAST BILL	$380,282.76
TOTAL PAID SINCE LAST BILL	-$174,011.16
ADJUSTMENTS	-$183,600.65
BALANCE FORWARD DUE NOW	$22,670.95
NEW CHARGES	
WATER	$55,232.89
RWCA $0.974/TGAL	$37,791.20
TOTAL WATER	**$93,024.09**
PAY THIS AMOUNT BY 02/27/2018:	**$93,024.09**
ACCOUNT BALANCE	**$115,695.04**

PLEASE ALLOW 5 BUSINESS DAYS BEFORE DUE DATE TO ENSURE PROPER CREDIT.

RECEIVED
FEB 16 2018
SOUTH TEXAS WATER AUTHORITY

IMPORTANT MESSAGE

Thank you so much for your patience during our transition to the new billing system. If you have a concern regarding your bill, please do not hesitate to contact us at 826-CITY or by email at uboresolutions@cctexas.com. We apologize for the inconvenience.

POSTED

PLEASE FOLD ON PERFORATION BEFORE TEARING – RETURN BOTTOM PORTION WITH YOUR PAYMENT. MAKE CHECKS PAYABLE TO CITY OF CORPUS CHRISTI. INCLUDE ACCOUNT NUMBER ON THE CHECK.

CITY OF CORPUS CHRISTI
P.O. Box 9257 • Corpus Christi, TX 78469-9097
(361) 826-CITY • www.cctexas.com

Working to Serve You Better.

Account Number: 20004093
Service Address: 0 END DR WTR5 RAW
Cycle-Route #: 01-60

DUE DATE:	02/27/2018
AMOUNT DUE:	$115,695.04

Remit to: **CITY OF CORPUS CHRISTI**
P.O. BOX 659880
SAN ANTONIO TX 78265-9143

36-2
SOUTH TX WATER AUTH
P O BOX 1701
KINGSVILLE TX 78364-1701

When making payment in person, please bring entire statement.

20004093011569504I

Nueces County Courthouse
901 Leopard, Suite 301
Corpus Christi, TX 78401

Kevin Kieschnick
Assessor and Collector of Taxes

Administration
(361) 888-0307
(361) 888-0308

February 7, 2018

South Texas Water District
C/O Carola Serrato
P.O. Box 1701
Kingsville, TX 78363

Fees for Collection of Ad Valorem Taxes
during the month of January 2018

Total collected parcels	2,501
Collection Fee per Parcel	$1.3881
Total for JANUARY	$3,471.64

Please Make Checks Payable To:
Nueces County Tax Assessor-Collector

For information contact:	*Motor Vehicle*	*Property Tax*	*Voter Registration*
voice	*(361) 888-0459*	*(361) 888-0230*	*(361) 888-0404*
fax	*(361) 888-0482*	*(361) 888-0218*	*(361) 888-0339*

SOUTH TEXAS WATER AUTHORITY
2012 BOND ELECTION

Cost of Bond Issuance:	**$107,386.40**	
Proposition #1: REGIONAL WATERLINE	**$1,900,000.00**	**36.54%**
Proposition #2: KINGSVILLE PUMP STATION	**$2,925,000.00**	**56.25%**
Proposition #3: BISHOP FACILITY	**$375,000.00**	**7.21%**
TOTAL BOND PROCEEDS:	**$5,307,386.40**	**100.00%**

Cost of Bond Issuance	
Financial Advisory Fee (First Southwest)	$30,385.00
Computer Structure Fee (for bidding securities)	$6,000.00
Bond Counsel - Leroy Grawunder (MP&H)	$39,000.00
Attorney General - State Fees and Review	$5,110.00
Standard & Poor's - Rating Agency	$11,000.00
Paying Agent - Bank processing bonds/paid semi annually	$200.00
Document Preparation/Printing	$5,000.00
Miscellaneous	$1,973.90
Accrued Interest - use to make first Debt Payment	$8,717.50
TOTAL Cost of Bond Issuance	$107,386.40

Proposition #1: REGIONAL WATERLINE
36.54%

	Engineer Estimate	Contract Amount	Percent Expended	Amount Expended	Amount Remaining
TOTAL PROPOSITION #1:	$1,900,000.00				
Construction: Lewis Construction		$1,035,100.00		$1,035,100.00	
Change Order #1		$4,320.85		$4,320.85	
Change Order #2		$30,815.17		$30,815.17	
Change Order #3		-$5,100.00		-$5,100.00	
Change Order #4		$13,954.16		$13,954.16	
		$1,079,090.18	100.00%	$1,079,090.18	
ROW Acquisition:		$60,541.31	100.00%	$60,541.31	
		$1,139,631.49		$1,139,631.49	$760,368.51
HDR Pipeline Condition Assessment		$105,900.00	100.00%	$105,900.00	
HDR LAS Booster -Driscoll		$71,100.00	97.47%	$69,300.00	
LAS Booster - Construction		$369,000.00			
Change Order #1		$45,586.84			
Change Order #2		$1,705.00			
Change Order #3		$10,650.00			
		$426,941.84	84.17%	$359,377.25	
Rock Engineering		$1,051.00		$1,051.00	
Rock Engineering		$2,026.00		$2,026.00	
				$362,454.25	
Non-Construction Related Costs:		$36,076.45	100.00%	$36,076.45	$0.00
TOTAL Proposition #1	$1,900,000.00	$1,782,726.78		$1,713,362.19	$116,222.22 *

* Estimated balance after Mercer/Driscoll LAS Project @ 100%

Proposition #2: KINGSVILLE PUMP STATION
56.25%

	Engineer Estimate	Contract Amount	Percent Expended	Amount Expended	Amount Remaining
ROW Acquisition:					
Construction Related Costs:					
Ground Storage Tank - PreLoad	$1,894,460.00	$1,248,602.55 *	100.00%	$1,206,897.95	
Final - Payment #8				$41,704.60	
				$1,248,602.55	$645,857.45
New Pumps - ACP	$327,378.00	$295,000.00		$295,000.00	
Change Order #1		$12,310.75		$12,310.75	
Odessa Pumps		$20,162.00		$20,162.00	
		$327,472.75	100.00%	$327,472.75	-$94.75
Emergency Generator	$0.00	$123,586.38	100.00%	$123,586.39	-$123,586.39
Engineering Costs:	$560,500.00				
Engineering - GST*		$234,800.00	100.00%	$234,800.00	
Engineering - GST additional work by HDR		$48,000.00	100.00%	$48,000.00	
Engineering - Pump Station		$91,600.00	100.00%	$91,600.00	
Rock Engineering, Inc.				$1,121.00	
LNV - Generator		$30,000.00	100.00%	$30,000.00	
				$405,521.00	$154,979.00
Non-Construction Related Costs:	$122,500.00	$60,404.85		$60,404.85	$62,095.15
TOTAL Proposition #2	$2,904,838.00	$2,164,466.53		$2,165,587.54	$739,250.46

*Reduced by Change Order #1

Proposition #3: BISHOP FACILITY
7.21%

		Engineer Estimate	Contract Amount	Percent Expended	Amount Expended	Amount Remaining
Construction:	Mercer	$277,100.00	$109,900.00	100.00%	$117,596.50	$159,503.50
Change Order:	Painting building		$3,996.00			
	Change to WYE		$3,700.00			
			$117,596.00			
Construction Related Costs:		$69,300.00	$52,200.00	100.00%	$52,200.00	$17,100.00
LNV Engineering						
Non-Construction Related Costs:		$28,600.00	$13,330.35	100.00%	$13,330.35	$15,269.65
TOTAL Proposition #3		$375,000.00	$183,126.35		$183,126.85	$191,873.15
					TOTAL	**$1,047,345.83**

ANTICIPATED (BUDGETED) vs. ACTUAL WATER RATE CHARGED

	ANTICIPATED (BUDGETED) CHARGES			ACTUAL CHARGES			Difference:
	Handling Charge	CC Cost	Total	Handling Charge	CC Cost	Total	Actual vs. Budgeted
Oct-17	$0.426386	$2.4362	$2.8626	$0.426386	$2.312247	$2.738633	-$0.1239
Nov-17	$0.426386	$2.4380	$2.8644	$0.426386	$2.316174	$2.742560	-$0.1218
Dec-17	$0.426386	$2.4383	$2.8647	$0.426386	$2.349496	$2.775882	-$0.0888
Jan-18	$0.426386	$2.4381	$2.8645	$0.426386	$2.397528	$2.823914	-$0.0405
Feb-18	$0.426386	$2.4398	$2.8662	$0.426386		$0.426386	-$2.4398
Mar-18	$0.426386	$2.4376	$2.8640	$0.426386		$0.426386	-$2.4376
Apr-18	$0.426386	$2.4359	$2.8623	$0.426386		$0.426386	-$2.4359
May-18	$0.426386	$2.4358	$2.8622	$0.426386		$0.426386	-$2.4358
Jun-18	$0.426386	$2.4350	$2.8614	$0.426386		$0.426386	-$2.4350
Jul-18	$0.426386	$2.4335	$2.8599	$0.426386		$0.426386	-$2.4335
Aug-18	$0.426386	$2.4330	$2.8594	$0.426386		$0.426386	-$2.4330
Sep-18	$0.426386	$2.4360	$2.8624	$0.426386		$0.426386	-$2.4360
Avg Cost	$0.426386	$2.4364	$2.8628	$0.426386	$2.343861	$2.770247	-$0.0926

ANTICIPATED (BUDGETED) vs. ACTUAL WATER USAGE

All Customers	Budgeted	Actual	Difference
Oct-17	43,106,064	49,257,770	6,151,706
Nov-17	39,010,208	41,240,370	2,230,162
Dec-17	38,272,268	37,196,850	-1,075,418
Jan-18	39,270,789	41,006,500	1,735,711
Feb-18	35,570,793	0	
Mar-18	39,754,343	0	
Apr-18	43,693,987	0	
May-18	44,073,875	0	
Jun-18	46,279,865	0	
Jul-18	50,891,700	0	
Aug-18	52,856,325	0	
Sep-18	43,581,741	0	
TOTAL	516,361,957	168,701,490	9,042,161

NWSC	Budgeted	Actual	Difference
Oct-17	11,406,490	13,839,280	2,432,790
Nov-17	10,288,004	12,528,080	2,240,076
Dec-17	10,329,528	11,526,840	1,197,312
Jan-18	10,835,370	13,263,230	2,427,860
Feb-18	9,334,104	0	
Mar-18	10,296,803	0	
Apr-18	11,536,949	0	
May-18	12,015,101	0	
Jun-18	12,879,697	0	
Jul-18	14,328,969	0	
Aug-18	14,308,455	0	
Sep-18	12,438,360	0	
TOTAL	139,997,830	51,157,430	8,298,038

Kingsville	Budgeted	Actual	Difference
Oct-17	10,188,919	13,323,000	3,134,081
Nov-17	10,188,919	8,716,000	-1,472,919
Dec-17	10,188,919	6,734,000	-3,454,919
Jan-18	10,188,919	7,519,000	-2,669,919
Feb-18	10,188,919	0	
Mar-18	10,188,919	0	
Apr-18	10,188,919	0	
May-18	10,188,919	0	
Jun-18	10,188,919	0	
Jul-18	10,188,919	0	
Aug-18	10,188,919	0	
Sep-18	10,188,919	0	
TOTAL	122,267,026	36,292,000	-4,463,675

RWSC	Budgeted	Actual	Difference
Oct-17	8,892,000	8,533,000	-359,000
Nov-17	7,675,200	7,776,000	100,800
Dec-17	7,091,800	7,006,000	-85,800
Jan-18	7,211,600	6,986,000	-225,600
Feb-18	6,276,600	0	
Mar-18	8,122,200	0	
Apr-18	9,168,400	0	
May-18	9,261,200	0	
Jun-18	10,412,600	0	
Jul-18	11,164,600	0	
Aug-18	11,785,400	0	
Sep-18	8,403,600	0	
TOTAL	105,465,200	30,301,000	-569,600

Bishop	Budgeted	Actual	Difference
Oct-17	5,417,400	5,521,000	103,600
Nov-17	4,275,800	4,247,000	-28,800
Dec-17	4,314,400	4,005,000	-309,400
Jan-18	4,635,200	4,873,000	237,800
Feb-18	3,702,800	0	
Mar-18	4,623,400	0	
Apr-18	5,871,600	0	
May-18	5,176,600	0	
Jun-18	4,661,600	0	
Jul-18	6,609,800	0	
Aug-18	8,080,400	0	
Sep-18	5,338,000	0	
TOTAL	62,707,000	18,646,000	3,200

Banquete	Budgeted	Actual	Difference
Oct-17	2,393,856	2,107,860	-285,996
Nov-17	2,168,468	1,979,060	-189,408
Dec-17	2,078,142	2,033,820	-44,322
Jan-18	2,037,054	2,288,560	251,506
Feb-18	1,971,256	0	
Mar-18	2,043,050	0	
Apr-18	2,106,092	0	
May-18	2,278,536	0	
Jun-18	2,477,094	0	
Jul-18	2,533,790	0	
Aug-18	2,561,114	0	
Sep-18	2,232,010	0	
TOTAL	26,880,462	8,409,300	-268,220

Driscoll	Budgeted	Actual	Difference
Oct-17	2,440,991	3,788,900	1,347,909
Nov-17	2,318,365	3,995,000	1,676,635
Dec-17	2,240,349	3,669,100	1,428,751
Jan-18	2,422,620	3,925,000	1,502,380
Feb-18	2,237,900	0	
Mar-18	2,467,160	0	
Apr-18	2,610,900	0	
May-18	2,832,220	0	
Jun-18	3,105,320	0	
Jul-18	3,369,200	0	
Aug-18	3,091,193	0	
Sep-18	2,683,790	0	
TOTAL	31,820,009	15,378,000	5,955,675

Agua Dulce	Budgeted	Actual	Difference
Oct-17	2,366,408	2,144,730	-221,678
Nov-17	2,095,452	1,999,230	-96,222
Dec-17	2,029,130	2,222,090	192,960
Jan-18	1,940,026	2,151,710	211,684
Feb-18	1,859,214	0	
Mar-18	2,012,811	0	
Apr-18	2,211,127	0	
May-18	2,321,299	0	
Jun-18	2,554,636	0	
Jul-18	2,696,422	0	
Aug-18	2,840,844	0	
Sep-18	2,297,062	0	
TOTAL	27,224,431	8,517,760	86,744

Kingsville Actual Usage vs. Bell Chart Volume

	Target Volume	**Actual Volume**	**Difference**
Oct-17	12,451,513	13,323,000	871,487
Nov-17	7,362,963	8,716,000	1,353,037
Dec-17	5,893,607	6,734,000	840,393
Jan-18	4,650,000	7,519,000	2,869,000
Feb-18	6,760,471	0	
Mar-18	8,319,028	0	
Apr-18	10,906,161	0	
May-18	12,497,858	0	
Jun-18	14,240,055	0	
Jul-18	15,711,155	0	
Aug-18	15,911,986	0	
Sep-18	13,866,300	0	
TOTAL	128,571,097	36,292,000	5,933,917

INTER-OFFICE MEMO

TO: Carola G. Serrato, Executive Director
FROM: Jacob Hinojosa, O&M Supervisor
DATE: February 23, 2018
RE: Maintenance & Technical Report

During the week of January 15, 2018, the following work was completed.

- Safety Meeting for all Field Techs.
- Exercised generators, downloaded GPS reports and performed line locates.
- Replaced old mesh with new mesh for air vents on the GST's at the pump stations.
- Picked up new battery back up device for office computers.
- Checked on possible leak on 42" line called in North of IES.
- Checked on punch list items for Driscoll LAS project.
- Checked on generators to prepare for freeze.
- Cleaned out shed and mowing equipment.
- Installed line markers on 42" line.
- All Field Techs attended a training session on Driscoll LAS system presented by Sherrell Mercer, Mercer Controls, Inc,
- Tested new laptops out in the field with new VPN for SCADA.

During the week of January 22, 2018, the following work was completed.

- Safety Meeting for all Field Techs.
- Exercised generators, downloaded GPS reports and performed line locates.
- Took water samples.
- Met with Mercer Controls in Driscoll and went over punch list items.
- Loaded up brush and took it to the landfill.
- Conducted annual TCEQ inspections on GST's with South Texas Pressure Systems.
- Took Unit #2 to get motor mounts replaced.
- Took Unit #10 to get passenger seat belt replaced.
- Picked up Unit #4 from dealership for oil leak repair.
- Took before/after sample for Driscoll LAS project.
- Greased mini track hoe.
- Repaired lighting on gooseneck trailer.
- Installed new locks on Kingsville GST.

During the week of January 29, 2018, the following work was completed.

- Safety Meeting for all Field Techs.
- Exercised generators, downloaded GPS reports and performed line locates.

- Checked on Driscoll LAS project punch list items.
- Took before/after samples for Driscoll LAS project.
- Picked up repaired pressure washer from repair shop.
- Took hydro tanks out of service for TCEQ required interior inspections.
- Inspected interiors of hydro tanks with South Texas Pressure Systems.
- Took employee uniforms to get monogrammed.
- Performed colorimeter calibrations.

During the week of February 5, 2018, the following work was completed.

- Safety Meeting for all Field Techs.
- Exercised generators, downloaded GPS reports and performed line locates.
- Repaired manway on top of the Driscoll GST.
- Took before/after residuals for Driscoll LAS project.
- Met with Mercer Controls to go over punch list items for Driscoll LAS project.
- Picked up plug for Unit #3 head lamp.
- Dropped off uniforms to get monogrammed.
- Cleaned out and stripped Unit #5 to get ready for surplus sale.
- Dropped off new truck in Corpus Christi to get tool box, exterior lights, etc.
- Took residual samples on 42" line.

During the week of February 12, 2018, the following work was completed.

- Safety Meeting for all Field Techs.
- Exercised generators, downloaded GPS reports and performed line locates.
- Took before/after residuals to Driscoll LAS project.
- Took residuals on 42" line.
- Dropped off Unit #4 at shop to check on rear main seal.
- Picked up new truck from Corpus Christi after additional equipment installed.
- Picked up materials to install front proof hydrants on 42" line ARV's.
- Worked on installing sample taps on ARV's on 42" line
- Met with DPC to pick up and deliver a new 1ton cylinder for Driscoll LAS project.

ATTACHMENT 3

TCEQ Enforcement Action

Memorandum

To: South Texas Water Authority Board of Directors
From: Carola G. Serrato, Executive Director
Date: February 21, 2018
Re: Texas Commission on Environmental Quality (TCEQ) Enforcement Action

Background:

Enclosed please find portions of the most recent Quarterly Report submitted by Aaron Archer on February 20th. In addition to the cover letter (enclosed), the Report included meter readings, residual readings, NAP readings, colorimeter calibration forms, CL 17 Verification forms, newly drafted SOPs (enclosed), and a revised Lab Approval Form. The entire document was approximately 250 pages.

Work is nearly complete on the sample sites approved by TCEQ and submitted as part of the Sample Site Plan (SSP). Taps/Connections with a frost proof hydrant have been installed on the FM 666 site, the Geo Detention Center location, the ARV at the intersection of FM 2826 and US 77 as well as the ARV on CR 36. Some of these sites created additional work in terms of boring through extremely thick concrete lids, some of which were at least 12 inches thick and containing rebar. Three (3) more connections resulting in much easier access remain on CR 48, a residence (Lopez) north of Bishop, and CR 4.

Finally, the other major factor in this matter is the completion of the Driscoll LAS project. Monday afternoon (February 19th), Sherrel Mercer, Mercer Controls (Mercer), made the necessary connections to once again utilize the 1-ton chlorine cylinder. Recent Weekly Updates have reported that Mr. Mercer believed the problems with boosting the chloramine residual were as a result of a bad cylinder. The chlorine supplier, DPC, offered to change out the cylinder and reported the original one would be taken to Houston for inspection (we surmise). In addition, Mr. Mercer adjusted the setting on the auto-valve which we believe was the result of a programming modification made by Mercer's subcontractor. By the Board meeting, staff should be able to report whether these changes have produced the desired effects of the Total Residual being slightly more than the Monochloramines in a range of 3.0 mg/l with low Free Chlorine and low (but not zero) Free Available Ammonia.

Analysis:

This is an update only.

Staff Recommendation:

Keep the Board updated on the TCEQ Order.

Board Action:

Provide feedback to staff and consultants.

Summarization:

According to the last conference call with TCEQ staff, submission of the latest Quarterly Report will provide their staff with the data to determine if STWA is meeting the 0.5 mg/l residual requirement for the months of November, December and January. As reported previously, STWA needs to have 12 months of compliance by November of 2018.

Walker Partners
engineers ★ surveyors

804 Las Cimas Parkway, Suite 150
Austin, Texas 78746

February 20, 2018

Texas Commission on Environmental Quality
P.O. Box 13087
Austin, TX 78711-3087

Attention: Water Supply Division, MC 154
Order Compliance Team, Enforcement Division, MC 149A

Re: Quarterly Progress Report for Order TCEQ Docket No. 2011-1647-PWS-E
Effective Date October 26, 2016

Dear Water Supply Division and Order Compliance Team:

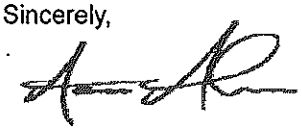
The following quarterly progress report addresses Item 8(a) of the Section IV Ordering Provisions. This is the fifth report prepared since the Order was issued. The purpose of these progress reports is to briefly summarize all actions taken and the results thereof during the preceding 90-day period. A tabulated status summary is provided below and includes references to specific ordering provisions.

Ordering Provision	Status Update
6(a)	The accuracy of continuous disinfectant analyzers has been checked by field technicians weekly by comparing their Hach Colorimeter to the CI17 analyzer. The Hach Colorimeter is calibrated every 90 days. Verification sheets are included as **Appendix A**. STWA has addressed TCEQ's comments on the colorimeter calibration SOP for use by STWA field technicians. The updated SOP and TCEQ laboratory approval form are included as **Appendix B**.
8(a)	This submittal serves as the quarterly report required by this Ordering Provision. The previous quarterly reports were submitted on February 23, May 25, August 19 and November 17 of 2017. STWA meter readings and residuals for November 15, 2017 through February 13, 2018 are included as **Appendix C.** Data collected for implementation of the STWA Nitrification Action Plan is attached as **Appendix D**. Water quality data obtained from the City of Corpus Christi from the O. N. Stevens Water Treatment Plant and utilized to evaluate compliance with the STWA Nitrification Action Plan are attached as **Appendix E.**
8(b) 8(e)	The design of additional sampling taps was submitted to TCEQ on December 7, 2017 and approved for construction on December 20, 2017. The TCEQ approval letter is attached as **Appendix F**. Construction of the sampling taps is ongoing. A letter documenting that the sampling taps were constructed in accordance with the plans will be submitted upon the completion of construction.

8(f)	An engineering report was submitted to TCEQ on January 5, 2018. An email response from TCEQ was received on January 26, 2018 requesting additional SOPs. The updated engineering report with the requested SOPs is attached as **Appendix G.**
9(a)	The Driscoll booster station project is online but the chlorine delivery system is not yet functioning reliably. The regulator and one-ton cylinder have been switched out. The general contractor and engineer of record are troubleshooting the issues. It is anticipated that the system will be declared substantially complete in March. Change Order #3 and the general contractor's December payment application as attached as **Appendix H.** Upon completion of the project, the engineer of record will prepare a project completion letter stating that the project is built in accordance with the drawings and will submit any as-built changes and change order documentation. The engineer of record will also certify that the facility can boost up to 4 mg/L total chlorine at the highest anticipated system flow rate.

This quarterly progress report has been distributed to all parties required by the Order. Please let me know if you need additional information to support your review.

Sincerely,

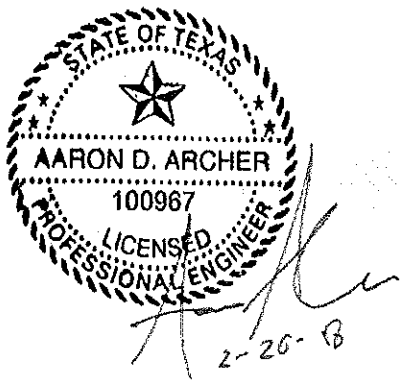


Aaron Archer, P.E.
Project Manager

STWA South Texas Water Authority

Dependable Water For South Texas

DISINFECTANT MANAGEMENT ENGINEERING REPORT



February 20, 2018

Prepared by:

Walker Partners

engineers ★ surveyors

TABLE OF CONTENTS

1.0 EXECUTIVE SUMMARY

The purpose of this Report is to describe strategies and facilities that the South Texas Water Authority (STWA) intends to employ now or in the future to comply with the Texas Commission on Environmental Quality (TCEQ) disinfectant residual requirements. STWA purchases water from the City of Corpus Christi O. N. Stevens Water Treatment Plant (WTP). This purchased water is delivered with chloramines, and STWA continues the use of chloramine disinfection (predominantly the preferred species – monochloramine) to continue to protect the drinking water from potential pathogenic microorganisms in the transmission system.

A number of factors lead to chloramine demand and decay in a transmission system. This Report outlines options and practices to manage and control the factors and constituents that lead to excessive chloramine decay. Management strategies to maintain a compliant chloramine residual throughout the STWA system are presented in the following principal classifications:

- Treatment process,
- Systems operation,
- Systems maintenance, and
- Infrastructure replacement.

The recommendations of this Report are developed to maximize the use and effectiveness of existing processes and infrastructure prior to implementing new improvements to promote compliance. This Report routinely references and compliments the STWA Monitoring Plan that is bound in Appendix A. Should STWA experience non-compliant disinfectant residuals, the implementation of one or more strategies may be required based on the location and nature of the problem. Consultation with a registered and qualified professional engineer may be required.

2.0 INTRODUCTION

2.1. Background and Overview

STWA was created by the Texas Legislature in 1979 and owns and operates water storage, pumping, and transmission facilities to deliver treated water to six wholesale customers in Nueces and Kleberg Counties. STWA purchases treated water from the City of Corpus Christi O. N. Stevens WTP located on Leopard Street in the Five Points Area. The secondary disinfectant at the WTP is chloramines. Water is distributed to customers through two pipelines: a 42-inch pipeline (Main Line) that runs 28 miles from Corpus Christi and a 14-inch pipeline that splits off from the Main Line and runs approximately 16.5 miles (Spur Line).

Historically, STWA wholesale customer water demands are such that the disinfectant residual declines in the transmission line from the WTP to the delivery points due to several factors that are discussed in this Report. At some locations, the disinfectant residual can fall below the minimum allowable total chlorine concentration.

STWA has been coordinating with TCEQ and evaluating alternatives to increase and maintain disinfectant residual levels since to 2009. Multiple improvements have been made to the STWA system since that time. STWA has currently entered Order No. 2011-1647-PWS-E with TCEQ to bring the system into compliance with all applicable water quality rules, including the minimum disinfectant residual requirements of TCEQ's rules. The Order is attached as Appendix B. This Report is being prepared in accordance with Ordering Provision 8(f).

2.2. Project Scope

The principal objectives of this Report are to:

- Summarize factors that may contribute to chloramine decay;
- Develop solutions to mitigate chloramine decay utilizing existing infrastructure;
- Identify solutions to mitigate chloramine decay through the development of new system improvements; and,
- Integrate the requirements and recommendations of the STWA Sampling Plan and Nitrification Action Plan into a comprehensive management strategy to comply with the disinfectant residual requirement.

3.0 CHLORAMINE DISINFECTION

The chloramine compound (combination of chlorine and ammonia) has a long history of successful application for disinfectant in drinking water distribution systems. Chloramine is generally less reactive than free chlorine thereby producing fewer disinfection by-products and persisting longer in the distribution system. However, chloramine is still inherently unstable and will decay and decompose in the distribution system over time.

The decay of chloramine in the distribution system is dependent on many factors due to bulk water reactions and pipe wall/sediment reactions. In addition, monochloramine auto-oxidizes over time with the oxidation of ammonia and reduction of free chlorine. The decomposition/degradation of chloramine also increases the amount of free ammonia which provides a substrate for ammonia-oxidizing bacteria.

The important factors that contribute to or accelerate chloramine decay include:

- A chlorine to ammonia ratio greater than 5:1 results in the conversion of monochloramine to unstable di- or trichloramine species.
- A chlorine to ammonia ratio less than 3:1 results in excess ammonia that increases the risk of nitrification.
- Low pH (below pH 7) hastens the hydrolysis of monochloramine to dichloramine.
- High temperature increases the rate of monochloramine decay.
- High alkalinity disproportionately catalyzes monochloramine due to the high concentration of carbonate.
- High natural organic matter concentrations exert an oxidant demand thereby reducing residual monochloramine.
- Nitrite accelerates monochloramine decay through the oxidation of nitrite to intermediate nitryl chloride.
- High bromide concentrations accelerate decay by oxidizing chloramines to bromamines.
- Nitrification due to high levels of free ammonia leads to biofilm growth in bulk water and on pipeline walls and subsequently increases chloramine demand.
- Increased water age allows more time for monochloramine to react with decay factor constituents and increased the auto-oxidation of monochloramine back to chlorine and ammonia elements.

More than one of these decay and decomposition factors can simultaneously exist and jointly contribute to a loss of disinfectant residual. In fact, the occurrence of some of these factors can directly lead to the subsequent occurrence of other decay factors.

4.0 MANAGEMENT STRATEGIES

The following management practices may be employed by STWA to mitigate the previously described decay factors. Management strategies to maintain a compliant chloramine residual throughout the STWA system are presented in the following categories:

- Treatment process,
- Systems operation,
- Systems maintenance, and
- Infrastructure replacement.

Selection of a particular management practice will depend on specific water quality information collected as part of the Monitoring Plan and Nitrification Action Plan which are included as Appendix A to the Report.

4.1. Treatment Processes

Treatment process management strategies are focused on addressing or modifying source water quality factors not related to chloramine chemistry.

4.1.1. Coordination with City of Corpus Christi

STWA receives treated water from the O. N. Stevens WTP and has limited ability to modify source water characteristics (e.g., organic concentrations, bromide, alkalinity, raw water nitrate, initial chlorine to ammonia ratio) without controlling the treatment practices at the O. N. Stevens WTP. Per the recommendations of the Nitrification Action Plan, STWA should contact the City of Corpus Christi to request modifications to treatment processes at the WTP whenever yellow or red flag events occur at sampling sites upstream of the City of Driscoll take-point, including the Spur Line sampling sites before chemical addition. This includes yellow flag and red flag events for total chlorine, free ammonia, nitrite, and nitrate. Additional details are included in Table 2 of the Nitrification Action Plan.

The City of Corpus Christi is currently sharing daily nitrate, nitrite, and free ammonia information with STWA. Based on recent data trendlines, it appears that the City of Corpus Christi is evaluating treatment process improvements to reduce finished water nitrate and free ammonia concentrations. Given the significant variability in nitrate entering the STWA system, entry point nitrate data provided by the City of Corpus Christi has been used to define downstream nitrate concentration yellow flag and red flag triggers in the Nitrification Action Plan. STWA will continue to request this water quality data from the City of Corpus Christi to properly implement the Nitrification Action Plan. Coordination and communication with the City of Corpus Christi to address water quality entering the STWA system is likely to benefit both STWA and the City of Corpus Christi.

4.1.2. New Treatment Processes

Should STWA not be able to maintain compliant disinfectant residuals within the STWA system, the following new treatment processes should be considered. To maximize the potential benefit of these systems, it is recommended that these systems be installed near the entry point to the STWA system. A new treatment site (land acquisition), injection point and manhole, chemical feed system, treatment building, perimeter fencing, and electrical, instrumentation and SCADA upgrades will be required to construct a new chemical delivery facility.

4.1.2.1. pH Adjustment

Nitrification most readily occurs at a pH between 6.5 and 8.5. Raising or lowering the pH outside of this optimum range can theoretically limit nitrification but has been met with mixed success (AWWA

M56 2013). However, lowering the pH in the distribution system below 6.5 may lead to other corrosion control and pipe wall scale stability issues and is not recommended.

The typical pH of water received from O. N. Stevens in around 7.6. It is recommended that the pH be increased to a range of 9.0 to 9.5 to reduce growth of nitrifying bacteria. Caustic (sodium hydroxide) is typically used for this application. In addition to reducing nitrification, elevating pH is also likely to create a more stable chloramine residual. As a downside, elevating pH reduces the rate of inactivation of chloramine (Oldenburg et al. 2002). In other words, at higher pH levels, it takes a longer period of time for the chloramine compound to inactivate microorganisms.

Should pH adjustment be utilized, STWA will need to coordinate this water quality change with its wholesale customers which blend STWA surface water with local groundwater sources. A holistic study to evaluate corrosion and deposition characteristics will be required to maintain water quality and avoid taste and odor issues within the STWA system and downstream water systems.

4.1.2.2. Sodium Chlorite

The chlorite ion has been shown to prevent nitrification by limiting the ability of nitrifying bacteria to survive in the distribution system. (McGuire et al 1999). The typical range of chlorite concentration to prevent and control nitrification is 0.2 to 0.4 mg/L (McGuire et al. 2004;). However, full-scale studies demonstrated that chlorite is not as effective in controlling areas of the distribution system where nitrification is already occurring (Zhu et al. 2010). Therefore, this strategy is more likely to be effective if implemented proactively as a management strategy rather than reactively to control an established nitrification event.

Chlorite can be produced as a byproduct of chlorine dioxide treatment or dosed as sodium chlorite. It should be noted that chlorite is a regulated disinfection by-product with a maximum contaminant level of 1.0 mg/L and maximum contaminant level goal of 0.8 mg/L. The M56 Nitrification Manual cautions utilities in adding a regulated substance to drinking water to prevent nitrification (AWWA M56 2013).

4.2. System Operations

Operational measures play an important role in maintaining a compliant disinfectant residual throughout the system. The following operational practices are recommended to promote regulatory compliance.

4.2.1. Monitoring

System-wide water quality monitoring is necessary to accurately determine water quality characteristics throughout the STWA system and to determine how water quality is changing as water age increases. The Monitoring Plan (Section D-3) and Nitrification Plan (Appendix A) detail a very specific monitoring plan that STWA will implement. The water quality monitoring plan detailed in these documents includes the collection of regulatory and non-regulatory samples at prescribed sampling locations throughout the STWA system. Implementation of the TCEQ approved monitoring plans provides the following benefits:

- Early detection of the onset of nitrification thereby allowing for early treatment and management.
- Disinfectant booster system process control monitoring to maintain a proper chlorine to ammonia ratio and optimize the chloramines boosting process.
- Identification of localized, affected areas for implementation of a targeted treatment strategy.

Proper sampling and testing methods are critical to the successful implementation of the Monitoring Plan. STWA should follow the Standard Operating Procedure (SOP) included in Appendix C for calibration of its Hach colorimeters. The Hach CL 17 verification procedure detailed in Section D-3

of the Monitoring Plan should be utilized for the online disinfectant analyzers. Data sheets for the online analyzers should include information on the colorimeter being used to verify a CL 17 and reference the appropriate colorimeter verification sheet. A SOP has also been developed for bacteriological sample collection and is attached as Appendix D.

An important step in the successful implementation of a monitoring plan is the regular review and evaluation of water quality data collected under the monitoring program. Proper data documentation and review is especially critical for data collected under the Nitrification Action Plan. STWA will use the data forms attached as Appendix E for implementation of the Nitrification Action Plan. The forms require that collected field data be recorded, assessed, and that any actions and responses taken as a result a yellow or red flag being triggered be documented. Nitrate, Nitrite, and free ammonia data shared by the City of Corpus Christi from the O. N. Stevens WTP should also be reviewed at a frequency no less than weekly.

4.2.2. Control Detention Time

High system detention times are a primary factor in the occurrence of nitrification and loss of disinfectant residual in distribution systems (Kirmeyer et al. 2002, EPA 2002). STWA's role as a water wholesale supplier limits the operational opportunities to control water age. The following options represent the best alternatives for STWA to increase water turnover in the system.

4.2.2.1. Flushing

Flushing is common practice to boost disinfectant residuals by disposing of long detention time water so that the fresher water can migrate to the area being flushed. Flushing can by localized or system-wide. Flushing can also be performed manually or automatically by a programmable flushing device. Higher flushing velocities promote the removal of accumulated biofilm and sediment in the pipeline that may be contributing to disinfectant loss. Dechlorination and disposal of flushed water must be coordinated in advance.

Flushing has not been demonstrated to be effective as a response measure to deal with active nitrification (AWWA M56 2013). Flushing is more effective as a preventative strategy and would be best employed to exert an artificial demand on the STWA if flows drop significantly in a portion of the STWA system due to low water use by a wholesale customer. However, flushing is not a viable long term solution to deal with excessive water age. Should flushing be required, a SOP has been developed and is attached as Appendix F.

4.2.2.2. Water Contracts

Given the significance of water age as a contributing factor to nitrification and the loss of disinfectant residual, securing long-term contracts with STWA's wholesale customers is an important strategy to maintain compliance with TCEQ's rules. It is recommended that water contracts prescribe a stable monthly flow regime to provide some amount of base flow at all times through the STWA system.

4.2.3. Chloramine Boosting

The construction of a booster chloramination is currently being completed at the STWA Driscoll delivery facility. This booster facility allows for free ammonia in the STWA 42-inch pipeline to be recombined with chlorine and to boost the disinfectant residual with the additional of supplemental chlorine and liquid ammonium sulfate. Proper process control is required with regular upstream and downstream sampling and process control as required in the Monitoring Plan to prevent overfeeding and to maintain a proper chlorine to ammonia ratio. A SOP for chloramine boosting has also been developed and is attached as Appendix G.

The addition of more booster chloramination facilities downstream of the Driscoll facility (between the City of Driscoll and the pipeline terminus at the City of Kingsville) is feasible if maintaining a

disinfectant residual in this portion of the line becomes problematic. A new booster site (land acquisition), injection point and manhole, chemical feed system, treatment building, perimeter fencing, and electrical, instrumentation and SCADA upgrades will be required to construct a new chemical delivery facility. It is important that any future booster chloramination facilities must also include the same level of process control as the Driscoll facility.

4.2.4. Storage Tank Operations

Storage tanks with low water turnover can lead to significant increases in water age and promote nitrification. Thermal stratification can also lead to adverse impacts.

STWA has previously replaced an aging 5 million gallon at the STWA Kingsville facility tank with a 1 million gallon tank that includes a tank mixer and disinfectant booster system. STWA may employ the following operational strategies to enhance water quality in other storage facilities if needed:

- Optimize daily tank turnover through the use of deep cycling.
- Install tank mixing systems in other system tanks.
- Install disinfectant boosting systems with tank mixers to increase disinfectant levels within and existing the tanks.
- Perform temperature monitoring if stratification is suspected.
- Operate the tanks at lower water levels to shorten detention time.
- Reconfigure tank inlet and outlet piping to increase mixing and tank turnover.
- Replace aging or underutilized tanks with smaller storage tanks.
- Perform regular tank cleaning and maintenance to reduce biofilm growth and sediment deposition.

4.2.5. Temporary Disinfectant Conversion

Periodic switching from chloramines to free chlorine, also referred to as a "free chlorine burn", is a viable nitrification control measure implemented by many water utilities. STWA has previously completed a free chlorine burn (by means of breakpoint chlorination) and received water for the O. N. Stevens WTP that has been converted to free chlorine. Disinfectant switching is considered a last resort for the prevention of nitrification because nitrifying bacteria can survive in biofilm throughout the free chlorine burn process (M56, Vikesland et al. 2007, Carrico et al. 2008). Disinfectant switching is most appropriate when a widespread nitrification episode is underway and immediate control measures are required.

To maximize the potential efficacy of a free chlorine burn, it is recommended that disinfectant switching be conducted in warmer months when nitrification occurrence is more likely (AWWA M56 2013). A minimum residual of 0.5 mg/L free chlorine should be maintained throughout the system. Breakpoint chlorination may be required if the City of Corpus Christi does not participate.

In the event that a free chlorine burn is implemented, STWA should contact TCEQ to note the dates of the temporary switch and request a delay of the collection of quarterly disinfection by-product samples until after the burn has been completed. STWA must also provide a list of customers that will be affected by the conversion and inform these customers of the change in treatment. To support the conversion process, it is advisable that storage tank levels be reduced in advance of the procedure and flushing be implemented to increase pipeline water velocities to facilitate the conversion. It should be noted that taste and odor impacts and an increase in disinfection by-product concentrations is likely to occur during the temporary conversion. A SOP for free chlorine burns is attached as Appendix H.

4.3. System Maintenance

Routine system maintenance can remove decay factor constituents that accelerate disinfectant decay. Storage tanks and pipelines accumulate sediment and biofilm growth over time. These constituents can exert a demand on disinfectants and shield nitrifying bacteria from disinfectants (Wolfe et al. 1990). Controlling and removing sediments and biofilm may facilitate compliance with disinfectant residual requirements.

4.3.1. Storage Tanks Inspection and Cleaning

Storage tank sediment removal and cleaning is recommended every 3 to 5 years (AWWA Standard 2004, EPA 2002). It should be noted that the storage tank must be properly disinfected prior to returning the tank to service.

4.3.2. Pipeline Pigging

Pipeline pigging is a recommended method to clean pipe walls of sediment and biofilm. A pigging program will require extensive design and construction for the inclusion of pig launching and retrieval stations. Pigging should also consider the condition of the pipeline to avoid damage to existing infrastructure. Ice pigging is a less invasive approach but the performance of ice pigging are not well quantified.

4.3.3. Corrosion Control

Effective corrosion control can reduce biofilm growth and sediment deposition thereby increasing disinfectant residuals. STWA is currently completing a condition assessment of the 42-inch main line. It is recommended that corrosion control measures be implemented as needed based on the findings of this study.

4.4. Infrastructure Replacement

The STWA regional water system is sized to convey a significant volume of water to its wholesale customers in accordance with original system planning and design that relied on STWA to be the primary regional water supplier. Use of the regional system as a secondary supply source can results in excessive water detention times thereby impacting disinfectant residual concentrations. This Report previously recommended other strategies to limit water age in the system. Another method to reduce water age is to replace all or a significant portion of the transmission line with a smaller diameter pipeline that is sized for current and future anticipated demands. Reducing the diameter of the pipeline will increase water velocity thereby reducing water age.

5.0 CONCLUSIONS

STWA has historically struggled to maintain disinfectant residuals throughout the system due to a number of contributing factors. As a result, STWA has implemented many improvements to promote compliance including:

- Free chlorine burns,
- Replacement of an oversized ground storage tank with a smaller volume tank at Kingsville,
- Installation of a tank mixing and disinfectant boosting system at Kingsville,
- Installation of a chloramines booster facility at Driscoll,
- Flushing, and
- Negotiation of new water contracts with wholesale customers that requires taking water based on a monthly flow regime.

This Report describes strategies and facilities that STWA may utilize to promote continued compliance with TCEQ's rules. It is recommended that STWA start with implementation of the following strategies:

- Monitoring (following the TCEQ approved Monitoring Plan and Nitrification Action Plan)
- Chloramine boosting using the Driscoll booster station
- Pursue advantageous water contracts with wholesale suppliers
- Perform routine maintenance of system storage tanks
- Optimize daily turnover of system storage tanks
- Implement corrosion control improvements as needed

If STWA is unable to meet the disinfectant residual requirements, the following strategies are recommended. Some of these strategies are also recommended as yellow flag and red flag action items in the Nitrification Action Plan.

- Contact the City of Corpus Christi to request modifications to upstream treatment
- Flush affected areas
- Inspect and adjust chemical doses at boosting facilities
- Perform additional sampling to determine affected areas and inspect for the occurrence of nitrification
- Perform a free chlorine burn

Additional alternatives have been included in this Report for further consideration if the aforementioned strategies fail to achieve compliance.

6.0 REFERENCES

AWWA Manual M56. Nitrification Prevention and Control in Drinking Water. Denver, Colorado. AWWA.

AWWA Standard G200-04. Distribution Systems Operation and Management. Denver, Colorado, AWWA.

Carrico, B., F. DiGiano, N.G. Love, P. Vikeland, K. Chandran, M. Fiss, A. Zaklikowski. 2008. Effectiveness of Switching Disinfectants for Nitrification Control. Journal AWWA 100:10.

Environmental Protection Agency (EPA). 2002. Effects of Water Age on Distribution System Water Quality. Distribution System Issue Paper. Washington DC.

Kirmeyer, G.J, L.H.Odell, J.G. Jacangelo, A. Wilczak, R.L. Wolfe. 1995. Nitrification Occurrence and Control in Chloraminated Water Systems. Denver, Colorado. WRF and AWWA.

McGuire, M.J., N.I. Lieu, M.S. Pearthree. 1999. Using Chlorite Ion to Control Nitrification. Journal AWWA 91(10):52-61.

McGuire, M.J., M.S. Pearthree, N.K. Blute, T. Hoogerwerf, K.F. Arnold. 2004. Tucson Nitrification Control Pilot Study: A Significant Advance in the State-of-the-Art of Implementing Chloramines in a Desert Environment. Arizona Water & Pollution Control Association Annual Conference.

Oldenburg, P.S., J.M. Regan, G.W Harrington, D.R. Noguera. 2002. Kinetics of Nitrosomonas Europaea Inactivation by Chloramine. Journal AWWA 94(10):100-110.

Vikeland, P., N. Love, M. Fiss, A. Zaklikowski, K. Chandran, F. DiGiano, B. Carrico. 2007. Water Quality Impacts of Disinfectant Switching Practices at Pilot and Full Scale. AWWA ACE. Denver, Colorado. AWWA.

Wolfe, R.L., N.I. Lieu, G. Izaguirre, E.G. Means III. 1990. Ammonia-Oxidizing Bacteria in a Chloraminated Distribution System: Seasonal Occurrence, Distribution, and Disinfection Resistance. Appl. Environmental Microbiology 56(2)451-462.

Zhu, E. V. Monks, R. Song, 2010. Effectiveness of Early Application of Sodium Chlorite in Nitrification Prevention – A Demonstration-Scale Study. AWWA WQTC. Denver, Colorado.

APPENDICES

A – STWA Monitoring Plan and Nitrification Action Plan

B – TCEQ Order 2011-1647-PWS-E

C – SOP Colorimeter Calibration

D – Bacteriological Sample Collection SOP

E – STWA Water Quality Data Sampling Forms

F – Flushing SOP

G – Chloramine Boosting SOP

H – Free Chlorine Burn SOP

SOUTH TEXAS WATER AUTHORITY

Bacteriological (Coliform) Sample Collection Standard Operating Procedure (SOP)

Remember: You MUST collect samples correctly. Failure to collect a sample correctly could result in the sample being contaminated. The test results are used by the TCEQ to determine the condition of our water system. "Found - Present" test results mean MORE testing and possible BOIL WATER NOTICES.

Remember: A coliform positive ("found - present") can be due to contamination in the distribution system OR as the result of an event during sampling OR poor sampling technique. Additional sampling will determine if there is contamination in the distribution system.

Remember: You MUST measure and record the disinfectant residual EACH TIME you collect a coliform sample.

Remember: A disinfectant residual MUST be present before you take a sample. If there is NOT a residual present – DO NOT COLLECT THE SAMPLE – contact your supervisor immediately for instructions on flushing and/or adjustments to disinfection systems at the various pump stations.

Proper Sampling Steps

1. **Conditions** - Samples must NOT be collected on windy or rainy days. Samples must NOT be collected from a leaking faucet or hydrant. Coliform bacteria are present in soil and dust. Small wind-blown debris (that may not be visible to the naked eye) can contaminate the sample. Rainwater may also contaminate the sample.
2. **Proper Hygiene** - Wash your hands or use a hand sanitizer before you collect the samples. Sterile gloves can be used when taking a sample.
3. **Flush** - Let the water run out of the faucet/hydrant for several minutes. Test the temperature with your hand when the flushing begins. Wait several minutes. Test the temperature again. You should feel a decrease in temperature.
4. **Residual** - Measure the disinfectant residual. Under most circumstances, you will be measuring **Total** Chlorine.
5. **Record** - The result of the residual MUST be recorded on the State provided form.
6. **Disinfect** - the faucet/hydrant MUST be disinfected by flaming with a torch for several seconds or until any water is evaporated off the faucet/hydrant to ensure the destruction of any bacteria. OR, you may disinfect the faucet/hydrant with a bleach solution. This MUST be done for several minutes. Please Note: the flame method may provide better results since the bleach method takes more time to kill bacteria.
7. **Stream** - Open the faucet/hydrant to produce a thin, pencil-sized (about ¼" thick) and steady stream of water that is not spurting, splashing or spraying which could contaminate the sample.
8. **Break the Seal** – Open bottle and break heat shrink wrap seal. DO NOT rinse the bottle before collecting the sample. The pill, powder, or liquid inside serves a purpose.
9. **Bottle and Care** - Treat the bottle with care because it is STERILE. Use bottles ONLY from the accredited or certified laboratory. DO NOT use bottles that appear damaged or open. You should have extra bottles available in case of improper sampling. DO NOT touch the INSIDE of the bottle or cap. DO NOT blow into the inside of the bottle or cap. DO NOT place the cap or bottle on the ground. DO NOT hold the bottle or cap upside down.
10. **Direct** the steady stream downward to the inside of the bottle to make sure it does not splash.
11. **Fill** - The sample bottle MUST contain **100 milliliters**. Fill the sample bottle to the shoulder only. Do not over-fill or under-fill the bottle.
12. **Cap** – Place the cap on the sample bottle making sure your fingers/gloves do not touch the surface of the collected water. Do not touch the inside of the cap. Do not touch the inside of the sample bottle.

13. **Transport** – Samples MUST BE KEPT COOL during transport to the laboratory by storing them on ice. Place the sample bottle in a SEALABLE plastic bag and place it in the cooler so that the top of the bottle is NOT submerged in any melting ice water. Heat allows bacteria to multiply. If the sample is going to be held before delivery to the laboratory, you MUST refrigerate it. Make sure you have clear instructions from your supervisor on the delivery times to the laboratory. Be certain that a temperature bottle is also included in the cooler for the lab to measure.
14. **Other** – There are other factors to keep in mind when collecting a sample:

- Store UNUSED bottles in a cool, dry area. Bottles should NOT be exposed to high heat, damp conditions, direct sunlight, or contact with contaminants. Bottles have EXPIRATION times. Check with the laboratory on dates.
- The laboratory CANNOT accept samples that are too old or unsuitable. Check with the laboratory for maximum hold times.
- Rejected samples MUST be replaced within 24 hours.
- DO NOT store or transport samples with non-potable water or waste water samples.

TCEQ Microbial Monitoring Form

1. The TCEQ Microbial Monitoring Form MUST be filled out correctly in neat, legible writing. If it is not legible or there is an error, discard the form and start a new form. OR, you may use a single line to cross out the error. Then, initial and date the error. Write the correction legibly above the crossed out error.
2. It is very important to understand that if the information on the form is mislabeled, inaccurate, incorrect or incomplete, the SAMPLE RESULTS WILL NOT BE APPLIED to South Texas Water Authority's system's record. The TCEQ will NOT credit South Texas Water Authority as having collected a sample and depending on the time of the month can result in a violation of TCEQ requirements.
3. The laboratory and the TCEQ WILL NOT correct or fill out a Microbial Monitoring Form.
4. Attached to this SOP is Form 10525. This is the ONLY form acceptable to the TCEQ.
5. The operator collecting the sample should fill out and sign the form.
6. A supervisor or manager should not sign the form unless he or she is the person collecting the sample.
7. There is information that is filled out by the laboratory. Those are shaded areas on the form. Leave those areas blank.
8. **On the upper left-hand side of the form, information filled in by the Operator prior to sample delivery at the laboratory are:**
   a. Public Water System ID: This has been **pre-filled** with TX 1370035
   b. Public Water System Name: This has been **pre-filled** with South Texas Water Authority.
   c. County: This has been **pre-filled** with NUECES.
   d. Report Results to/Name: This has been **pre-filled** with South Texas Water Authority.
   e. Report Results to/Address: This has been **pre-filled** with P.O. Box 1701.
   f. Report Results to/City: This has been **pre-filled** with Kingsville.
   g. Report Results to/State: This has been **pre-filled** with Texas.
   h. Report Results to/Zip Code: This has been **pre-filled** with 78364,
   i. Report Results to/Phone #: This has been **pre-filled** with 361-592-9323.
   j. Report Results to/Fax #: This has been **pre-filled** with N/A.

MAKE CERTAIN THAT YOU ARE USING THE CORRECT PRE-FILLED FORM!

   k. Sampler Name (Print) – Fill in your name in neat, legible handwriting.
   l. License # - Fill in your TCEQ license number in neat, legible handwriting.
   m. Sampler Signature – Using your full name, provide your signature.
   n. Boxes: Owner – Operator – Mark an "X" in the Owner box.

o. Other - This box is for samples that are not collected at an identified collection site in the Monitoring Plan.

9. **On the lower left-hand side of the form, information filled in by the Operator <u>when collecting the sample</u> are:**
   a. Sample Identification/Location:
      i. Replacement Box – Under most circumstances, *this box will be left blank.*
      ii. Use Specific Address/Location – Under <u>most</u> circumstances, *the site will be (1) FM 666 – Sample Tap* ***OR*** *(2) FM 2826 ARV.*
   b. Collected:
      i. Date – In neat, legible handwriting fill in the Month, Day, and Year
      ii. Time – In neat, legible handwriting fill in the time and *circle* am or pm.
   c. Sample Type – Place a "✓" in the type of sample being collected. Under <u>most</u> circumstances the "Distribution" box will be selected. However, *below* are descriptions of Repeat, Raw Well, Special*, and Construction*
   d. Chlorine Residual:
      i. In the left-hand box, in neat, legible writing fill in the residual (in mg/l) recorded when the sample was collected.
      ii. In the right-hand box, circle "F" for Free Chlorine or "T" for Total Chlorine. Under <u>most</u> circumstances the "T" will be circled.

Repeat: Is a sample collected in response to any **positive** ("found" or "present") compliance sample result. The laboratory ID of the **original** coliform positive sample that is associated with the Repeat Samples MUST be included. ***This information is filled in the box to the right of the "Construction" box and is labeled as "Sample ID & Date of Originating Sample (All Repeat, Replacement, and Triggered Raw Samples).***

Raw: Is a sample collected before disinfection. South Texas Water Authority does not have any raw water sources.

Special: Is a sample collected as a diagnostic tool for water systems to determine water quality and do not count toward TCR or GWR compliance. These may be collected in response to a customer complaint or during construction or repair of a water line.

Construction: Is a sample collected following construction events in the distribution system.

10. **On the upper right-hand side of the form, information filled in by the Operator <u>when delivering the sample to the laboratory</u> are:**
    a. Relinquished by (Sampler) - Fill in your name in neat, legible handwriting.
    b. Date/Time – Using the time clock provided by the laboratory*, fill in the date and time in neat, legible handwriting.
    c. *Received by Courier/Relinquished by Courier – These boxes are used if the Sampler is unable to deliver the collected samples. The Field Tech transporting the sample will in fill his/her name in Received by Courier with date/time when the Sampler gives him/her the collected sample. The Field Tech transporting the sample will fill in his/her name in Relinquished by Courier with the date/time at the lab when the sample is delivered.

Laboratory Actions

The laboratory will fill out the shaded areas of the form including if the sample was iced, temperature, corrected temperature, received by, date/time, lab comments, tested by, date/time, report to client by, date/time and Lab Results.

Under Lab Results, information provided by the laboratory are rejection code, test method, whether Total Coliform are present/absent, whether E. Coli are present/absent and laboratory sample ID number.

The laboratory will notify South Texas Water Authority if a sample test result is "Found or Present." This means potentially harmful or harmful bacteria were identified in the water sample. If a routine distribution Total Coliform or E. Coli positive result occurs, your supervisor should contact TCEQ to ensure that proper steps are taken for Repeat samples.

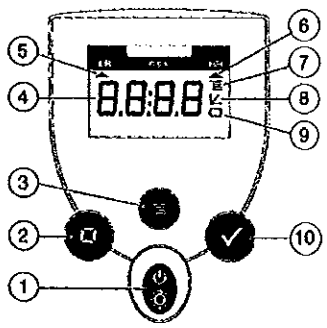
It is also possible that a sample will be found to be "Unsuitable for Analysis." If this occurs, a Replacement sample MUST be collected within 24 hours at the same location. Various reasons for a sample to be unsuitable include: a too old sample, insufficient sample quantity, an incomplete form, an inaccurate form, handwriting is illegible, heavy silt, bacteria or turbidity, leakage of sample in transit, and the concentration (or lack of) chlorine residual.

After analysis, the laboratory will send one copy of the completed form to your supervisor and one to the TCEQ.

South Texas Water Authority MUST retain these records for five years. South Texas Water Authority MUST be able to supply copies to the TCEQ upon request.

South Texas Water Authority – Standard Operation Procedure (SOP) – Sampling for Total and Free Chlorine Residuals

Instrument Keys and Display



Item	Description
1	POWER/BACKLIGHT Key
2	ZERO/SCROLL Key
3	MENU Key
4	Numeric Display
5	Range Indicator
6	Range Indicator
7	Menu Indicator
8	Calibration Adjusted Indicator
9	Battery Low Indicator
10	READ/ENTER Key

Instrument Cap Cord

The instrument cap for the Pocket Colorimeter™ II doubles as a light shield. Accurate measurements cannot be obtained unless the sample or blank is covered with the cap. Use the instrument cap cord to secure the cap to the body of the colorimeter and prevent loss of the cap.

1. Loop the instrument cap cord through the ring on the cap.

2. Remove the battery compartment cover. Press the knotted end of the cord into the hole indicated by the arrow.

3. Slide the cord into the slot on the battery compartment cover. Snap the cover into place.

The instrument cap for the Pocket Colorimeter™ II doubles as a light shield.

Using Powder Pillows

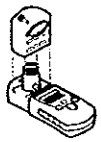
1. Fill a 10-ml cell with sample (the blank). Cap.

Note: *Samples must be analyzed immediately and cannot be preserved for later analysis.*

2. Press the **POWER** key to turn the meter on. The arrow should indicate the low range channel (LR). This channel should be used if the anticipated residual is less than 2.0 mg/l. If the anticipated residual is more than 2.0 mg/l, scroll to the high range channel (HR) and select.

3. Remove the meter cap. Place the blank in the cell holder with the diamond mark facing the keypad. Fit the meter cap over the cell compartment to cover the cell.

Note: Wipe excess liquid and finger prints off sample cells.



4. Press ZERO/SCROLL. The display will show "- - - -" then "0.00". Remove the blank from the cell holder.

5. Fill a second 10-ml cell to the 10-ml line with sample.

Note: Do not use the same sample cells for free and total chlorine analysis without thoroughly rinsing the cells with sample between free and total tests.

6. Add the contents of one DPD Free Chlorine Powder Pillow or one DPD Total Chlorine Powder Pillow to the sample cell (the prepared sample).

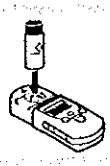
7. Cap and shake gently for 20 seconds.

Note: Shaking dissipates bubbles that may form in samples with dissolved gases.

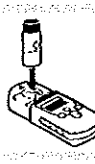
Note: *A pink color will develop if chlorine* is *present.*

8. For **FREE** chlorine, wipe excess liquid and fingerprints from the sample cell. Put the prepared sample cell in the cell holder, then cover the cell with the instrument cap. Proceed to STEP 10 within **one** minute after adding the DPD Free Pillow.

Note: Accuracy is not affected by undissolved powder.



9. For **TOTAL** chlorine, **wait 3 to 6** minutes after adding the DPD Total Pillow. After the reaction time, wipe excess liquid and fingerprints from the sample cell. Put the prepared sample in the cell holder and cover the cell with the instrument cap. Proceed to STEP 10.



10. Press READ/ENTER. The instrument will show "- - - -" followed by the results in mg/L chlorine.

Saturday through Thursday, the TOTAL chlorine will be the residual being sampled. Record the result in the SOUTH TEXAS WATER AUTHORITY DAILY DISINFECTANT RESIDUAL WORKSHEET, a copy of which is attached.

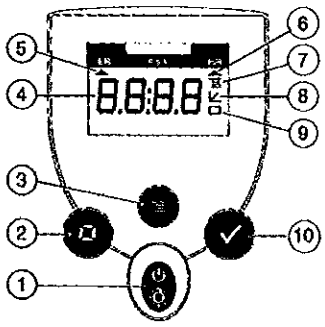
On **FRIDAY**, **both** FREE and TOTAL residuals will be sampled.

- The FREE chlorine will be recorded in the SOUTH TEXAS WATER AUTHORITY WEEKLY NAP FORM.
- The TOTAL chloramines will be recorded on two (2) forms:
    1. SOUTH TEXAS WATER AUTHORITY DAILY DISINFECTANT RESIDUAL WORKSHEET **and**
    2. SOUTH TEXAS WATER AUTHORITY WEEKLY NAP FORM, a copy of which is attached. The Total chloramines will be recorded in the column marked "Total" for each location. The Free chlorine will be recorded in the column marked "Free" for each location.

Note: If the sample temporarily turns yellow after reagent addition, or if the display shows overrange dilute a fresh sample and repeat the test. A slight loss of chlorine may occur because of the dilution. Multiply the result by the appropriate dilution factor.

South Texas Water Authority – Standard Operating Procedure (SOP) – Sampling for Monochloramine (Mono) and Free Available Ammonia (FAA) Residuals

Instrument Keys and Display



Item	Description
1	POWER/BACKLIGHT Key
2	ZERO/SCROLL Key
3	MENU Key
4	Numeric Display
5	Range Indicator
6	Range Indicator
7	Menu Indicator
8	Calibration Adjusted Indicator
9	Battery Low Indicator
10	READ/ENTER Key

Nitrogen, Free Ammonia and Chloramine (Mono)

1. Press the **POWER** key to tum the meter on. The arrow should indicate the monochloramine channel (Cl2),

2. Fill two cells with 10 ml of sample. Label one cell "Free Ammonia" and one cell "Monochloramine".

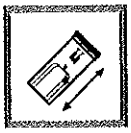
3. Place the cell for Monochloramine measurement into the cell holder.

4. Cover the cell with the instrument cap.

5. Press ZERO/SCROLL. The display will show "~ - - -" then "0.0 0". Remove the cell from the cell holder.

6. Add the contents of one pillow of Monochlor F to the cell for Monochloramine measurement.

7. Cap the cell and shake for 20 seconds to dissolve the reagent. A green color will form if monochloramine is present.



8. Add one drop of Free Ammonia Reagent Solution to the cell for Free Ammonia measurement.

9. Cap the reagent bottle to maintain reagent performance and stability.

10. Cap the cell and mix.

Note: *If the sample becomes cloudy by the end of the reaction period, pretreat the sample and retest.*

11. Wait five minutes.

Note: *Color development time is dependent on sample temperature. See Table 1 below.*

12. Wipe off the sample cell. Place the prepared Monochloramine sample into the cell holder.

13. Cover the cell with the instrument cap.

14. Press **READ/ENTER.** The results are displayed in mg/L Monochloramine (as Cl2). Record the result for the proper location in the NAP form in the column labeled Mono (for **Mono**chloramines), a copy of which is attached. Leave the cell in the meter.

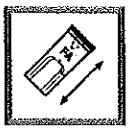
15. Change the channel. The arrow will indicate the free ammonia channel (NH_3 – N).

16. With the Monochloramine sample still in the cell holder, press **ZERO/SCROLL.** The display will show 0.00. Remove the sample cell from the meter.

17. Add the contents of one pillow of Monochlor F to the cell for Free Ammonia measurement.

Note: *The reaction period indicated in step 11 on must be completed before the addition of Monochlor F to the cell for free ammonia measurement.*

18. Cap and shake for 20 seconds to dissolve the reagent. A green color will form if ammonia or monochloramine is present.



19. Wait 5 minutes.

Note: *Color development depends on sample temperature. See Table 1 below.*

20. Wipe off the sample cell. Place the prepared Free Ammonia sample into the cell holder.

21. Cover the cell with the instrument cover.

22. Press **READ/ENTER.** The results are displayed in mg/L free ammonia as nitrogen (NH_3 – N).). Record the result for the proper location in the NAP form in the column labeled FAA (for Free Available Ammonia), a copy of which is attached.

23. Return the meter to the chlorine channel for the next measurement.

Color Development Time

Test results are strongly influenced by sample temperature. Both reaction periods in the procedure are the same and depend on the temperature of the sample. The reaction periods indicated in the procedure are for a sample temperature of 18-20 °C (64-68 °F). Adjust both reaction periods according to Table 1.

Table 1 Reaction Period

Sample Temperature °F	Reaction Period (Minutes)	Sample Temperature °F	Reaction Period (Minutes)
41	10	61	6
45	9	64	5
48	8	68	5
50	8	73	2½
54	7	77	2
57	7	>77	2

Measuring Hints

- Collect samples in clean glass bottles. Results are most reliable from samples analyzed as soon as possible after collection.
- This method is intended for finished, chloraminated drinking water samples that have a measurable combined (total) chlorine disinfectant residual.
- Samples where the disinfectant residual has disappeared and exhibit a chlorine demand may produce low ammonia test results.
- Blanks and ammonia standards analyzed without a disinfectant residual must be prepared using high quality, reagent grade water.
- For more accurate chloramine results, determine a reagent blank for each new lot of reagent using deionized water in place of the sample. Subtract the reagent blank value from the final chloramine results.
- The Pocket Colorimeter™ II is designed to measure solutions contained in sample cells. DO NOT dip the meter in the sample or pour the sample directly into the cell holder.

SOUTH TEXAS WATER AUTHORITY
STANDARD OPERATING PROCEDURE (SOP)
FOR FLUSHING/TANK OVERFLOW
AS A MEANS OF ADDRESSING POSSIBLE
DISTRIBUTION SYSTEM NITRIFICATION

1) This Standard Operating Procedure (SOP) for FLUSHING/TANK OVERFLOW is a supplement to South Texas Water Authority's (STWA) Nitrification Action Plan (NAP). A copy of the NAP is attached.
2) According to STWA's NAP, flushing is a possible option to address a decrease in the total chlorine residual.
3) Total chlorine residual in the distribution system should be maintained at no less than 0.5 mg/l.
4) STWA's distribution system does not have any dead-end lines that can be flushed. Therefore, alternative methods are necessary to increase the flow in STWA's 42" waterline and the west branch spur line.
5) In accordance with STWA's NAP, a decrease in the residual at the southern maximum age location (Kingsville), could possibly be addressed by the following:
   a) The 8" valve in the San Fernando Creek located approximately 4000 LF north of STWA's Kingsville office can be opened to flush water. Flushed water MUST be discharged using de-chlorination tablets placed in netting which will allow water to come in contact with the tablets and still produce a sufficient flow.
   b) Ground storage tanks (GST) at the Driscoll, Bishop West (City of Bishop), Bishop East (Nueces Water Supply Corporation - NWSC), Kingsville (City of Kingsville) and/or the eight (8) Ricardo Water Supply Corporation (RWSC) can be overflowed. Flushed water MUST be discharged using de-chlorination tablets placed in netting placed on the overflow slab of the GST which will allow water to come in contact with the tablets.
6) In accordance with STWA's NAP, a decrease in the residual at the western maximum age location (Agua Dulce), could possibly be addressed by overflowing the GSTs in Banquete (NCWCID #5), Sablatura Park (NWSC) and Agua Dulce (City of Agua Dulce/NWSC). Flushed water MUST be discharged using de-chlorination tablets placed in netting placed on the overflow slab of the GST which will allow water to come in contact with the tablets.
7) Overflow of tanks in any of the locations listed in items 5 and 6 MUST be coordinated with the entities listed in parenthesis ().
8) An increase in the chloramine injection at the Driscoll Booster Station will be made when flushing in the San Fernando Creek and/or when any of the GSTs are overflowed in Driscoll, Bishop, Kingsville or Ricardo.
9) An increase in the chloramine injection at the Central Pump Station disinfection facilities will be made when any of the GSTs are overflowed in Banquete, Sablatura Park or Agua Dulce.
10) Volumes of flushing and overflows MUST be recorded. This will require additional meter readings than the typical daily readings as follows:
    a) Flushing in the San Fernando Creek will require reading of the ON Stevens master meter before and after the flushing occurs. The calculated usage during the period of flushing will need to be adjusted for any GSTs that are overflowed.
    b) Overflow of GSTs will require meter readings before and after the overflow occurs.
    c) The calculated flushing in the creek will also need to be adjusted if any GSTs fill (normal operation filling) during the period of flushing. If possible, field personnel should manually control filling of GSTs if no overflows are scheduled during the creek flushing.

End of SOP

SOUTH TEXAS WATER AUTHORITY – STANDARD OPERATING PROCEDURE

Free Chlorine Burn

A method used to hinder nitrification is to starve the nitrifying bacteria of nitrogen by temporarily converting chloramine disinfection to free chlorine disinfection. There are certain steps that must be taken prior to the temporary conversion:

- Thirty (30) days prior to the conversion, South Texas Water Authority will notify the TCEQ by e-mail to DBP@tceq.texas.gov of the planned conversion. Please note that the number of prior days' notice is contingent on whether (1) the conversion is a self-generated emergency, (2) the conversion is an emergency as a result of South Texas Water Authority's wholesale supplier (the City of Corpus Christi), or (3) the City of Corpus Christi has provided sufficient notice for a non-emergency conversion. Regardless of whether or not the conversion is an emergency, South Texas Water Authority will notify TCEQ even if the situation does not allow for a 30-day notice.

- Information provided to the TCEQ will include:

    - South Texas Water Authority's Public Water System (PWS) ID,
    - Contact names, titles, and phone numbers,
    - The estimated start and end date of the conversion,
    - PWS ID names and numbers of South Texas Water Authority's wholesale customer systems as well as the chain of other systems that those wholesale customers provide service to – for example, the Nueces Water Supply Corporation provides service to Golden Acres Water System, and
    - The reason for change in treatment such as routine preventive maintenance or corrective maintenance due to nitrification.

- South Texas Water Authority will notify its wholesale customers of the conversion whether it is self-generated or as a result of City of Corpus Christi action.

- South Texas Water Authority will expect to discuss disinfection by-product sampling schedules with TCEQ staff. A request to postpone collection of disinfection by-product samples for South Texas Water Authority will be requested in writing. South Texas Water Authority will also submit the same requests on behalf of the Nueces Water Supply Corporation and Ricardo Water Supply Corporation which South Texas Water Authority manages by contract. South Texas Water Authority will remind its wholesale customers of this need when providing the notice of the conversion.

- Included in the notice to wholesale customer will be:

    - A statement that the temporary change is being made to the treatment process to improve the quality of water.
    - A statement regarding the possible taste and odor changes that will occur; however, also noting that there are no associated health risks.

- The statement will include language that these complaints may occur when returning to chloramine treatment as the chloraminated water comes into contact with the chlorinated water in the distribution system. The notice will state that these problems can be minimized with increased flushing of their own distribution systems.
- South Texas Water Authority's contact information will be included.

Specific implementation steps for a free chlorine burn will be influenced by the location where the free chlorine burn is initiated as determined by regular monitoring conducted under the STWA Nitrification Action Plan. The following steps may require modification and/or consultation with a Professional Engineer.

Step 1 – Determine extent of free chlorine burn and select a location for initiating the burn based on the assessment of water quality data collected under the Nitrification Action Plan.

Step 2 – Calculate the free chlorine dose required to achieve breakpoint chlorination and achieve the target free chlorine residual in the system. Free ammonia residual and monochloramine residual must be determined to calculate the free chlorine dose.

Step 3 – Reduce wholesale customer delivery storage tanks to the lowest possible level.

Step 4 – Initiate chlorine injection to the dose determined in Step 2 and monitor downstream water quality including free chlorine and total chlorine. The required chlorine dose shall be flow paced to accommodate changes in system flows. Note that the detention time can be calculated to estimate when the free chlorine burn will reach downstream sampling locations. Field personnel will monitor South Texas Water Authority's distribution system for both free and total chlorine residuals until levels stabilize.

Step 5 – Breakpoint chlorinate the system storage tanks by increasing flow into the tank and raising water levels when the free chorine burn has reached a tank. Conversion to Free Chlorine occurs when the Total Chlorine residual is equal to the Free Chlorine residual.

Step 6 – Continue operation under free chlorine conditions and monitor free chlorine and HPC in nitrifying areas of the system. Continue free chlorine burn for the predetermined period of time or until nitrifying indicators are resolved.

Step 7 – Lower storage tanks levels and end free chlorine injection. Resume ammonia feed as required. Monitor water quality through the transition to chloramines and increase flow to fill the system storage tanks when chloramines reach a storage tank. Reverting to chloramines is complete when the Total Chlorine residual is equal to or nearly equal to the Monochloramine residual.

South Texas Water Authority
Driscoll LAS System – Chloramine Guidance Document

Process Description

Proper chloramine formation is critical to maintaining residual disinfectant levels and preventing nitrification from occurring in the distribution system. Free chlorine reacts with ammonia to form chloramines, with monochloramine being the desired species for disinfection, with different species formed at different chlorine to ammonia mass ratios (see Figure 1). Monochloramine is the preferred species because it is a stable form of chloramines and does not have the taste and odor problems associated with other forms. Monochloramine is mostly formed with the chlorine to ammonia ratio ranges from 0 to 5:1 (see Figure 2).

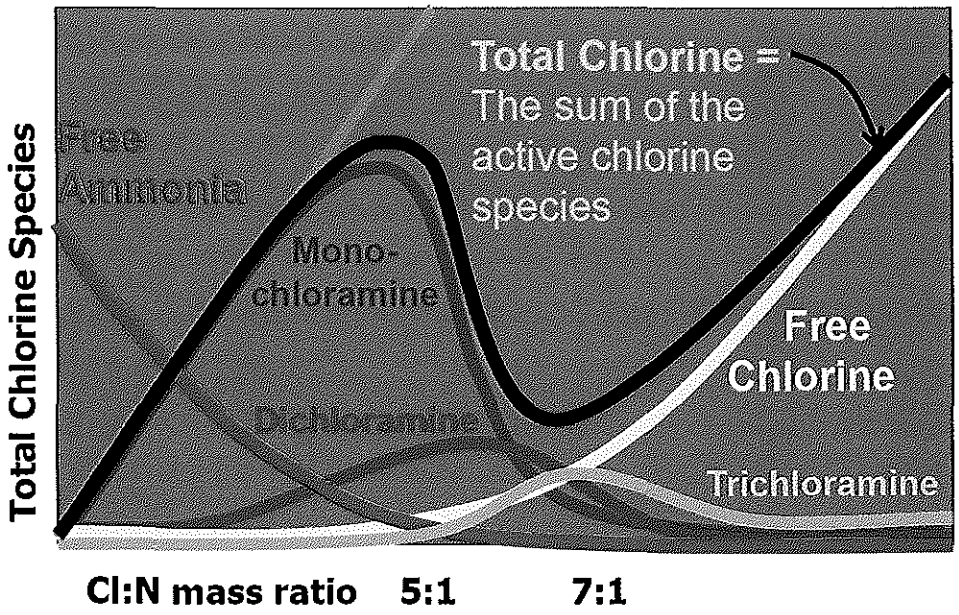


Figure 1: Chloramine Breakpoint Curve (Source: TCEQ)

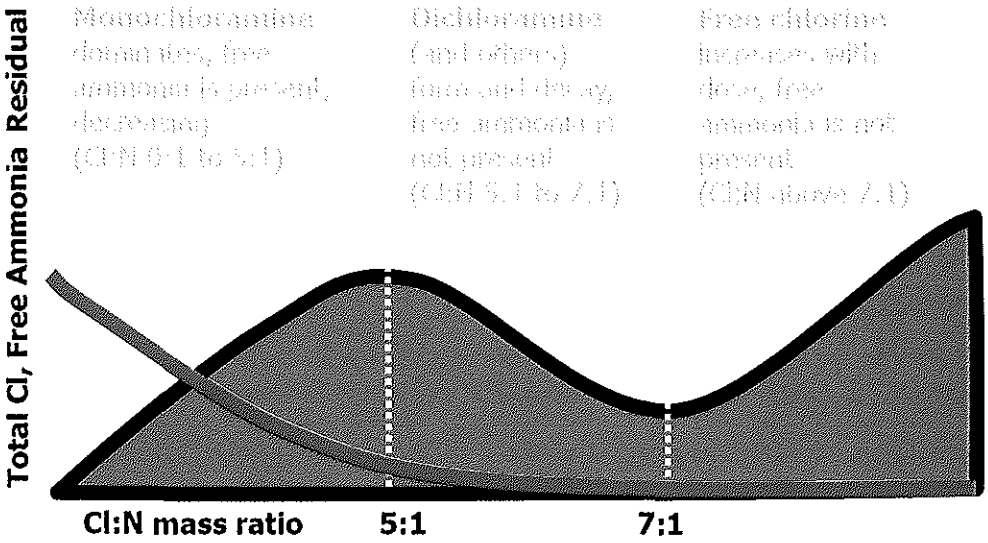


Figure 2: Summary of Chloramine Formation (Source: TCEQ)

As shown in Figure 2, ratios above 5:1 start to produce di- and tri-chloramines, which are undesirable species of chloramines. With consistent monitoring and a good understanding of chloramine formation, the proper free chlorine to ammonia ratio can be achieved and maintained. The purpose of this document is to provide guidance information on how to analyze sampling results and make chemical adjustments at the Driscoll PS.

Chemical Sampling

To determine a position on the breakpoint curve, the following samples are required as a minimum:

- Total chlorine – measuring total chlorine helps to determine which species of chloramine is being produced and to make sure the right level of disinfectant is available
- Monochloramine – measuring chloramine levels helps to determine if we have the right ratio of chlorine and ammonia, and compare to the level of monochloramine
- Free ammonia – measuring free ammonia helps to determine if too much ammonia is being added, and/or if additional chlorine should be applied

Free chlorine can also be sampled, but it does not have as much impact on determining the chloramine levels as the other three parameters. However, it can be useful in determining if the additional ammonia may need to be added. Detailed information on how to collect total and free chlorine residuals, monochloramine, and free available ammonia, as well as sampling forms, are available as part of the STWA SOP sampling document. Nitrate and nitrite are shown on some forms, but are not required parameters for chloramine formation analysis.

Analyzing Sampling Results

Once samples have been collected, they should be analyzed to determine the position on the breakpoint curve and if additional chemicals are required. Generally, if free ammonia is present then the system is in the monochloramine zone of the breakpoint curve because free chlorine cannot be present. Ideally, the mass ratio of chlorine to ammonia should be close to, but not exceed, 5:1. Another goal is to keep free ammonia levels as low as possible, around 0.2 mg/L based on the STWA Nitrification Action Plan (NAP), and to have monochloramine at roughly the same level as total chlorine as shown in Figure 1.

Since chemicals can be adjusted at the Driscoll PS, it is important to understand how to respond to sampling already conducted at the PS. It is important to measure total chlorine, monochloramine, and free ammonia levels prior to making changes to the chlorine and ammonia feed systems, and to stay within the proper mass ratio of chlorine to ammonia so that monochloramine formation occurs and the level of free ammonia is limited.

Since ammonia is added before chlorine at the Driscoll PS, the important item to consider is a free available ammonia level equal to the target monochloramine level divided by the target chlorine to ammonia ratio. After boosting chlorine and ammonia levels, the following should be achieved:

- Monochloramine level is within the acceptable range per the NAP, or approximately 3.1 – 3.5 mg/L
- Minimal change has been made in the total chlorine level after the chemicals were added
- Free ammonia levels are within the acceptable range per the NAP, or approximately 0.2 mg/L

The TCEQ presents several scenarios and recommendations on what to do if issues arise.

Monochloramine levels are too high (greater than 3.5 mg/L)

If water entering the Driscoll PS has monochloramine levels that are too high, then boosting is not required, or should be limited. Both the ammonia feed and chlorine feed should be reduced.

Total chlorine drops after ammonia addition

If total chlorine levels drop after ammonia addition, then it is an indication that the mass ratio is moving beyond 5:1 and dichloramines are being produced. In this scenario, the ammonia level should be increased or the chlorine feed should be reduced (or both changes made) so that the proper ratio can be achieved again.

Ammonia levels are too high (greater than 0.3 mg/L)

One goal of operating a chloramine system is to minimize free ammonia levels, which also has the benefit of limiting nitrification. If free ammonia levels are too high, then the ammonia feed should be reduced or the chlorine feed should be increased. Both adjustments can also be made depending on the resulting total chlorine level. If the total chlorine level is too high, then the system should start by reducing the ammonia feed system.

Total chlorine levels are higher than monochloramine

If total chlorine levels are higher than monochloramine, then the chlorine feed should be reduced.

Chlorine and LAS Dosing

Chlorine and LAS dosing procedures are available in the **Driscoll LAS System – Functional Description** document. The document contains information on how the PLC and SCADA system is programmed, as well as the calculations used by the systems to set dosage and feed rates.

References

The following references provide additional information on the formation and maintenance of chloramines.

TCEQ – Chloramines 101

TCEQ – Fact Sheet on Chloramine Requirements

TCEQ – Course Manual: Process Control for Systems Using Chloramines

ATTACHMENT 4

Assessment of 42" Waterline – Russell Corrosion Projects

Memorandum

To: South Texas Water Authority Board of Directors
From: Carola G. Serrato, Executive Director
Date: February 19, 2018
Re: EN Engineering/Russell Corrosion Consultants, LLC (Russell) Services for Examination of Section 0 – 5000 LF

Background:

Last month, staff reported that the 0-5000 LF project, a technical memorandum had not been received. Enclosed is a February 15th email from Mr. Bruce Norred, EN Engineering/Russell Corrosion (Russell), with the attached draft report. The draft report lists Mr. Michael Szeliga and Mr. Norred as the co-authors. I spoke with Mr. Norred today regarding the recommendations and conclusions in the draft report.

Analysis:

As expected, the draft report recommends bonding all joints and adding anodes where there are none. The draft report reminds readers that originally the recommendation was to add anodes at every third joint. According to the draft report, this was not sufficient since the readings have never reached the desired 0.85-volt level. One of my questions of Mr. Norred related to previous Russell reports that categorized the level of protection as inadequate, marginal and adequate. We discussed whether parts of the 0-5000 feet have some protection since there are installed sacrificial anodes. He indicated he would discuss the descriptions with Mr. Szeliga.

The draft report also references HDR's recent report and its recommendation to excavate and perform more evaluations. Russell's draft report recommends that rather than spend HDR's estimated cost of performing additional evaluations ($50,000 to $112,000) "it would be most prudent to proceed with cathodic protection and linear continuity ...as quickly as possible." The draft report also indicates that the estimated cost of doing such for section 0+00 to 51+67.49 would be $150,000. This figure caught my attention and raised numerous questions which I asked of Mr. Norred. Mr. Norred agreed to speak to Mr. Szeliga and provide additional details such as whether this estimate is on a turn-key basis or with STWA providing manpower and/or materials.

Staff Recommendations:

It is not certain whether Mr. Norred will have responses to my inquiries. I indicated that the Board would receive this memo and a copy of the draft report.

Board Action:

Provide feedback to staff.

Summarization:

I have left a message for Mr. Noel Valdez, McCall, Parkhurst and Horton, to research whether the cost of having an outside company/consultant adding cathodic protection would qualify as an improvement to the system in terms of the use of bond proceeds. Staff is of the opinion that if the project extends the life of the 42" line it is eligible as a capital improvement project. The Board will recall that about $1.0 M remains in available bond funds.

mcgserrato@stwa.org

From: Bruce Norred <bnorred@enengineering.com>
Sent: Thursday, February 15, 2018 1:00 PM
To: mcgserrato@stwa.org
Subject: FW: STWA Contract 1 Station 0+00 to 50+00 Draft Report
Attachments: STWA Contract 1 0+00 to 50+00 Evaluation Draft Report RCC 1795027.02 February 9 2018.pdf

Importance: High

Carola,

Here is the Draft report from Mr. Szeliga. Please review and provide any feedback that you want to provide. Once you are okay with the report, Mr. Szeliga will sign and put his stamp on the report.

Any questions, please let us know.

Thanks,

K. Bruce Norred
Project Manager
Corrosion Engineering Services
EN Engineering LLC

(C)307-389-7479
(O)346-772-2092
bnorred@enengineering.com

NACE Institute No. 6707 & 18514
Certified Cathodic Protection Technician
Certified Senior Corrosion Technologist
Certified Coating Inspector Level 2
Confirm Certification at www.naceinstitute.org

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Russell Corrosion Consultants is a wholly owned subsidiary of EN Engineering LLC.
WWW.enengineering.com
WWW.russellcorrosion.com

DRAFT REPORT

CATHODIC PROTECTION EVALUATION

42-Inch Water Transmission Pipeline Contract 1
Station 0+00 to 50+00
South Texas Water Authority

Prepared for:

South Texas Water Authority
P.O. Box 1701
Kingsville, Texas 78364

Reference:

RCC Project Number: 1795027.02

February 9, 2018

Michael J. Szeliga, P.E.
Practice Area Lead

K. Bruce Norred
Project Manager

RUSSELL CORROSION CONSULTANTS, LLC.

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(410) 997-4481 • Fax (410) 740-2541

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DRAFT REPORT

CATHODIC PROTECTION EVALUATION

42-Inch Water Transmission Pipeline Contract 1
Station 0+00 to 50+00
South Texas Water Authority

1. EXECUTIVE SUMMARY

1.1 Background

Russell Corrosion Consultants, LLC. (RCC) was asked to provide an evaluation of the cathodic protection on the South Texas Water Authority (STWA) 42-Inch Water Transmission Pipeline Contract 1 from Station 0+00 to 50+00 and to also evaluate the recommendations included in previous evaluations of this segment of the pipeline. The pipeline is bar wrapped concrete piping.

The original approach to the corrosion control upgrades for the subject pipeline included reestablishment of electrical continuity at discontinuous pipe joints and the installation of zinc anodes for "hot spot" cathodic protection. Following this approach, electrical continuity would be restored to the entire pipeline and adequate levels of cathodic protection could be verified along its length. Additional zinc anodes were to be added when inadequate levels of cathodic protection were detected.

Due to the large number of discontinuous pipe joints that required excavation and repair, an alternate approach to improving the level of corrosion control in a more expedited manner was implemented by STWA after the initial completion of continuity repairs on Contract 1. The alternate approach involved the installation of zinc anodes at every third pipe joint and restoration of electrical continuity at the joints that were exposed for anode installations. Under this approach, more of the pipeline would be provided with cathodic protection faster, even if fully effective protection was not achieved at all locations. It is important to note that even marginal levels of cathodic protection significantly slow the rate of corrosion of the reinforcing steel in the concrete pipeline. By installing anodes at every third joint, corrosion may still be occurring in some areas, but the rate of the corrosion would be reduced so that the number and frequency of pipeline failures would be dramatically reduced. Once the entire pipeline was upgraded by installing zinc anodes at every third joint, the intent was to add additional anodes for supplementary protection and/or to repair discontinuous pipe joints as necessary.

Testing was conducted during 2007 and the installation of additional anodes and the repair of electrical continuity at all pipe joints that were excavated for installation of anodes were recommended for this segment of the pipeline. In 2008 a design was prepared to install additional cathodic protection upgrades to the 42-inch water pipeline. Included in Appendix A are the design drawings that cover the Contract 1 pipeline from Station 0+00 to 50+00.

During 2016, HDR conducted a study of the 42-Inch Water Transmission Pipeline that included the Contract 1 segment from Station 0+00 to 50+00. Their recommendation for this portion of the pipeline was to conduct additional evaluations at five to eight excavation sites. The evaluations would include a direct examination of the piping exposed in each of five to eight excavations and the installation of zinc anodes and test stations at the excavation sites. The estimated cost to implement this recommendation was given as ranging from $50,000 to $112,000.

During 2017, RCC conducted an evaluation of the electrical continuity of the Contract 1 Pipeline from Station 0+00 to 50+00 using the available test stations. A close-interval potential survey was also conducted to evaluate cathodic protection levels on this segment of the pipeline. Previous evaluation reports were reviewed and an overall evaluation of this segment of pipeline was conducted.

1.2 Summary of Findings/Recommendations

Linear Continuity

Linear continuity was conducted and the piping is not continuous from Station 0+00 to 39+48. The lack of continuity in this segment of pipeline is unchanged from previous evaluations. Linear continuity should be repaired along this section of the Contract 1 pipeline.

Test Station Potential Data

The pipe-to-earth potential data obtained during 2017 indicated that no meaningful protection is being provided to the piping from station 0+00 to 39+48. However, at station 17+28 the anode lead was found disconnected at the damaged test station. The anode lead was reconnected and it is likely that the pipe at this location will polarize to at least partial protection levels. Additional anodes should be installed along this section of the Contract 1 pipeline.

Close-Interval Potential Survey

The close-interval potential survey data indicated that the pipeline from Station 0+00 to 50+00 is receiving no meaningful protection from the zinc anodes that have been installed except directly at the pipe sections that anodes are connected to.

Evaluation of Previous Report Recommendations

The 2007 report recommended upgrading the piping from 0+00 to 50+00 with additional anodes and pipe joint continuity repairs. In 2008 a design was prepared that showed which pipe joints should be excavated for the installation on anodes and repair of pipe joint continuity if found to be required.

The 2016 HDR report recommended additional evaluations at a cost of between $50,000 and $112,000 depending on whether five or eight sections of pipe were evaluated and whether the cost per evaluation was $10,000 or $14,000 per site.

The problems with this segment of the pipeline are well defined. It is a lack of electrical continuity and insufficient cathodic protection current. Those problems will not be alleviated with additional evaluations. They will only be alleviated by installing additional zinc anodes and repairing pipe joint bonding.

The most cost effective approach for this pipeline is to use what funding is available to upgrade the cathodic protection now, rather than spending additional funds on more evaluations. Delaying the cathodic protection further to do additional evaluations will only result in additional corrosion occurring on the unprotected pipe sections.

The recommendations shown on Drawing CP-3 in Appendix A from Station 0+00 to 51+67.49 should be implemented as soon as possible. The cost of those additional anodes and pipe joint continuity repairs would be on the order of $150,000. STWA personnel could perform the work themselves as was done with the upgrades prior to 2007 to minimize costs.

RCC can provide personnel to help guide STWA personnel in starting the work but there would be no need for RCC personnel to be with STWA personnel during the entire installation project. RCC would also be available to perform testing of the installed anodes and repaired pipe joints once the work was complete.

Missing Test Station at Station 14+72

The test station at Station 14+72 could not be located during the 2016 or 2017 evaluations. The test station should be located and repaired or replaced. A 30 pound prepackaged zinc anode should be installed at this test station.

Damaged Test Station at Station 17+28

The test station at Station 17+28 is damaged and should be repaired.

2. CONCLUSIONS AND GENERAL RECOMMENDATIONS

2.1 Linear Continuity

Linear continuity was measured from Station 0+00 to 39+48 and the data indicate that the piping is not electrically continuous. The lack of continuity in this segment of pipeline is unchanged from testing conducted during 2007 and 2016. Linear continuity should be repaired along this section of the Contract 1 pipeline.

2.2 Cathodic Protection Effectiveness

The test station and close-interval survey test data indicate that no meaningful protection is presently being achieved on the Contract 1 Pipeline from station 0+00 to 50+00. Additional zinc anodes should be installed at the pipe joints shown on Drawing CP-3 in Appendix A.

2.3 Previous Report Evaluations

In 2007, RCC recommended installing additional zinc anodes on the Contract 1 Pipeline from Station 0+00 to 50+00. In 2008, RCC designed cathodic protection upgrades for this segment of piping and showed which pipe joints were to be excavated for continuity repairs and the installation of anodes. The current estimated cost of implementing the 2018 design from Station 0+00 to 51+67.49 is approximately $150,000.

In 2016, HRD recommended that additional evaluations be conducted by excavating and examining five to eight pipe sections. These evaluations would cost between $50,000 and $112,000 according to HDR's report and would include cathodic protection upgrades at between five and eight pipe sections.

Since the deficiencies associated with the corrosion control for the Contract 1 Pipeline from Station 0+0 to 51+67.49 are so well defined, it would be most prudent to proceed with the cathodic protection and linear continuity upgrades shown on Drawing CP-3 in Appendix A as quickly as possible. Additional evaluations would only further delay the installation of additional zinc anodes and linear continuity repairs.

2.4 Test Station at 14+72

The test station at Station 14+72 could not be located during the 2016 or 2017 evaluations. This test station should be located and repaired or a new test station should be installed. A zinc anode should also be installed at this test station to provide protection to the piping in this area.

2.5 Test Station at 17+28

The test station at Station 17+28 was found damaged and the anode lead wire was not connected to the pipe lead. The anode lead was connected to the pipe lead for testing. The damaged test station should be repaired.

3. SPECIFIC RECOMMENDATIONS

3.1 Cathodic Protection Upgrades

STWA should implement the recommendations shown on Drawing CP-3 in Appendix A from Station 0+00 to 51+67.49 as soon as possible. Installation details are shown on Drawings CP-16 and CP-17 in Appendix A.

3.2 Test Station at Station 14+72

The missing test station at Station 14+72 should be located and repaired or replaced. A zinc anode should also be installed at this location.

3.3 Test Station at Station 17+28

The damaged test station at Station 17+28 should be repaired.

3.4 Post Installation Testing

Post installation testing should be conducted by RCC to verify that electrical continuity has been restored to the piping and that effective cathodic protection has been achieved. The post installation testing would include linear continuity measurements, test station potential and current output measurements, and a close-interval potential survey. This testing should be conducted to verify repairs and to determine if additional zinc anodes need to be installed at select locations.

4. DISCUSSION

4.1 Cathodic Protection Criteria/Data Analysis

NACE International Recommended Practice RPO169 lists several criteria that are used to evaluate the effectiveness of cathodic protection on pipelines. The two primary criteria are a negative polarized potential of at least 0.85 volt relative to a saturated copper/copper sulfate reference electrode, and a minimum of 0.10 volt of cathodic polarization. However, the NACE criteria were developed for use on electrically continuous pipelines and caution is urged when applying the 0.10 volt polarization criterion to pipelines with dissimilar metal couplings.

The STWA Contract 1 Pipeline from Station 0+00 to 50+00 is not electrically continuous in all areas and there are areas where the reinforcing steel may be exposed directly to soil, resulting in potential differences for steel exposed to soil and steel embedded in concrete. Such conditions are similar to dissimilar metal couplings. As a result of these conditions, the most conservative criterion should be applied to assure that protection is achieved in the areas where it is most critical (areas where the steel is directly exposed to the soil). The negative 0.85 volt criterion was therefore selected for evaluating cathodic protection effectiveness on the STWA pipeline. Since steel exposed to soil has a potential of approximately 0.60 volt, potential values between 0.70 and 0.85 volt indicate partial protection. Potential values below 0.70 volt indicate inadequate protection on the water main.

It is also important to note that in non-electrically continuous pipe segments, the close-interval potential survey can generate potentials indicative of areas remote from the reference cell. Potentials measured with the reference cell on the side of a non-continuous joint opposite the test station used for the test wire connection can actually reflect the potential on the side of the non-continuous joint closest to the test station. While the possibility of non-continuous pipe joints has been considered in the analysis of the close-interval data, there may be isolated locations where the data inadvertently misrepresent the level of protection being provided to the water main. The installation of the additional anodes recommended in this report will further minimize the possibility of isolated non-protected areas due to non-continuous pipe joints.

4.2 Previous Report Evaluations

The 2007 RCC report recommended upgrading the piping from 0+00 to 50+00 with additional anodes and pipe joint continuity repairs. In 2008 RCC prepared a design that showed which pipe joints should be excavated for the installation of anodes and repair of pipe joint continuity if found to be required.

The 2016 HDR report recommended additional evaluations at a cost of between $50,000 and $112,000 depending on whether five or eight sections of pipe were evaluated and whether the cost per evaluation was $10,000 or $14,000 per site. This approach would include the upgrade of between five and eight pipe sections with anodes. It would also provide very good information for the five to eight pipe sections examined, but would provide only a limited idea of the likely condition of the other piping between Station 0+00 and 50+00. Many of those pipe

sections have had zinc anodes installed on them and it is reasonable to assume that those pipe sections do not have serious corrosion on them unless there was physical damage to them during installation. The remaining pipe sections may or may not have significant corrosion on them, but until linear continuity is reestablished on this pipeline segment, there is no way to determine that at a reasonable cost. Testing that could be conducted with discontinuous piping is typically conducted from the interior of the piping. That type of testing tends to be very expensive.

The problems with this segment of the pipeline are well defined. It is a lack of electrical continuity and insufficient cathodic protection current. The joints where the pipe continuity has not been repaired is also known based on STWA records of which joints had been repaired. The problems of discontinuous joints and insufficient anodes will not be alleviated with additional evaluations. They will only be alleviated by installing additional zinc anodes and repairing pipe joint bonding.

The most cost effective approach for this pipeline is to use what funding is available to upgrade the cathodic protection now, rather than spending additional funds on more evaluations. Delaying the cathodic protection further to do additional evaluations will only result in additional corrosion occurring on the unprotected pipe sections.

Implementing the recommendations shown on Drawing CP-3 in Appendix A from Station 0+00 to 50+00 would cost on the order of $150,000. STWA personnel could perform the work themselves as was done with the upgrades prior to 2007 to minimize costs. The approximate cost of $150,000 for repairs and upgrades would provide far more value to STWA than would the information gained by spending $50,000 to $112,000 for additional evaluations.

It is recommended that STWA proceed with upgrading the pipeline from Station 0+00 to 51+67.49 with additional anodes and pipe joint repairs as shown on Drawing CP-3 in Appendix A. RCC can provide personnel to help guide STWA personnel in starting the work but there would be no need for RCC personnel to be with STWA personnel during the entire installation project. RCC would also be available to perform testing of the installed anodes and repaired pipe joints once the work was complete.

4.3 Linear Continuity Testing

The effectiveness of the pipe joint bonding was evaluated using two methods. The first method applied current at a test station and measured the resulting potential shifts at each of the available test stations. Typically piping with good electrical continuity will have relatively similar (though not always identical) potential shifts at nearby test stations. The test is then repeated at the other available test stations. The data are shown in Table B-2 in Appendix B and indicate that the piping has significant electrical discontinuities between adjacent test stations.

The second method measured the electrical resistance along the pipeline from test station to test station. The measured electrical resistance was then compared to a theoretical electrical resistance for each test section. The theoretical resistance was based on the length of pipe and the number of bond wires in the test section. The number of bond wires was based on the number of pipe joints between test stations in each test section. The piping was originally

bonded using wires that were bolted across each pipe joint. As these bolted wires have corroded and failed, repaired pipe joints have been bonded using steel clips that are welded across the pipe joints.

The measured electrical resistance and the theoretical resistance for each of the test sections are shown in Table B-3 in Appendix B. Test sections with acceptable continuity will have a measured resistance that is no more than 120% of the theoretical resistance for the test section. The two measured segments of piping had measured resistance values that were 620% and 1,960% higher than properly bonded piping.

4.4 Test Station Testing

Traditional pipe-to-earth DC potential measurements were conducted at the existing test stations using a DC voltmeter and a copper-copper sulfate reference electrode. The copper-copper sulfate reference cell consists of a copper bar suspended in a saturated copper sulfate solution. Contact to the soil is made through a porous plug at one end of the reference electrode and the copper rod is connected to the positive terminal of a voltmeter. The negative terminal of the voltmeter is connected to the structure by utilizing the permanent test wires. This meter connection provides a positive reading but is considered a negative value to copper sulfate (the NACE criteria refers to data as negative to copper sulfate). The permanent test wires are typically terminated in a permanent test box placed directly above the structure to be tested. To obtain accurate structure-to-earth measurements, a high resistance (usually 10 million ohms per volt) voltmeter is used. Test station potential data are shown in Table B-1 in Appendix B. All potential data in this report are negative to copper sulfate.

4.5 Close-Interval Potential Survey

The close-interval survey (CIS) technique is utilized to verify that the cathodic protection system is effective along the entire pipeline and that the piping is protected from external corrosion. The close-interval potential survey enables the measurement of pipe-to-earth potentials at a close interval, typically every 2.5 to 5 feet. A close-interval survey was conducted on the Contract 1 pipeline from 0+09 to 40+65. Potentials were measured every five feet with an Allegro data logger and a copper/copper sulfate reference electrode. The plotted CIS data are included in Appendix C.

A close-interval potential survey is conducted by connecting a high internal resistance (typically 1 megohm or greater) voltage data logger between the pipeline and two copper-copper sulfate reference electrodes. The data logger is connected to the pipeline at the test stations. A special close-interval survey wire is spooled off as the engineer walks directly above the pipeline. The engineer places one of the reference electrodes in contact with the earth directly above the pipeline and measures the voltage potential between the pipe and the electrode. The second electrode is then placed approximately 5 feet away from the first electrode and a second potential reading is measured. Special data loggers for this survey measure and store the data. This process continues along the entire pipeline route and potential data are collected every 5 feet. The field data are then down loaded from the data logger to a computer. The data are graphed to show the pipeline's electrical potential at 5 foot intervals along its length. The specific testing techniques will vary according to the type of

equipment and survey software that is utilized. The benefit is access to the pipe-to-earth potential data between test stations.

The plotted close-interval potential data will show areas where the cathodic protection is not providing full protection to the piping. If areas are located where the cathodic protection is not providing complete protection to the piping, test stations and zinc anodes can be repaired or added to assure that the piping does not suffer a premature failure due to external corrosion.

It is also important to note that in non-electrically continuous pipe segments, the close-interval potential survey can generate potentials indicative of areas remote from the reference electrode. Potentials measured with the reference electrode on the side of a non-continuous joint opposite the test station used for the test wire connection can actually reflect the potential on the side of the non-continuous joint closest to the test station. While the possibility of non-continuous pipe joints has been considered in the analysis of the close-interval data, there may be isolated locations where the data inadvertently misrepresent the level of protection being provided to the water main. The installation of the additional anodes and pipe joint bonding recommended in this report will further minimize the possibility of isolated non-protected areas due to non-continuous joints. .

APPENDIX A

2008 Cathodic Protection Drawings
Contract 1 Station 0+00 to 50+00

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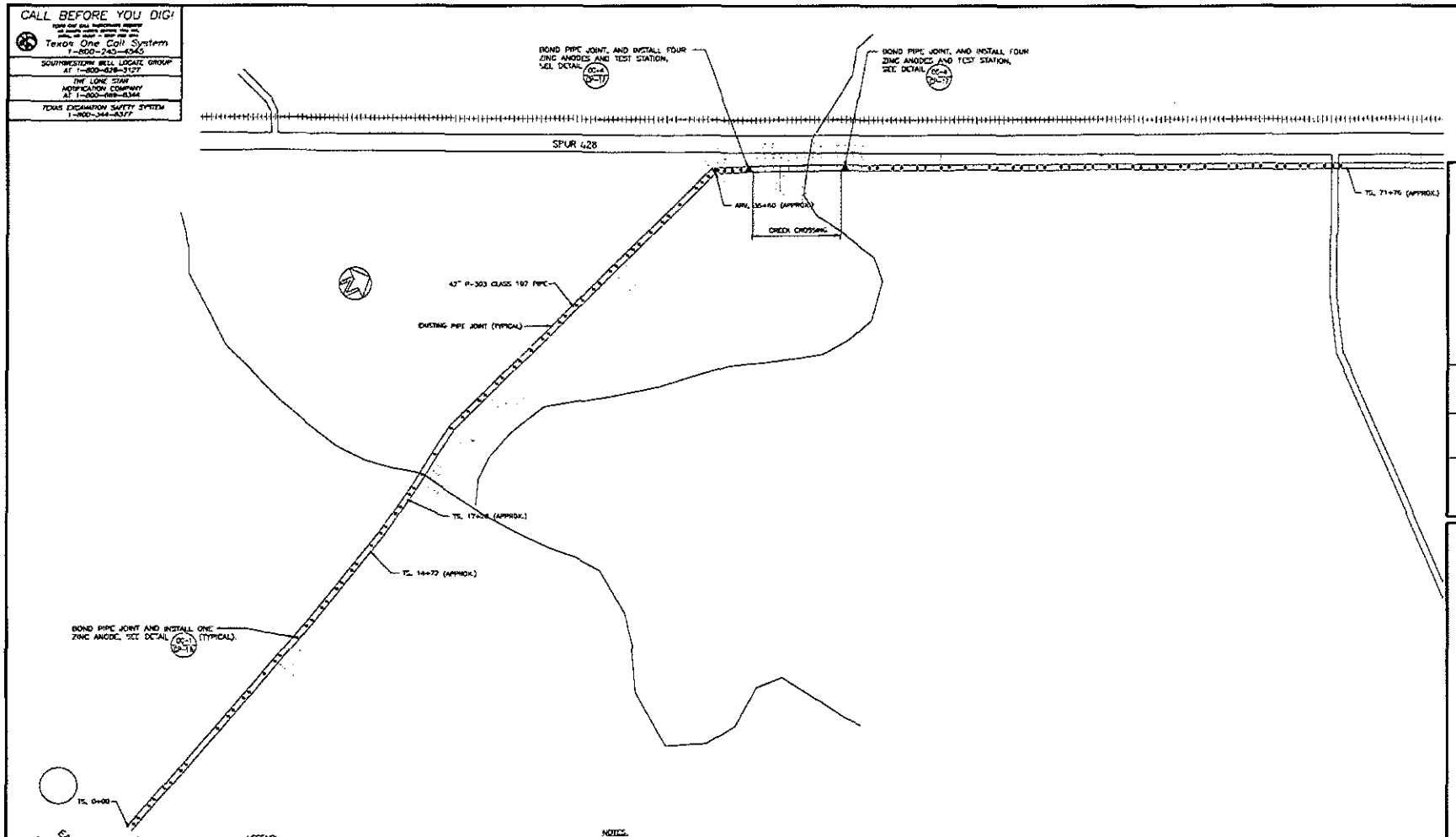
1-800-344-8377



LEGEND:

+ – BOND PIPE JOINT, AND INSTALL ONE ZINC ANODE
△ – BOND PIPE JOINT, AND INSTALL FOUR ZINC ANODES
▲ – BOND PIPE JOINT, AND INSTALL FOUR ZINC ANODES AND TEST STATION
● – INSTALL ZINC ANODES AT EXISTING TEST STATION

NOTES:

1. THE UTILITIES, PIPELINES AND OTHER UNDERGROUND FEATURES SHOWN ON THE DRAWING WERE OBTAINED FROM THE ORIGINAL PRISTINE CONSTRUCTION DRAWINGS AND MAY NOT REPRESENT CURRENT CONDITIONS.
2. CONTRACT DRAWINGS DO NOT SHOW ALL UNDERGROUND UTILITIES/STRUCTURES. UTILITIES/STRUCTURES SHOWN ON THE DRAWINGS ARE SHOWN AT THEIR APPROXIMATE LOCATIONS. THE CONTRACTOR SHALL LOCATE ANY AND ALL UNDERGROUND UTILITIES/STRUCTURES PRIOR TO PERFORMING ANY OF THE EXCAVATIONS FOR THE INSTALLATION OF ANODES OR TEST WIRES.
3. ALL DIMENSIONS SHOWN ARE APPROXIMATE. CONTRACTOR SHALL FIELD ADJUST CATHODIC PROTECTION TO AVOID DAMAGE TO ANY AND ALL EXISTING STRUCTURES/UTILITIES.
4. WHEN EXCAVATING, THE CONTRACTOR SHALL BE CAREFUL TO AVOID DAMAGE TO ANY AND ALL EXISTING UTILITIES/STRUCTURES. ANY AND ALL UTILITIES/STRUCTURES THAT ARE DAMAGED BY THE CONTRACTOR SHALL BE RESTORED TO THE SATISFACTION OF THE STWA AND THE REPRESENTATIVE OF THE DAMAGED UTILITY/STRUCTURE AT NO ADDITIONAL COST TO STWA.
5. RESTORE ANY AND ALL PAVEMENTS REMOVED OR DAMAGED BY THIS WORK TO AS FOUND CONDITIONS AND TO THE SATISFACTION OF STWA.
6. RESTORE ANY AND ALL SURFACES IMPACTED BY THIS WORK TO AS FOUND CONDITIONS AND TO THE SATISFACTION OF STWA.

200 100 0 200

SCALE: 1"=200'

100% SUBMITTAL
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CP-3

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BY: MICHAEL J. KELLY, P.E.
LICENSE NO. 91556
DATE 7/17/08

NO.	REVISION	BY	DATE
	DESCRIPTION		

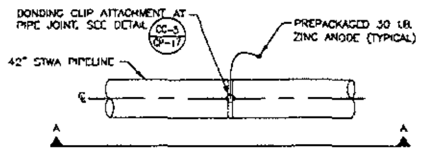
SOUTH TEXAS WATER AUTHORITY
KINGSVILLE, TEXAS

CATHODIC PROTECTION UPGRADES
FOR CONTRACTS 1, 2 AND 3
SOUTH TEXAS WATER AUTHORITY

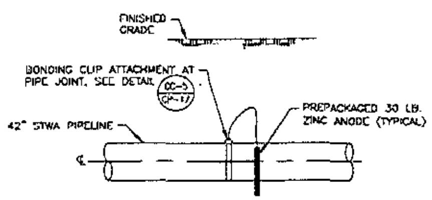
CONTRACT NO. 1
CATHODIC PROTECTION LAYOUT - 1

SHEET 3 of
RECORD DRAWING NO.

STWA PROJECT #



PLAN VIEW



SECTION "A-A"

NOTES:
1. INSTALL ANODES SO THAT THEY ARE NO CLOSER THAN 3' FROM ALL EXISTING PIPING.
2. ANODES SHALL NOT BE LOWERED INTO THE EXCAVATIONS BY THEIR LEAD WIRES. THE CONTRACTOR SHALL LOWER THE ANODES INTO THE EXCAVATIONS WITH A ROPE THAT IS TEMPORARILY WRAPPED AROUND THE ANODE. THE ROPE SHALL BE REMOVED AFTER THE ANODE IS IN PLACE.

CC-1: SINGLE ANODE INSTALLATION AND PIPE JOINT BONDING DETAIL

NOT TO SCALE

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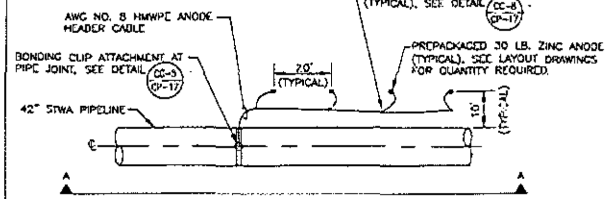
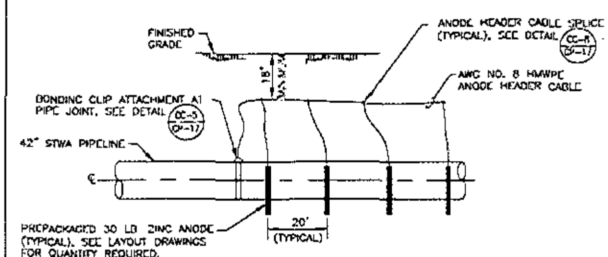

AWG NO. 8 HMWPE ANODE HEADER CABLE
ANODE HEADER CABLE SPLICE (TYPICAL), SEE DETAIL CC-8 CP-17
BONDING CLIP ATTACHMENT AT PIPE JOINT, SEE DETAIL CC-5 CP-17
PREPACKAGED 30 LB. ZINC ANODE (TYPICAL), SEE LAYOUT DRAWINGS FOR QUANTITY REQUIRED.
20' (TYPICAL)
10' (TYPICAL)
42" STWA PIPELINE
A
A

PLAN VIEW

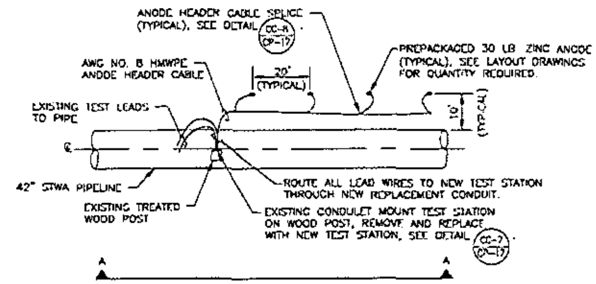

FINISHED GRADE
ANODE HEADER CABLE SPLICE (TYPICAL), SEE DETAIL CC-8 CP-17
AWG NO. 8 HMWPE ANODE HEADER CABLE
18"
BONDING CLIP ATTACHMENT AT PIPE JOINT, SEE DETAIL CC-5 CP-17
42" STWA PIPELINE
PREPACKAGED 30 LB. ZINC ANODE (TYPICAL), SEE LAYOUT DRAWINGS FOR QUANTITY REQUIRED.
20' (TYPICAL)

SECTION "A-A"

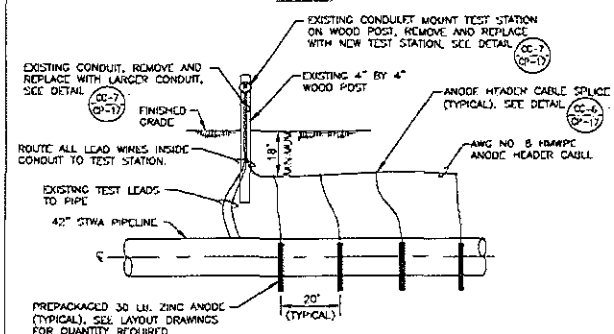
NOTES:
1. INSTALL ANODES SO THAT THEY ARE NO CLOSER THAN 3' FROM ALL EXISTING PIPING.
2. ANODES SHALL NOT BE LOWERED INTO THE EXCAVATIONS BY THEIR LEAD WIRES. THE CONTRACTOR SHALL LOWER THE ANODES INTO THE EXCAVATIONS WITH A ROPE THAT IS TEMPORARILY WRAPPED AROUND THE ANODE. THE ROPE SHALL BE REMOVED AFTER THE ANODE IS IN PLACE.

CC-2: MULTIPLE ANODE INSTALLATION AND PIPE JOINT BONDING DETAIL

NOT TO SCALE


ANODE HEADER CABLE SPLICE (TYPICAL), SEE DETAIL CC-8 CP-17
AWG NO. 8 HMWPE ANODE HEADER CABLE
20' (TYPICAL)
PREPACKAGED 30 LB. ZINC ANODE (TYPICAL), SEE LAYOUT DRAWINGS FOR QUANTITY REQUIRED.
EXISTING TEST LEADS TO PIPE
10' (TYPICAL)
42" STWA PIPELINE
ROUTE ALL LEAD WIRES TO NEW TEST STATION THROUGH NEW REPLACEMENT CONDUIT.
EXISTING TREATED WOOD POST
EXISTING CONDULET MOUNT TEST STATION ON WOOD POST, REMOVE AND REPLACE WITH NEW TEST STATION, SEE DETAIL CC-7 CP-17
A
A

PLAN VIEW


EXISTING CONDULET MOUNT TEST STATION ON WOOD POST, REMOVE AND REPLACE WITH NEW TEST STATION, SEE DETAIL CC-7 CP-17
EXISTING CONDUIT, REMOVE AND REPLACE WITH LARGER CONDUIT, SEE DETAIL CC-7 CP-17
EXISTING 4" BY 4" WOOD POST
FINISHED GRADE
ANODE HEADER CABLE SPLICE (TYPICAL), SEE DETAIL CC-6 CP-17
ROUTE ALL LEAD WIRES INSIDE CONDUIT TO TEST STATION.
18"
AWG NO. 8 HMWPE ANODE HEADER CABLE
EXISTING TEST LEADS TO PIPE
42" STWA PIPELINE
PREPACKAGED 30 LB. ZINC ANODE (TYPICAL), SEE LAYOUT DRAWINGS FOR QUANTITY REQUIRED.
20' (TYPICAL)

SECTION "A-A"

NOTES:
1. REMOVE EXISTING CONDUIT AND TEST STATION. INSTALL NEW CONDUIT AND TEST STATION. SEAL CONDUIT TO TEST STATION CONNECTION WITH URETHANE FOAM AFTER WIRES ARE INSTALLED AND CONNECTED TO TERMINAL BOARD.
2. INSTALL ANODES SO THAT THEY ARE NO CLOSER THAN 3' FROM ALL EXISTING PIPING.
3. ANODES SHALL NOT BE LOWERED INTO THE EXCAVATIONS BY THEIR LEAD WIRES. THE CONTRACTOR SHALL LOWER THE ANODES INTO THE EXCAVATIONS WITH A ROPE THAT IS TEMPORARILY WRAPPED AROUND THE ANODE. THE ROPE SHALL BE REMOVED AFTER THE ANODE IS IN PLACE.
4. PAINT CEDAR POSTS WHITE.

CC-3: ANODE PLACEMENT AT EXISTING TEST STATION DETAIL

NOT TO SCALE

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BY: MICHAEL J. SZELIGA P.E. LICENSE NO. 82XXX DATE 7/26/XX

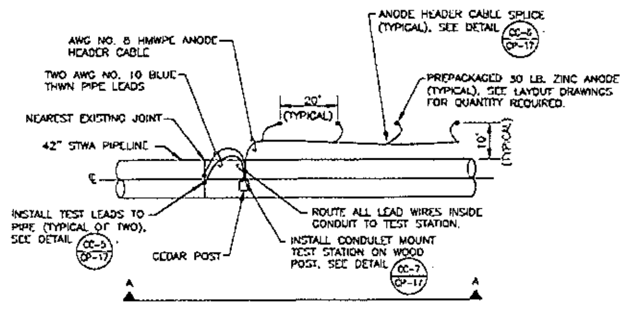
REVISION NO.	DATE	BY	DESCRIPTION

SOUTH TEXAS WATER AUTHORITY
KINGSVILLE, TEXAS

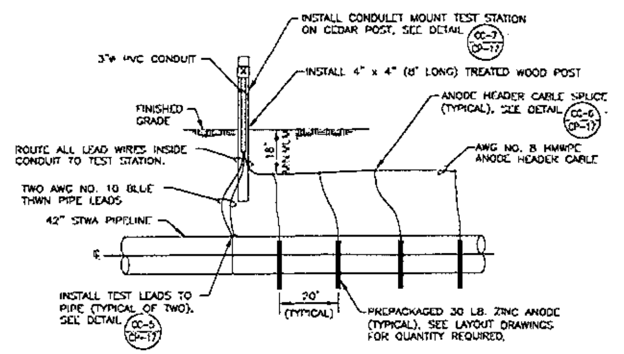
CATHODIC PROTECTION UPGRADES FOR CONTRACTS 1, 2 AND 3
SOUTH TEXAS WATER AUTHORITY

CONTRACT NO.S 1, 2 AND 3
CATHODIC PROTECTION DETAILS - 1

SHEET 16 of
RECORD DRAWING NO.
STWA PROJECT #


AWG NO. 8 HMWPE ANODE HEADER CABLE
TWO AWG NO. 10 BLUE THWN PIPE LEADS
NEAREST EXISTING JOINT
42" STWA PIPELINE
INSTALL TEST LEADS TO PIPE (TYPICAL OF TWO), SEE DETAIL CC-5 CP-17
CEDAR POST
ROUTE ALL LEAD WIRES INSIDE CONDUIT TO TEST STATION.
INSTALL CONDULET MOUNT TEST STATION ON WOOD POST, SEE DETAIL CC-7 CP-17
20' (TYPICAL)
10' (TYPICAL)
ANODE HEADER CABLE SPLICE (TYPICAL), SEE DETAIL CC-8 CP-17
PREPACKAGED 30 LB. ZINC ANODE (TYPICAL), SEE LAYOUT DRAWINGS FOR QUANTITY REQUIRED.
A
A

PLAN VIEW


3"ø PVC CONDUIT
FINISHED GRADE
ROUTE ALL LEAD WIRES INSIDE CONDUIT TO TEST STATION.
TWO AWG NO. 10 BLUE THWN PIPE LEADS
42" STWA PIPELINE
INSTALL TEST LEADS TO PIPE (TYPICAL OF TWO), SEE DETAIL CC-5 CP-17
INSTALL CONDULET MOUNT TEST STATION ON CEDAR POST, SEE DETAIL CC-7 CP-17
INSTALL 4" x 4" (8' LONG) TREATED WOOD POST
ANODE HEADER CABLE SPLICE (TYPICAL), SEE DETAIL CC-8 CP-17
AWG NO. 8 HMWPE ANODE HEADER CABLE
18"
20' (TYPICAL)
PREPACKAGED 30 LB. ZINC ANODE (TYPICAL), SEE LAYOUT DRAWINGS FOR QUANTITY REQUIRED.

SECTION "A-A"

NOTES:
1. INSTALL ANODES SO THAT THEY ARE NO CLOSER THAN 3' FROM ALL EXISTING PIPING.
2. ANODES SHALL NOT BE LOWERED INTO THE EXCAVATIONS BY THEIR LEAD WIRES. THE CONTRACTOR SHALL LOWER THE ANODES INTO THE EXCAVATIONS WITH A ROPE THAT IS TEMPORARILY WRAPPED AROUND THE ANODE. THE ROPE SHALL BE REMOVED AFTER THE ANODE IS IN PLACE.
3. PAINT CEDAR POSTS WHITE.

CC-4: NEW TEST STATION AND ANODE PLACEMENT DETAIL

NOT TO SCALE

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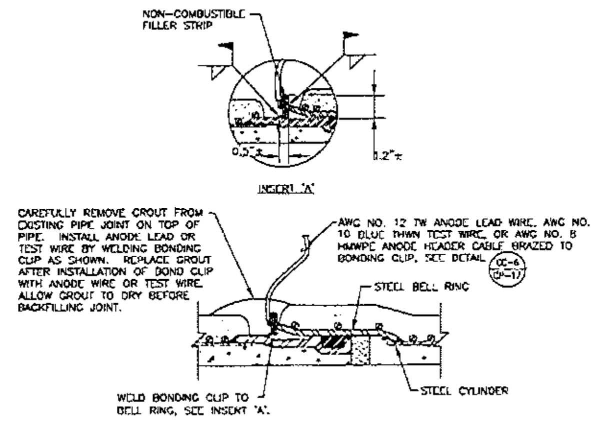
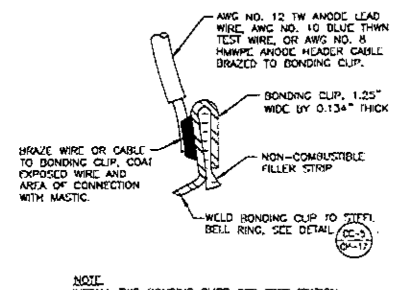

NON-COMBUSTIBLE FILLER STRIP
0.5"±
1.2"±
INSERT "A"
CAREFULLY REMOVE GROUT FROM EXISTING PIPE JOINT ON TOP OF PIPE. INSTALL ANODE LEAD OR TEST WIRE BY WELDING BONDING CLIP AS SHOWN. REPLACE GROUT AFTER INSTALLATION OF BOND CLIP WITH ANODE WIRE OR TEST WIRE. ALLOW GROUT TO DRY BEFORE BACKFILLING JOINT.
AWG NO. 12 TW ANODE LEAD WIRE, AWG NO. 10 BLUE THWN TEST WIRE, OR AWG NO. 8 HMWPE ANODE HEADER CABLE BRAZED TO BONDING CLIP, SEE DETAIL CC-6 CP-17
STEEL BELL RING
STEEL CYLINDER
WELD BONDING CLIP TO BELL RING, SEE INSERT "A".

CC-5: BONDING CLIP ATTACHMENT DETAIL

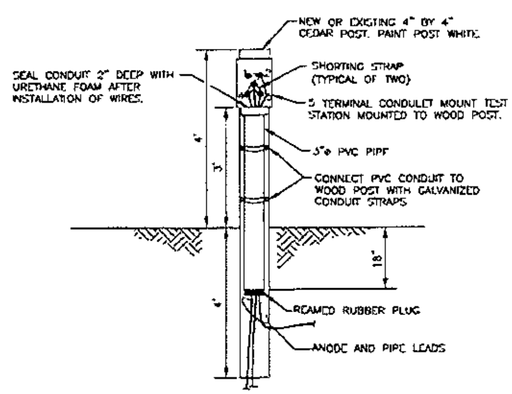
NOT TO SCALE


AWG NO. 12 TW ANODE LEAD WIRE, AWG NO. 10 BLUE THWN TEST WIRE, OR AWG NO. 8 HMWPE ANODE HEADER CABLE BRAZED TO BONDING CLIP.
BONDING CLIP, 1.25" WIDE BY 0.134" THICK
BRAZE WIRE OR CABLE TO BONDING CLIP. COAT EXPOSED WIRE AND AREA OF CONNECTION WITH MASTIC.
NON-COMBUSTIBLE FILLER STRIP
WELD BONDING CLIP TO STEEL BELL RING, SEE DETAIL CC-5 CP-17

NOTE:
INSTALL TWO BONDING CLIPS PER TEST STATION.

CC-6: WIRE ATTACHMENT TO BONDING CLIP DETAIL

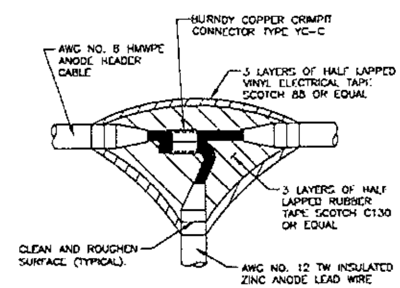
NOT TO SCALE


NEW OR EXISTING 4" BY 4" CEDAR POST. PAINT POST WHITE.
SEAL CONDUIT 2" DEEP WITH URETHANE FOAM AFTER INSTALLATION OF WIRES.
SHORTING STRAP (TYPICAL OF TWO)
5 TERMINAL CONDULET MOUNT TEST STATION MOUNTED TO WOOD POST.
3"ø PVC PIPE
CONNECT PVC CONDUIT TO WOOD POST WITH GALVANIZED CONDUIT STRAPS
4'
3'
4'
18"
REAMED RUBBER PLUG
ANODE AND PIPE LEADS

NOTES:
1. TERMINATE ANODE LEAD AT TERMINAL.
2. TERMINATE PIPE LEADS AT TERMINALS 2 AND 3.
3. JUMPER TERMINALS 3 AND 4 WITH SHORTING STRAP.
4. TEST STATION LID NOT SHOWN FOR CLARITY.

CC-7: CONDULET MOUNT TEST STATION ON WOOD POST DETAIL

NOT TO SCALE


AWG NO. 8 HMWPE ANODE HEADER CABLE
BURNDY COPPER CRIMPIT CONNECTOR TYPE YC-C
3 LAYERS OF HALF LAPPED VINYL ELECTRICAL TAPE SCOTCH 88 OR EQUAL
3 LAYERS OF HALF LAPPED RUBBER TAPE SCOTCH C130 OR EQUAL
CLEAN AND ROUGHEN SURFACE (TYPICAL).
AWG NO. 12 TW INSULATED ZINC ANODE LEAD WIRE

CC-8: ANODE HEADER CABLE SPLICE DETAIL

NOT TO SCALE

100% SUBMITTAL
NOT FOR CONSTRUCTION

REVISION NO.	DATE	BY	DESCRIPTION

REVISION NO.	DATE	BY	DESCRIPTION

CONSULTANT'S SHEET NO.
CP-17

THIS DOCUMENT IS FOR INTERIM REVIEW AND IS NOT INTENDED FOR CONSTRUCTION, BIDDING, PERMIT OR OTHER UNAUTHORIZED PURPOSES. THESE DOCUMENTS/PLANS WERE AUTHORIZED TO BE RELEASED BY: MICHAEL J. SZELIGA, P.E. LICENSE NO. 81538 DATE: 7/24/24

SOUTH TEXAS WATER AUTHORITY
KINGSVILLE, TEXAS

CATHODIC PROTECTION UPGRADES
FOR CONTRACTS 1, 2 AND 3
SOUTH TEXAS WATER AUTHORITY

CONTRACT NO.S 1, 2 AND 3
CATHODIC PROTECTION DETAILS - 2

SHEET 17 of
RECORD DRAWING NO
STWA PROJECT #

APPENDIX B

Tabulated Test Data

TABLE B-1
Test Station Data

Station Number	Test Station	2007 Pipe-to-Earth Potential "On" (volts)	2007 Pipe-to-Earth Potential "Instant Off" (volts)	Anode Current (milliamps)	Anode Potential (volts)
0+90	1-wire	0.78	na	na	na
14+72	1-wire	0.81	na	na	na
17+28	anode	0.82	0.79	125	1.10
39+48	1-wire	CNL			
Station Number	**Test Station**	**2016 Pipe-to-Earth Potential "On" (volts)**	**2016 Pipe-to-Earth Potential "Instant Off" (volts)**	**Anode Current (milliamps)**	**Anode Potential (volts)**
0+90	1-wire	0.77	na	na	na
14+72	1-wire	CNL			
17+28	anode	0.80	0.78	nd	1.07
39+48	1-wire	nd	na	na	na
Station Number	**Test Station**	**2017 Pipe-to-Earth Potential "On" (volts)**	**2017 Pipe-to-Earth Potential "Instant Off" (volts)**	**Anode Current (milliamps)**	**Anode Potential (volts)**
0+90	1-wire	0.60	na	na	na
14+72	1-wire	CNL			
17+28	anode	0.52 (see note 1)	0.50	nd	1.03
39+48	1-wire	0.44	na	na	na

Notes: 1. Anode lead found disconnected. Reconnected immediately prior to testing.
2. na = not applicable
3. nd = no data
4. CNL = could not locate

TABLE B-2
Overall Continuity Data

Station Number	Test Station	Current Applied at 0+90 Pipe-to-Earth Potential "On" (volts)	Current Applied at 0+90 Pipe-to-Earth Potential "Instant Off" (volts)	Delta Potential (volts)	Applied Current (amps)
0+90	1-wire	2.65	0.99	1.66	20
14+72	1-wire	CNL			
17+28	anode	0.63	0.60	0.03	na
39+48	1-wire	0.48	0.48	0.00	na
Station Number	**Test Station**	**Current Applied at 17+38 Pipe-to-Earth Potential "On" (volts)**	**Current Applied at 17+38 Pipe-to-Earth Potential "Instant Off" (volts)**	**Delta Potential (volts)**	**Applied Current (amps)**
0+90	1-wire	0.63	0.61	0.02	na
14+72	1-wire	CNL			
17+28	anode	2.74	0.86	1.88	20
39+48	1-wire	0.61	0.54	0.07	na
Station Number	**Test Station**	**Current Applied at 39+48 Pipe-to-Earth Potential "On" (volts)**	**Current Applied at 39+48 Pipe-to-Earth Potential "Instant Off" (volts)**	**Delta Potential (volts)**	**Applied Current (amps)**
0+90	1-wire	0.63	0.62	0.01	na
14+72	1-wire	CNL			
17+28	anode	0.75	0.64	0.11	na
39+48	1-wire	2.75	0.84	1.91	20

Notes: 1. na = not applicable
2. CNL = could not locate

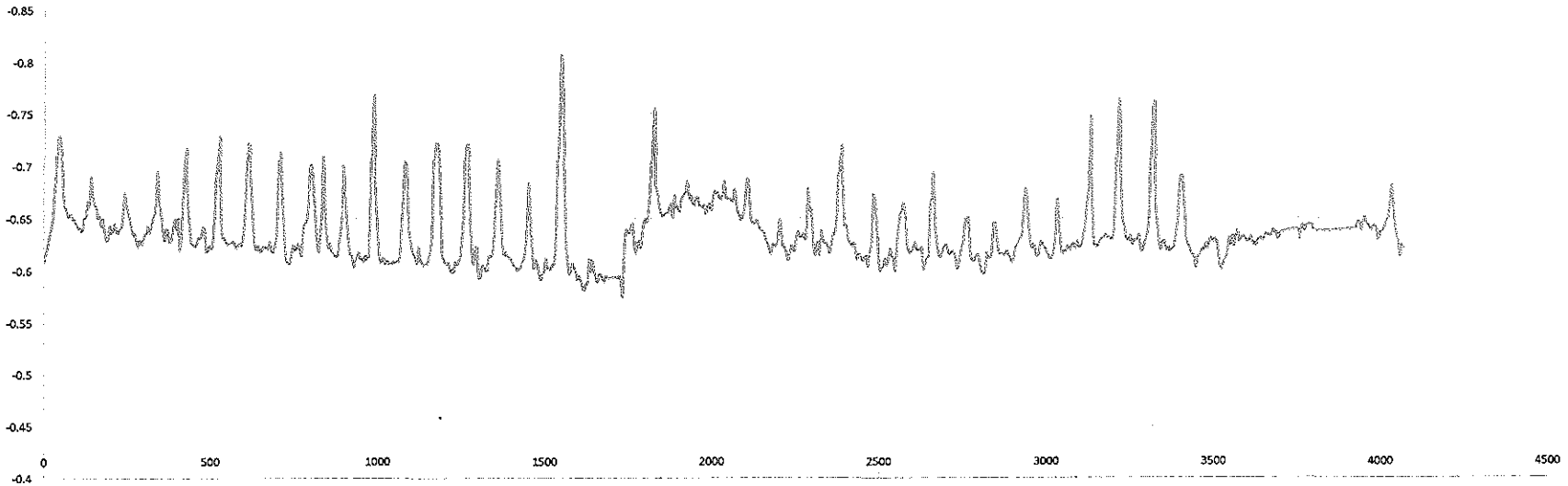
TABLE B-3
Direct Continuity Data

Station Number From	Station Number To	Length (feet)	Measured Resistance (ohms)	Theoretical Resistance (ohms)	Percent High/Low
0+90	17+28	1,638	0.389739	0.054162	620% High
17+29	39+48	2,219	1.425743	0.069207	1,960% High

APPENDIX C

Plotted Close-Interval Potential Survey Data

CIS On Potentials Station 0+00 to 50+00



ATTACHMENT 5

Driscoll LAS Project

Memorandum

To: South Texas Water Authority Board of Directors
From: Carola G. Serrato, Executive Director
Date: February 22, 2018
Re: Driscoll Disinfection Booster Station – Conversion to Chloramination System

Background:

Enclosed are the latest emails related to the construction of the Driscoll LAS station. Last month, staff reported that on January 15th the LAS system was in service. However, as described in recent Weekly Updates, several issues have affected the project which has not operated as designed. In addition to the leaking LAS fittings reported during last month's meeting, problems with regulators, the 1-ton chlorine cylinder, and programming having been discussed amongst Mr. Sherrel Mercer with Mercer Controls (Mercer), Shay Roalson with HDR Engineering Inc. (HDR) and STWA staff. Staff had not anticipated that a pay request would be submitted for this meeting. However, enclosed is a pay application with accompanying correspondence.

Analysis:

Following my February 19th email to Ms. Roalson, we discussed the completion date and the various details regarding Mercer's claim that the system was not operating correctly as a result of a bad 1-ton cylinder. In addition, we discussed the evidence that Mercer referenced in his recent email as it relates to the chlorine regulators. She indicated a review of her notes were in order particularly since the original problems were related to leaking fittings and Mr. Mercer made the decisions to change regulators. Mention of orange residue/deposits inside regulators and/or filters was not made until very recently despite the last installed regulator being the fourth one. These events and a timeline will be important factors in establishing a substantial completion date and any liquidated damages the Board may want to assess. In addition, contact with DPC, the chlorine supplier, has been made in order to receive a copy of the report which should be generated as a result of the interior inspection of the original 1-ton cylinder.

Staff Recommendation:

There is not any close-out paperwork for approval. However, as stated in Ms. Roalson's letter (a copy of which was provided to Mercer), full payment of the *latest request* in the amount of $46,217.50 is not recommended. I have discussed these events and situation with legal counsel, Bill Flickinger, and voiced my concerns that regarding (a) the possibility that another company will need to be consulted to produce the desire operation of the system – whether as a result of equipment or programming issues, (b) the potential for a repeat occurrence with HDR and being charged fees for additional time spent on this project and (c) the fact that failure of this system working does negatively impact STWA as it pertains to the TCEQ Order. As such, withholding the recommended fees in the event liquidated damages are assessed is prudent.

Board Action:

Determine whether to pay the full amount requested from Mercer or withhold the recommended amount per Ms. Roalson's attached letter.

Summarization:

As you can see from the enclosed timeline, there have been issues with the proper functioning of the newly installed system. Staff contends that it was not STWA's decision to keep replacing the regulator and reverting back to the use of the 150 lb cylinders. STWA also asserts replacement of the 1-ton cylinder occurred in an expedited manner as a result of Mr. Mercer's request.

HDR

February 21, 2018

Ms. Carola Serrato
Executive Director
South Texas Water Authority
P.O. Box 1701
Kingsville, Texas 78364

RE: Driscoll Pump Station LAS Chemical Feed System Addition
Pay Application No. 5

Dear Ms. Serrato:

According to the Notice to Proceed and subsequent change orders for the referenced Project, the Substantial and Final Completion dates are December 24, 2017 and January 23, 2018, respectively. At the present time, the Certificate of Substantial Completion has not been issued.

The contractual liquidated damages per Section 00500 are $250 per day for each day that expires after the dates of both Substantial and Final Completion. Mercer Controls was notified by letter on January 11 and by email on February 8 that the Authority reserves the right to assess liquidated damages for each day that the work is not completed in order to recover additional expenses.

On February 12, the Authority became aware that the chlorine gas cylinder may have been discharging a rusty sludge that was fouling the regulator furnished and installed by Mercer Controls. The Authority coordinated replacement of the cylinder with the chlorine gas supplier and a new cylinder was delivered on February 15. HDR recommends that the contract dates be extended by four days to reflect this delay to the completion of the work.

Mercer Controls placed the system into service on February 19. On February 20, Mercer Controls submitted a pay request for the full contract value less retainage. Because the Authority has not yet made a determination on whether it will assess liquidated damages, HDR recommends withholding $13,250 (53 days of liquidated damages) from the pay request at this time. If the Authority opts not to assess the full liquidated damages and if the system remains in reliable service, the portion not assessed and the retainage can be authorized for payment at the March 27 Board meeting.

I am available to discuss at your convenience.

hdrinc.com

4401 West Gate Blvd., Suite 400, Austin, TX 78745,
Suite 400, Austin, TX 78745-1469
T 512.912.5100 F 512.912.5158(512) 912-5100

Texas Registered Engineering Firm F-754

Sincerely,
HDR Engineering, Inc.

Shay Ralls Roalson, PE
Vice President

Contractor's Application and Certificate for Payment

To:	From:	Via:
South Texas Water Authority	Mercer Controls, Inc.	HDR Engineering, Inc.
111 E. Sage Road	804 Apollo Drive	4401 West Gate Blvd., Suite 400
Kingsville, TX 78363	Edna, TX 77957	Austin, TX 78745
LAS Chem Feed System Additions	Application No.: 5	Application Period: 11/24/2017 - 02/19/2018

Application for Payment

Change Order Summary

Change Orders Approved by Owner

Number	Date Approved	Additions	Deductions
1	8/16/2017	$45,586.84	
2	9/22/2017	$1,705.00	
3	11/30/2017	$10,650.00	
TOTALS		$57,941.84	$0.00
NET CHANGE BY CHANGE ORDERS		$57,941.84	

1. ORIGINAL CONTRACT SUM	$369,000.00
2. Net change by Change Orders	$57,941.84
3. CONTRACT SUM TO DATE (Line 1 + 2)	$426,941.84
4. TOTAL COMPLETED AND STORED TO DATE (Column F on Progress Estimate)	$426,941.84
5. RETAINAGE: 5% of Completed Work and Stored Material	$21,347.09
6. AMOUNT ELIGIBLE TO DATE	$405,594.75
7. LESS PREVIOUS PAYMENTS (Line 6 from prior certificate)	$359,377.25
8. AMOUNT DUE THIS APPLICATION	$46,217.50
9. BALANCE TO FINISH, PLUS RETAINAGE (Column G on Progress Estimate)	$21,347.09

Contractor's Certification

The undersigned Contractor certifies that to the best of the Contractor's knowledge, information and belief, the Work covered by this Application for Payment has been completed in accordance with the Contract Documents, that all amounts have been paid by the Contractor for Work for which previous Certificates for Payment were issued and payments received from the Owner, and that current payment shown herein is now due.

By: Steve J. Gabrysch **Date: 02/19/2018**

Steve J. Gabrysch, Treasurer, Mercer Controls, Inc.

$ 46,217.50 (line 8)
- $ 13,250.00 (potential liquidated damages, not yet assessed)
$ 32,967.50

Payment of | $ 32,967.50 | is recommended.

By: _____ Date: _____

Jacob Hinojosa, Inspector, STWA

Approved For Payment:

By: _____ Date: _____

Carola Serrato, Executive Director, STWA

Approved For Payment:

By: Shay Rall Rodson Date: 2/21/2018

HDR Engineering, Inc.

LAS Chemical Feed System Additions — **Contractor's Progress Estimate**

Application Number: 5

Application Period: 11/24/2017 - 02/19/2018 — Application Date: 2/19/2018

A		B				C	D	E	F		G
Item						Work Completed					
Item	Description	Units	Quantity	Unit Price	Scheduled Value	From Previous Application	This Period	Materials Presently Stored (not in C or D)	Total Completed and Stored to Date (C+D+E)	% (F/B)	Balance to Finish (B-F)
1	Bonds, Insurance, and Mobilization		1	$25,000.00	$25,000.00	$25,000.00	$0.00		$25,000.00	100.00%	$0.00
2	Chlorination Building Slab		1	$10,820.51	$10,820.51	$10,820.51	$0.00		$10,820.51	100.00%	$0.00
3	1 Ton Chlorine and Cover Slab		1	$6,875.53	$6,875.53	$6,875.53	$0.00		$6,875.53	100.00%	$0.00
4	Two Vaults		1	$13,987.76	$13,987.76	$13,987.76	$0.00		$13,987.76	100.00%	$0.00
5	Tap Saddle and Hot Tapping		1	$25,500.32	$25,500.32	$25,500.32	$0.00		$25,500.32	100.00%	$0.00
6	Installations and Relocation of Vaults		1	$45,919.52	$45,919.52	$45,919.52	$0.00		$45,919.52	100.00%	$0.00
7	Electrical Material		1	$20,279.06	$20,279.06	$20,279.06	$0.00		$20,279.06	100.00%	$0.00
8	Electrical Labor		1	$29,979.94	$29,979.94	$27,979.94	$2,000.00		$29,979.94	100.00%	$0.00
9	Fence		1	$4,508.54	$4,508.54	$4,508.54	$0.00		$4,508.54	100.00%	$0.00
10	Building and Building Material		1	$75,696.58	$75,696.58	$75,696.58	$0.00		$75,696.58	100.00%	$0.00
11	Building Labor		1	$3,184.16	$3,184.16	$3,184.16	$0.00		$3,184.16	100.00%	$0.00
12	Booster Pump Panel		1	$5,290.96	$5,290.96	$5,290.96	$0.00		$5,290.96	100.00%	$0.00
13	Piping Material		1	$3,000.00	$3,000.00	$3,000.00	$0.00		$3,000.00	100.00%	$0.00
14	Piping Labor		1	$13,311.48	$13,311.48	$12,311.48	$1,000.00		$13,311.48	100.00%	$0.00
15	Shade Cover and Track Installation		1	$5,500.42	$5,500.42	$5,500.42	$0.00		$5,500.42	100.00%	$0.00
16	Storm Water Pollution&Erosion Control Install		1	$9,197.43	$9,197.43	$9,197.43	$0.00		$9,197.43	100.00%	$0.00
17	Two Yard Hydrants		1	$1,878.56	$1,878.56	$1,878.56	$0.00		$1,878.56	100.00%	$0.00
18	Sidewalk and Misc. Concrete		1	$5,964.43	$5,964.43	$5,964.43	$0.00		$5,964.43	100.00%	$0.00
19	Site Clean Up, Demobilization		1	$14,341.65	$14,341.65	$12,341.65	$2,000.00		$14,341.65	100.00%	$0.00
20	Startup, Miscellaneous		1	$5,000.00	$5,000.00	$2,000.00	$3,000.00		$5,000.00	100.00%	$0.00
21	SCADA Allowance		1	$43,763.16	$43,763.16	$28,763.16	$15,000.00		$43,763.16	100.00%	$0.00
22	CO#1-CPR#1 Revise off-site tap		1	$8,350.00	$8,350.00	$8,032.50	$317.50		$8,350.00	100.00%	$0.00
23	CO#1-CPR#2 F&I I/O panel, Polling PLC		1	$39,236.83	$39,236.83	$24,236.83	$15,000.00		$39,236.83	100.00%	$0.00
24	CO#2- Revise off-site tap		1	$1,705.00	$1,705.00	$1,705.00	$0.00		$1,705.00	100.00%	$0.00
24	CO#3- Chemical feed system additional equip.		1	$10,650.00	$10,650.00	$0.00	$10,650.00		$10,650.00	100.00%	$0.00
	Totals				**$426,941.84**	**$377,974.34**	**$48,967.50**	**$0.00**	**$426,941.84**		**$0.00**

Stored Material Summary

For (contract):	LAS Chemical Feed System Additions						Application Number:	4	
Application Period:	11/24/2017 - 02/19/2018						Application Date:	2/19/2018	
Invoice No.	Drawing Transmittal No.	Materials Description	Stored Previously		Stored this Month		Incorporated in Work		Materials Remaining in Storage ($)
			Date (Month/Year)	Amount ($)	Amount ($)	Subtotal	Date (Month/Year)	Amount ($)	
									$0.00
									$0.00
									$0.00
									$0.00
									$0.00
									$0.00
									$0.00
									$0.00
									$0.00
									$0.00
									$0.00
									$0.00
									$0.00
									$0.00
									$0.00
									$0.00
									$0.00
									$0.00
									$0.00
		Total		$0.00	$0.00	$0.00		$0.00	$0.00

mcgserrato@stwa.org

From: mcgserrato@stwa.org
Sent: Wednesday, February 21, 2018 11:50 AM
To: 'Roalson, Shay'
Subject: RE: Driscoll PS LAS Dates

Shay,

As we discussed yesterday as well as my conversation with legal counsel yesterday, I agree you should draft the letter as described.

Carola

Carola G. Serrato
Executive Director
South Texas Water Authority
PO Box 1701
Kingsville, Texas 78364
361-592-9323 x112

From: Roalson, Shay [mailto:Shay.Roalson@hdrinc.com]
Sent: Tuesday, February 20, 2018 5:34 PM
To: Carola Serrato (mcgserrato@stwa.org) <mcgserrato@stwa.org>
Subject: Driscoll PS LAS Dates

Carola –

Here are the pertinent dates per my records:

- Dec 24 – contract substantial completion
- Thurs, Jan 11 – HDR issued notice of delay letter
- Fri, Jan 19 – Mercer conducted training on-site, put the LAS system in operation, the first chlorine regulator failed
- Mon, Jan 22 – Mercer fixed LAS system leaks and replaced the chlorine regulator
- Tues, Feb 6 – STWA communicated with HDR by email about punch list items remaining to be completed and by phone that the system was not reliably operating
- Wed, Feb 7 – HDR notified Mercer that in order for HDR to recommend payment at the Feb 27 Board meeting, the system must be in operation by Feb 9, and demonstrate reliable operation until the date of the Board meeting. In an email on Feb 8, we notified Mercer that the LDs to date would be $11,500.
- Fri, Feb 9 – Mercer visited the site, stating that he was going to confirm that there was a problem with the one-ton cylinder. He installed regulator #4 on the 150-lb cylinder. He apparently told STWA staff not to use the one-ton cylinder, but there was no communication from Mercer to HDR after the visit.
- Wed, Feb 14 – STWA communicated to HDR that Mercer wanted to change the cylinder. STWA called DPC, who agreed to change the one-ton cylinder.

- Thurs, Feb 15 – DPC delivered the new one-ton cylinder.
- Mon, Feb 19 – Mercer placed the new one-ton cylinder in service.

Assuming the system stays in reliable operation, the substantial completion date would be February 19. Given that Mercer never communicated to HDR after the Feb 9 site visit, it's hard to say how many days would be appropriate for a credit against LDs between the Feb 9 site visit and when the cylinder was replaced on Feb 15. However, I would suggest that Feb 12-15 (four days) would be a defensible credit.

So, total days beyond substantial completion from Dec 24 through Feb 19 is 57 - 4 = 53 days * $250/day = $13,250

If you agree, I will draft a letter indicating that we recommend payment of 100% of the work less 5% retainage and accumulated LDs. If the STWA opts not to assess the full LDs, the portion not assessed and the retainage can be authorized for payment at the March 27 Board meeting.

Thanks,
Shay

Shay Ralls Roalson, PE
Vice President

HDR
4401 West Gate Blvd., Suite 400
Austin, TX 78745
D 512.912.5106 M 512.426.9847
shay.roalson@hdrinc.com

Texas TBPE Firm No. F-754

mcgserrato@stwa.org

From: mercercontrols@aol.com
Sent: Friday, February 16, 2018 3:38 PM
To: shay.roalson@hdrinc.com; mcgserrato@stwa.org; jhinojosa@stwa.org
Cc: s.gabrysch@mercercontrols.com; a.garza@mercercontrols.com; bob@chlorinators.com; j.wilson@mercercontrols.com
Subject: Driscoll Chlorinator

Shay:

At my office we disassembled the two chlorinator vacuum regulators which were removed from Driscoll. Each of these two worked for a few days and then failed. One failed twice, and the second time was after the factory rebuilt it. The failure mode included the dumping of raw chlorine out the vent tube on one of these both times. We have been out considerable expense in time and material to keep the plant disinfection system in operation.

In both of the units we disassembled today, there is a considerable amount of sticky resinous material that gummed up the o-rings and interference fit areas. The same material was on the main valve and it most likely held the main valve partly open to allow raw chlorine to vent. Some of the sticky resinous material was trapped on the fiberglass filter at the inlet to the Ton Container Adapter, also known as a "drip leg heater." The sticky material has the appearance of "orange syrup."

Our discoveries inside the regulators provide a very pointed indictment of the integrity of the chlorine load in the ton cylinder that was first delivered to the site. I realize that 100% purity of the chlorine gas is not to be expected. However, something close to that is expected, with the proviso that no non-gas material will be presented at the output valve on the ton cylinder.

The regulator that we installed most recently was placed on one of the older 150-pound cylinders instead of the ton cylinder, and according to STWA staff, it has performed to expectations. It had NOT been installed on the ton cylinder at any time. All of these regulators should perform just as well on a ton cylinder as on a 150-pound cylinder, so long as the "drip leg heater" stays powered to prevent droplets of chlorine from entering the regulator.

We are aware that the chlorine supplier has replaced the ton cylinder that was initially supplied. We offered to the staff of the South Texas Water Authority to go to Driscoll today and reinstall the "drip leg heater" and move the regulator from the 150-pound cyinder to the new ton cylinder. However, due to staff commitments today, the STWA asked that I come Monday instead of today. I intend to be on site Monday to make the change.

Our findings and photographs are available to the chlorine supplier.

Please note that during the last few years, the quality of chlorine we have seen delivered, and the condition of the cylinder valves, has not been at a premium level. One client had two 150-pound cylinders with valve failures just weeks apart, and all the contents of one of the cylinders escaped into the chlorine room. Damage was major.

The chlorination equipment we supplied for the Driscoll job from Superior has a fiberglass filter at the entry point to the "drip leg heater" as well as a sintered-stone filter at the inlet to the regulator itself. I speculate that the sticky substance was being vaporized in the "drip leg heater" only to re-condense in the small compartments within the regulator. The dual filter system effectively prevents solid material from entering the regulator, but it cannot stop gas or most liquid impurities.

If the initial ton cylinder had been filled with chlorine gas to the expected high level of purity, the date of substantial completion would have been certain as of about thirty days ago.

MERCER CONTROLS INC./S. A. Mercer Pres.

mcgserrato@stwa.org

From:	mcgserrato@stwa.org
Sent:	Monday, February 19, 2018 3:49 PM
To:	Roalson, Shay
Cc:	Beroset, Shaun D.; Singer, Lisa; Bill Flickinger; Aaron Archer; 'Dony Cantu (dcantu@stwa.org)'; 'Frances Rosales'; 'Jacob Hinojosa'; 'Jo Ella Wagner'
Subject:	Driscoll LAS - Latest developments - STWA Board Agenda
Attachments:	Copy of HS1 and HS2 NO3 NO2 and FAA Data 02192018.xlsx

Shay,

Jacob called a few minutes ago to report that Mr. Mercer has placed the LAS system back on the 1-ton cylinder. In addition, Mr. Mercer set the auto-valve at 100% - down from 150%. Jacob feels certain that John Gross, the subcontractor, made adjustments to the program and that the 150% setting was not necessary any longer.

Mr. Mercer wants the system to stay as is for the remainder of the week – however, we will be monitoring closely.

I will be sending more before/after results from this weekend and today later. Verbal reports from this weekend on the before/after sampling are not what we want to see.

Some recent results from the City of Corpus Christi are also attached which show the NO3 as much higher that usual. I have received a response to my question whether this is related to taking Garwood/Lower Colorado resources from the City of CC's Assistant Director of Water Quality and Treatment, Gabriel Ramirez. He confirmed the higher levels are as a result of the change in sources.

This week we will be developing the agenda packet for next Tuesday's (Feb 27) Board meeting. At this point, do you believe a pay request will be submitted?

Carola

Carola G. Serrato
Executive Director
South Texas Water Authority
PO Box 1701
Kingsville, Texas 78364
361-592-9323 x112

mcgserrato@stwa.org

From:	mcgserrato@stwa.org
Sent:	Thursday, February 22, 2018 10:23 AM
To:	Roalson, Shay
Cc:	Aaron Archer; Bill Flickinger; Beroset, Shaun D.; Singer, Lisa; 'Dony Cantu (dcantu@stwa.org)'; 'Frances Rosales'; 'Jacob Hinojosa'; 'Jo Ella Wagner'
Subject:	FW: Driscoll Booster Station - Before/After - Punch List
Attachments:	DR LAS Before After Results Feb 2018.xlsx

Shay,

Per our conversation yesterday, attached are the updated results for Total, Free, Mono and FAA on the before/after of the Booster Station. As before, the results are shown to reflect whether the chlorine source was the 1-ton or 150 lb cylinders as well as whether the auto-valve was set at 150% or 100%.

Yesterday's results look more promising than before, particularly since the 1-ton is back on line and the auto-valve is set to 100%. Jacob thought it was necessary to make some adjustments to the desired FAA and it is set to 0.025 mg/l.

The next days should reveal more information and I will pass along those results.

As before, there were some odd readings with Mono above Total. And, there were some incoming Mono results from CC on Friday 2/16 and Saturday 2/17 that were troubling.

Carola

Carola G. Serrato
Executive Director
South Texas Water Authority
PO Box 1701
Kingsville, Texas 78364
361-592-9323 x112

From: mcgserrato@stwa.org [mailto:mcgserrato@stwa.org]
Sent: Monday, February 12, 2018 11:28 AM
To: Roalson, Shay <Shay.Roalson@hdrinc.com>; Aaron Archer <aarcher@walkerpartners.com>
Cc: Singer, Lisa <Lisa.Singer@hdrinc.com>; Beroset, Shaun D. <Shaun.Beroset@hdrinc.com>; Bill Flickinger <bflickinger@wfaustin.com>; 'Dony Cantu (dcantu@stwa.org)' <dcantu@stwa.org>; 'Frances Rosales' <fvrosales@stwa.org>; 'Jacob Hinojosa' <jhinojosa@stwa.org>; 'Jo Ella Wagner' <jwagner@stwa.org>
Subject: Driscoll Booster Station - Before/After - Punch List

Shay and Aaron,

Aaron, you are copied on this email since the next TCEQ Order Quarterly Report is due on Feb 20th. I have already discussed my concerns with Bill Flickinger regarding the problems with the 1-ton cylinder not working as it should. We also have concerns that it appears the setting needs to be at 150% to produce the desired residual increase.

Attached are the before/after readings at the Driscoll Booster Station from (a) Tuesday, Jan 23 – Friday, Jan 26, (b) Monday, Jan 29 – Friday, Feb 2 and (c) Monday, Feb 5 – Sunday, Feb 11.

I have highlighted the days when the setting is at 150% as well as those days when the 150 lb cylinder is used in place of the 1-ton cylinder, leaving the 100%/1-ton cylinder readings without any highlighting.

We have noted that there are some "After" readings which seem odd with the Mono being slightly higher than the Total.

In addition, Jacob and Dony will be gathering some more readings today upstream and downstream from the Booster Station – upstream KB, FM 2826 and CR 34 and downstream at CR 16.

I believe this information is sufficient to respond to Mr. Mercer's claim that the Booster Station is located where the residuals are going through breakpoint chlorination.

Also, Shay per your request, attached is the Punch List that Jacob reviewed again on Friday, Feb 9th. He has added a remark for Item 3. We are wondering if Mercer is going to replace the fittings on the LAS lines since Mr. Mercer indicated he had ordered the other type of fitting. With regards to the position of the 1-ton cylinder. Jacob is checking with DPC about a cost to move the cylinder. I asked him to be certain that moving it would not create any problems with the connections being too short, pinched, etc.

Please let me know if you need any additional information.

Carola

Carola G. Serrato
Executive Director
South Texas Water Authority
PO Box 1701
Kingsville, Texas 78364
361-592-9323 x112

ATTACHMENT 6

City of Bishop Water Supply Contract

Memorandum

To: South Texas Water Authority Board of Directors
From: Carola G. Serrato, Executive Director
Date: February 22, 2018
Re: City of Bishop - Revised Wholesale Water Supply Contract

Background:

As reported in recent Weekly Updates, my conversation with City Administrator Cynthia Contreras indicated that this subject may be an agenda item during a February City Council meeting. As of today, notice of a meeting has not been received. As such I called and spoke with Ms. Contreras this morning. The Council is meeting today (2/22/2018); however, there are not any items related to STWA. I inquired whether the Council would meet next Wednesday, February 28th; Ms. Contreras stated that the meeting had not yet been scheduled by the Mayor. I have requested that Ms. Contreras provide a copy of their agenda when it is available. However, as mentioned last month, the City's legal counsel is indisposed for medical reasons.

Analysis:

This item was placed on the agenda in the event some type of response is received from the City of Bishop or if a City Council meeting occurs and any developments for the meeting can be reported.

Staff Recommendation:

Determine if staff or legal counsel need to take any additional action regarding the offered Wholesale Water Supply Contract.

Board Action:

Provide feedback to staff and/or legal counsel.

Summarization:

During my conversation with Ms. Contreras, she indicated that the City Council had other options they possibly wanted the STWA Board to consider. I suggested that they provide those in writing. Again, to date, our office has not received any written feedback from the City.

ATTACHMENT 7

Surplus Property Sale

Memorandum

To: South Texas Water Authority Board of Directors
From: Carola G. Serrato, Executive Director
Date: February 23, 2018
Re: Surplus Property Sale Report

Background:

Last month, staff presented a list of items that the Board declared as surplus. Additionally, the Board authorized staff to advertise the sale of the items and approved the sale to the highest bidder. Finally, the Board declared any items that did not receive a bid as salvage property and instructed staff to dispose of those salvage items. Attached is a list of the items with the bids received, the highest bid identified and items without any bids labeled as "salvage."

Analysis:

This is a report only. As you can see, the total collected from the sale is $4,344.52.

Staff Recommendation:

Provide feedback to staff.

Board Action:

Determine if there is any further action required by staff on this subject.

Summary:

As stated in previous memos related to surplus sales, the amount of funds collected from these types of sales are typically not very large; however, it is a necessary housekeeping exercise.

South Texas Water Authority Surplus Property Sale
February 23, 2018 10:00 a.m.

Name of Bidder	1 2009 Ford F150 truck	2 Scag	3 Welder	4 Pressure Washer	5 Projector	6 Dell Laptop	7 Calculator	8 HP 932C printer	9 Epson LX-300 Printer	10 Acer Laptop	11 HP 3600N Printer	12 Lexmark T632 Printer	13a HP Notebook	13b HP Notebook	14a HP 2025 Printer	14b HP 2025 Printer	15 Brother IntelliFax
Chuck Saverline		300.00															
Jacob Hinojosa													**62.00**	**62.00**			
Dony Cantu	120.00		200.00														
Luis Fuentes Jr.	**3,051.00**																
Robert Schumacher										**0.11**			16.31	26.31	**5.31**	**5.31**	
Oscar Ayarzagoitia	800.13	700.13	**200.13**										50.13	50.13			
Dony Cantu	210.00																
Kenneth Huff Jr.		**850.00**		**25.00**													
High Bid	**3,051.00**	**850.00**	**200.13**	**25.00**	-	-	-	-	-	**0.11**	-	-	**62.00**	**62.00**	**5.31**	**5.31**	-

South Texas Water Authority Surplus Property Sale
February 23, 2018 10:00 a.m.

Name of Bidder	16	17	18a	18b	18c	19	20a	20b	21	22	23	24	25	26	27
	Sharp TV	Sharp VCR	Intel i3 Computer	Intel i3 Computer	Intel i3 Computer	Pentium 4 Computer	Dell Monitor	Dell Monitor	HP Office Jet K80xi	Dell 2400 Computer	Motorola Radio	Polaroid Camera	Projector	Philips VCR	Tripp Lite UPS
Chuck Saverline															
Jacob Hinojosa															
Dony Cantu															
Luis Fuentes Jr.															
Robert Schumacher			16.31	16.31	36.31						11.31	1.31	2.11		
Oscar Ayarzagoitia															
Dony Cantu															
Kenneth Huff Jr.															
High Bid	-	-	16.31	16.31	36.31	-	-	-	-	-	11.31	1.31	2.11	-	-

Total **$4,344.52**

ATTACHMENT 8

Incremental Increase

Memorandum

To: South Texas Water Authority Board of Directors
From: Carola G. Serrato, Executive Director
Date: February 22, 2018
Re: Incremental Increase Charges for Customers without a Long-Term Contract

Background:

As reported last month, December Usage invoices (sent in January) which included an Incremental Increase Charge of $0.426386/1000g were delayed due to the late receipt of the City of Corpus Christi's wholesale invoice. Staff also reported due to sending out the invoices later than usual that the three (3) affected customers (the City of Bishop, the City of Driscoll, and the Nueces County Water Control and Improvement District #5) may not have had sufficient time to review the invoice. As such, staff stated that this item would be on the February agenda.

Analysis:

As reported last month, the City of Bishop was charged approximately $1,700 in the Incremental Increase; the City of Driscoll was charged slightly more than $1,550 in the Incremental Increase; and, the Banquete Water District was charged about $870 in the Incremental Increase. To date, all three (3) wholesale customers have paid their December usage invoice.

Staff Recommendation:

Provide an opportunity for any of these three (3) customers to address the Board about the Incremental Increase Charge.

Board Action:

Provide feedback to any wholesale customers approaching the Board. Provide instruction to staff and legal counsel on any communication the Board deems necessary.

Summarization:

Staff has not been contacted by any of the three (3) wholesale customers requesting additional information or questioning the Incremental Increase Charge.

ATTACHMENT 9

Mercer Quote – Elimination of Repeater in Driscoll

Memorandum

To: South Texas Water Authority Board of Directors
From: Carola G. Serrato, Executive Director
Date: February 23, 2018
Re: Mercer Controls, Inc. – Proposal for elimination of Repeater Antenna located on Elevated Storage Tank (EST) owned by the City of Driscoll

Background:

As the Board is aware, STWA pays an annual fee to the City of Driscoll for the use of antenna space on the City's EST. The equipment associated with the antenna and the antenna belong to STWA. In addition, several years ago STWA upgraded SCADA equipment located in the Agua Dulce, Sablatura Park, Banquete, Central, Driscoll, Bishop East and Kingsville Pump Stations. In addition, there is communication equipment at the meter run/vault at the ON Stevens Treatment Plant.

The upgrade of that equipment allows for the use of a repeater station that does not require the greater height of an EST. For quite some time, STWA has been in communication with Automated Concepts (Automated) about eliminating the Driscoll EST repeater. However, ultimately Mr. Dave Counts with Automated passed along quotes from other companies that STWA is unfamiliar with in terms of their previous work or project experience.

As such, staff communicated with Mr. Sherrel Mercer, Mercer Controls Inc. (Mercer) about receiving a quote to eliminate the Driscoll EST repeater station. (See enclosed emails.) The enclosed quote is in the amount of $34,475.

Analysis:

As the Board is aware, there have been some past problems with the electric service at the Driscoll EST which interrupts all STWA SCADA communication. In addition, there is an annual fee of $3,600 for rental fee on the EST. Staff anticipates that installing an antenna tower at one or more of the above-mentioned locations will be a sizeable project from a financial perspective; however, the cost will eventually be recouped by eliminating the rental fee. As you can see from the emails, staff anticipated receiving a quote earlier in the week. Unfortunately, receipt of the quote today provides inadequate time for review and clarification on any items of concern.

Staff Recommendation:

Contingent upon satisfactory responses to questions and concerns being addressed prior to the Board Meeting on Tuesday, consider review of the proposal to eliminate the Driscoll EST repeater. The cost of this project can be paid by remaining available bond funds.

Board Action:

Review the proposal. Provide feedback to staff. Consider whether to proceed with a project to eliminate the Driscoll EST repeater station.

Summarization:

Reliability of SCADA communication is of utmost importance in terms of responding to operational problems, with the goal of addressing the issues before the situation becomes critical.

mcgserrato@stwa.org

From: mcgserrato@stwa.org
Sent: Wednesday, February 21, 2018 4:42 PM
To: Sherrel Mercer (mercercontrols@aol.com)
Cc: 'Dony Cantu (dcantu@stwa.org)'; 'Frances Rosales'; 'Jacob Hinojosa'; 'Jo Ella Wagner'
Subject: FW: STWA PS Work

Mr. Mercer:

We are finalizing our agenda packet for the STWA Board meeting next Tuesday, Feb 27th. I was hoping to have the proposal described below that would eliminate the repeater station currently located on the Driscoll EST.

Will you be able to provide the proposal/quote?

Carola

Carola G. Serrato
Executive Director
South Texas Water Authority
PO Box 1701
Kingsville, Texas 78364
361-592-9323 x112

From: mcgserrato@stwa.org [mailto:mcgserrato@stwa.org]
Sent: Thursday, January 25, 2018 2:41 PM
To: Sherrel Mercer (mercercontrols@aol.com) <mercercontrols@aol.com>; rickcornejo@me.com
Cc: Dony Cantu (dcantu@stwa.org) <dcantu@stwa.org>; Frances Rosales <fvrosales@stwa.org>; Jacob Hinojosa <jhinojosa@stwa.org>; Jo Ella Wagner <jwagner@stwa.org>
Subject: STWA PS Work

Mr. Mercer,

This is a brief follow – up to the conversation that you, Jacob and I had earlier this week.

This morning STWA Managers met and reviewed the repair/replacement items on our spreadsheet for STWA, Nueces WSC and Ricardo WSC.

We briefly discussed the STWA work that needs attention:

- Agua Dulce – Act Pak needs to be installed – possibly 2 – one for Master Meter and one for Rural Meter
- Agua Dulce – We also agreed that Mercer would be able to correct problem with SCADA communication which may require new cable for the antenna/radio.
- Banquete – New Master Meter needs to be set to x100 not x10 – A new Act Pak may also be needed.
- Central – Act Pak needs to be installed for Master Meter and Rural Meter.
- Kingsville and Sablatura Park – The Act Paks are installed – does programming need to occur?

In addition, you agreed to provide a detailed quote on eliminating the repeater station on the City of Driscoll's EST for the STWA Board's consideration during their February Board meeting. Ideally, this quote would be provided by **February 19th** which allow sufficient time for staff review and questions with responses available for the agenda packet mailout on February 22nd.

Finally, with regard to STWA items we did not discuss; but, I want to bring to your and Rick's attention:

- Tuesday evening, the STWA Board approved the ~$21,000 invoice for the Central PS rehab; payment was mailed yesterday. STWA realizes that $1500 remains to be billed and the invoice refers to the installation of the fan. However, can you provide an anticipated timeline for that installation? In addition to the fan, there are some corner pieces that are missing and trash that needs to be cleared.
- Recently, you met with field personnel and me at the Driscoll PS for training on the DR LAS project. I commented on the water in the station which was attributed to a check valve. However, during this morning's Managers' meeting Dony Cantu reported that the roof is also leaking on the building. Our records indicate the work at that station was invoiced in April of 2016. Is this work still under warranty?

BTW, I will be sending two more emails related to Nueces WSC and Ricardo WSC.

Carola G. Serrato
Executive Director
South Texas Water Authority
PO Box 1701
Kingsville, Texas 78364
361-592-9323 x112

MERCER CONTROLS, INC.

P. O. BOX 777 / 804 APOLLO DRIVE

EDNA, TEXAS 77957

PH: (361) 782-7168 FAX: (361) 782-7706

S.A. Mercer, P.E.

www.MERCERCONTROLS.com

(361) 782-5678

February 23, 2018

To: South Texas Water Authority
Attn: Carola Serrato

Project: South Texas Water Authority – SCADA Communication Upgrade

Mercer Controls proposes to re-arrange the existing radio system so that space is no longer required on the elevated tower in Driscoll. The radio units at three of the pump stations will become repeater stations. An antenna height of 60 feet or more will be required at Central for dependable communication with the class of radio equipment you now use. Antenna heights at Banquete and Driscoll will be 30 to 40 feet high.

The base proposal includes replacing all antennas, lighting arrestors, and antenna cables, unless we are able to learn that any single antenna installation has been recently done. We will test the antennas and cable at all of the sites to verify performance. Normal lifetime of an antenna and cable installation is ten to twelve years.

We will conduct a limited radio path survey to verify the integrity of the revised arrangement of the radio system. As a result of the survey some antennas at individual sites may need to be raised and placed on a taller existing structure or placed on a new pole or tower.

We are assuming all SCADA Panels including radio units are currently functional, but our price includes minor repairs only. You will be notified prior if any additional charges are required to repair the existing equipment.

Complete Price: **$34,475.00**.

We appreciate your confidence in Mercer Controls.

Respectfully Submitted,

Mercer Controls

Adrian Garza, E.I.T. Estimator

ATTACHMENT 10

Kleberg County Extension Agency Funding Request

Memorandum

To: South Texas Water Authority Board of Directors
From: Carola G. Serrato, Executive Director
Date: February 22, 2018
Re: Funding Request – Kleberg County Extension Agency – Private Water Well Screening

Background:

Enclosed please find an email request from the Kleberg/Kenedy County Agriculture Extension Agent, Frank Escobedo. The request is for $4,147 to provide funds for a Water Quality Screening study of private water wells located in Kleberg and Kenedy Counties. The proposal is based on total funds in the amount of $12,441 with three (3) participants providing funding – Texas A&M AgriLife Extension Service, Kenedy County Groundwater Conservation District and South Texas Water Authority.

According to the proposal submitted by Dr. Lee Clapp, Texas A&M Kingsville, this type of screening has occurred in the past. However, the proposal would expand on the constituents which would be tested. The number of private wells that would be tested is thirty (30). The exact wells have not yet been selected. The screening period is from March 15 through July. A report on the findings would be provided to STWA by the end of November, should the STWA Board decide to approve the requested funds. Attached to the proposal is the budget worksheet, TAMUK supplies cost, and the analytes which will be tested.

Analysis:

According to the proposal, the information from this latest round of sampling/testing would be combined with previously collected data. This would provide greater detail in the mapping of certain constituents such as uranium which is a known problem in area groundwater wells.

Finally, also attached is my email to legal counsel, Bill Flickinger with Willatt and Flickinger, PLLC, requesting his advice on any restrictions which would prevent STWA from funding a study for beneficiaries outside of STWA's district boundaries. This afternoon, I spoke with Mr. Flickinger about the matter and his initial response is that it should not violate any rules. However, he has not researched the matter and he will provide a definite response by Tuesday's Board meeting.

Staff Recommendation:

If Mr. Flickinger's research reveals that providing the funds does not violate any rules or laws, consider providing the requested $4,147.

Board Action:

Determine whether to provide $4,147 for the Water Quality Screening study of private water wells located in Kleberg and Kenedy Counties.

Summarization:

Although all of the participants in the study may not be STWA residents paying STWA property taxes, staff feels certain some of the beneficiaries of the study will be district residents. Regardless, additional mapping of potentially harmful constituents in area groundwater wells and gathering important information of those contaminants that exceed the MCL is a worthwhile project.

mcgserrato@stwa.org

From: Frank Escobedo <Frank.Escobedo@ag.tamu.edu>
Sent: Wednesday, February 21, 2018 9:33 AM
To: mcgserrato@stwa.org
Subject: Private Water Well Project
Attachments: Private Water Well Screening Proposal 02_16_18.docx; AgriLife Budget - Water Well Screening v2.xlsx

Good Morning Carola,

Over the last five years, we (Extension) have been providing private water well screening for Kleberg and Kenedy County residents.
We were limited on the number of contaminates we could screen.

Dr. Clapp at TAMUK has been working on a similar project with more depth to his project but with some limitations as well.

We started having conversations about a year ago on expanding the project.

We are seeking contributions from several partners.

I have attached a proposal with budget for you and your board to review.

If you have any questions, please let me know.

I will be in contact tomorrow just to touch base with you.

Thanks,
Frank

WATER QUALITY SCREENING OF PRIVATE WELLS IN KLEBERG AND KENEDY COUNTIES

Funding Agencies:	Texas A&M AgriLife Extension Service-Kleberg & Kenedy Counties, Healthy South Texas Program (**AgriLife-HST**) South Texas Water Authority (**STWA**) Kenedy County Groundwater Conservation District (**KCGCD**)
Applicant/Institution:	Texas A&M University – Kingsville (**TAMUK**)
Principal Investigator:	Dr. Lee Clapp (TAMUK)
Collaborator:	Mr. Frank Escobedo (AgriLife-HST)
Address:	917 W. Avenue B, MSC 213, Kingsville, TX 78363
Telephone Number:	(361) 593-4007
Email:	lee.clapp@tamuk.edu
Total Funding Requested:	**$12,441** (**$4,147** from each funding agency)

The proposed project encompasses integration of the following **specific aims**:

1) Protect public health by collecting samples from 30 private wells and analyzing for 35 different water quality parameters;
2) Increase public awareness of groundwater quality issues by discussing the well water analysis results in one-on-one communication with private well owners;
3) Expand an existing GIS-based database of groundwater quality in Kleberg and Kenedy Counties using the resulting groundwater quality data;
4) Enhance professional training of two environmental engineering graduate students at Texas A&M University-Kingsville (TAMUK).

1. Summary

Texas A&M University-Kingsville (**TAMUK**) proposes to partner with the Texas A&M AgriLife Extension Service-Kleberg & Kenedy Counties, Healthy South Texas Program (**AgriLife-HST**), the Kenedy County Groundwater Conservation District (**KCGCD**), and the South Texas Water Authority (**STWA**) to expand existing efforts to monitor groundwater quality from private wells in Kleberg and Kenedy Counties. **AgriLife-HST** provides educational programs to help people and communities make sure their water wells are safe for their family, livestock and land. As this need has arisen they have provided yearly water screenings that test for nitrate, salinity, arsenic, and fecal coliform bacteria. Along with the screenings they have provided one-on-one guidance to go over the results and help residences correct any health issues their water well may have. Similarly, **TAMUK** has recently engaged in U.S. Nuclear Regulatory Commission (NRC) funded research to characterize groundwater quality near existing – and potentially future – uranium mining sites and has analyzed groundwater quality in 85 private wells in Kleberg and Kenedy Counties. **KCGCD** works with state water regulators, farmers, ranchers and regional communities to preserve and protect groundwater from over-consumption and contamination. **STWA** works with governmental entities, water supply corporations, industry and commerce to maintain dependable water supplies for residents in central Kleberg County and western Nueces County.

AgriLife-HST's current well monitoring program has been limited to analyzing samples for nitrate, salinity, arsenic, and fecal coliform bacteria. The proposed collaborative monitoring program would significantly expand this program to include a total of 35 parameters for 30 private wells in Kleberg and Kenedy Counties. In addition, the collected groundwater quality data would be incorporated into a geospatial database to characterize groundwater quality throughout Kleberg and Kenedy Counties.

To support this effort, TAMUK is requesting a total of $12,441 from AgriLife-HST, KCGCD and STWA ($4,147 each) to support two graduate students for 4.5 months and the principle investigator for 0.05 months. This will include compensation for travel to and from the selected well locations, well sampling and field analyses, laboratory analyses, GIS database development, and report writing. To cover laboratory supply costs, the selected well owners will also be charged $32 per sample. Each participating well owner will be provided with a report summarizing the water quality analyses and the degree to which the well water quality conforms to existing standards for drinking water, and livestock watering.

2. Objectives

The main objectives for the proposed project – to be equally supported by AgriLife-HST, KCGCD and STWA – are to:

1. Protect public health by collecting samples from 30 private wells and analyzing for 35 different water quality parameters. This will Expand AgriLife-HST's existing well monitoring program to include a much broader range of parameters (35) while keeping the cost for residents low;
2. Increase public awareness of groundwater quality issues by discussing the well water analysis results in one-on-one communication with private will owners;

3. Expand an existing GIS-based database of groundwater quality in Kleberg and Kenedy Counties using the resulting groundwater quality data; and
4. Enhance professional training of two environmental engineering graduate students at Texas A&M University-Kingsville (TAMUK).

3. Scope of Work

Task 1 – Well Sampling

A total of 30 well owners will be recruited to participate by advertising in the local paper along with word of mouth to well owners who have had wells screened by AgriLife-HST or TAMUK in the past (Figures 1a-c show the locations of 106 wells previously screened by AgriLife-HST and TAMUK in Kleberg and Kenedy Counties). All testing and sampling will be done on well owner's properties by TAMUK graduate students (Figure 2) to ensure that obtained groundwater samples are representative and uncontaminated. In addition, TAMUK will work with the KCGCD to identify wells in areas were sampling was not performed previously.

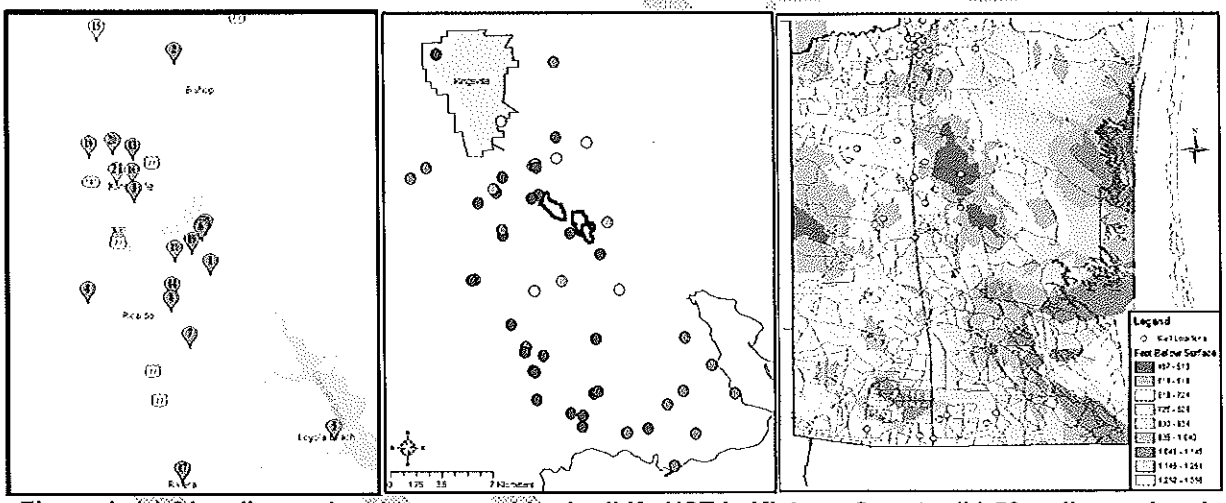


Figure 1: (a) 21 wells previously screened by AgriLife-HST in Kleberg County; (b) 50 wells previously screened by TAMUK in Kleberg County, (c) 35 wells previously screen by TAMUK in Kenedy County.

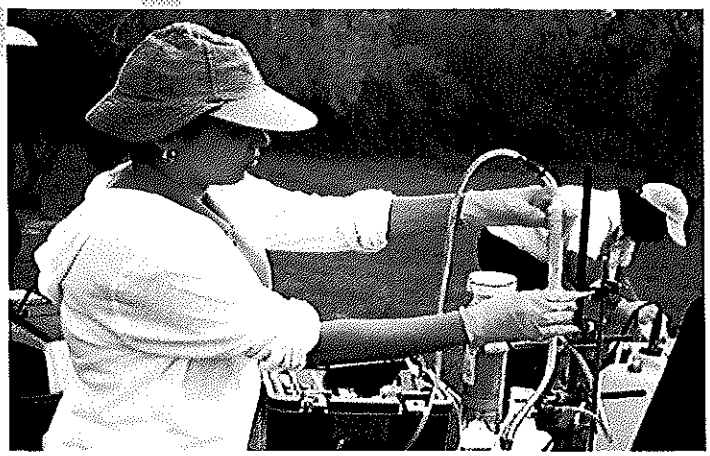


Figure 2: TAMUK graduate students collecting well samples and performing field analyses.

Samples will be collected following procedures outlined in the Texas Water Development Board's *Field Manual for Groundwater Sampling* (Boghici, 2003), including procedures for sample bottle preparation, well purging, sample filtering, sample storage, and sample preservation. A Trimble GPS receiver will be used to determine the latitude and longitude of each well, which will subsequently be used to map the wells. The well owners will also be asked to provide data about the depth of each well, if available. The following samples will be collected for each well:

- A 250-mL filtered water sample preserved with nitric acid for cation and trace metal analyses (see below).
- A 250-mL filtered sample, unpreserved, for anion analyses (see below).

Task 2 – Field Analyses

Field analyses will also be performed following the TWDB manual. Water level will be measured using a water level meter (Solinst, Ontario, CA). Specific conductivity, temperature, dissolved oxygen (DO) and pH values will be measured on site using a pre-calibrated multi-meter (YSI Inc., Yellow Springs, OH). The multi-meter will also be used on site to verify that the purged water purging has reached a stable level for proper sampling. Oxidation reduction potential (ORP) will be measured using a pre-calibrated ORP meter. Alkalinity will be measured in the field by titration with 0.20N sulfuric acid. Dissolved radon will be analyzed on-site using a portable radon detector (Durridge Company Inc., Billerica, MA) for well owners who request this analysis (at an extra $20 charge).

Task 3 – Laboratory Analyses

Samples will be analyzed for **major cations** (calcium, iron, magnesium, manganese, potassium, sodium), **target trace elements** (arsenic, barium, boron, chromium, copper, lead, molybdenum, nickel, selenium, strontium, uranium, vanadium, zinc), **common anions** (fluoride, bromide, chloride, nitrate, sulfate, phosphate), **total dissolved solids** (TDS), and **total coliform bacteria**.

Cations and trace metals concentrations will be measured using a PerkinElmer NexION inductively coupled plasma mass spectrometer (ICP-MS) following EPA Method 200.8 (Brockhoff, 1999). Anion concentrations will be measured using a Dionex ion chromatograph (IC) following EPA Method 300.1 (Hautman and Munch, 1997). Bicarbonate and carbonate concentrations will calculated from the measured pH and alkalinity values using pK_a values of 6.35 and 10.33, respectively. Total dissolved solids (TDS) will be measured gravimetrically following Standard Method 2.65 (APHA, 2012). Total coliform bacteria will be measured using Standard Method 9222 (APHA, 2012). Hardness concentrations will be calculated from measured Ca^{2+} and Mg^{2+} concentrations, while sodium adsorption ratio (SAR) values will be calculated from measured Na^{+}, Ca^{2+}, and Mg^{2+} concentrations.

For **quality control** (QC) purposes, ion balance calculations will be performed to assure that the ion balance for any given sample is not off by more than 15%, samples not meeting this QC criterion will be reanalyzed. Standard Method 1020 (APHA, 2012) will be followed for routine analytical QA/QC procedures (i.e., method detection limits, reagent blanks, laboratory-fortified blanks, laboratory-fortified matrix samples, and duplicate analyses).

Task 4 – Water Quality Assessment and Communication

Water quality for each well will be assessed by comparing the results for each constituent with the primary and secondary drinking water standards (PDWS and SDWS, respectively) established by the U.S. EPA. In cases where the constituents measured do not have established EPA drinking water standards the results were compared with the criteria recommended by the World Health Organization (WHO) when possible. A summary report will be prepared and delivered to each participating well owner. TAMUK and AgriLife-HST will subsequently contact each well owner to discuss questions or concerns they may have about the reported results.

Task 5 – Groundwater Quality Mapping

Base maps will be constructed using county boundaries, the road shape for U.S. Highway 77, and an aerial photograph of Kenedy County, which will all be obtained from the Texas Natural Resource Information System webpage (TNRIS, 2014). The well locations and associated groundwater constituent concentrations will be imported into the ArcGIS mapping software, ArcMap, and georeferenced with a NAD 1983 coordinate system. The data for the 30 wells sampled in the proposed project will be combined with the data obtained for 85 wells in Kleberg and Kenedy Counties that were sampled in previous studies (Figures 1b and 1c). The inverse-distance-weighted raster (IDW) method will be used for raster interpolation due to the relatively low number of wells in relation to the area spanned. A raster image with a gradient color scheme will be created to indicate the concentration levels for each groundwater constituent across most of Kleberg and Kenedy Counties (see example shown in Figure 3).

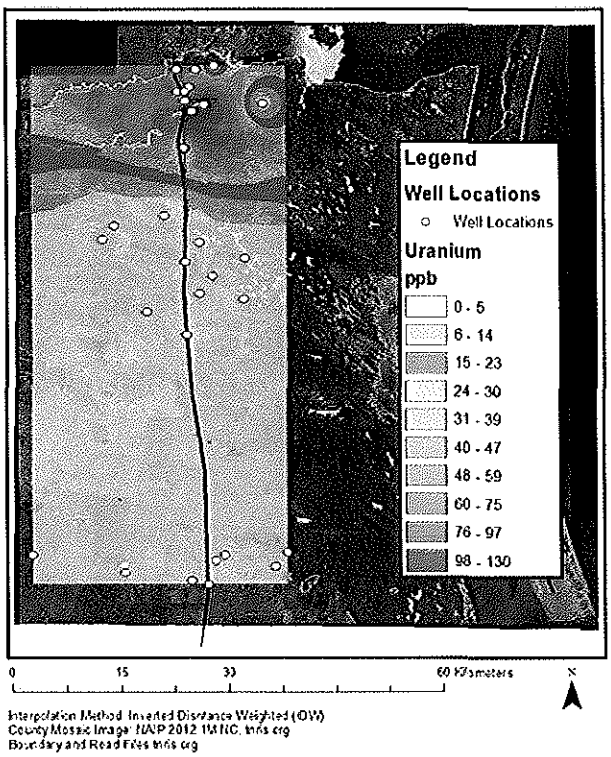


Figure 3: Example map of interpolated groundwater constituent concentrations based on data from 25 wells in Kenedy County (red-based shades indicate values above the EPA drinking water standard).

Task 6 – Final Report

A final report will be submitted to AgriLife-HST, KCGCD, and STWA by November 30, 2018. The final report will include a summary of the coordinates of the 30 wells sampled, contact information for the well owners, all the field and laboratory analysis data for each well, the quality control data for the analyses, copies of the summary reports provided to each well owner, and maps of interpolated concentrations for 36 different groundwater constituents. AgriLife-HST, KCGCD, and STWA will review the report and suggest any changes within two weeks, after which TAMUK will have two weeks to make the requested revisions.

4. Project Management

The proposed work will be supervised by Dr. Lee Clapp, Professor of Environmental Engineering at TAMUK, with oversight by Mr. Frank Escobedo, Texas AgriLife-HST Extension County Coordinator. Dr. Clapp has 17 years of experience supervising similar projects conducted by graduate students. The day-to-day sampling and lab analysis work will be performed by two TAMUK graduate students, with additional lab supervision from Dr. Yaneth Gamboa, Laboratory Manager for the TAMUK Department of Engineering.

5. Performance Period

The proposed scope of work will be completed between March 15 and December 31, 2018.

6. Budget and Justification

A **total of $12,441** is requested to cover the costs associated with the proposed scope of work (see attached budget spreadsheet). This total encompasses the following costs:

PI salary: $591
The project principle investigator, Dr. Lee Clapp, will be compensated for 0.05 months of summer salary to supervise the overall project, which is equivalent to $591.

Graduate student salaries: $4,500
Two graduate students will be supported to perform field sampling, field analyses, lab analyses, and GIS mapping of groundwater constituent concentrations for 30 wells sampled in Kleberg and Kenedy Counties. It is estimated that the sampling, field analyses, lab analyses, data management, and data mapping will require 2.5 work days of graduate student time per well (this includes analytical method development and quality control procedures). The graduate students will be paid approximately $7.50 per hour, as calculated below:

$$\frac{2.5\ work\ days}{well} \cdot \frac{8\ hrs}{work\ day} \cdot \frac{\$7.50}{hr} \cdot \frac{30\ wells}{project} = \$4{,}500$$

PI benefits: $136

The project PI, Dr. Lee Clapp, will also receive fringe benefits (workman's Compensation, Unemployment Compensation Insurance, and Leave Termination) at 16.80% of his salary. He will also receive 0.05 months of insurance coverage at a rate pf $746/month.

$$\$591 \times 0.1680 = \$99$$

$$\$746/month \times 0.05\ months = \$37$$

Graduate student benefits: $1,058

Both graduate students will receive fringe benefits (workman's Compensation, Unemployment Compensation Insurance, and Leave Termination) at 2.4% of their salary.

$$\$4{,}500 \times 0.024 = \$108$$

One of the graduate students will be hired as a half-time research assistant, which will make him/her eligible for health insurance at a rate of $211/month. The second graduate student will be paid hourly at less than half-time and will not be eligible for health insurance.

$$\$211/month \times 4.5\ months = \$950$$

Travel: $1,650

It is estimated that each well will, on average, will require about half a day to sample (including travel time, sample collection, and field analyses). Thus, on average, two wells can be sampled per day, so 30 wells can be sampled in 15 days. A pickup truck will be rented for each day at $90/day. Gas is estimated at $20/day.

$$\$110/day \times 15\ days = \$1{,}650$$

Supplies: $1,080

It is estimated that a total of $2,040 will be required for supplies, of which $960 will be recouped by charging the well owners a subsidized fee of $32 per well, leaving an additional $1,080 required. Required supplies include the following:

TAMUK Supplies Costs	
Sample bottles (case of 72 250-mL polyethylene)	$390
Field analyses supplies (pH probe; pH, cond, ORP standards)	$500
Argon gas for ICP-MS	$250
ICP-MS consumables	$150
IC consumables	$200
ICP-MS and IC Analytical standards	$250
Other consumables (reagents and acids)	$100
Fecal coliform analysis supplies	$200
Total	**$2,040**

Modified Total Direct Cost: $9,015

The "Modified Total Direct Cost" (MTDC) is the sum of the direct costs listed above.

Indirect Cost: $3,426
The indirect cost (IDC) is 38% of the MTDC, or $3,149 (38% is the stipulated IDC rate in the agreement between TAMUK and the Department of Housing and Human Services).

Total Cost: $12,441
The total cost is the sum of the MTDC and the IDC above.

Total Cost per Funder: $4,147
This proposal is requesting that Texas AgriLife Extension-Kleberg & Kenedy Counties, Healthy South Texas Program (**AgriLife-HST**), South Texas Water Authority (**STWA**), and Kenedy County Groundwater Conservation (**KCGCD**) each fund one-third of the total cost.

7. References

American Public Health Association (APHA). *Standard Methods for the Examination of Water and Wastewater*. 22nd Edition (2012).

Boghici, R. *A Field Manual for Groundwater Sampling.* Texas Water Development Board. (2003).

Brockhoff, C. A., et al. *EPA Method 200.8: Determination of Trace Elements in Waters and Wastes by Inductively Coupled Plasma-Mass Spectrometry*. (1999).

Hautman, Daniel P., and David J. Munch. *EPA Method 300.1: Determination of Inorganic Anions in Drinking Water by Ion Chromatography. EPA: Ohio* (1997).

Texas Natural Resources Information System (TNRIS). 2014. Maps & Data. http://www.tnris.org/get-data.

U.S. Environmental Protection Agency (EPA). 2017. Drinking Water Contaminants – Standards and Regulations. http://water.epa.gov/drink/contaminants/.

TAMUK Office of Research and Sponsored Programs Budget Template/Worksheet

Project Title: Water Quality Screening of Private Wells in Kleberg County and Kenedy Counties
SPONSOR: Texas AgriLife Extension - Kleberg & Kenedy Counties, Healthy South Texas
Performance Period: 3/15/18 - 12/31/18

This worksheet is a guide only, as each project, sponsor, and proposal will vary, so some entries will change for each PI. Please be careful as you add, edit, or delete cells to not lose or alter the formulas entered to help make calculations easier.

This is for Salaries for PIs, CoPIs, Staff who are Key/Senior Personnel. Enter one month's salary in column "C". In columns D-H, enter the number of months to be worked. Those to be charged to the

	A. Senior Personnel	Monthly Salary	Year 1	Year 2	Year 3	Year 4	Year 5	Year 1	Year 2	Year 3	Year 4	Year 5	Total Project Costs
		see calculating person months tab											
	1. PI Lee Clapp	$ 11,821.20	0.05	0	0	0	0	591.06	0.00	0.00	0.00	0.00	591.06
	2. CoPI Name 01	$ -	0	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00
	3. CoPI Name 02	$ -	0	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00
	4. CoPI Name 03	$ -	0	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00
	5. Full Time Staff (Example Postdoctoral Scientist)	$ -	0	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00
	6. Full Time Staff (Example Postdoctoral Scientist)	$ -	0	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00
	7. Part Time Staff (not eligible for full time benefits)	$ -	0	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00
					Subtotal Key Personnel Wages			591.06	0.00	0.00	0.00	0.00	591.06

This is for Salaries for students and other workers to be paid on the project. Enter one month's salary in column "C". In columns D-H, enter the number of months to be worked.

	B. Other Personnel		Year 1	Year 2	Year 3	Year 4	Year 5	Year 1	Year 2	Year 3	Year 4	Year 5	Total Project Costs
	1. Graduate Student(s)	$ 650.00	4.5	0	0	0	0	2,925.00	0.00	0.00	0.00	0.00	2,925.00
	2. Graduate Students (Hourly)	$ 356.00	4.5	0	0	0	0	1,575.00	0.00	0.00	0.00	0.00	1,575.00
	3. Undergraduate Student(s) (Hourly)	$ -	0	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00
						Subtotal Student Wages		4,500.00	0.00	0.00	0.00	0.00	4,500.00
						TOTAL SALARY AND WAGES for ALL Employees:		5,091.06	0.00	0.00	0.00	0.00	5,091.06

This is to calculate the Fringe benfits (payroll taxes, etc) for those on the project. Rates vary based on type of employee.

	C. Fringe Benefits												
	1. PI Lee Clapp	16.80%						99.30	0.00	0.00	0.00	0.00	99.30
	2. CoPI Name 01	16.80%						0.00	0.00	0.00	0.00	0.00	0.00
	3. CoPI Name 02	16.80%						0.00	0.00	0.00	0.00	0.00	0.00
	4. CoPI Name 03	16.80%						0.00	0.00	0.00	0.00	0.00	0.00
	5. Full Time Staff (Example Postdoctoral Scientist)	16.80%						0.00	0.00	0.00	0.00	0.00	0.00
	6. Full Time Staff (Example Postdoctoral Scientist)	16.80%						0.00	0.00	0.00	0.00	0.00	0.00
	7. Part Time Staff (not eligible for full time benefits)	10.00%						0.00	0.00	0.00	0.00	0.00	0.00
	1. Graduate Student(s)	2.40%						70.20	0.00	0.00	0.00	0.00	70.20
	2. Graduate Students (Hourly)	2.40%						37.80	0.00	0.00	0.00	0.00	37.80
	3. Undergraduate Student(s) (Hourly)	2.40%						0.00	0.00	0.00	0.00	0.00	0.00
						Subtotal All Fringe Benefits		207.30	0.00	0.00	0.00	0.00	207.30

These rates are for individual employees. If you or any of your Key Personnel pay a family rate for insurance, please enter it in column "C". For monthly rates see: http://www.tamuk.edu/osr/Forms/index.html

	D. Insurance Rates												
	1. PI Lee Clapp	$ 746.00	0.05	0	0	0	0	37.30	0.00	0.00	0.00	0.00	37.30
	2. CoPI Name 01	$ 746.00	0	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00
	3. CoPI Name 02	$ 746.00	0	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00
	4. CoPI Name 03	$ 746.00	0	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00
	5. Full Time Staff (Example Postdoctoral Scientist)	$ 746.00	0	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00
	6. Full Time Staff (Example Postdoctoral Scientist)	$ 746.00	0	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00
	7. Part Time Staff (not eligible for full time benefits)	$ 352.00	0	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00
	1. Graduate Student(s)	$ 211.00	4.5	0	0	0	0	949.50	0.00	0.00	0.00	0.00	949.50
	2. Graduate Students (Hourly)	$ 211.00	0	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00
						Subtotal All Insurance		986.80	0.00	0.00	0.00	0.00	986.80
						TOTAL COMBINED SALARY, FRINGE & INSURANCE :		6,285.16	0.00	0.00	0.00	0.00	6,285.16

This is for Permanent Equipment, and is not used in calculation of Indirect Costs

	E. Permanent Equipment - Not included in MTDC (**Equipment must be a single item equal to or greater than $5000 a unit**)												
	1. Example - Mass Spectrometer							0.00	0.00	0.00	0.00	0.00	0.00
	2.							0.00	0.00	0.00	0.00	0.00	0.00
	3.							0.00	0.00	0.00	0.00	0.00	0.00
						Subtotal Permanent Equipment		0.00	0.00	0.00	0.00	0.00	0.00

	F. Travel - Included in MTDC												
	1. (Lodging / Meals / Transportation x how many people x how many times a year)							1,650.00	0.00	0.00	0.00	0.00	1,650.00
	2. (Lodging / Meals / Transportation x how many people x how many times a year)							0.00	0.00	0.00	0.00	0.00	0.00
						Subtotal Travel		1,650.00	0.00	0.00	0.00	0.00	1,650.00

This is for expenses that do not fit easily in other categories, but are not excluded from Indirect Cost calculations

	G. Other Direct Costs - Included in MTDC												
	1. Example - Publication Costs							0.00	0.00	0.00	0.00	0.00	0.00
	2. Example - Materials and Supplies							1,080.00	0.00	0.00	0.00	0.00	1,080.00
	3. Example- contractual costs							0.00	0.00	0.00	0.00	0.00	0.00
	4.							0.00	0.00	0.00	0.00	0.00	0.00
						Subtotal Other Direct Costs		1,080.00	0.00	0.00	0.00	0.00	1,080.00

This section is to add the Direct Costs for each subcontract. Up to the first $25,000 of each subgrant or subcontract is used in IDC calculations (regardless of the period covered by the subgrant or subcontract).

	H. Sub-Contract - The first $25,000 of EACH subcontract is included in MTDC Calculations												
	1. Subcontract 1- Example- Subawards, University							0.00	0.00	0.00	0.00	0.00	0.00
	2. Subcontract 2							0.00	0.00	0.00	0.00	0.00	0.00
	3. Subcontract 3							0.00	0.00	0.00	0.00	0.00	0.00
						Subtotal Subcontracts		0.00	0.00	0.00	0.00	0.00	0.00

This section is to calculate the allowable Indirect Costs for each subcontract - be careful to keep formulas if adding more than 3 subcontracts. Otherwise, do not manually enter anything here - it will auto calculate the allowable IDC amounts for you.

	Sub-contract 1 amount allowed for MTDC							0.00	0.00	0.00	0.00	0.00	0.00
	Sub-total (out of the allowed 25,000)							0.00	0.00	0.00	0.00	0.00	
	Sub-contract 2 amount allowed for MTDC							0.00	0.00	0.00	0.00	0.00	0.00
	Sub-total (out of the allowed 25,000)							0.00	0.00	0.00	0.00	0.00	
	Sub-contract 3 amount allowed for MTDC							0.00	0.00	0.00	0.00	0.00	0.00
	Sub-total (out of the allowed 25,000)							0.00	0.00	0.00	0.00	0.00	
						Subtotal of Sub-contract amounts allowed for MTDC		0.00	0.00	0.00	0.00	0.00	0.00

This section is to add costs that cannot be used to generate Indirect Costs

	I. Other Direct Costs - Not included in MTDC (capital expenditures, charges for patient care, student tuition remission, rental costs of off-site facilities, scholarships, and fellowships)- Participant Costs Only												
	1. Example - Tuition for Students							0.00	0.00	0.00	0.00	0.00	0.00
	2. Example - Stipends for Students							0.00	0.00	0.00	0.00	0.00	0.00
	3. Example -							0.00	0.00	0.00	0.00	0.00	0.00
						Subtotal Other Direct Costs Not Included in MTDC		0.00	0.00	0.00	0.00	0.00	0.00

All salaries and wages, fringe benefits, materials, supplies, services, travel and subgrants and subcontracts up to the first $25,000 of each subgrant or subcontract

J.	Modified Total Direct Costs (MTDC)	9,015.16	0.00	0.00	0.00	0.00	9,015.16
K.	Total Direct Costs (ALL Direct Costs)	9,015.16	0.00	0.00	0.00	0.00	9,015.16

TAMUK's on-campus rate is 38.00% - some sponsors will not allow this rate and will have either no IDC allowed, or another rate to use

L.	Indirect Costs (IDC) / F&A Rate 38.00% — Subtotal - IDC amount	3,425.76	0.00	0.00	0.00	0.00	3,425.76

		Year 1	Year 2	Year 3	Year 4	Year 5	Total
M.	TOTAL PROJECT COSTS	12,440.93	0.00	0.00	0.00	0.00	12,440.93

ORIGS

2/21/2018

TAMUK Supplies Costs	
Sample bottles (case of 72 250-mL polyethylene)	$390
Field analyses supplies (pH probe; pH, cond, ORP standards)	$500
Argon gas for ICP-MS	$250
ICP-MS consumables	$150
IC consumables	$200
ICP-MS and IC Analytical standards	$250
Other consumables (reagents and acids)	$100
Fecal coliform analysis supplies	$200
Total TAMUK supplies costs for 30 samples	**$2,040**
Fees charged to 30 well owners ($32 per well)	$960
Total charged to grant	$1,080

Analysis	Cost per sample	Analytes													Methods
On-site sampling [1] + cond. (SC)[2] + ORP + pH +	$20														On-site multimeter
Major cations + hardness + sodium adsorption ratio (SAR)	$20	Ca	Mg	Na	K	Fe	Mn	hardness	SAR						ICP-MS (hardness & SAR by calculation)
Major anions + alkalinity (Alk)	$20	Cl^-	F^-	Br^-	SO_4^{2-}	NO_3^-	PO_4^{3-}	HCO_3^-	CO_3^{2-}	Alk					Ion chromatograph (Alk and carbonates by acid titration)
Trace elements (must include major cation & anion	$20	As	U	Cu	Zn	Ba	Pb	Cr	Ni	Sr	Se	V	Mo	B	ICP-MS
Total dissolved solids (TDS)	$10	TDS													Gravimetric (provides a more accurate value than calculating from spec. cond.)
Fecal coliform bacteria	$20	Fecal coliform													Membrane filter method
Dissolved radon gas (optional)	$20	Dissolved radioactive radon gas													*On-site* radon detector
Ion balance (for QC; requires both cation & anion	free														Calculation
Comparison to EPA and/or TCEQ drinking water	free														Calculation
Total cost per well (without radon analysis)	$110														

[1] All samples bottles with appropriate preservative will be provided by TAMUK.

[2] Specific conductivity analysis includes an *estimate* of total dissolved solids (TDS).