

INTERLOCAL AGREEMENT BETWEEN
THE CITY OF CORPUS CHRISTI
and
THE UNIVERSITY OF TEXAS AT AUSTIN

This Interlocal Agreement ("Agreement") is made by and between the University of Texas at Austin, a public institution of higher education located in Austin, Texas ("the University") and the City of Corpus Christi, a Texas home-rule municipality located principally in Nueces County, Texas, acting by and through its duly authorized City Manager, or designee ("the City"), and collectively referenced to as "Parties" or individually referenced to as "Party."

WHEREAS, the parties are authorized to enter into this Agreement pursuant to the provisions of the "Texas Interlocal Cooperation Act", Chapter 791 Texas Government Code; and

WHEREAS, the City of Corpus Christi desires that University perform certain research services hereafter described and is willing to compensate University for such services; and

WHEREAS, the University is willing to perform such research services;

Now therefore, The University and the City agree as follows:

I. AGREEMENT PURPOSE

The purpose of this Agreement is for the University to provide the City with research services related to microbial analysis in the Corpus Christi chlorinated distribution system.

II. OBLIGATIONS OF UNIVERSITY OF TEXAS AT AUSTIN

A. The University agrees to provide the City with services for the Project as set out in the Exhibit "A" (Scope of Services) attached to this Agreement and incorporated by reference.

B. The University shall appoint one staff person to act as the single point of contact with the City ("University SPOC"). The University SPOC shall possess the decision-making authority necessary to provide the services under the Agreement.

Contact information for the University SPOC is:

Dr. Mary Jo Kirisits
Associate Professor
310 E Dean Keeton St. Stop C1786
Austin, Texas 78712
Email: kirisits@mail.utexas.edu
Phone: 512-232-7120

C. If the identity of the University SPOC changes, the University will designate a replacement and provide written notification of this change to the City SPOC within thirty (30) days.

D. The University SPOC will provide monthly interim status report(s) via email correspondence to the City SPOC on the progress of the University's services as described in Exhibit "A" (Scope of Services).

III. OBLIGATIONS OF THE CITY OF CORPUS CHRISTI

A. In consideration for the services to be performed under this Agreement as described Exhibit "A" (Scope of Services), the City agrees to pay the University a total contract amount not-to-exceed \$49,547,

as set out in the itemized budget in Exhibit "A" (Budget) attached to this Agreement and incorporated by reference.

B. Specific funding for the services described in Exhibit "A" will be paid by the City of Corpus Christi.

C. The City shall appoint one staff person to act as the single point of contact with the University ("City SPOC").

Contact information for the City SPOC is:
Nikki Gordon
Project Manager, Water Utilities Laboratory
Utilities Department, City of Corpus Christi
13101 Leopard Corpus Christi, TX 78410
Email: NikkiG@cctexas.com
Phone: 361-826-1843

D. If the identity of the City SPOC changes, the City will designate a replacement and provide written notification of this change to the University SPOC within thirty (30) days.

IV. TERM AND TERMINATION

A. This Agreement begins on March 1, 2014, and ends on July 31, 2014, unless previously terminated in accordance with this Agreement. This Agreement expiration date may be extended, subject to the prior written approval of the parties, and authorization of the City of Corpus Christi.

B. If either party defaults in the performance of any of the terms or conditions of this Agreement, the defaulting party shall have thirty (30) days after receipt of the nondefaulting party's written notice of the default to cure the default. If such default is not cured within the thirty (30) day period, the nondefaulting party has the right without further notice to terminate this Agreement.

V. PAYMENT FOR SERVICES

A. The University agrees to submit invoices, in a form acceptable to the City, on a monthly basis, but not less than quarterly. The invoices shall be sent to:

Nikki Gordon
Project Manager, Water Utilities Laboratory
Utilities Department, City of Corpus Christi
13101 Leopard Corpus Christi, TX 78410
Email: NikkiG@cctexas.com
Phone: 361-826-1843

Upon receipt of complete and correct invoices, remittance will be payable to University of Texas at Austin and sent to:

The University of Texas at Austin
Office of Accounting
Attn: Sponsored Projects Award Administration
PO Box 7159
Austin, Texas 78713-7159

B. Each party paying for the performance of governmental function or services shall make those payments from current revenues available to the paying party.

VI. INTELLECTUAL PROPERTY

Reports, designs, and other work ("Material") developed by the University under this Agreement is the property of the University. The University warrants and represents the Material is the independent work of the University and an original work of authorship under the U.S. Copyright Act. Furthermore, the University warrants and represents the University has the right to license the Material to the City. The University licenses and grants to the City an irrevocable, nonexclusive, and royalty-free license to use, reproduce, copy, publish, prepare derivative works from, distribute to the public, perform, and display publicly for or on behalf of the City, the intellectual property rights in the Material developed as part of the work under this Agreement.

VII. MISCELLANEOUS

A. Severability. If a court of competent jurisdiction determines that a term or provision of the Agreement is void or unenforceable, the remainder of this Agreement remains effective to the extent permitted by law.

B. Law and Venue. This Agreement shall be governed by the laws of the State of Texas, without regard to conflict of law principles which would apply the law of any other jurisdiction. Venue for any lawsuit or litigation arising from this Agreement shall be in Austin, Texas.

C. Assignment. A party to this Agreement may not assign or transfer its interests under this Agreement.

D. Amendment in Writing. This Agreement may be modified in whole or in part only by a writing properly executed by both parties. Neither any representation or promise made after the execution of this Agreement, nor any modification or amendment of this Agreement, shall be binding on the parties unless made in writing and properly executed by both parties.

E. Entire Agreement. This Agreement constitutes the entire Agreement and understanding between the parties and supersedes all previous agreements, understandings, discussions, or representations concerning its subject matter.

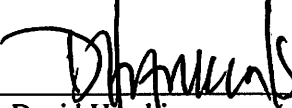
F. Notice. Notices to either party shall be in writing, and may be either hand-delivered or sent by certified or registered mail, postage paid, returns receipt requested. If sent to the parties at the addresses designated in this Agreement, notice shall be deemed effective upon receipt in the case of hand-delivery and three days after deposit in the U.S. Mail in case of mailing. All notices to the University shall be sent to the address of the University SPOC in Section II B. above. All notices to the City shall be sent to the address of the City SPOC in Section III C. above.

G. Survival of Obligations. All obligations that impose continuing obligations on the Parties, including but not limited to reports, ownership of intellectual property, and warranty of title shall survive the expiration or termination of this Agreement.

H. Signature Authority. The parties attest that the signatories below are duly authorized by their respective parties to enter into this Agreement.

WHEREFORE, this Interlocal Agreement is effective on the date of execution by the last of the party to sign this Agreement.

The University of Texas at Austin

By: 
David Hawkins
Associate Director
Office of Sponsored Projects

Date: 4.1.2014

City of Corpus Christi

By: _____
Name:

Title:

Date: _____

Approved as to form:

By: _____
Assistant City Attorney

EXHIBIT A
SCOPE OF SERVICES

See attached

Proposal for The City of Corpus Christi

To: Gabriel Ramirez and Nikki Gordon

From: The University of Texas at Austin, Dr. Mary Jo Kirisits and Dr. Sungwoo Bae

2/15/14

Task 1. Microbial community analysis in the Corpus Christi chloraminated distribution system to identify key nitrifying microorganisms

In our previous report, *amoA* genes from Bacteria and Archaea in the Corpus Christi distribution system were monitored through qPCR. Given the *amoA* concentrations measured, the report suggests that diverse AOB and AOA might be present throughout the distribution system. For example, the occurrence of *amoA* genes from total Bacteria was more frequent than that from *Nitrosomonas oligotropha* (a Bacteria), indicating that unidentified *amoA* genes from AOB were predominant in the distribution system. In a recent report examining 112 drinking water samples (source waters, pilot-plant and full-scale distribution systems), *Nitrosomonas oligotropha* occurred widely but other substrains of *Nitrosomonas oligotropha* and *Nitrobacter* also were common (Starke et al. 2013).

To allow the City of Corpus Christi to ensure that their monitoring program is specific and appropriate to their particular distribution system, we propose to collect microbial community structure data about the City of Corpus Christi distribution system. With the three Taqman AOB assays that we have applied previously to City of Corpus Christi samples, *Nitrosomonas oligotropha* was the only one detected (i.e., *Nitrosospira* and non-*oligotropha Nitrosomonas* were not observed). However, a Bacterial community analysis (via pyrosequencing) for the City of Corpus Christi will demonstrate if any other AOB should be routinely monitored; the community analysis will be performed using DNA extracted from previous samples across the year. If no other AOB are routinely found in this analysis, we suggest that the City of Corpus Christi continue the Taqman assay for only *Nitrosomonas oligotropha* on a routine basis. If other AOB are routinely found in this analysis, we will develop Taqman assays for those organisms (Task 2.2); we will suggest that the City of Corpus Christi perform these Taqman assays and that for *Nitrosomonas oligotropha* on a routine basis. (Note: Taqman assays are preferable over SYBR Green assays because melting-curve analysis for each sample is not required for a Taqman assay.)

We also propose an AOA microbial community analysis (pyrosequencing) for the City of Corpus Christi because the specific AOA important in their distribution system are unknown; we currently are using a SYBR Green qPCR assay for AOA from marine environments because no assay for AOA in chloraminated distribution systems is available. Thus, to make the City's monitoring of AOA specific to their system, we must know which AOA are commonly found in the City of Corpus Christi distribution system. As above for Bacteria, specific Taqman AOA assays will be developed if several AOA predominate in the analysis (Task 2.2).

Thus, the microbial community analyses will allow us to develop a specific monitoring program for AOB and AOA in the City of Corpus Christi distribution system.

Task 2. Develop robust qPCR assays for AOB and AOA detection in the Corpus Christi distribution system

qPCR assays are useful tools that can rapidly provide information about nitrification events via *amoA* gene quantification in distribution systems. qPCR assays should be designed properly to perform routine examination of *amoA* genes from AOB and AOA in drinking water. Previously, Regan et al. developed Taqman assays by modifying conventional PCR assays to quantify AOB in chloraminated distribution system (Regan et al. 2007). However, those assays were not designed for qPCR - where qPCR needs explicit consideration of amplicon size and qPCR running time. Furthermore, our data suggest that the existing three AOB Taqman assays might not detect *amoA* genes from all numerically important AOB present in the City of Corpus Christi distribution system. Therefore, we propose the following subtasks:

Task 2.1. To modify the current *Nitrosomonas oligotropha* Taqman assay to meet acceptable qPCR design criteria. Here, the current *N. oligotropha* assay will be optimized to meet criteria accepted in current practice. This optimized assay can be used immediately by the City of Corpus Christi because they routinely observe *N. oligotropha* in their distribution system.

Task 2.2. To design new Taqman assays for the AOB and AOA that are numerically dominant in the Corpus Christi distribution system. Given the data from the microbial community analysis (Task 1.1), new Taqman assays will be designed to target the numerically dominant AOB and AOA in the Corpus Christi system. Multiplex assays will be designed so as to be compatible with the real-time thermal cycler purchased by the City of Corpus Christi.

Task 3. A training session of molecular techniques for qPCR

A one-week, on-site training session is proposed at the City of Corpus Christi laboratory.¹ The session will include lecture and laboratory components. In the lecture, Corpus personnel will learn molecular biology and (q)PCR theory as well as getting an overview of current methods related to nitrification in drinking water distribution systems. In the laboratory sessions, Corpus personnel will learn molecular lab techniques including DNA extraction from enrichment cultures and distribution system water samples, qPCR plate setup, and real-time thermal cycler operation. Basic data analysis, statistical analysis of qPCR data, and troubleshooting will be discussed. We will provide information on ordering primers and probes. We will bring aliquots

¹ As we discussed, the choice of which Corpus Christi personnel participate in the training session is at the discretion of the City of Corpus Christi. For instance, a one-on-one training between Dr. Sungwoo Bae and Ms. Nikki Gordon could be done.

of plasmid DNA from *Escherichia coli* strains for use as qPCR standards, where the aliquots can be stored at -20 °C (in a non-self-defrosting freezer) for several years.

Timeline

The following timeline is proposed.

Task	Mar 2014	April 2014	May 2014	June 2014	July 2014
1 – Microbial community analysis					
2.1 - Optimize current <i>N. oligotropha</i> assay					
2.2 – Design new qPCR assays targeting AOB/AOA in Corpus Christi system					
3 – Training session					

Budget

The budget will cover the time dedicated by Dr. Sungwoo Bae and Dr. Mary Jo Kirisits to the project (e.g., laboratory work, report preparation, meetings with Corpus personnel, preparation of materials for the training session, on-site training session with Corpus personnel), consumable supplies (e.g., DNA extraction kits, qPCR reagents, gloves, plasticware [microfuge tubes, qPCR plates, pipet tips]), chemicals (e.g., growth media, disinfectant), equipment fees (real-time thermal cycler), sequencing costs, travel (for the training session at Corpus Christi), and overhead (15%). The budget is outlined below according to task.

Task	Budget
1 – Microbial community analysis	\$13,428
2.1 - Optimize current <i>N. oligotropha</i> assay	\$ 9,748
2.2 – Design new qPCR assays targeting AOB/AOA in Corpus Christi system	\$17,657
3 – Training session	\$ 8,714
TOTAL	\$49,547

References

- Regan, J.M., Cho, A.-Y. and Kim, S. (2007) Monitoring Ammonia-Oxidizing Bacteria in Chloraminated Distribution System, American Water Works Association Research Foundation, Denver, Colorado.
- Starke, J.A., Safak Yilmaz, Gorzalski, A., Noguera, D.R. and Harrington, G.W. (2013) Characterizing the Microbial Community Responsible for Nitrification Water Research Foundation, Denver, CO.
- Wahman, D.G., Wulfeck-Kleier, K.A. and Pressman, J.G. (2009) Monochloramine Disinfection Kinetics of *Nitrosomonas europaea* by Propidium Monoazide Quantitative PCR and Live/Dead BacLight Methods. *Applied and Environmental Microbiology* 75(17), 5555-5562.