STATE OF TEXAS

TWDB Contract No. 1600011949

COUNTY OF TRAVIS

General Revenue
INTERA INCORPORATED

This Contract, (hereinafter "CONTRACT"), between the Texas Water Development Board (hereinafter "TWDB") and **INTERA INCORPORATED** (hereinafter "CONTRACTOR"), is composed of two parts, SECTION I. SPECIFIC CONDITIONS AND EXCEPTIONS TO THE STANDARD AGREEMENT and SECTION II. STANDARD AGREEMENT. The terms and conditions set forth in SECTION I will take precedence over terms and conditions in SECTION II.

SECTION I. SPECIFIC CONDITIONS AND EXCEPTIONS TO STANDARD AGREEMENT

ARTICLE I. DEFINITIONS

For the purposes of this CONTRACT, the following terms or phrases shall have the meaning ascribed therewith:

1. TWDB – The Texas Water Development Board, or its designated representative

2. CONTRACTOR – INTERA INCORPORATED

3. EXECUTIVE ADMINISTRATOR – The Executive Administrator of the TWDB or a designated representative

4. PARTICIPANT(S) – Dennis Powers Consulting, University of Texas at Austin (Dr. Carlos Torres-Verdin and Dr. Jack Sharp), Carollo Engineers, Inc., Drillinginfo, and The Subsurface Library

5. REQUIRED INTERLOCAL AGREEMENT(S) – None

6. PROJECT – Identification of Potential Brackish Groundwater Production Areas – Rustler Aquifer

7. TWDB APPROVAL DATE – January 6, 2016

8. DEADLINE FOR CONTRACT EXECUTION – April 1, 2016

9. CONTRACT INITIATION DATE – January 6, 2016

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10. DEADLINE FOR IDENTIFICATION OF POTENTIAL PRODUCTION AREAS: CONTRACTOR to provide a minimum of one-month advance notice to TWDB staff to setup and prepare for the meeting.

11. PROJECT COMPLETION DATE – July 31, 2016

12. CONTRACT EXPIRATION DATE – September 30, 2016 (60 days after Project Completion Date)

13. TOTAL PROJECT COSTS – $200,000.00

14. TWDB SHARE OF THE TOTAL PROJECT COSTS – the lesser of $200,000.00 or 100.00 percent of the total project costs or individual payment submission

15. LOCAL SHARE OF THE TOTAL PROJECT COSTS – $0 in cash or 0 percent of the total project costs or individual payment submission

16. PAYMENT SUBMISSION SCHEDULE –Monthly

17. OTHER SPECIAL CONDITIONS AND EXCEPTIONS TO STANDARD AGREEMENT OF THIS CONTRACT – See below

    a. Conflict of Interest: The CONTRACTOR agrees that it will not be involved in any new or existing contracts with persons or entities other than TWDB and regional water planning groups for brackish groundwater supply and availability studies involving the geographical project area of this CONTRACT (as detailed in Exhibit A and Exhibit I) while conducting the work required under this TWDB Contract without a prior no conflict of interest determination and written authorization by TWDB.

SECTION II. STANDARD AGREEMENT

ARTICLE I. RECITALS

Whereas, on TWDB APPROVAL DATE, the TWDB considered providing the CONTRACTOR a grant to conduct a PROJECT;

Whereas, the CONTRACTOR and PARTICIPANT will commit the LOCAL SHARE OF THE TOTAL PROJECT COSTS, if applicable, in cash and/or in-kind services to pay for the LOCAL SHARE OF THE TOTAL PROJECT COSTS of this PROJECT;

Whereas, the CONTRACTOR is the entity who will act as administrator of the TWDB's research grant and will be responsible for the execution of this contract;

Whereas, on the TWDB APPROVAL DATE, the TWDB approved a research grant to the CONTRACTOR;

Now, therefore, the TWDB and the CONTRACTOR, agree as follows:

ARTICLE II. PROJECT DESCRIPTION AND SERVICES TO BE PERFORMED

1. The TWDB enters into this CONTRACT pursuant to Water Code §16.012; Exhibit A, the original grant application, and Exhibit I, the original request for qualifications, which is incorporated herein and made a permanent part of this CONTRACT; and this CONTRACT.

2. The CONTRACTOR will conduct a PROJECT, as delineated and described in Exhibit A and Exhibit I, according to the Scope of Work contained in Exhibit B.

3. A progress report, including results to date, will be provided to the EXECUTIVE ADMINISTRATOR monthly, throughout the project. Special interim reports on special topics and/or results will be provided as appropriate. Instructions for the progress report are shown in Exhibit E, TWDB Guidelines for a Progress Report.

ARTICLE III. CONTRACT TERM, SCHEDULE, REPORTS, AND OTHER PRODUCTS

1. The CONTRACTOR has until the DEADLINE FOR CONTRACT EXECUTION to execute this CONTRACT and to provide acceptable evidence of any REQUIRED INTERLOCAL AGREEMENT(S) and the CONTRACTOR’s ability to provide the LOCAL SHARE OF THE TOTAL PROJECT COSTS, if applicable, to the EXECUTIVE ADMINISTRATOR for approval or the TWDB's SHARE OF THE TOTAL PROJECT COSTS will be rescinded.

2. The term of this CONTRACT shall begin and the CONTRACTOR shall begin performing its obligations hereunder on the CONTRACT INITIATION DATE and shall expire on the CONTRACT EXPIRATION DATE. Delivery of an acceptable final report prior to the CONTRACT EXPIRATION DATE shall constitute completion of the terms of this CONTRACT.

3. The CONTRACTOR will complete the Scope of Work and will deliver seven (7) double-sided copies of a draft final report to the EXECUTIVE ADMINISTRATOR no later than the PROJECT COMPLETION DATE. The draft final report will include the scope of work; a description of the research performed; the methodology and materials used; any diagrams or graphics used to explain the procedures related to the project; any data collected; an electronic copy of any computer programs, maps, or models developed under the terms of this CONTRACT; analysis of the research results; conclusions and recommendations; a list of references, a Table of Contents, List of Figures, List of Tables, an Executive Summary, and any other pertinent information. Each report shall have an authorship list of persons responsible for the studies: firm or agency names as authors are not acceptable. The reports shall be sealed as required by Texas Occupation Code, Title 6, Chapter 1002. All final reports should be prepared according to Exhibit D, Guidelines for Authors Submitting Contract Reports to the Texas Water Development Board, Exhibit G, Contract Data Requirements, and Exhibit H, Outline for Reports. After a 14-day review period, the EXECUTIVE ADMINISTRATOR will return review comments to the CONTRACTOR.

4. The CONTRACTOR will consider incorporating comments from the EXECUTIVE ADMINISTRATOR and other commenters on the draft final report into a final report. The CONTRACTOR will include a copy of the EXECUTIVE ADMINISTRATOR's comments in the final report. The CONTRACTOR will submit one (1) electronic copy of the entire final report in Portable Document Format (PDF) and seven (7) bound double-sided copies of the final report to the EXECUTIVE ADMINISTRATOR no later than thirty (30) days after the PROJECT COMPLETION DATE. The CONTRACTOR will submit one (1) electronic copy of any computer programs or models developed under the terms of this CONTRACT. In compliance with Texas Administrative Code Chapters 206 and 213 (related to Accessibility and Usability of State Web Sites), the digital copy of the final report will comply with the requirements and standards specified in statute. After a 30-day review period, the EXECUTIVE ADMINISTRATOR will either accept or reject the final report. If the final report is rejected, the rejection letter sent to the CONTRACTOR shall state the reasons for rejection and the steps the CONTRACTOR need to take to have the final report accepted and the retainage released.

5. The CONTRACTOR will submit the most recent progress report with submittal of payments according to the PAYMENT SUBMISSION SCHEDULE. Progress reports shall be in written form and shall include a brief statement of the overall progress made since the last status report; a brief description of any problems that have been encountered during the previous reporting period that will affect the project, delay the timely completion of any portion of this CONTRACT, inhibit the completion of or cause a

change in any of the project's products or objectives; and a description of any action the CONTRACTOR plans to take to correct any problems that have been encountered.

6. The EXECUTIVE ADMINISTRATOR cannot extend the PROJECT COMPLETION DATE or the CONTRACT EXPIRATION DATE. The CONTRACTOR shall notify the EXECUTIVE ADMINISTRATOR in writing and the CONTRACT MANAGER in person immediately if any problems encountered during the project will delay the timely completion of any portion of this CONTRACT.

ARTICLE IV. COMPENSATION AND REIMBURSEMENT

1. The TWDB agrees to compensate and reimburse the CONTRACTOR in a total amount not to exceed the TWDB's SHARE OF THE TOTAL PROJECT COSTS for costs incurred and paid by the CONTRACTOR pursuant to performance of this CONTRACT. The CONTRACTOR will contribute local matching funds, if applicable, in sources and amounts defined as the LOCAL SHARE OF THE TOTAL PROJECT COSTS. The TWDB shall reimburse the CONTRACTOR for ninety percent (90%) of the TWDB's share of each invoice pending the CONTRACTOR’s performance, completion of a Final Report, and written acceptance of said Final Report by the EXECUTIVE ADMINISTRATOR, at which time the TWDB shall pay the retained ten percent (10%) to the CONTRACTOR.

2. The CONTRACTOR shall submit payments and documentation for reimbursement billing according to the PAYMENT SUBMISSION SCHEDULE and in accordance with the approved task and expense budgets contained in Exhibit C to this CONTRACT. The CONTRACTOR has budget flexibility within task and expense budget categories to the extent that the resulting change in amount in any one task or expense category does not exceed 35% of the total authorized amount by this CONTRACT for the task or category. Larger deviations shall require approval by EXECUTIVE ADMINISTRATOR or designee which will be documented through an Approved Budget Memorandum to the TWDB contract file. The CONTRACTOR will be required to provide written explanation for the overage and reallocation of the task and expense amount.

   For all reimbursement billings including any subcontractor's expenses, the EXECUTIVE ADMINISTRATOR must have determined that the REQUIRED INTERLOCAL AGREEMENT(S) and contracts or agreements between the CONTRACTOR and the subcontractor are consistent with the terms of this CONTRACT. The CONTRACTOR is fully responsible for paying all charges by subcontractors prior to reimbursement by the TWDB.

3. The CONTRACTOR and its subcontractors shall maintain satisfactory financial accounting documents and records, including copies of invoices and receipts, and shall make them available for examination and audit by the EXECUTIVE ADMINISTRATOR. Accounting by the CONTRACTOR and its subcontractors shall be in a manner consistent with Generally Accepted Accounting Principles.

4. By executing this CONTRACT, the CONTRACTOR accepts the authority of the State Auditor's Office, under direction of the legislative audit committee, to conduct audits and investigations in connection with any and all state funds received pursuant to this contract. The CONTRACTOR shall comply with and cooperate in any such investigation or audit. The CONTRACTOR agrees to provide the State Auditor with access to any information the State Auditor considers relevant to the investigation or audit. The CONTRACTOR also agrees to include a provision in any subcontract related to this contract that requires the subcontractor to submit to audits and investigation by the State Auditor's Office in connection with any and all state funds received pursuant to the subcontract.

5. The CONTRACTOR shall submit a progress report as described in Article II, Item 3 and the following documentation which documents the TOTAL PROJECT COSTS for the reporting period even if the TOTAL PROJECT COSTS is zero for reimbursement by the TWDB to the CONTRACTOR for the TWDB's SHARE OF THE TOTAL PROJECT COSTS shall be submitted by the CONTRACTOR to the EXECUTIVE ADMINISTRATOR for reimbursement billing:
   A. Completed and Signed Payment Request Checklist which includes the following:
      (1) TWDB CONTRACT Number;
      (2) Billing period; beginning (date) to ending (date);
      (3) Total Expenses for this period;
      (4) Total In-kind services;
      (5) Less LOCAL SHARE OF THE TOTAL PROJECT COSTS for the billing period;
      (6) Total TWDB's SHARE OF THE TOTAL PROJECT COSTS for the billing period;
      (7) Amount of retainage to be withheld for the billing period;
      (8) Total costs to be reimbursed by the TWDB for the billing period; and
      (9) Certification, signed by the CONTRACTOR’s authorized representative, that the expenses submitted for the billing period are a true and correct representation of amounts paid for work performed directly related to this contract.
   B. For direct expenses incurred by the CONTRACTOR other than subcontracted work:
      (1) Detail showing the tasks that were performed; the percent and cost of each task completed; a total cost figure for each direct expense category including labor, fringe, overhead, travel, and other expenses such as communication and postage, technical and computer services, expendable supplies, printing and reproduction; and
      (2) Copies of detailed, itemized invoices/receipts for other expenses (credit card summary receipts or statements are not acceptable)

   C. For direct expenses incurred by the CONTRACTOR for subcontracted work:
      (1) Copies of invoices from the subcontractors to the CONTRACTOR;
      (2) Detail showing the tasks that were performed; the percent and cost of each

task completed; a total cost figure for each direct expense category including travel, and other expenses such as communication and postage, technical and computer services, expendable supplies, printing and reproduction; and the total dollar amount due to the consultant; and

(3) Copies of detailed, itemized invoices/receipts for other expenses (credit card summary receipts or statements are not acceptable)

D. For travel expenses for the CONTRACTOR and/or subcontractor(s) –

(1) Names, dates, work locations, time periods at work locations, itemization of subsistence expenses of each employee, limited, however, to travel expenses authorized for state employees by the General Appropriations Act, Tex. Leg. Regular Session, 2015, Article IX, Part 5, as amended or superseded. Receipts required for lodging;

(2) Copies of invoices or tickets for transportation costs or, if not available, names, dates, and points of travel of individuals; and

(3) All other reimbursable travel expenses -- invoices or purchase vouchers showing reason for expense with receipts to evidence the amount incurred.

6. Incomplete requests will be returned to the CONTRACTOR if deficiencies are not resolved within ten (10) business days.

7. If for some reason the reimbursement request cannot be processed due to the need for an amendment to the CONTRACT, the CONTRACTOR will be required to resubmit the Payment Request Checklist dated after the execution of the amendment.

8. The CONTRACTOR is responsible for any food or entertainment expenses incurred by its own organization or that of its subcontractors, outside that of the travel expenses authorized and approved by the State of Texas under this CONTRACT.

9. In accordance with Texas Administrative Code (TAC) Title 1, Part 5, Chapter 111, Subchapter B, Rule §111.14, the CONTRACTOR shall maintain business records documenting its compliance with the approved Historically Underutilized Business subcontracting plan in the format prescribed by the Texas Procurement and Support Services (Exhibit F). Exhibit F must include payment information on all HUB and non-HUB subcontractors. Submittal of these monthly reports is required as a condition of payment.

   The TWDB will monitor the HUB subcontracting plan monthly to ensure the value of the subcontracts meets or exceeds the HUB subcontracting provisions specified in the contract. The CONTRACTOR who fails to implement the HUB subcontracting plan in good faith will be reported to Texas Procurement and Support Services. The TWDB may revoke the contract for breach of contract and make a claim against the CONTRACTOR.

ARTICLE V. INTELLECTUAL PROPERTY: OWNERSHIP, PUBLICATION, AND ACKNOWLEGEMENT

1. "Use" of a work product, whether it's the CONTRACTOR Works, a Subcontractor Works or otherwise, shall mean and include, without limitation hereby, any lawful use, copying or dissemination of the work product, or any lawful development, use, copying or dissemination of derivative works of the work product, in any media or forms, whether now known or later existing.

2. "No Compensation Obligation" shall mean there is no obligation on the part of one co-owner or licensee of a work, whether it's the CONTRACTOR Works, a Subcontractor Works or otherwise, to compensate other co-owners, licensees or licensors of the work for any use of the work by the using co-owner or licensee, including but not limited to compensation for or in the form of: royalties; co-owner or licensee accounting; sharing of revenues or profits among co-owners, licensees or licensors; or any other form of compensation to the other co-owners, licensees or licensors on account of any use of the work.

3. "Dissemination" shall include, without limitation hereby, any and all manner of: physical distribution; publication; broadcast; electronic transmission; internet streaming; posting on the Internet or World Wide Web; or any other form of communication, transmission, distribution, sending or providing, in any forms or formats, and in or using any media, whether now known or later existing.

4. The TWDB shall have an unlimited, unrestricted, perpetual, irrevocable, non-exclusive royalty-free right to access and receive in usable form and format, and to use all technical or other data or information developed by the CONTRACTOR and Subcontractor in, or otherwise resulting from, the performance of services under this CONTRACT.

5. For purposes of this Article, "CONTRACTOR Works" are work products developed by the CONTRACTOR and Subcontractor using funds provided under this CONTRACT or otherwise rendered in the performance in whole or part of this CONTRACT, including but not limited to reports, drafts of reports, or other material, data, drawings, studies, analyses, notes, plans, computer programs and codes, or other work products, whether final or intermediate.

    a. It is agreed that all CONTRACTOR Works shall be the joint property of the TWDB and the CONTRACTOR.

    b. The parties hereby agree that, if recognized as such by applicable law, the CONTRACTOR Works are intended to and shall be works-made-for-hire with joint ownership between the TWDB and the CONTRACTOR as such works are created in whole or part.

    c. If the CONTRACTOR Works do not qualify as works-made-for-hire under

applicable law, the CONTRACTOR hereby conveys co-ownership of such works to the TWDB as they are created in whole or part. If present conveyance is ineffective under applicable law, the CONTRACTOR agrees to convey a co-ownership interest of the CONTRACTOR Works to the TWDB after creation in whole or part of such works, and to provide written documentation of such conveyance upon request by the TWDB.

d. The TWDB and the CONTRACTOR acknowledge that the copyright in and to a copyrightable CONTRACTOR Work subsists upon creation of the CONTRACTOR Works and its fixing in any tangible medium. The CONTRACTOR or the TWDB may register the copyrights to such Works jointly in the names of the CONTRACTOR and the TWDB.

e. The TWDB and the CONTRACTOR each shall have full and unrestricted rights to use a CONTRACTOR Works with No Compensation Obligation.

6. For purposes of this Article, "Subcontractor Works" include all work product developed in whole or part by or on behalf of Subcontractors engaged by the CONTRACTOR to perform work for or on behalf of any CONTRACTOR under this CONTRACT (or by the Subcontractors' Subcontractors hereunder, and so on). The CONTRACTOR shall secure in writing from any Subcontractors so engaged:

a. unlimited, unrestricted, perpetual, irrevocable, royalty-free rights of the TWDB (and, if desired, of the CONTRACTOR) to access and receive, and to use, any and all technical or other data or information developed in or resulting from the performance of services under such engagement, with No Compensation Obligation; and either

b. assignment by the Subcontractor to the TWDB (and, if desired by them, jointly to the CONTRACTOR) of ownership (or joint ownership with the Subcontractor) of all Subcontractor Works, with No Compensation Obligation; or

c. grant by Subcontractor of a non-exclusive, unrestricted, unlimited, perpetual, irrevocable, world-wide, royalty-free license to the TWDB (and, if desired by them, the CONTRACTOR) to use any and all Subcontractor Works, including the right to sublicense use to third parties, with No Compensation Obligation.

7. No unauthorized patents. The CONTRACTOR Works and Subcontractor Works or other work product developed or created in the performance of this CONTRACT or otherwise using funds provided hereunder shall not be patented by the CONTRACTOR or their Subcontractor unless the EXECUTIVE ADMINISTRATOR consents in writing to submission of an application for patent on such works; and provided that, unless otherwise agreed in writing, any application made for patent shall include and name the TWDB (and, as applicable and desired by them, the CONTRACTOR) as co-owners of the patented work:

a. no patent granted shall in any way limit, or be used by the CONTRACTOR or Subcontractor to limit or bar the TWDB's rights hereunder to access and receive in useable form and format, and right to use, any and all technical or other data or information developed in or resulting from performance pursuant to this CONTRACT or the use of funds provided hereunder; and

b. the TWDB (and, if applicable, the CONTRACTOR) shall have No Compensation Obligation to any other co-owners or licensees of any such patented work, unless otherwise expressly agreed in writing.

8. The CONTRACTOR shall include terms and conditions in all contracts or other engagement agreements with any Subcontractors as are necessary to secure these rights and protections for the TWDB; and shall require that their Subcontractors include similar such terms and conditions in any contracts or other engagements with their Subcontractors. For the purposes of this section, "Subcontractors" includes independent contractors (including consultants) and also employees working outside the course and scope of employment.

9. Any work products subject to a TWDB copyright or joint copyright and produced or developed by the CONTRACTOR or their Subcontractor pursuant to this CONTRACT or using any funding provided by the TWDB may be reproduced in any media, forms or formats by the TWDB or the CONTRACTOR at their own cost, and be disseminated in any medium, format or form by any party at its sole cost and in its sole discretion. The CONTRACTOR may utilize such work products as they may deem appropriate, including Dissemination of such work products or parts thereof under their own name, provided that any TWDB copyright is noted on the materials.

10. The CONTRACTOR agrees to acknowledge the TWDB in any news releases or other publications relating to the work performed under this CONTRACT.

ARTICLE VI. AMENDMENT, TERMINATION, AND STOP ORDERS

1. This CONTRACT may be altered or amended by mutual written consent or terminated by the EXECUTIVE ADMINISTRATOR at any time by written notice to the CONTRACTOR. Upon receipt of such termination notice, the CONTRACTOR shall, unless the notice directs otherwise, immediately discontinue all work in connection with the performance of this CONTRACT and shall proceed to cancel promptly all existing orders insofar as such orders are chargeable to this CONTRACT. The CONTRACTOR shall submit a statement showing in detail the work performed under this CONTRACT to the date of termination. The TWDB shall then pay the CONTRACTOR promptly that proportion of the prescribed fee, which applies to the work, actually performed under this CONTRACT, less all payments that have been previously made. Thereupon, copies of all work accomplished under this CONTRACT shall be delivered to the TWDB.

2. The EXECUTIVE ADMINISTRATOR may issue a Stop Work Order to the CONTRACTOR at any time. Upon receipt of such order, the CONTRACTOR shall discontinue all work under this CONTRACT and cancel all orders pursuant to this CONTRACT, unless the order directs otherwise. If the EXECUTIVE ADMINISTRATOR does not issue a Restart Order within 60 days after receipt by the CONTRACTOR of the Stop Work Order, the CONTRACTOR shall regard this CONTRACT terminated in accordance with the foregoing provisions.

ARTICLE VII. SUBCONTRACTS

Each Subcontract entered into to perform required work under this CONTRACT shall contain the following provisions:

a. a detailed budget estimate with specific cost details for each task or specific item of work to be performed by the Subcontractor and for each category of reimbursable expenses;

b. a clause stating that the Subcontract is subject to audit by the Texas State Auditor's Office and requiring the Subcontractor to cooperate with any request for information from the Texas State Auditor, as further described in Article X, Section 1, Paragraph D hereof;

c. a clause stating that payments under the Subcontract are contingent upon the appropriation of funds by the Texas Legislature, as further described in Article X, Section 1, Paragraph A hereof;

d. a clause stating that ownership of data, materials and work papers, in any media, that is gathered, compiled, adapted for use, or generated by the Subcontractor or the CONTRACTOR shall become data, materials and work owned by the TWDB and that Subcontractor shall have no proprietary rights in such data, materials and work papers, except as further described in Article V hereof;

e. a clause stating that Subcontractor shall keep timely and accurate books and records of accounts according to generally acceptable accounting principles as further described in Article X, Section 2, Paragraph G;

f. a clause stating that Subcontractor is solely responsible for securing all required licenses and permits from local, state and federal governmental entities and that Subcontractor is solely responsible for obtaining sufficient insurance in accordance with the general standards and practices of the industry or governmental entity; and

g. a clause stating that Subcontractor is an independent contractor and that the TWDB shall have no liability resulting from any failure of Subcontractor that results in breach of CONTRACT, property damage, personal injury or death.

ARTICLE VIII. LICENSES, PERMIT, AND INSURANCE

1. For the purpose of this CONTRACT, the CONTRACTOR will be considered an independent contractor and therefore solely responsible for liability resulting from negligent acts or omissions. The CONTRACTOR shall obtain all necessary insurance, in the judgment of the CONTRACTOR, to protect themselves, the TWDB, and employees and officials of the TWDB from liability arising out of this CONTRACT.

2. The CONTRACTOR shall be solely and entirely responsible for procuring all appropriate licenses and permits, which may be required by any competent authority for the CONTRACTOR to perform the subject work.

3. Indemnification. The CONTRACTOR shall indemnify and hold the TWDB and the State of Texas harmless, to the extent the CONTRACTOR may do so in accordance with state law, from any and all losses, damages, liability, or claims therefore, on account of personal injury, death, or property damage of any nature to the extent caused by the CONTRACTOR, arising out of the activities and work conducted pursuant to this CONTRACT. The CONTRACTOR is solely responsible for liability arising out of its negligent acts or omissions during the performance of this CONTRACT.

ARTICLE IX. SEVERANCE PROVISION

Should any one or more provisions of this CONTRACT be held to be null, void, voidable, or for any reason whatsoever, of no force and effect, such provision(s) shall be construed as severable from the remainder of this CONTRACT and shall not affect the validity of all other provisions of this CONTRACT which shall remain of full force and effect.

ARTICLE X. GENERAL TERMS AND CONDITIONS

1. GENERAL TERMS.
   a. No Debt Against the State. This CONTRACT does not create any debt by or on behalf of the State of Texas and the TWDB. The TWDB's obligations under this CONTRACT are contingent upon the availability of appropriated funds and the continued legal authority of the TWDB to enter into this CONTRACT.

   b. Independent Contractor. Both parties hereto, in the performance of this contract, shall act in an individual capacity and not as agents, employees, partners, joint ventures or associates of one another. The employees or agents of one party shall not be deemed or construed to be the employees or agents of the other party for any purposes whatsoever.

   c. Procurement Laws. The CONTRACTOR shall comply with applicable State of Texas procurement laws, rules and policies, including but not limited to competitive bidding and the Professional Services Procurement Act, Government Code, Chapter 2254, relating to contracting with persons whose services are within the scope of

practice of: accountants, architects, landscape architects, land surveyors, medical doctors, optometrists, professional engineers, real estate appraisers, professional nurses, and certified public accountants.

d. Right to Audit. The CONTRACTOR and its Subcontractors shall maintain all financial accounting documents and records, including copies of all invoices and receipts for expenditures, relating to the work under this CONTRACT. The CONTRACTOR shall make such documents and records available for examination and audit by the EXECUTIVE ADMINISTRATOR or any other authorized entity of the State of Texas. The CONTRACTOR'S financial accounting documents and records shall be kept and maintained in accordance with generally accepted accounting principles. By executing this CONTRACT, the CONTRACTOR accepts the authority of the Texas State Auditor's Office to conduct audits and investigations in connection with all state funds received pursuant to this CONTRACT. The CONTRACTOR shall comply with directives from the Texas State Auditor and shall cooperate in any such investigation or audit. The CONTRACTOR agrees to provide the Texas State Auditor with access to any information the Texas State Auditor considers relevant to the investigation or audit. The CONTRACTOR also agrees to include a provision in any Subcontract related to this CONTRACT that requires the Subcontractor to submit to audits and investigation by the State Auditor's Office in connection with all state funds received pursuant to the Subcontract.

e. Force Majeure. Unless otherwise provided, neither the CONTRACTOR nor the TWDB nor any agency of the State of Texas, shall be liable to the other for any delay in, or failure of performance, of a requirement contained in this CONTRACT caused by force majeure. The existence of such causes of delay or failure shall extend the period of performance until after the causes of delay or failure have been removed provided the non-performing party exercises all reasonable due diligence to perform. Force majeure is defined as acts of God, war, strike, fires, explosions, or other causes that are beyond the reasonable control of either party and that by exercise of due foresight such party could not reasonably have been expected to avoid, and which, by the exercise of all reasonable due diligence, such party is unable to overcome. Each party must inform the other in writing with proof of receipt within two (2) business days of the existence of such force majeure or otherwise waive this right as a defense.

f. Interested Parties. All non-governmental CONTRACTORS are required to submit a Certificate of Interested Parties at the time the signed contract is submitted to the TWDB. The Certificate of Interested Parties (Form 1295) is a sworn statement by the contracting business entity and must be submitted even if there is no interested party in the transaction. The Form 1295 and instructions for completing and submitting the form are available at: https://www.ethics.state.tx.us/tec/1295-Info.htm. The TWDB is prohibited from executing a contract unless the contracting business entity submits a completed Form 1295. Any contract resulting from a TWDB procurement with a business entity will be void if the Certificate of Interested Parties is not submitted within 30 days of submitting an executed contract.

2. STANDARDS OF PERFORMANCE.

a. Personnel. The CONTRACTOR shall assign only qualified personnel to perform the services required under this CONTRACT. The CONTRACTOR shall be responsible for ensuring that any Subcontractor utilized shall also assign only qualified personnel. Qualified personnel are persons who are properly licensed to perform the work and who have sufficient knowledge, skills and ability to perform the tasks and services required herein according to the standards of performance and care for their trade or profession.

b. Professional Standards. The CONTRACTOR shall provide the services and deliverables in accordance with applicable professional standards. The CONTRACTOR represents and warrants that he is authorized to acquire Subcontractors with the requisite qualifications, experience, personnel and other resources to perform in the manner required by this CONTRACT.

c. Antitrust. The CONTRACTOR represents and warrants that neither the CONTRACTOR nor any firm, corporation, partnership, or institution represented by the CONTRACTOR, or anyone acting for such firm, corporation, partnership, or institution has (1) violated the antitrust laws of the State of Texas under the Texas Business & Commerce Code, Chapter 15, of the federal antitrust laws; or (2) communicated directly or indirectly the proposal resulting in this CONTRACT to any competitor or other person engaged in such line of business during the procurement process for this CONTRACT.

d. Conflict of Interest. The CONTRACTOR represents and warrants that the CONTRACTOR has no actual or potential conflicts of interest in providing the deliverables required by this CONTRACT to the State of Texas and the TWDB. The CONTRACTOR represents that the provision of services under this CONTRACT will not create an appearance of impropriety. The CONTRACTOR also represents and warrants that, during the term of this CONTRACT, the CONTRACTOR will immediately notify the TWDB, in writing, of any potential conflict of interest that could adversely affect the TWDB by creating the appearance of a conflict of interest.

CONTRACTOR represents and warrants that neither the CONTRACTOR nor any person or entity that will participate financially in this CONTRACT has received compensation from the TWDB or any agency of the State of Texas for participation in the preparation of specifications for this CONTRACT. The CONTRACTOR represents and warrants that he has not given, offered to give, and does not intend to give at any time hereafter, any economic opportunity, future employment, gift, loan, gratuity, special discount, trip, favor or service to any public servant in connection with this CONTRACT.

e. Proprietary and Confidential Information. The CONTRACTOR warrants and represents that any information that is proprietary or confidential, and is received by the CONTRACTOR from the TWDB or any governmental entity, shall not be disclosed to third parties without the written consent of the TWDB or applicable governmental entity, whose consent shall not be unreasonably withheld.

f. Public Information Act. The CONTRACTOR acknowledges and agrees that all documents, in any media, generated in the performance of work conducted under this CONTRACT are subject to public disclosure under the Public Information Act, Government Code, Chapter 552. The CONTRACTOR shall produce all documents upon request of the TWDB within two (2) business days when the documents are required to comply with a request for information under the Public Information Act.

g. Accurate and Timely Record Keeping. The CONTRACTOR warrants and represents that he will keep timely, accurate and honest books and records relating to the work performed and the payments received under this CONTRACT according to generally accepted accounting standards. Further, the CONTRACTOR agrees that he will create such books and records at or about the time the transaction reflected in the books and records occurs.

h. Dispute Resolution. The CONTRACTOR and the TWDB agree to make a good faith effort to resolve any dispute relating to the work required under this CONTRACT through negotiation and mediation as provided by Government Code, Chapter 2260 relating to resolution of certain contract claims against the state. The CONTRACTOR and the TWDB further agree that they shall attempt to use any method of alternative dispute resolution mutually agreed upon to resolve any dispute arising under this CONTRACT if this CONTRACT is not subject to Chapter 2260.

i. Contract Administration. The TWDB shall designate a project manager for this CONTRACT. The project manager will serve as the point of contact between the TWDB and the CONTRACTOR. The TWDB's project manager shall supervise the TWDB's review of the CONTRACTOR's technical work, deliverables, draft reports, the final report, payment requests, schedules, financial and budget administration, and similar matters. The project manager does not have any express or implied authority to vary the terms of the CONTRACT, amend the CONTRACT in any way or waive strict performance of the terms or conditions of the CONTRACT.

ARTICLE XI. CORRESPONDENCE

All correspondence between the parties shall be made to the following addresses:

For the **TWDB**:

Contract Issues:
Texas Water Development Board
Attention: Contract Administration
P.O. Box 13231
Austin, Texas 78711-3231
Email: contracts@twdb.texas.gov

Payment Request Submission:
Texas Water Development Board
Attention: Accounts Payable
P.O. Box 13231
Austin, Texas 78711-3231
Email: invoice@twdb.texas.gov

Physical Address:
Stephen F. Austin State Office Building
1700 N. Congress Avenue
Austin, Texas 78701

For the **CONTRACTOR:**

Contract Issues:
INTERA INCORPORATED
1812 Centre Creek Drive, Suite 300
Austin, Texas 78754
Email: **vkelley@intera.com**

Payment Request Submission:
Kris Spencer
1812 Centre Creek Drive, Suite 300
Austin, Texas 78754
Email: **kspencer@intera.com**

Physical Address:
1812 Centre Creek Drive, Suite 300
Austin, Texas 78754

IN WITNESS WHEREOF, the parties have caused this CONTRACT to be duly executed in multiple originals.

TEXAS WATER DEVELOPMENT BOARD

Kevin Patteson
Executive Administrator

Date: 3/20/16

CONTRACTOR

Van Kelley, P.G.
Senior Vice President

Date: 3/16/16

EXHIBIT A

ORIGINAL GRANT APPLICATION

INTERA
GEOSCIENCE & ENGINEERING SOLUTIONS

INTERA Incorporated
1812 Centre Creek Drive, Suite 300
Austin, Texas, USA 78754
512.425.2000

November 24, 2015

Ms. Tina Newstrom
Texas Water Development Board
Stephen F. Austin Building
1700 North Congress Avenue, 6th Floor
Austin, Texas 78701

Re: Study of Brackish Aquifers in Texas, Project No. 3: Rustler Aquifer
Response to Request for Qualifications (RFQ) No. 580-16-RFQ0008

Dear Ms. Newstrom and Members of the Selection Committee,

INTERA Incorporated (INTERA) is pleased to submit the enclosed Statement of Qualifications (SOQ) in response to the above-referenced solicitation. This SOQ addresses the Texas Water Development Board's (TWDB) Request for Qualifications for conducting a study of brackish groundwater resources in the Rustler Aquifer. Over the past 16 years, INTERA has completed a number of similar and related projects for the TWDB and we look forward to supporting this effort under the Brackish Resources Aquifer Characterization System (BRACS) program.

To assist us in completing the study, INTERA has enlisted the support of three independent consultants—Drs. John Sharp and Carlos Torres-Verdin who are both professors at the University of Texas at Austin and Dr. Dennis Powers, a recognized expert in working with the Rustler Formation. Our team also includes the water treatment expertise of Carollo Engineers. The INTERA Team integrates experience in evaluating brackish groundwater resources across Texas with detailed knowledge of the Rustler, both through INTERA's development of the Rustler Aquifer GAM and other recent projects to evaluate water resources for use in oil and gas production. Given some of the unique complexities associated with performing this study, including a relatively small number of publically-available geophysical well logs to use for interpreting water quality, we believe that the INTERA Team's expertise and experience makes us ideally suited to produce a scientifically-sound and usable evaluation of brackish groundwater resources in the Rustler.

We know that the TWDB's review of our SOQ will confirm our exemplary skills, capacity, and desire to execute this project. In accordance with the RFQ instructions, the "ORIGINAL" version of our SOQ includes a copy of the RFQ solicitation document behind Attachment B. Should you have any questions regarding our submittal, please do not hesitate to contact me at 512-425-2047 or by email at vkelley@intera.com. We look forward to supporting the TWDB in completing this important project.

Sincerely,

Van Kelley

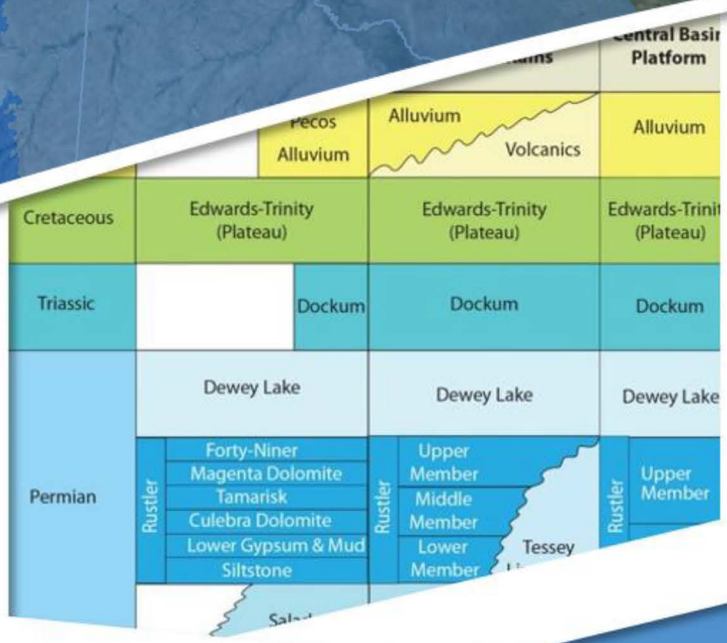
Van Kelley, PG
Project Manager
Principal Geoscientist

Enclosure: Statement of Qualifications (1 original and 6 hard copies, 1 electronic copy, 1 separate HUB plan)

STATEMENT OF QUALIFICATIONS

Study of Brackish Aquifers in Texas – PROJECT NO. 3: RUSTLER AQUIFER

RFQ No. 580-16-RFQ0008



Prepared For:

Texas Water Development Board

Prepared By:

INTERA
GEOSCIENCE & ENGINEERING SOLUTIONS

November 24, 2015

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INTRODUCTION

INTERA
GEOSCIENCE & ENGINEERING SOLUTIONS

INTRODUCTION

Groundwater is a major source of water in Texas, providing about 60 percent of the water used in the state. To better formulate water management strategies, planners and decision makers need reliable estimates of available fresh, brackish, and saline groundwater. House Bill 30, passed by the 84th Texas Legislative Session, requires the Texas Water Development Board (TWDB or "the Board") to identify and designate brackish groundwater production zones in the aquifers of the state. Specifically, the legislation directs the Board to conduct studies on four aquifers and report the results of the studies to the legislature by December 31, 2016. Studies and reports on the remaining aquifers are to be completed by December 31, 2022. To meet this requirement, the TWDB is seeking highly qualified contractors to conduct studies of brackish groundwater in six aquifers. These studies will also support implementation of House Bill 1232 (84th Texas Legislative Session), which requires the TWDB to map the confined and unconfined aquifers in the state.

INTERA's 30+ years of corporate experience in studying the Rustler Formation in west Texas and southeast New Mexico includes developing the GAM of the Rustler Aquifer under the TWDB's Groundwater Availability Modeling Program.

One of the six aquifers to be evaluated is the Rustler Aquifer located in the west Texas counties of Brewster, Culberson, Jeff Davis, Loving, Pecos, Reeves, and Ward. The aquifer consists of the carbonates and evaporites of the Rustler Formation, which is part of the Late Permian Ochoan Series. The successful evaluation of brackish groundwater resources in the Rustler requires a contractor with in-depth knowledge of the aquifer; specialized expertise and experience in assembling, interpreting, and correlating geophysical logs to delineate hydrostratigraphic units and water quality; geographic information system (GIS) and other analytical skills to quantify the volume of available fresh, brackish, and saline groundwater in the aquifer; the ability to use this information to delineate potential production areas (PPAs), and proven experience in applying groundwater availability models (GAMs) to determine the volume of brackish groundwater that the PPAs are capable of producing over time without causing significant impact to water quality and quantity. Furthermore, to meet the challenging schedule for completing this work (by August 31, 2016), the contractor must bring proven performance in delivering projects with accelerated schedules. As this Statement of Qualifications (SOQ) will demonstrate, INTERA Incorporated (INTERA), an Austin, Texas-based geosciences and engineering firm, has assembled an outstanding team that brings the capabilities and experience to meet all of these requirements.

To assist us in evaluating brackish groundwater in the Rustler Aquifer, INTERA has enlisted the support of three companies—Carollo Engineers (Carollo), Drillinginfo, and The Subsurface Library—and three expert consultants, Drs. John "Jack" Sharp, Dennis Powers, and Carlos Torres-Verdin. Collectively referred to as the "INTERA Team", we will operate as an integrated team with each member contributing key expertise and experience. INTERA offers the experience and proven performance of a leader in groundwater resource evaluations and modeling responsible for developing more GAMs under the TWDB's Groundwater Availability Modeling Program than any other contractor, including the

GAM of the Rustler Aquifer. Carollo, and specifically Dr. Justin Sutherland, bring industry leading expertise in water treatment technology and will provide added value to the project by further defining areas in the aquifer where desalination is feasible given the current state of the technology. Drillinginfo and The Subsurface Library are commercial distributors of geophysical well logs. Both have numerous logs from wells in the Delaware Basin that are not publicly available. Since they provide logs almost exclusively to the oil and gas exploration and production (E&P) industry, and because the primary oil and gas resources in the Delaware Basin are at significantly greater depths than the Rustler Aquifer, both companies have agreed to redact the deeper portion of applicable logs and make the Rustler portion of the logs available to the public (i.e., we will provide electronic versions of the redacted logs to the TWDB for inclusion in publically-available databases). Dr. Sharp, a recognized expert in Texas geology and hydrogeology, including the Trans-Pecos area of west Texas, will serve as a senior technical advisor on the project. Dr. Dennis Powers has been studying the Rustler Formation for over 40 years, and Dr. Torres-Verdin brings 25 years of experience in analyzing geophysical well logs and developing algorithms to define water quality from logs. The functional organization of the INTERA Team, including our key qualifications and roles for evaluating brackish groundwater in the Rustler Aquifer, is shown in **Figure I-1**.

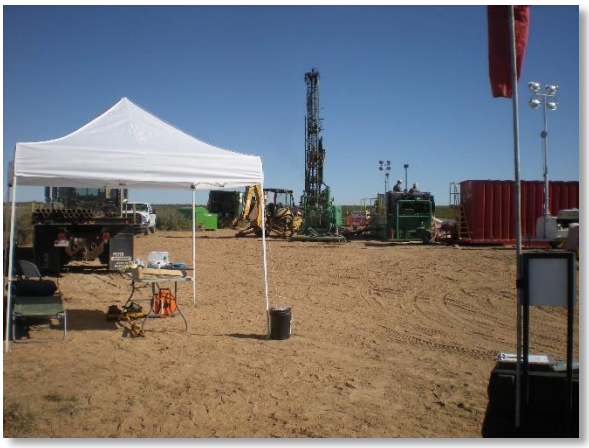
Figure I-1. Functional organization of the INTERA Team

What the INTERA Team Offers TWDB. We believe the INTERA Team offers the TWDB the "best value" for completing the evaluation of brackish groundwater in the Rustler Aquifer. We will produce the highest quality study possible given the available funding for this project, and we will ensure that every dollar spent is focused on the ultimate goal of delineating and quantifying brackish groundwater in the aquifer to assist planners and decision makers in better formulating water use and management strategies. To substantiate our belief, we bring a number of key assets that are introduced below and described in more detail throughout our SOQ.

- **Proven Performance on Groundwater Resource Evaluation and Modeling Projects.** INTERA has completed hundreds of studies to evaluate the groundwater resources of Texas. Using state-of-the-science tools such as Petra, we have analyzed and correlated thousands of geophysical well logs on projects aimed at better defining the hydrostratigraphy of aquifers and delineating brackish

groundwater. We have conducted hydrogeological studies to examine the effects of faults on groundwater flow and availability, the impact of hydraulic fracturing on groundwater production, and the feasibility of aquifer storage and recovery (ASR) operations. INTERA is also a leader in developing GAMs and applying these models to support the water planning process. We have led the development of 12 GAMs of major and minor aquifers in Texas (includes a revised model of the Northern Trinity and Woodbine Aquifer), and we are currently working on one more. In addition to developing the models, we have worked with multiple GCDs and groundwater management areas (GMAs) to update and refine GAMs and our personnel have performed thousands of simulations with the models to support water planning efforts.

- **Specialized Expertise.** The technical team and expertise we have assembled to evaluate brackish groundwater in the Rustler is second to none. We bring unparalleled expertise in the areas of geophysical well log analysis, water quality delineation, and hydrogeology of the Rustler Aquifer. Our proposed Project Manager, Van Kelley, PG, brings experience in characterizing the hydrogeology of the Rustler that dates back to the mid-1980s. He also has over 15 years of experience managing projects for the TWDB that include developing, updating, and/or refining seven Texas GAMs (including the Rustler Aquifer GAM). Our Technical Leads, Daniel Lupton, PG, Jevon Harding, Dennis Powers, PhD, PG, and John Ewing, PE collectively bring over 50 years of experience studying the Rustler Formation. In support of water resource evaluations for E&P companies, Daniel Lupton and Dennis Powers have recently completed several projects involving the interpretation and correlation of geophysical logs to delineate groundwater resources in the Rustler Aquifer. Jevon Harding and John Ewing bring expertise in developing GAMs, using GIS and other tools to present and interpret hydrogeologic data, and applying models to quantify the volume and availability of groundwater resources. Our team also includes technical specialists like Dr. Carlos Torres-Verdin, a Professor in the Department of Petroleum and Geosystems Engineering at the University of Texas at Austin and Carollo's Dr. Justin Sutherland. Dr. Torres-Verdin has over 25 years of experience in well log analysis, borehole geophysics, formation evaluation, integrated reservoir characterization, and numerical simulation. Dr. Sutherland has 16 years of experience in water quality assessments, feasibility studies, pilot testing, and full-scale implementation of desalination technology, and knowledge of state-of-the-science technology and best practices for groundwater desalination.



In support of oil and gas production operations, our proposed Technical Leads, Daniel Lupton and Dr. Dennis Powers, bring recent experience in conducting water resource evaluations and providing drilling oversight for the installation and testing of wells in the Rustler Aquifer.

- **A Sound Technical Approach.** The INTERA Team has developed a technical approach that uses best-in-class techniques in data acquisition and analysis for characterizing the volume and availability of brackish groundwater in the Rustler Aquifer. We will apply our experience working directly with TWDB's Brackish Resources Aquifer Characterization System (BRACS) personnel and data to deliver the study on-time and on-budget. Our strategy for geophysical well log acquisition, which includes a unique agreement with commercial log vendors that allows public release of logs acquired through their comprehensive databases, ensures the best possible data coverage over the Rustler project area. To support calculating water quality based on the logs, we will employ oilfield techniques for

determining the sensitivity of log resistivity to geometric and petrophysical conditions. Due to the sparseness of water quality samples from the Rustler, our approach for determining total dissolved solids (TDS) from resistivity logs goes beyond empirical correlations to modern computational methods customized specifically for the hydrogeochemical conditions in the Rustler. We will use a proven GIS-based workflow for calculating the volume of each of the salinity classes, and apply our modeling experience from developing the Rustler GAM to determine brackish groundwater availability and evaluate the potential impacts of developing this resource.

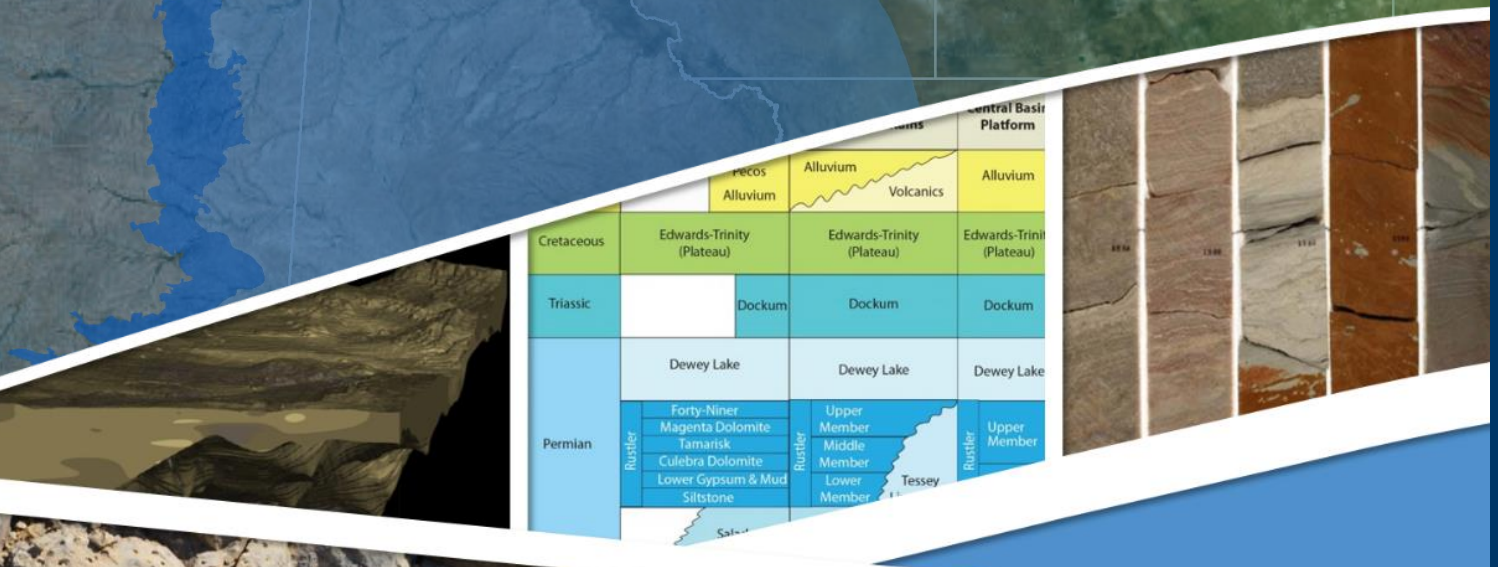
Equally important to the assets described above, all of the INTERA Team companies and consultants are firmly committed to the success of this project. We have chosen to work on water resource issues not only because they are challenging and require creative technical and management solutions, but because they are important to us, personally. We share TWDB's overall mission of preserving and protecting the water resources of Texas through effective management. We are confident that the Board's review of this SOQ will confirm the INTERA Team's skills, capacity, and desire to support this mission through the development of a high-quality evaluation of brackish groundwater in the Rustler Aquifer.

Statement of Qualifications Organization. The remainder of our SOQ is organized to follow the content requirements defined in Section IV of the TWDB's Request for Qualifications (RFQ). Accordingly, there are seven main sections, and consistent with the requirements, the Scope of Work section (Section 7) does not exceed 20 pages. Commitment letters verifying that Drillinginfo and The Subsurface Library will allow the Rustler Aquifer portions of acquired geophysical well logs to be made publically-available are included in **Attachment A**. Literature references cited in our Scope of Work discussion (Section 7) are included in **Attachment B**. To facilitate the TWDB's review of our SOQ with respect to the evaluation criteria defined in the RFQ (Section 4.11, page 12), **Table I-1** provides the location of information in our SOQ to be evaluated under each criteria.

Table I-1. Cross-Reference of Evaluation Criteria and Corresponding Location of Information in SOQ

Evaluation Criteria	Location(s) Where Addressed in SOQ
Qualifications and Experience	▪ SECTION 4 Resumes of Individuals ▪ Section 4.1 Proposed Staff's Experience on Similar Projects ▪ Section 4.2 Ability to Meet Project Completion Deadlines
Technical Approach	▪ Section 7.2 Technical Approach to Scope of Work Tasks
Organization and Management	▪ Section 7.3 Organization and Management
Reports and Deliverables	▪ Section 7.4 Report and Deliverables ▪ Section 7.2 Technical Approach to Scope of Work Tasks (Task 7)
Feasible Approach	▪ Section 7.1 Feasibility of Approach

SECTION 1:
Execution of Response



INTERA
GEOSCIENCE & ENGINEERING SOLUTIONS

SECTION 1:
Execution of Response

SECTION 1: SIGNED/DATED EXECUTION OF RESPONSE TO THE REQUEST FOR QUALIFICATIONS

INTERA's executed response to the RFQ (Attachment A from the RFQ) is provided below. In accordance with the requirement defined in Section 5.17 of the RFQ (page 17), a statement regarding conflicts of interest is provided on the next page.

Texas Water Development Board
REQUEST FOR QUALIFICATIONS NO. 580-16-RFQ0008
FOR SERVICES ASSOCIATED TO STUDY BRACKISH AQUIFERS IN TEXAS

SECTION 1 EXECUTION OF RESPONSE

FOR PROJECT NO. 3: Rustler Aquifer

Company Name: INTERA Incorporated

Address: 1812 Centre Creek Drive
Suite 300
Austin, TX 78754

Phone Number: 512-425-2000

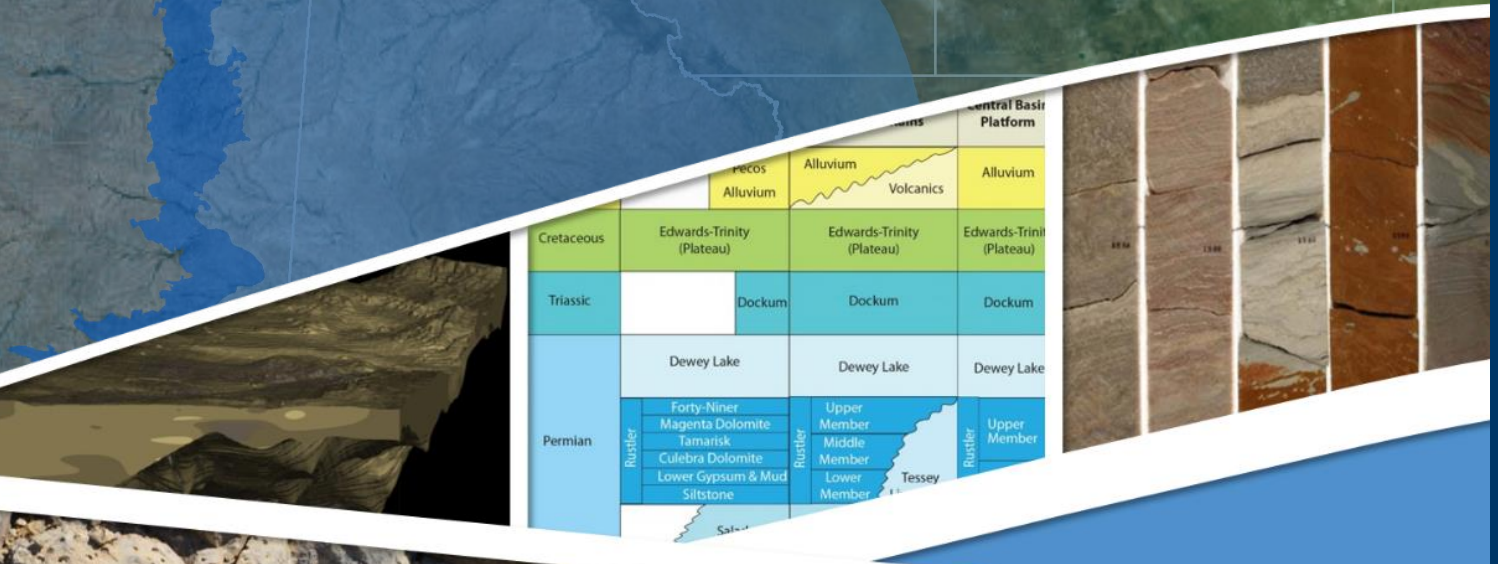
I, Van Kelley, Senior Vice President, am the above-referenced company's representative and I am authorized to submit this response and sign future contract documents. By signing, vendor certifies that if a Texas address is shown as the address, the vendor qualifies as a Texas Resident Bidder as defined in Texas Administrative Code, Title 34, Part 1, Chapter 20.

Authorized Signature _____ Date 11/18/15

Conflicts of Interest

INTERA does not have any business interest or relationships that could reasonably be considered to pose possible conflicts of interest in our performance of contract obligations. Furthermore, INTERA represents and warrants that in the performance of services under this contract with the TWDB, (1) we do not have and will not have any actual or potential conflict of interest, and (2) we will take whatever reasonable actions may be necessary and prudent to avoid even the appearance of impropriety.

SECTION 2:
Company Profile and History



INTERA
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SECTION 2:
Company Profile and History

SECTION 2: COMPANY PROFILE SUMMARY AND HISTORY

A summary of the team that INTERA has assembled to delineate, quantify, and determine the availability of brackish groundwater in the Rustler Aquifer is provided below.

a. Legal company name, address, phone number, and legal status:

INTERA Incorporated, 1812 Centre Creek Drive, Suite 300, Austin, TX 78754, Texas Corporation

b. Legal name of each participant, their involvement with the Project, their phone number, and email:

- Dr. Jack Sharp, senior technical review, 512-471-3317, jmsharp@jsg.utexas.edu
- Dennis Powers Consulting, geophysical log analysis and technical lead for delineating potential production areas, 915-877-3929, dwpowers@evaporites.com
- University of Texas at Austin (Dr. Carlos Torres-Verdin), geophysical log analysis, 512-471-4216, cverdin@austin.utexas.edu
- Carollo Engineers, Inc., technical support for delineation of potential production areas (feasibility of desalination), 512-453-5383, jsutherland@carollo.com
- Drillinginfo, provide geophysical logs, 512-477-9200, info@drillinginfo.com
- The Subsurface Library, provide geophysical logs, 432-683-5588, info@subsurface.info

c. Name, title, phone number, and email address of person submitting the response:

Mr. Van Kelley, Executive Vice President, 512-425-2047, vkelley@intera.com

d. Describe the general nature of previous work, the number of years in business, size and scope of operation:

Summaries of the INTERA Team companies and expert consultants are provided below.

Established in 1974, **INTERA** is an Austin, Texas-based geosciences and engineering firm. With over 40 years of corporate experience, INTERA is a leader in applying numerical models and other quantitative tools to gain a better understanding of hydrogeologic systems—from determining the availability of a groundwater resource and evaluating groundwater flow and the transport of contaminants in the subsurface, to quantifying specific hydrogeologic processes that effect a site's ability to safely isolate radioactive wastes. Through offices in Texas, New Mexico, Florida, California, Indiana, Washington, France, and Switzerland, INTERA's solutions are provided by an outstanding staff of 125 professionals specializing in geology, hydrogeology, hydrology, water resource and environmental engineering, geostatistics, remote sensing, and GIS technology. In Texas, we are registered to perform geoscientific and engineering services by the Texas Boards of Professional Geoscientists and Engineers (Geosciences Registration Number 50189 and Engineering Registration Number 4722). INTERA has 35 groundwater and surface water professionals located in Texas including eight registered Texas Professional Engineers and 12 registered Texas Professional Geoscientists. In addition, many of our geoscientists are nationally licensed as Certified Ground Water Professionals and Professional Hydrogeologists.

Our history of working with the Rustler Aquifer in west Texas and southeastern New Mexico dates back to the mid-1980s when we began supporting the hydrogeologic characterization of the U.S. Department of Energy's Waste Isolation Pilot Plant (WIPP) in southeast New Mexico. Since the Rustler Formation contains the primary water bearing zones overlying the WIPP repository, we have performed hundreds of aquifer tests, conducted detailed core analyses, and developed and applied flow and transport models of the Culebra and Magenta dolomite members of the Rustler. We have also conducted hydrogeologic

studies and developed and/or revised regional-scale GAMs for nearly all of the major and minor aquifers in the Permian Basin and High Plains area of Texas. Under TWDB's GAM Program, we developed the models of the Rustler, Dockum, and High Plains Aquifer System (includes the Ogallala, Edwards-Trinity, Pecos Valley Alluvium, Dockum, and Rita Blanca). In support of locating suitable sources of groundwater for use in oil and gas production, INTERA has assimilated hydrogeologic data and analyzed geophysical logs for the Rustler and other west Texas aquifers as part of preparing groundwater resource reports for nearly 40% of the counties in the Permian Basin area of Texas and New Mexico. This work has included overseeing the installation of rig water supply wells in the Rustler Aquifer. As part of obtaining licenses to dispose of low-level radioactive waste at a facility in Andrews County, Texas, INTERA performed detailed geologic characterization of all formations beneath the facility, including the Rustler. All of this experience is directly relevant and transferable to evaluating brackish groundwater resources in the Rustler Aquifer.

Expert Consultants. Drs. John "Jack" Sharp, PG, Dennis Powers, PG and Carlos Torres-Verdin are experts in their respective fields and bring valuable and relevant experience to the INTERA Team for executing this project. Dr. Sharp, who will serve as a Senior Technical Reviewer on the project, brings nearly 35 years of experience on regional groundwater flow in the Trans-Pecos area of Texas. Dr. Powers has over 40 years of experience studying the geology and hydrogeology of the Delaware Basin and adjacent regions. Through his work on the U.S. Department of Energy's WIPP site and hundreds of other studies in support of oil and gas exploration and production in southeast New Mexico and west Texas, he is an expert in the geology of the Rustler Formation. Dr. Torres-Verdin brings more than 25 years of experience in the quantitative evaluation of geophysical logs and will apply his expertise to develop variables and correction factors to calculate water quality from resistivity logs of the Rustler.

carollo
Engineers...Working Wonders With Water®

Carollo Engineers is a consulting firm with more than 700 employees in 39 offices throughout the U.S. All of the company's work is performed in the areas of water and wastewater. Carollo is an industry leader in the planning, permitting, design and construction of facilities that treat challenging water supplies. The company applies cutting edge, cost-effective features to conventional, membrane, and desalination designs, and has developed a number of innovative planning and treatment evaluation tools that include Blue Plan-it, which is able to automatically evaluate dozens of customized water supply combinations and identify optimal options in a fraction of the effort it takes for a conventional planning approach.

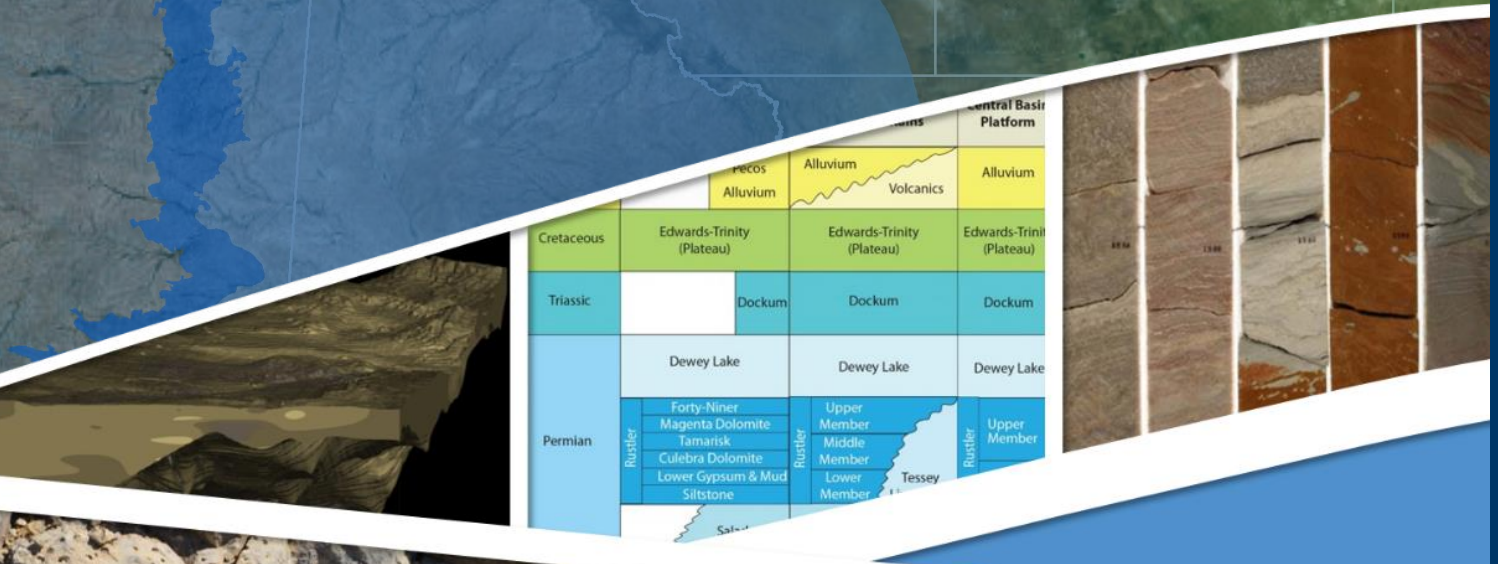
drillinginfo
better, faster decisions

Drillinginfo, established in 1999, provides customers with the tools and insights for success. The company's DI Digital Well Logs product provides access to a virtual library of digital well logs from across the country. With the entire well bore represented in a single LAS file, DI Digital Well Logs streamlines the data-gathering process. Drillinginfo has amassed over 2,000,000 raster images of well logs across nearly every oil and gas producing state in the U.S., and actively obtains new logs to supplement the collection.

THE SUBSURFACE LIBRARY

The Subsurface Library, founded in 1962, is the premier petroleum data library for the Permian Basin. The Library's collection includes: over 1,000,000 well logs that are searchable online by location, sample logs and sample descriptions, six historical scout ticket collections, Midland Oil Scouts Association scout ticket collection, current scouting information, IHS production and well data, and current county lease/ownership maps for all of Texas and New Mexico, and statewide well data from the Bureau of Economic Geology (BEG), Railroad Commission of Texas (RRC), and Texas General Land Office (GLO).

SECTION 3:
Company References



INTERA
GEOSCIENCE & ENGINEERING SOLUTIONS

SECTION 3: COMPANY REFERENCES

As the proposed prime contractor to the TWDB for evaluating brackish groundwater in the Rustler Aquifer, INTERA is providing references from the five clients listed below for whom we have provided similar services in the past 36 months. Completed reference forms are provided on the following pages. INTERA is proud of our ability to provide clients with technically-sound and reliable solutions that are delivered on time and in accordance with approved budgets. We welcome the TWDB to contact any, or all, of these references to further confirm our track record of proven performance.

Reference #1

Mr. Mike Massey
Director, Upper Trinity Groundwater Conservation District

Reference #2

Mr. Cal Cooper
Manager of Special Projects, Office of the CEO, Apache Corporation

Reference #3

Mr. Ben Warden
Manager of Water Resources, Diamondback Energy, Inc. (formerly with ConocoPhillips)

Reference #4

Ms. Kathy Turner Jones
General Manager, Lone Star Groundwater Conservation District

Reference #5

Mr. William Mullican III, PG
Owner and Principal, Mullican and Associates

Client Reference

Name of Organization:	Upper Trinity Groundwater Conservation District
Business Address:	1250 E Hwy 199 Springtown, TX 76082
Contact Person Name:	Mike Massey
Contact Person Title:	Director
Phone/Fax Number:	817-991-4372

Client Comments:

Having been a Director since the creation of UTGCD, I would characterize Intera's involvement with UTGCD as always delivering everything expected under the scope of work, many times delivering more than required, and never exceeding the budget approved for the project as contracted or requiring an extension in order to deliver the finished product. Many of the projects UTGCD has assigned to them have been on very short turnarounds and Intera has still managed to deliver on time and within budget.
If it were not for their expertise, professionalism, and assistance to UTGCD I don't believe it would have been possible for the District to have intelligently participated in the first round of DFC adoption, to have been an active participant in the joint planning process at GMA 8, to have adopted Temporary Rules of the District based upon the best available science, to have resolved many contentious issues regarding granting exceptions to District Rules in a manner that ensured that existing and future wells were properly protected, to have formed a coalition of GCD's to create a new and improved GAM for the Northern Trinity and Woodbine aquifers benefiting all of the GCD's in GMA 8, or for the Board of Directors to be able to approach the second round of DFC's with a better understanding of the complexity of the aquifer system the state has asked them to manage.

Mike Massey 11-6-25

Signature/Date

Reference Provided for Project –

Hydrogeologic Support for the Upper Trinity Groundwater Conservation District

INTERA has provided hydrogeologic support for the Upper Trinity Groundwater Conservation District (UTGCD) for 8 years. INTERA's support for UTGCD has included review and assessment of well variance applications. A key component of some of these applications is determination of whether sufficient hydrogeologic barriers exist between the proposed well and existing wells in the region, so that existing wells would not see significant impacts from pumping in the proposed well. This assessment typically requires characterizing the vertical conductivity of units that separate the proposed well from existing wells, and performing groundwater modeling to assess drawdown impacts at the existing wells.

In support of the GMA-8 planning process, INTERA performed simulations with the Northern Trinity and Woodbine Groundwater Availability Model, to assess impacts of changes in pumping in one county on adjacent counties. These simulations helped to show how much pumping could increase in one area without creating a significant impact in neighboring areas. The effects were reported in terms of drawdown, and also based on a change in each county water budget.

Client Reference

Name of Organization:	Apache Corporation
Business Address:	2000 Post Oak Blvd, Suite 100 Houston, Texas 77056
Contact Person Name:	Cal Cooper
Contact Person Title:	Manage of Special Projects, Office of the CEO
Phone/Fax Number:	713-296-7418

Client Comments:

Intera has consistently done outstanding work for Apache. In my opinion, they are the best in the business for integrating and obtaining information for subsurface water science and management.

Cal Cooper 20 November 2015

Signature/Date

Reference Provided for Project –

Evaluation of Groundwater Resources in the Permian Basin, TX and NM. 2015. Compiled, reviewed, interpreted, and presented hydrogeologic information for aquifers in West Texas and southeastern New Mexico in 9 studies spanning 18 counties in the Permian Basin. These studies were used to help the client evaluate potentially suitable water resources for hydraulic fracturing operations while minimizing impacts to existing users. These studies included detailed evaluations of water levels, water quality, well locations, geologic framework, and hydraulic properties for the Ogallala, Dockum (including Santa Rosa formation), Pecos Valley, Edwards-Trinity (Plateau), Rustler, Capitan Reef Complex, Edwards-Trinity (High Plains), and Roswell Artesian Basin aquifers. Brackish groundwater reservoirs not defined as aquifers by the Texas Water Development Board (TWDB) were also evaluated as potential alternative supplies. One study also included the development of a MODFLOW-NWT numerical groundwater model to evaluate the sustainability of groundwater production from a brackish aquifer. Using this model we found that the expected impacts of pumping of the brackish aquifer on the overlying fresh groundwater sources were very limited.

Client Reference

Name of Organization:	Diamondback Energy, Inc. (project was completed for ConocoPhillips)
Business Address:	500 West Texas Avenue, Suite 1200 Midland, TX 79701
Contact Person Name:	Mr. Ben Warden (formerly with ConocoPhillips currently with Diamondback Energy)
Contact Person Title:	Manager of Water Resources
Phone/Fax Number:	(432) 661-2102 (phone)

Client Comments:

Intera Inc. did an outstanding water evaluation tailored to our water needs. Their staff was courteous, professional and on time with our project. Intera's data was used to evaluate our properties potential water availability and quality before developing our well field. The material that Intera provided as part of their report was quantifiable and substantial enough to make an educated business decision for our future development plans. The staff worked with our group to help develop a hydrogeology study that fit our needs without wasting resources and provided support throughout the project to ensure the best possible results.

Signature/Date

Reference Provided for Project –

Determination of Structure and Hydrogeology of the Rustler Formation, 2014, West Texas

After developing a detailed structure for the Rustler Formation and organizing all of the hydraulic data, INTERA used the water wells that were completed in the Rustler to establish likely hydraulic trends. In general, the Submitted Driller's Reports post-2002 provided the most useful dataset due to the increased usage of the Rustler as a source water for hydraulic fracturing operations. Specific capacity measurements (gallons per minute [gpm] per foot of drawdown) along with well construction specifications were used to determine interval specific hydraulic conductivities for the member units of the Rustler Formation. This data was input into a solver for the groundwater flow equation and drawdown from various proposed wellfield geometries was calculated. The well field geometries were modified until an ideal wellfield geometry on the clients lease areas was calculated. INTERA presented the results of our evaluations to the client and documented the evaluation activities, conclusions, and recommendations in formal reports.

Client Reference

Name of Organization:	Lone Star Groundwater Conservation District
Business Address:	655 Conroe Park North Drive Conroe, TX 77303
Contact Person Name:	Kathy Turner Jones
Contact Person Title:	General Manager
Phone/Fax Number:	Work: (936) 494-3436 Cell (936) 522-8893

Client Comments:

The Lone Star Groundwater Conservation District's (District) has engaged INTERA on several projects through the years. Our experiences with INTERA have always been of excellence. Included in projects… a geologic study and conceptual model development focused on the Catahoula and Jasper aquifers in Montgomery County to assist the District in establishing protocols for evaluation of utilization of brackish groundwater supplies as an alternative source of water under the District Regulatory Plan. For this project, the District engaged a team including Van Kelley and Steve Young, both from INTERA, which we considered the "best-of-the-best" experts to collaborate in the study and model development. INTERA and others proved very responsive to the District. Any delay in completion was due to the District's request for additional work not originally scoped and was still provided in a timely and satisfactory manner. Work was preformed within budget as well.

Our experiences with INTERA and its staff is of excellence. District would not hesitate to offer future projects INTERA as they may arise.

11-6-2015

Signature/Date

Reference Provided for Project –

Subsurface Mapping, and Modeling of Jasper and Catahoula Aquifers, Lone Star GCD, Texas

INTERA was a part of a collaboration with two other consulting firms to develop a regional model for groundwater flow in the Jackson, Catahoula, and Jasper aquifers across a six-county area. INTERA work and responsibility was to develop a hydrogeologic conceptual model of the study area and for the aquifers of interest. To accomplish this task, analyzed about 300 geophysical logs to delineate profiles of sands, clays, and total dissolved solid concentrations. Based on a results from the log analysis and a literature review, INTERA developed maps of sand percentages, sand thicknesses, total dissolved solids concentrations for formations that comprised the aquifers for the study area.

Client Reference

Name of Organization:	Mullican and Associates
Business Address:	19212 Luedtke Lane Pflugerville, Texas 78660
Contact Person Name:	William F. Mullican III, P.G.
Contact Person Title:	Owner and Principal
Phone/Fax Number:	512-658-2320

Client Comments:

The NTWGAM update project was unique in the history of TWDB's GAM program, in that this was the first time a GAM was developed solely using local funds but with the upfront recognition and integration of TWDB GAM requirements, including a formal stakeholder process, throughout the project from start to finish. By utilizing this approach, TWDB staff were involved in all aspects of the project, which facilitated an efficient and effective review process at the conclusion of the project. Throughout execution of the project, several challenges were encountered, many with respect to the availability of hydrologic data. In each of these instances, INTERA worked to identify reasonable and acceptable approaches to challenges presented. A good example of this was the realization that a large number of the pumping tests available to the study turned out to have inadequate data or pumping periods for standard analysis. INTERA was successful in developing alternative techniques that allowed for the analyses of significantly more wells for use in model development. This is just one of many examples of challenges faced that were outside the original scope of work for which INTERA successfully completed on time and within budget.

William F Mullican 11/6/2015

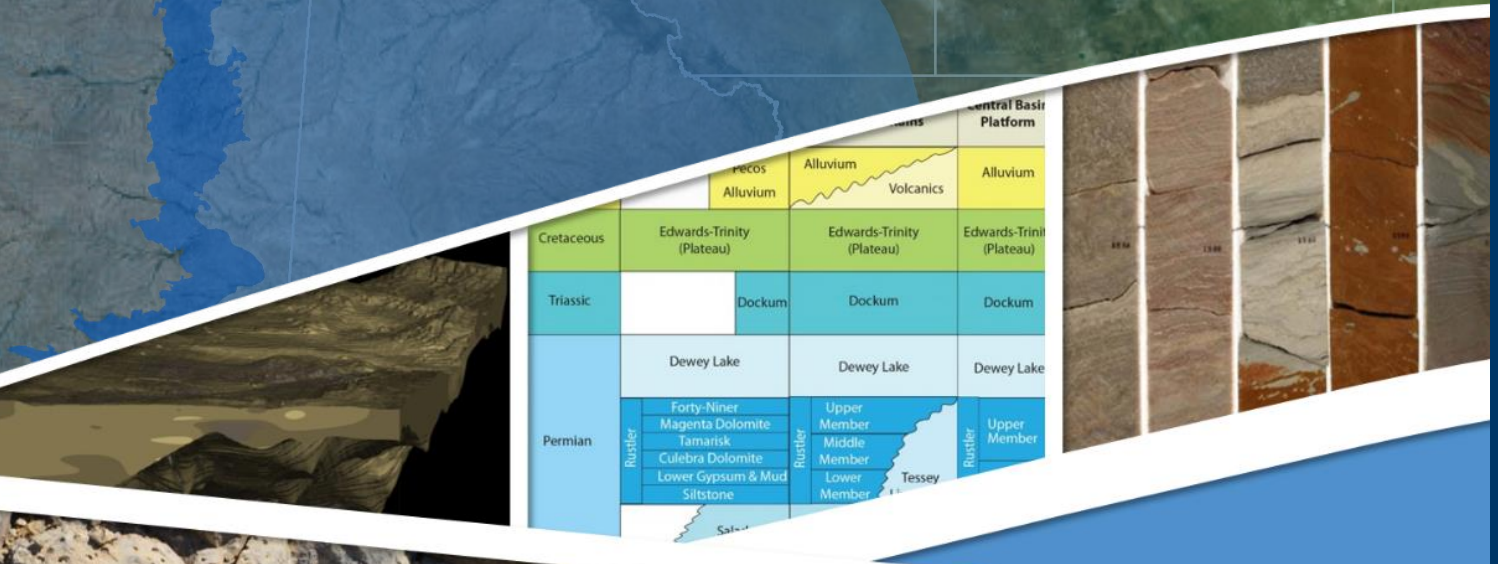
Signature/Date

Reference Provided for Project –

Revised Northern Trinity and Woodbine Groundwater Availability Model, TX

INTERA served as the Prime Contractor for the update and complete redevelopment of the Northern Trinity and Woodbine aquifers Groundwater Availability Model (GAM). INTERA worked in cooperation with the member Groundwater Conservation Districts (GCDs) in Groundwater Management Area 8 (GMA-8) through a Technical Advisory Committee throughout the model development process. This panel also included the Texas Water Development Board (TWDB) and the USGS. Major enhancements of this GAM included a refined grid structure, a consistent hydrostratigraphic framework for the Northern Trinity and Woodbine aquifers from Oklahoma south to the Colorado River, extensive analysis of aquifer test data, inclusion of metered or estimated pumping data from GCDs and an improved model calibration from predevelopment prior to 1950 through to 2012. Rigorous analysis of water quality data was used to create zones that separated the fresh water (< 1,000 mg/L TDS) from the brackish water (> 1,000 mg/L TDS). Reverse particle-tracking was used to verify that the simulated groundwater ages were spatially consistent with observed groundwater chemistry. INTERA developed the updated NTWGAM on an expedited schedule on budget and on schedule for use by GMA-8 in the second round of joint planning. The TWDB accepted the updated NTWGAM as the official GAM on November 24th, 2014.

SECTION 4:
Resumes of Individuals

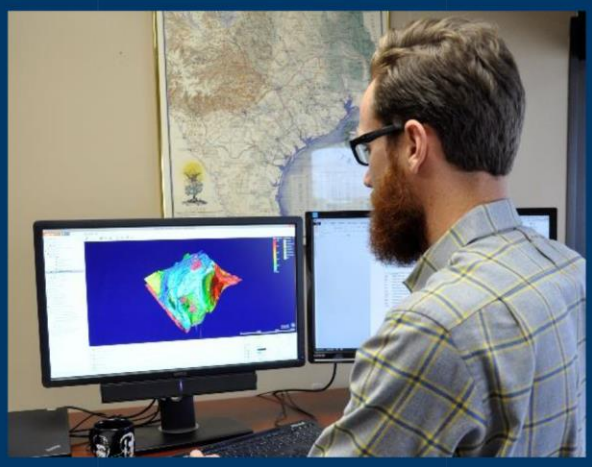


INTERA
GEOSCIENCE & ENGINEERING SOLUTIONS

SECTION 4:
Resumes of Individuals

SECTION 4: RESUMES OF INDIVIDUALS

INTERA has assembled an outstanding team of management and technical personnel to evaluate brackish groundwater in the Rustler Aquifer. **Figure 4-1** provides a summary of our personnel's experience in the relevant areas defined in Section 2.4 (Response Requirements for Evaluation) of the RFQ. Resumes of our project team, presented in the order they appear in Figure 4-1 are provided on the following pages. This section also provides more detailed descriptions of several relevant projects completed by members of proposed staff and describes INTERA's ability, and specifically our proposed Project Manager, Mr. Van Kelley, to meet project completion dates within budget. This is particularly important for the brackish groundwater evaluation of the Rustler Aquifer given the aggressive and challenging timeframe under which the project must be completed—no later than August 31, 2016.



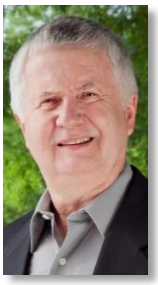
Name	Proposed Role	Education (highest degree)	General hydrogeology	Hydrogeology of Rustler Aquifer	Interpreting and using geophysical well logs (delineate hydrostratigraphic units, determine water quality, etc.)	Using data from TWDB GAM projects and other TWDB contracted studies in the Rustler Aquifer area	Groundwater modeling to evaluate potential production areas	GIS files, use, and metadata documentation	Communicating with the public and other stakeholders	Technology transfer	Producing high quality technical reports	Using the TWDB BRACS and Groundwater databases	Management of projects to meet completion deadlines and within budget
			Relevant Areas of Expertise and Experience										
John Pickens, PhD, PE, PG	Project Principal	PhD/Earth Sciences	■	■	■	■	■		■	■	■	■	■
Van Kelley, PG	Project Manager	MS/Geology	■	■	■	■	■	■	■	■	■	■	■
Daniel Lupton, PG	Technical Lead — Delineation of Fresh, Brackish, and Saline Groundwater	MS/Hydrogeology	■	■	■	■		■	■	■	■	■	■
Jevon Harding	Technical Lead — Quantification of Fresh, Brackish, and Saline Groundwater	MS/Hydrology	■			■	■	■	■		■	■	
Dennis Powers, PhD, PG	Technical Lead — Delineation of PPAs	PhD/Geology	■	■	■	■			■	■	■	■	■
John Ewing, PE	Technical Lead — Availability of Brackish Groundwater in PPAs	MS/Civil Engineering	■	■		■	■	■	■	■	■	■	■
Carlos Torres-Verdin, PhD	Technical Specialist — Log Analysis	PhD/Engineering Geoscience	■		■				■	■	■		■
Clark Griffith, EIT	Technical Specialist — Delineation of Existing Water Supplies	MS/Engineering Science	■	■		■	■	■			■	■	
Kim Gordon, PE, PG	Technical Specialist — Delineation of Injection Zones	BS/Geosystems Engineering and Hydrogeology	■		■	■	■	■	■	■	■	■	■
Justin Sutherland, PhD, PE	Technical Specialist — Feasibility of Desalination	PhD/Civil Engineering							■	■	■		■
Tingting Yan, EIT	Technical Specialist — Groundwater Modeling	MS/Hydrogeosciences	■	■		■	■	■			■	■	

Figure 4-1. Summary of expertise and experience of proposed personnel

John Pickens, PhD, PE, PG

INTERA

Project Principal



John Pickens is a Principal Geoscientist and Engineer at INTERA with broad experience in water resources development and management, field site characterization, groundwater and vadose zone flow and transport modeling, remedial investigations and feasibility studies, and radioactive waste site evaluations and permitting. His experience includes the design, execution, and interpretation of well hydraulic and tracer tests to determine formation properties of both porous and fractured media. He has authored or co-authored numerous articles on hydraulic and tracer testing and groundwater/transport modeling. He serves as principal or project manager on large multidisciplinary site characterization, groundwater flow and transport modeling, and waste-management projects with teams of several to more than 20 professionals and annual budgets ranging up to several million dollars. He provides senior input and review on development of conceptual models and parameter input distributions, data analysis, model calibration and sensitivity analysis, and reporting. For water resource evaluations, he has managed groundwater availability modeling projects to address long term water supply planning. He has provided expert report and testimony support related to groundwater modeling and subsurface contamination evaluation on litigation projects, including cases involving release of petroleum hydrocarbons from oil and gas exploration and development activities in west Texas and southeastern New Mexico. He has conducted site characterization and/or modeling to support environmental restoration and radioactive waste disposal programs at several U.S. Department of Energy (DOE) sites. He has managed site characterization, modeling, and/or performance assessment projects to support radioactive waste-management programs in the U.S., Australia, Canada, France, Switzerland, and the U.K.

Years of Experience: 41

Education:

- PhD, 1982, Earth Sciences, University of Waterloo
- MASc, 1974, Civil Engineering, University of Waterloo
- BASc, 1972, Civil Engineering, University of Waterloo

Professional Certifications:

- Professional Geoscientist, Texas, No. 1962
- Professional Engineer, Texas, No. 83817
- Professional Engineer, Ontario, Canada, No. 36645018

Key Experience:

- Over 40 years in general hydrogeology, geology, and interdisciplinary geoscience investigations and studies
- 25 years working with aquifers, including the Rustler, in the Permian and Delaware basins
- TWDB projects include GAMs for Rustler, Dockum, Seymour, and Carrizo-Wilcox aquifers

Representative Project Experience

Groundwater Availability Model for the Rustler Aquifer, Texas Water Development Board, Austin, TX. 2011 – 2012. *Project Principal.* Provided oversight for development of a three-dimensional groundwater model for the Rustler Aquifer—located in the Trans-Pecos area of west Texas and southern New Mexico. The GAM was developed using the groundwater simulation code MODFLOW-NWT and consists of a lower layer representing the Rustler Aquifer and an upper layer representing the overlying Dewey Lake Formation and Dockum Group. While there is a general lack of hydrogeologic property data for the Rustler Aquifer in Texas, the available data provide good evidence for significant variability in the aquifer properties resulting from structural complexity within the basin, variability in lithology, and the effects of post-depositional processes. As a result of this complexity, parameterization of the Rustler Aquifer GAM relied heavily on the conceptual models we developed while trying to honor the sparse property data available. The model incorporates the available information on structure,

hydrostratigraphy, hydraulic properties, streamflow, recharge, evapotranspiration, and pumping for the Rustler Aquifer.

John Pickens (cont.)

Site Characterization for the U.S. Department of Energy's Waste Isolation Pilot Plant, Sandia National Laboratories, NM. 1985 – 1996. *Project Manager.* Led INTERA's efforts in providing consulting services for hydrologic characterization at the WIPP site in southeastern New Mexico. Site-characterization project tasks included: developing and implementing a quality assurance program for all field, data interpretation, and modeling activities; designing, performing, and interpreting hydraulic and tracer tests for characterizing the regional groundwater flow and transport characteristics in the Rustler Formation; detailed data base development and evaluation for regional hydrologic modeling; designing, performing, and interpreting gas and/or water hydraulic tests in boreholes in the claystone and halite units surrounding the WIPP underground facility and in the Waste Handling and Air-Intake Shafts units to evaluate near-field (disturbed-rock zone) and far-field permeabilities and in situ pressures; and performing and interpreting hydrofracture tests in the anhydrite units to evaluate formation response to post-closure gas pressure buildup in the underground facility. The primary focus of these activities was the Salado and Rustler Formations. The data collected and evaluated was used in the development of the license application for WIPP as a radioactive waste repository.

Site Characterization and Permitting Support for a Low-Level Radioactive Waste Landfill Facility, Waste Control Specialists, TX. 2008 – 2012. *Task Leader.* Project activities included hydrogeologic characterization and modeling in support of the licensing for Texas Compact and federal low-level radioactive waste landfills in Andrews County, Texas. Field activities included deep borehole testing in sandstones, claystones and halites, pumping and slug testing of sandstone units, groundwater sampling for environmental tracers and age dating, and gas-injection testing to determine fracture connectivity. Investigations were conducted in the High Plains and Dockum aquifers. Evaluated geologic and groundwater elevation data to determine the areal extent and the causes and controls on infiltration and groundwater occurrence in the shallow subsurface. A large geologic and hydrogeologic database was evaluated to develop the conceptual model for the shallow groundwater flow system and formed the basis for a local groundwater model using MODFLOW-SURFACT. Prepared or contributed to technical reports documenting the project site characterization, data evaluation, and modeling activities for submittal to the Texas Commission on Environmental Quality.

Estimation of Groundwater Inflows to a Mine Shaft, Intercontinental Potash Corporation, Hobbs, NM. 2013. *Senior Hydrogeologist.* Responsible for review of formation-testing results and shaft inflow estimation approach and results for several water-bearing zones including the Rustler Aquifer. A vertical large-diameter shaft is planned to provide access to the underground workings of a new mine. Packer testing and data interpretation were conducted for an exploratory borehole with results used to define parameters for use in estimating groundwater inflows to the shaft. Both early-time transient and steady-state inflow estimates at depth intervals corresponding to differing lithologies were derived. The shaft inflow estimates were needed for planning purposes prior to shaft excavation.

Development of a Regional-Scale Groundwater Availability Model for the Dockum Aquifer, Texas Water Development Board. 2006 – 2008. *Project Manager.* Led development of a regional-scale groundwater model for the Dockum Aquifer in west Texas and southeastern New Mexico. The model was developed using MODFLOW and includes three model layers, one layer for the more mud-rich upper Dockum, a second layer for the more sandy lower Dockum, and a third upper layer rudimentarily representing the Ogallala Aquifer and other younger sediments. Production from the Dockum Aquifer is predominantly from the lower unit. Project tasks included: data development, GIS data presentation, model conceptualization/design/calibration, and stakeholder presentations and meetings. Sensitivity

analyses were performed on both the steady-state and transient-calibrated groundwater models. The models will be used to evaluate water management strategies.

Development of a Groundwater Availability Model and Refined Model for the Seymour Aquifer in Haskell, Knox, and Baylor Counties, Texas. 2003 – 2004 and 2009 – 2012. *Project Manager.* Led development of GAM for the entire Seymour Aquifer in northern Texas and for a detailed portion of the aquifer in Haskell, Knox, and Baylor counties. Tasks included conceptual model development, numerical model development (using MODFLOW2000) and calibration, transient calibration of the model, sensitivity analysis, stakeholder presentations and meetings, and a training seminar to explain the model structure, assumptions, results, limitations, and applicability. Delivered source data in GIS format.

Development of a Regional-Scale Groundwater Availability Model for the Northern Carrizo-Wilcox Aquifer, Texas Water Development Board. 2001 – 2003. *Project Manager.* Led development of a regional-scale groundwater model for the Carrizo-Wilcox Aquifer in the northeast Texas and western Louisiana region. The model was developed using MODFLOW and consists of six layers which includes four layers for the Carrizo-Wilcox Aquifer and additional layers for the overlying Reklaw and Queen City formations. Project tasks included: data development, GIS data presentation, model conceptualization/design/calibration/prediction, and stakeholder presentations and meetings. The model provides an integrated tool for the assessment of water management strategies.

Relevant Publications/Reports

Blainey, J., J. Pickens, G.E. Grisak, R.M. Holt, J. Sigda, S. Cook, and E. Hughes, 2011. Groundwater Modeling of Playa-Focused Recharge at the Southwestern Edge of the High Plains Aquifer in West Texas. Presentation for American Geophysical Union Fall Meeting, San Francisco, CA, Dec. 5-9.

Holt, R.M., G.E. Grisak, E. Hughes, J.F. Pickens, D.W. Powers, J.S. Kuszmaul, S. Cook, 2011. The Hydrogeology of the Upper Dockum Group at the Waste Control Specialists Site, West Texas. 2nd Canadian Symposium on Aquitard Hydrogeology, Ottawa Geotechnical Group, the IAH-CNC, and the University of Ottawa, June 21-23.

Jones, T.L., J.E. Ewing, T. Yan, J.F. Pickens, B.R. Scanlon, J. Olyphant, and A. Chastain-Howley, 2009. Draft Conceptual Model for the Refined Seymour Aquifer Groundwater Availability Model: Haskell, Knox, and Baylor Counties. Contractor Report, Texas Water Development Board.

Ewing, J.E., T.L. Jones, T. Yan, A.M. Vreugdenhil, D.G. Fryar, J.F. Pickens, K. Gordon, J.P Nicot, B.R. Scanlon, J.B. Ashworth, and J. Beach, 2008. Groundwater Availability Model for the Dockum Aquifer. Contractor Report, Texas Water Development Board.

Ewing, J.E., T.L. Jones, J.F. Pickens, A. Chastain-Howley, K.E. Dean, and A.A. Spear, 2004. Groundwater Availability Modeling for the Seymour Aquifer. Contractor Report. Texas Water Development Board, Austin, Texas.

Fryar, D, R. Senger, N. Deeds, J. Pickens, T. Jones, A. Whallon, and K. Dean, 2003. Groundwater Availability Modeling for the Northern Carrizo-Wilcox Aquifer. Contractor Report. Texas Water Development Board, Austin, Texas.

Jones, T.L., V.A. Kelley, J.F. Pickens, R.L. Beauheim, and P.B. Davies, 1993. Transport Process Identification for Interpretation of Conservative Tracer Tests Performed in the Culebra Dolomite at the

John Pickens (cont.)

Waste Isolation Pilot Plant Site. Paper presented at Focus 93 Conference on Site Characterization and Model Validation, Las Vegas, Nevada. Published in Proceedings Volume.

Jones, T.L., V.A. Kelley, J.F. Pickens, D.T. Upton, R.L. Beauheim, and P.B. Davies, 1992. Integration of Interpretation Results of Tracer Tests Performed in the Culebra Dolomite at the Waste Isolation Pilot Plant (WIPP) Site. Sandia National Laboratories, Contractor Report SAND92-1579.

LaVenue, A.M. and J.F. Pickens, 1992. Application of a Coupled Adjoint Sensitivity and Kriging Approach to Calibrate a Ground-Water Flow Model. Water Resources Research, Vol. 28, No. 6, p. 1543 1569.

Pickens, J.F., 1992. Analysis of Tracer Tests in the Culebra Dolomite. Presentation to the National Academy of Sciences WIPP Review Panel, 1-2 April, 1992, Washington, D.C.

Beauheim, R.L., T.F. Dale, and J.F. Pickens, 1991. Interpretations of Single-Well Hydraulic Tests of the Rustler Formation Conducted in the Vicinity of the Waste Isolation Pilot Plant Site, 1988-1989. Sandia National Laboratories, Contractor Report SAND89 0869.

Pickens, J.F., and T.L. Cauffman, 1991. Double-Porosity Interpretations of Convergent-Flow Tracer Tests in the Culebra Dolomite at the Waste Isolation Pilot Plant (WIPP) Site. Paper presented at INTRAVAL Working Group 2 Meeting, Santa Fe, New Mexico, October 10.

Reeves, M., G.A. Freeze, V.A. Kelley, J.F. Pickens, D.T. Upton, and P.B. Davies, 1991. Regional Double-Porosity Solute Transport in the Culebra Dolomite under Brine-Reservoir-Breach Release Conditions: An Analysis of Parameter Sensitivity and Importance. Sandia National Laboratories, Contractor Report SAND89-7069.

Reeves, M., G.A. Freeze, V.A. Kelley, and J.F. Pickens, 1989. Regional Double Porosity Solute Transport in the Culebra Dolomite Under High Pressure Release Conditions: An Analysis of Parameter Sensitivity and Importance at the Waste Isolation Pilot Plant (WIPP) Site. Sandia National Laboratories, Contractor Report 89 7069.

Pickens, J.F., V.A. Kelley, and M. Reeves, 1988. Evaluation of the Role of Fractures in Governing Solute Transport in the Culebra Dolomite at the Waste Isolation Pilot Plant (WIPP) Site. Abstract in EOS Transactions, American Geophysical Union, Vol. 69, No. 44, p.1177; presented at AGU Fall Meeting, San Francisco, 5 9 December.

Haug, A., V.A. Kelley, A.M. LaVenue, and J.F. Pickens, 1987. Modeling of Ground Water Flow in the Culebra Dolomite at the Waste Isolation Pilot Plant (WIPP) Site: Interim Report, Sandia National Laboratories, SAND86 7167.

Reeves, M., V.A. Kelley, and J.F. Pickens, 1987. Regional Double Porosity Transport in the Culebra Dolomite: An Analysis of Parameter Sensitivity and Importance at the Waste Isolation Pilot Plant (WIPP) Site, Sandia National Laboratories, SAND87 7105.

Kelley, V.A., and J.F. Pickens, 1986. Interpretation of the Convergent Flow Tracer Tests Conducted in the Culebra Dolomite at the H 3 and H 4 Hydropads at the Waste Isolation Pilot Plant (WIPP) Site. Sandia National Laboratories, SAND86 7161.

Van Kelley, PG

INTERA

Project Manager

Van Kelley is a Principal Hydrogeologist at INTERA with 33 years of experience in the fields of geology, hydrogeology, and numerical groundwater flow modeling. He has given dozens of presentations on aquifer characterization and groundwater flow modeling including published work in conference proceedings and journals. He also has a personal and professional interest in explaining the role of groundwater models in water resources focusing on issues of scale, availability, and water resources management. Mr. Kelley regularly presents to GCDs, GMAs, the Texas Alliance of Groundwater Districts (TAGD) and the Texas Water Conservation Association (TWCA). He has experience in general hydrogeology ranging from basic aquifer monitoring, aquifer characterization including pumping tests, core analysis, and detailed borehole fluid logging analysis using moment methods and numerical simulators. He has participated in and managed large field characterization programs including large-scale pumping tests, tracer tests in fractured media, and detailed fracture characterization studies using packer testing and dual-tracer techniques in the U.S and abroad. He is an expert in water-balance, recharge, and water-availability evaluations.

Years of Experience: 33

Education:

- MS, 1985, Hydrogeology, Texas A&M University
- BS, 1982, Petroleum Geology, Mississippi State University

Professional Certifications:

- Professional Geoscientist, Texas, No. 4923

Key Experience:

- 33 years in hydrogeology and modeling, including managing work on 7 GAMs and providing technical support and review on 4 others
- Proven ability to deliver projects involving water resource evaluations on schedule and on budget
- Recent projects involving delineation and quantification of brackish groundwater resources in Texas

Mr. Kelley's experience conducting evaluations of the aquifers in west Texas and southeastern New Mexico dates back to the mid-1980s, and includes: characterization and modeling studies of the Rustler, Dockum, and Dewey Lake formations in southeastern New Mexico to support performance assessment and licensing of the U.S. Department of Energy's Waste Isolation Pilot Plant (WIPP); managing the development of the Rustler Aquifer GAM for the TWDB; and revising the Region A Northern Ogallala GAM. He has also worked on numerous projects in Texas to delineate and quantify brackish groundwater resources. These include studies in the Gulf Coast Aquifer where he served on an expert panel for the Lone Star GCD regarding the characterization and regulation of brackish groundwater resources in the Gulf Coast Aquifer in Montgomery County. He has also recently managed projects to characterize brackish and fresh groundwater resources in the central (near Brazos County) and northeastern (near Anderson County) portions of the Carrizo-Wilcox Aquifer. Mr. Kelley is currently participating on a project to evaluate brackish and impaired groundwater in the Paleozoic, Northern Trinity, and Woodbine aquifers for the Tarrant Regional Water Authority and the City of Wichita Falls.

Representative Project Experience

Groundwater Availability Model for the Rustler Aquifer, Texas Water Development Board, Austin, TX. 2009 – 2012. *Project Manager.* Led the development of the Rustler Aquifer GAM. The Rustler Aquifer is a minor aquifer in west Texas and southeast New Mexico in the Delaware Basin. The aquifer system is complex and is known to be connected to other aquifer systems and spring systems in the region.

Van Kelley (cont.)

Development of an Updated Groundwater Availability Model for the Northern Trinity and Woodbine Aquifers, Inter-Local Agreement, TX. 2012 – Present. *Project Manager.* Currently leading a team responsible for completing a major revision to the Northern Trinity and Woodbine Aquifers groundwater availability model (GAM). This model is unique in Texas in that it is being entirely funded by four groundwater conservation districts (GCDs) (North Texas GCD, Northern Trinity GCD, Prairielands GCD and Upper Trinity GCD) through an Inter-local Agreement. The model is being developed to bridge the gap between regional Groundwater Management Area (GMA) models and those that have significance on a water planning perspective at a GCD scale.

Hydrogeologic Characterization of the U.S. Department of Energy's Waste Isolation Pilot Plant, Sandia National Laboratories, Carlsbad, NM. 1985 – 1989. Hydrogeologist. Provided field and modeling support for a variety of hydrologic tests designed to characterize the primary aquifers (Culebra and Magenta dolomite members of the Rustler Formation) and other hydrostratigraphic units overlying the WIPP repository horizon as part of the overall performance assessment and licensing of the facility as a geologic repository for transuranic wastes. Specific assignments included performing detailed design, implementation, and analysis of conservative, convergent-flow tracer tests performed in the Culebra dolomite (a fractured carbonate aquifer overlying the WIPP repository and a primary contaminant transport pathway in the event of a repository breach). He also performed a detailed core analysis for the Culebra Dolomite to determine the transport properties and pore characteristics to support subsequent transport studies. The analysis included three types of porosity determination methods including mercury porosimetry to define the pore throat diameter distributions. Resistivity studies were also performed to estimate constrictivity and tortuosity values to better define effective diffusion coefficients for the dolomite.

Technical Support for Water Planning, Upper Trinity Groundwater Conservation District (UTGCD), TX. 2008 – Present. *Consulting Hydrogeologist.* Providing technical support to the UTGCD as hydrogeologist. The UTGCD is a new district aimed at conserving groundwater within a four-county region just west of the Dallas-Ft Worth Metroplex. Historically, the Northern Trinity Aquifer has experienced significant drawdown, and the region has most recently been designated as a Priority Management Groundwater Area by the Texas Commission on Environmental Quality. The counties within the district are experiencing urbanization as well as groundwater production associated with the Barnet Shale gas play. Tasks have included supporting UTGCD in gaining an understanding of the current Northern Trinity Aquifer GAM, the significance of the GMA-8 Northern Trinity Desired Future Conditions, interim rules on well spacing, estimates of current groundwater use, and developing a GIS-based database system. Also led the effort to get the Groundwater Management Plan approved by the Texas Water Development Board within the regulatory deadline. In addition to regular review of variance requests and other technical matters that come before the Board, leading a study to expand the UTGCD's monitoring program. This work includes the development of a detailed hydrogeologic framework and detailed and documented strategy for monitoring network expansion.

Update of the Northern Ogallala Groundwater Availability Model (GAM) to Support the 2011 Regional Water Plan, Panhandle Area Water Planning Group, TX. 2009 – 2010. *Project Manager*. Supervised INTERA staff in revision and recalibration of the model using updated and improved pumping estimates through 2008, an updated aquifer surface base, and newly available aquifer test data. The model was calibrated from predevelopment through 2008 and run in predictive mode through the year 2060. Led all technical presentations of the model to the Regional Water Planning Group and to the Region A Modeling Subcommittee.

Van Kelley (cont.)

Development of a Groundwater Availability Model for the Yegua-Jackson Aquifer, Texas Water Development Board, Austin, TX. 2008 – 2010. *Project Manager.* Led development of the Yegua-Jackson Aquifer GAM. The model is comprised of five layers and extends from the Rio Grande to the Red River. Since the Yegua-Jackson is a minor aquifer with little supporting data, the modeling efforts relied heavily on the depositional environment study that was part of an earlier study completed by INTERA to develop the structure for this aquifer system.

Development of Structure for the Yegua-Jackson Aquifer, Texas Water Development Board, Austin, TX. 2006 – 2007. *Project Manager.* Led the team responsible for developing the geologic structure for the Yegua-Jackson Aquifer in Texas to support the subsequent development of a GAM of the aquifer. The analysis augmented previous stratigraphic interpretations with 250 well logs within the outcrop and along the downdip boundaries of the aquifer. The log data were used to subdivide the Yegua and Jackson intervals into genetic units on the basis of maximum flooding surfaces, which were presumed to be time-synchronous. The spontaneous potential (SP) and resistivity curves from 150 logs were digitized for consistent, repeatable percent-sand calculations. These new structural and lithologic data were then incorporated with trends from previous studies to produce updated genetic maps spanning the aquifer trend from Mexico to Louisiana.

Development of Groundwater Availability Models (GAMs) for the Queen City and Sparta Aquifers, Incorporating the Carrizo-Wilcox GAMs, Texas Water Development Board (TWDB), Austin, TX. 2002 – 2004. *Project Manager.* In support of the TWDB's GAM program, led INTERA's development of three regional MODFLOW models for the southern, central, and northern portions of the Queen City and Sparta Aquifers. Each model consisted of eight layers representing the Sparta, Queen City, and Carrizo-Wilcox aquifers, as well as the intervening aquitards. Key technical issues included hydraulic properties, recharge, and aquifer-stream interaction. In addition to the standard GAM calibration requirements, developed a set of models that reproduced water balances consistent with the accepted conceptualization of groundwater flow in the aquifer. The Queen City and Sparta GAMs intersect 10 of the 16 Regional Water Planning Groups (RWPGs) in Texas, and consistent with state water planning policy, the models were developed with the support of numerous stakeholders. In addition to leading the modeling efforts, organized and conducted quarterly stakeholder forums involving the TWDB, RWPGs, groundwater conservation districts, river authorities, and the public to present modeling results and solicit input. These GAMs were subsequently used by state planners, RWPGs, consultants, and other interested stakeholders to support water planning.

Development of Groundwater Availability Models for Southern Portion of the Carrizo-Wilcox Aquifer, Texas Water Development Board, Austin, TX. 2001 – 2003. *Project Manager and Lead Modeler.* In support of the TWDB's GAM program, led INTERA's development of a regional MODFLOW model for the southern Carrizo-Wilcox Aquifer (basin divide between the Colorado and Guadalupe Rivers to the Rio Grande River). Efforts included developing a steady-state, pre-development model and a transient model calibrated from 1980 through 1990. The time period from 1991 through 2000 was used for validation and predictions were made from 2001 to 2050. Conceptual model development included the review and assessment of aquifer/aquitard system geometry (geology, hydrostratigraphy, outcrops, river basins, and model boundaries), water levels and regional groundwater flow, aquifer hydraulic properties, recharge, discharge (groundwater/ surface water interaction and pumping), and water quality. Additional project tasks included database development, GIS data development and presentation, reporting and web publishing, and stakeholder meetings. Responsible for leading the modeling team, providing senior technical input, interfacing with the TWDB, and planning

Van Kelley (cont.)

and conducting quarterly stakeholder meetings to present the results of the modeling efforts and to solicit input. All project milestones and deliverables were completed on schedule and on budget.

Relevant Publications/Reports

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Kelley, V.A., B.S. Ramarao, T. Clemo, and M. Lavenue, 2013. An Innovative MODFLOW-based Tool for Managing Ground-Water Resources. Presented at the NGWA Summit — The National and International Conference on Groundwater, April 28-May 2, 2013, in San Antonio, TX.

Ewing, J.E., V.A. Kelley, T.L Jones, T. Yan, A. Singh, D.W. Powers, R.M. Holt, and J.M. Sharp, 2012. Groundwater Availability Model Report for the Rustler Aquifer. Report to Texas Water Development Board, INTERA, 434p.

Austin, B., and V. Kelley, 2012. Aquifer Storage and Recovery (ASR), Part III of Chapter 24 – Innovative Technologies, Essentials of Texas Water Resources, Texas Bar Books.

Huang, Y., B.R. Scanlon, J.P. Nicot, R.C Reedy, V. A. Kelley and N.E. Deeds, 2012. "Sources of groundwater pumpage in a layered aquifer system in the Upper Gulf Coastal Plain, USA", Hydrogeology Journal, April 13, 2012.

Kelley, V.A., N. Deeds, and D. Fryar, 2009. Hydrogeology of the Queen City and Sparta Aquifers with an Emphasis on Regional Mechanisms of Discharge. Published in Aquifers of the Upper Coastal Plains of Texas, TWDB Report 374, 87-116.

Kelley, V.A., N. Deeds, D. Fryar, and R. Senger, 2009. Development of Regional Groundwater Availability Models of the Carrizo-Wilcox Aquifer of Texas. Presented at the GCAGS Annual Conference Session: The Wilcox, from the Outcrop to the Abyss, Sept. 29, 2009, Shreveport, LA.

Kelley, V.A., and S. Young, 2009. Importance of Groundwater-Surface Water Interactions to Texas Water Programs. Presented at the 65th Annual Convention of the Texas Water Conservation Association, Feb. 26, 2009, Austin, TX.

Kelley, V.A., 2008. Ground Water Availability–Texas. Presented at the 2008 Ground Water Expo, Ground Water Sustainability Interest Group Public Session, Dec. 3.

Kelley, V.A., R. Mace, and N. Deeds, 2008. Groundwater Availability Modeling –The Texas Experience. Published in The Water Report, 54.

Kelley, V.A., and N. Deeds, 2004. The Queen City and Sparta GAMs, Strengths and Limitations for Groundwater Management. Presented at Texas Groundwater 2004, Texas Capitol Extension, Nov. 19, Austin, TX.

Jones, T.L., V.A. Kelley, J.F. Pickens, D.T. Upton, R.L. Beauheim, and P.B. Davies, 1992. Integration of Interpretation Results of Tracer Tests Performed in the Culebra Dolomite at the Waste Isolation Pilot Plant Site. Sandia Report SAND92-1579. Sandia National Laboratories, Albuquerque, NM.

Kelley, V.A. and G.J. Saulnier, Jr., 1990. Core Analysis for Selected Samples from the Culebra Dolomite at the Waste Isolation Pilot Plant (WIPP) Site. Sandia National Laboratories Contractor Report SAND90-7011.

John Sharp, Jr., PhD, PG

Expert Consultant

Senior Technical Advisor

John "Jack" Sharp, Jr. has 41 years of professional experience in the fields of geology, hydrogeology, field methods, fractured rock hydrology, and engineering geology. He is the Carlton Professor of Geology in the Department of Geological Sciences, Jackson School of Geosciences at the University of Texas at Austin and is a Fellow of the Geological Society of America. Over the past 33 years, he has taught classes in hydrogeology, field methods, fractured rock hydrology, engineering geology, hydrogeophysics, and karst and urban hydrogeology; completed hundreds of research projects; and supervised over 80 graduate students in the completion of their degrees. He has initiated two new curricula at the University of Texas; a BS degree in Hydrogeology and Environmental Geology, and a BS in Geosystems Engineering and Hydrogeology (a joint program with the Petroleum Engineering Department). Dr. Sharp has received numerous awards and recognitions in the areas of hydrology and hydrogeology.

Years of Experience: 41

Education:

- PhD, 1974, Hydrogeology, University of Illinois
- BS, 1967, Geological Engineering, University of Minnesota

Professional Certifications:

- Professional Geoscientist, Texas

Key Experience:

- Over 40 years in geology and hydrogeology
- 30 years on projects evaluating regional groundwater flow in the Trans-Pecos area of Texas, including participation on the Rustler Aquifer GAM for TWDB
- Expert in characterization and modeling of hydrogeologic systems

Representative Experience

Evaluation of Regional Groundwater Flow in the Trans-Pecos Area, Texas. *Principal Investigator.* Based on groundwater chemistry data and geochemical models, he has evaluated the sources of groundwater discharge from several large springs in the area. Low annual precipitation in the Trans-Pecos area is insufficient to maintain observed spring flows, suggesting the presence of a regional groundwater flow system. He has analyzed data from over 1,400 wells in the area over a 50-year time period to delineate 11 hydrochemical facies based on the predominant ions. Dr. Sharp has also investigated recharge estimates, mechanisms, and spatial variability for aquifers in semiarid regions.

Development of Groundwater Flow Models. *Principal Investigator.* Dr. Sharp has experience in developing models for groundwater flow in numerous aquifer types, including alluvial systems, tuffs, and carbonate aquifers. This includes characterizing regional aquifer systems with sparse hydrogeologic data, like the Rustler Aquifer. Dr. Sharp has studied issues related to fractured aquifers/reservoirs, including permeability and porosity variations and fracture controls in regional groundwater flow. He has also examined the hydrogeological effects of urbanization, land subsidence along the Texas Gulf Coast related to oil and gas production, and variable-density groundwater flow.

Groundwater Availability Model for the Rustler Aquifer, Texas Water Development Board, Austin, TX. *Senior Technical Advisor.* From 2009 to 2012, provided technical input and review as part of INTERA team responsible for developing the Rustler Aquifer GAM under TWDB's Groundwater Availability Modeling Program. Provided advice during development of conceptual model on methods of addressing sparsity of available data for the Rustler.

Relevant Publications/Reports

Jack Sharp (cont.)

Sharp, J.M., Jr., and Robertson, W.R., 2014, Arid basin water budgets and fracture controls on recharge and discharge: Example of Trans-Pecos Texas [abs.]: in Groundwater: Challenges & Strategies. Proceedings, 41st Congress, International Association of Hydrogeologists, Marrakech, Morocco, CD with program

Robertson, W.R., and Sharp, J.M., Jr., 2013, Techniques for estimating recharge in arid basin aquifers: A case study from Trans-Pecos Texas: Geo. Soc. America, Abs. with Programs (South-Central Section Mtg.), v. 45, p. 7

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Robertson, W.R., and Sharp, J.M., Jr., 2012, Evidence of young water in the Trans-Pecos basin aquifers: Geo. Soc. America, Abs. with Programs (South-Central Section Mtg.), v. 44, no. 1, p. 32.

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Wolaver, B.D., and Sharp, J.M., Jr., 2007, Ground Water Model Development in Regional Aquifer Systems with Sparse Hydrogeologic Data: Cuatrocienegas Basin, Coahuila, Mexico[abs]: The Abstract Book of the 2007 Ground Water Summit Program, National Ground Water Association, Westerville, OH, p. 232.

Sharp, J.M., Jr., Pierce, S.A., Lowry, T.S., and Tidwell, V.C., 2006, Developing an interactive model (decision support system) to address water management policy issues: an Edwards aquifer example: Geol. Soc. America, Abs. with Programs (South-Central Sec. Mtg.), v. 38, no. 1, p. 37.

Budge, T.J., Young, S.C., and Sharp, J.M., Jr., 2006, Tailoring ARCGIS to assist groundwater conservation district with evaluating alternative water resource management strategies: Geographic Information Systems and Water Resources IV, American Water Resources, Spring Speciality Conference, Houston, Texas, 7p.

Sharp, J.M., Jr., 2005, Forgotten and emerging issues in Trans-Pecos groundwater systems: Geol. Soc. America, Abs. with Programs (South-Central Sec.), v. 37, no. 3, p. 3.

Beach, J.A., Ashworth, J.B., Finch, S.T., Jr., Chastain-Howley, A., Calhoun, K., Urbanczyk, K.M., Sharp, J.M., Jr., and Olson, J., 2004, Groundwater availability model for the Igneous and parts of the West Texas Bolsons (Wild Horse Flat, Michigan Flat, Ryan Flat, and Lobo Flat) aquifers: Contract report to the Texas Water Development Board, 208p.

Pierce, S. A., Evans, S.A., and Sharp, J.M., Jr., 2004, Groundwater systems in the Cuatrociénegas Basin: Comparing conceptual flow models and related implications for groundwater management strategies [abs.]: Proceedings, Junta de Investigadores de Cuatrociénegas /Meeting of Cuatrociénegas Researchers, Desert Fishes Council, Cuatrociénegas, Mexico.

Sharp, J.M., Jr., Boghici, R., and Uliana, M.M., 2003, Groundwater systems feeding the springs of West Texas: in Aquatic Fauna of the Northern Chihuahuan Desert (Garret, G.P., and Allen, N.L., eds.), Proceedings, 33 Annual Symposium of the Desert Fishes Council, Museum of Texas Tech University Special Publications 46, p. 1-11. *

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Sharp, J.M., Jr., 2001, Regional groundwater flow systems in Trans-Pecos Texas: in Aquifers of West Texas (Mace, R.E, Mullican, W.F., III, and Angle, E.S., eds.), Texas Water Development Board, Austin, TX, Report 356, Ch. 4, p. 41-55.

Sharp, J.M., Jr., 2001, Regional groundwater flow systems in Trans-Pecos Texas [abs.]: Texas Water Development Board, Aquifers of West Texas Symposium, Alpine, Texas.

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Sharp, J.M., Jr., Uliana, M.M., and Boghici, R., 1999, Fracture controls on regional groundwater flow in a semiarid environment and implications for long-term maintenance of spring flows: Water 99 Joint Congress, Inst. of Engineers, Australia, Brisbane, v. 2, p.1212-1217.

Uliana, M.M., and Sharp, J.M., Jr., 1999, Tracing regional flow paths to major springs in Trans-Pecos Texas using naturally occurring geochemical and isotopic species: Geol. Soc. America, Abs. with Programs (Ann. Mtg.), v. 31, p. A-396.

Van Broekhoven, N.G., and Sharp, J.M., Jr., 1999, Recharge estimates, mechanisms, and spatial variability in a basin aquifer in the semiarid West Texas Basin and Range: Geol. Soc. America, Abs. with Programs (Ann. Mtg.), v. 31, p. A-151.

Sharp, J.M., Jr., 1998, Sustainable groundwater supplies - an evolving issue: examples from major carbonate aquifers of Texas, U. S. A.: in Groundwater: Sustainable Solutions (eds., Weaver, T.R., and Lawrence, C.R.), Int. Assoc. Hydrogeologists, Melbourne, p. 1- 12.

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Jack Sharp (cont.)

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Darling, B.K., Hibbs, B.J., Dutton, A.R., and Sharp, J.M., Jr., 1997, Interbasin ground-water flow in Trans-Pecos Texas: Geol. Soc. America, Abs. with Programs (South-Central/Rocky Mountain Secs.), v. 29, p. 7.

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LaFave, J.I., and Sharp, J.M., Jr., 1987, Hydrogeology of the Toyah Basin aquifer and Balmorhea Springs: Geol. Soc. America, Abs. with Programs (South-Central Sec.), v. 19, p. 172.

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Daniel Lupton, PG

INTERA

Technical Lead –
Delineation of Groundwater

Daniel Lupton is a Hydrogeologist at INTERA with 11 years of experience in water resource and geological sciences focused on employing field data collection and interpretation methods, such as geophysical logging/correlation, water level sampling, and spring discharge surveys, in conjunction with data analysis and modeling to develop an improved understanding of the hydraulic properties of groundwater flow systems. Mr. Lupton brings specialized expertise in using advanced techniques to analyze and integrate hydrogeologic data into groundwater flow models. Much of his work at INTERA is focused on the acquisition and interpretation of geophysical logs that provide important information on water quality, lithology, and structure, as they relate to defining the hydraulic properties of aquifer systems. He has supported projects ranging from the development and application of groundwater models to evaluate water availability and production economics to developing standard procedures for digitizing large amounts of geological and hydrogeological data from public sources. Through this and other work, he has become proficient in accessing both public and private geophysical log databases and analyzing and integrating geophysical log information to support evaluations of groundwater resources. To perform hydrogeologic analyses and integrate and present hydraulic property data, Mr. Lupton routinely uses tools that include Arc GIS, Leapfrog Geo, and Petra, an integrated application with a common database and interface for project and data management, well log analysis, mapping, cross-sections and seismic integration. He regularly presents the results of the hydrogeologic analyses to clients and other project stakeholders, including GCDs, and at national/international conferences. In addition, Mr. Lupton is regularly responsible for documenting these results in technical reports and industry publications.

Years of Experience: 11

Education:

- MS, 2009, Hydrogeology, University of Texas at San Antonio
- BS, 2006, Resource and Environmental Studies (Geology Emphasis), Texas State University

Professional Certifications:

- Professional Geoscientist, Texas, No. 11354

Key Experience:

- 11 years in water quality and lithologic evaluations and integration of hydraulic properties into flow models
- Projects involving hydrogeologic characterization of aquifers throughout Texas, including Rustler, Capitan, Dockum, Carrizo-Wilcox, Gulf Coast, and Yegua-Jackson
- Work on TWDB projects, including Rustler GAM and analysis of structure, hydraulic properties, and water quality for High Plains Aquifer System GAM

Representative Project Experience

Delaware Basin Groundwater Availability Assessment, Confidential E&P Client, 2014 – Present. *Geologist.* Evaluated the structure, stratigraphy and lithology of various groundwater bearing units, including the Rustler Aquifer across a large area of northern Culberson and western Reeves and Loving counties in Texas. This was in support of evaluating the occurrence and extent of groundwater supplies suitable to support oil and gas operations and to define areas on their properties with a critical need for alternative water supplies for a confidential water resources client. Data sources for the evaluation relied almost exclusively on the evaluation of natural gamma logs run across cased and uncased oil and gas wells. Over 1,500 geophysical logs were evaluated for structure and lithology. Resulting structure and distribution of sands and clays were interpolated in three dimensions using the software GSLib. Model results provided a guide for trends in high net sands areas and in turn areas of high groundwater productivity. Model results were checked against high and low productivity groundwater wells in the

Daniel Lupton (cont.)

area with favorable results. Ongoing tasks for this client include the development of a high-yield well field from a brackish aquifer to serve areas identified as having insufficient water supplies.

Evaluation of Hydrogeologic Resources in Specified Areas within West Texas, Confidential Oil and Gas Client. 2014-present. *Hydrogeologist/Project Manager.* Client provided INTERA with maps of lease holdings and specified a desired quality and quantity of water that they need for well stimulation purposes. Compiled area groundwater well data, along with any geophysical well logs that could be used to evaluate the local area hydrogeology. Once a target formation was determined, cross sections, along with lithologic analysis, were completed and integrated into a report detailing the local hydrogeologic conditions. Well spacing calculations, along with well spacing maps, were completed for the client to use as an example, should they choose to develop the well field. Finally, a presentation was made to the client, along with any interested parties, of task findings. To date, five of these assessments focusing on the Rustler, Santa Rosa, Edwards-Trinity Plateau, Ogallala and Pecos Valley Alluvial Aquifers have been successfully completed and presented to the client. The results of one of the hydrogeologic assessments resulted in the client requesting that Mr. Lupton oversee field activities. Field activities included cuttings analysis, geophysical logging, interval isolation testing, well construction and well testing oversight. The field portion of the project lasted one month and resulted in the successful completion and testing of a highly productive groundwater well in the Rustler Aquifer.

Groundwater Availability Model for the Rustler Aquifer, Texas Water Development Board, Austin, TX. 2010 – 2012. *Hydrogeologist/Geologist.* Assisted in the development of the conceptual groundwater availability model of the Rustler aquifer. Duties included the creation of a stratigraphic cross section using existing data from groundwater models that over- and underlie the Rustler aquifer. Additional duties included evaluating preexisting data with the goal of providing baseline hydraulic properties for the aquifer. This project is part of the TWDB's GAM Project, which is meant to model all major and minor aquifers in the state of Texas. GAMs provide state and local water resource regulators with a tool for evaluating water usage in the state of Texas.

Oversight of Rustler Groundwater Well Drilling Program, Confidential Oil and Gas Client. 2014. *Project Manager.* An oil and gas client wanted to assess the groundwater potential in the Rustler aquifer in their lease holdings. After overseeing the creation of a desktop study for the area, the results were presented to the client, and they decided to move forward with a groundwater well drilling program. Provided oversight of the drilling, along with lithologic characterization at 5-foot increments. Upon completion of drilling, a full suite of logs was run. Responsible for the selection of potential intervals to isolate and test and involved through the entire testing process. Responsible for generating and presenting a report to the client detailing project findings.

Evaluation of Potential Water Resources, Confidential E&P Client, West Texas and Eastern New Mexico. 2012 – Present. *Hydrogeologist.* The recent expansion of hydrocarbon production and exploration in the Permian Basin, resulting from technological advances in hydraulic fracturing, has led to an increased stress on conventional water resources in the area. In recognition of current and future challenges in west Texas and eastern New Mexico, INTERA has been working to identify sources of water in the Permian Basin that can be developed and used to support hydraulic fracturing operations while minimizing impacts to existing groundwater users. INTERA's evaluations include performing detailed analysis and mapping of water levels, water quality, well locations, current groundwater uses, overall geologic framework, and aquifer hydraulic properties. To better understand potential brackish groundwater resources in the client's areas of interest, INTERA has also used Railroad Commission of Texas datasets to compile records for over 1,000 Class II injection/disposal wells and interpret some

18,000 data points defining the depth to the base of usable-quality water (total dissolved solids <3,000 mg/L). In addition, public and proprietary geophysical well logs are being interpreted for both Texas and New Mexico to further refine hydrogeologic conditions in the areas of interest.

Ochoa Sulphate of Potash Mine Water Supply Project, Intercontinental Potash Corp. (USA), Lea County, NM. 2012 – Present. *Hydrogeologist.* The Capitan aquifer system is a brackish water source in west Texas and eastern New Mexico that has previously been used by the oil and gas industry in the western extents (more brackish portion) and as a municipal supply in the eastern extents (more fresh-water portion). INTERA was hired by Intercontinental Potash Corporation (ICP) to oversee the various aspects of installing a well field into the brackish portion of the Capitan aquifer.

Brackish Resource Assessment, City of Corpus Christi, San Patricio, Nueces and Aransas Counties, TX. 2013. *Geologist.* The water resource manager for the city of Corpus Christi contacted INTERA about the possibility of using brackish groundwater for their future water supplies. The project was set up in multiple phases. Phase I involved the construction of a Petra database that included all of the existing geologic/hydrogeologic information for the area, along with more than 100 strategically placed oil and gas geophysical logs. The logs were subsequently digitized and evaluated for lithology and water quality parameters. Results were compared with water wells in the area, and corrections were made. The resulting dataset provided insight into the depth and quality of accessible groundwater within San Patricio and Nueces counties. The next phase of the project involved specific testing of areas designated from the results of the water quality and lithology distribution. Test wells were drilled, logged, tested, and sampled. Upon completing the test well phase, improvements to the water quality conceptual model were made as necessary.

Evaluation of the Effects of Faulting on Groundwater Flow, Post Oak Savanah Groundwater Conservation District. 2014-present. *Geologist.* Post Oak Savanah Groundwater Conservation District (POSGCD) wanted to know the impacts of not integrating faults into the regional Groundwater Availability Model (GAM) that they used to model their Desired Future Conditions (DFCs) as required by Texas law. The project to date has involved the acquisition of over 600 geophysical logs in an attempt to resolve the base of the Carrizo-Wilcox aquifer system. All structural picks will be brought together and incorporated into a surface that reflects the significant faulting affecting the area. Hydraulic simulations using this surface will be run, and the effects of faulting on the groundwater system will be investigated.

Feasibility Study for Aquifer Storage and Recovery, New Braunfels Utility, New Braunfels, TX. 2012. *Hydrogeologist.* INTERA was asked to evaluate the practical aquifer storage and recovery (ASR) applications that might be beneficial to the New Braunfels Utility (NBU) (a municipally owned public utility) and its service area; to gather pertinent information on NBU's water system and future plans; and to conduct a preliminary feasibility study to assess the viability of ASR as an NBU water management strategy. INTERA's primary role was evaluating the hydrogeology of the area, determining the best formations for injection and production, and designing a test plan for the next phase of the project. Personal responsibilities included evaluation of geophysical logs and surface geology in anticipation of developing a cross section through the project area. In addition, porosity logs and down-dip oil and gas logs were evaluated for up-dip projections of trends in the study area.

Feasibility Study for Aquifer Storage and Recovery, Texas General Land Office, Comal County, TX. 2012. *Hydrogeologist.* The Texas General Land Office (GLO) is the owner of property in Comal County, TX. In order for development to occur on the property, a reliable water supply must be

Daniel Lupton (cont.)

established. One possible supply option is brackish groundwater combined with a desalination facility. INTERA was engaged by the GLO to perform a preliminary feasibility study for this option. INTERA's primary role was determining the probable brackish water production rate, the water quality of this raw source, and the feasibility of disposing of the saline waste stream through a deep injection well. In addition, INTERA provided initial cost estimates for construction and operation of the production and disposal wells. Personal responsibilities consisted of evaluating the formation characteristics for production/injection potential.

Evaluation of Variable Density Modeling Software, Texas Water Development Board, TX. 2010 – 2012. *Hydrogeologist.* Responsible for identifying and evaluating the capabilities of the most commonly used variable density groundwater modeling software for simulating flow in brackish aquifers to support the Texas Water Development Board's (TWDB) Brackish Resources Aquifer Characterization System (BRACS) program. Duties included performing a literature review on the status and applicability of various types of flow models for brackish aquifers and the influence of aquifer geometry and geological structure on salinity distribution and brackish groundwater movement, soliciting input from coastal groundwater modelers as part of the model evaluation process, and making recommendations on the conditions under which a specific type of groundwater flow model(s) is applicable. The results of this work will enable TWDB to select and use appropriate models for predicting the performance of brackish aquifers, evaluating the temporal changes in water quality in response to stress on these aquifers, and determining the potential impacts to associated fresh water supply sources.

Construction of Geologic Model for the Panola Groundwater Conservation District. 2014-present. *Geologist.* Panola County Groundwater Conservation District (PCGCD) was interested in mapping the subsurface geologic units within their district. Used both previously published information and geophysical well logs in order to supplement areas with low data density. The analysis required the construction of a geologic model, along with the analysis of hundreds of geophysical logs for structural contacts and lithologic properties. In addition, all groundwater wells within the study area that had digitized driller's logs were incorporated into the geologic model. The results of this study will be used to understand better the hydraulics of the groundwater units within the district.

Relevant Publications/Reports

Lupton, D., W. Oliver, and G. Grisak, 2014. Evaluation and Use of Brackish Groundwater Resources. Shale Play Water Management Magazine, May/June 2014. Available in print and online at: http://www.shaleplaywatermanagement.com/2014-May-June.html.

Lupton, D.M., and G. Strassberg, 2013. Creating a 3D Hydrostratigraphy Model of the Gulf Coast Aquifer in Texas. 2013 Arc News Magazine Spring 2013 Vol.35, No.1.

Lupton, D.M., and Young, S. C., 2012. Assessment of Brackish Groundwater Resources for a Coastal Texas County. 2012 Environmental Water Resource Congress Conference, May 21, 2012.

Lupton, D.M., 2009. Mapping Zones of Aquifer Recharge and Discharge Based on Correlation of Naturally Occurring Hydrologic Features, Central Texas. MS Thesis Defense, Dec. 5, 2009.

Lupton, D.M., and A.R. Dutton, 2009. Mapping Recharge and Discharge Zones Based on Correlations Between Dynamic Pressure Increment and Stream Order Analyses. Geological Society of America National Conference, Hydrogeology Division, Oct. 18, 2009.

Jevon Harding

INTERA

Technical Lead –
Quantification of Groundwater

Jevon Harding is a Hydrogeologist at INTERA with eight years of research and applied experience in the fields of hydrogeology, water chemistry, and numerical groundwater flow and transport modeling. In support of water resource evaluations, she has performed analyses to quantify hydrologic and hydrogeologic processes and properties, applied GIS to manage, analyze, and map data, developed and applied numerical models, and implemented field data collection programs. Ms. Harding has contributed to projects for state, regional, and local water authorities, as well as commercial industry, including the development of GAMs of aquifer systems to support long-term water planning, the use of models to evaluate seawater intrusion and its impacts on water supply systems, the assessment of impacts to watersheds from climate change, and the design of rainwater harvesting systems to reduce water usage. In support of developing regional-scale GAMs, she has supported the development of conceptual models, compiled and analyzed water quality data from the TWDB Groundwater database, and performed literature reviews to identify aquifer water quality trends and potential areas of cross-formational flow. Other activities on these GAMs have included preparing GIS databases and maps of the study areas, calculating shallow areal recharge estimates using hydrograph separation, and investigation of aquifer interaction with surface water. She has experience with analytical solutions and numerical codes including the application of MODFLOW and its associated family of codes, as well as the finite-element modeling program COMSOL Multiphysics and the multi-layer transient analytic element solver TTim. Her experience also includes coordinating and presenting workshops and establishing other community outreach efforts to communicate technical and scientific information on topics such as water use and conservation. In addition to her work with the public, she has also presented her research in academic settings and at professional conferences such as the American Geophysical Union and Geological Society of America.

Years of Experience: 8

Education:

- MS, 2012, Hydrology, New Mexico Institute of Mining & Technology
- BS, 2007, Geosciences, Princeton University

Key Experience:

- 8 years in hydrogeology, water chemistry, and numerical groundwater flow and transport modeling using codes that include MODFLOW
- 4 years in the field data collection and interpretation of water quality and water isotopes
- Contribution to multiple TWDB GAMs including High Plains, Brazos River Alluvium, and Northern Trinity

Representative Project Experience

Development of a Groundwater Availability Model of the Brazos River Alluvium Aquifer, Texas Water Development Board, TX. 2014 – Present. *Hydrogeologist.* Supporting the development of a GAM of the Brazos River Alluvium Aquifer (BRAA). This research includes analyses to help characterize the surface water-groundwater interaction as well as the interaction between the BRAA and underlying aquifers. The groundwater model constructed as part of this research will provide a tool that will help evaluate various water management scenarios and their impacts on the BRAA and the Brazos River. Responsibilities include preparing a GIS geodatabase and creating maps of physiography, climate, geology, surface hydrology, hydraulic properties, and water quality; conducting a literature review of historical references to collect all relevant information on water chemistry, hydraulic properties and groundwater-surface water interaction; developing spatial coverages of recharge and

Jevon Harding (cont.)

hydraulic properties; presenting the research to the TWDB as well as local stakeholders; and documenting the conceptual model in a detailed report.

Modification and Recalibration of the Groundwater Model for Paleozoic Aquifers in the Upper Trinity Groundwater Conservation District, Upper Trinity Groundwater Conservation District, TX. 2014. *Hydrogeologist.* Supporting the updates and recalibration of a groundwater model for the Paleozoic aquifers in Upper Trinity Groundwater Conservation District and surrounding areas. Since the Paleozoic aquifers are not formally recognized by the Texas Water Development Board as either a major or minor aquifer, no official groundwater availability model has been developed. This study was designed to update key issues identified with an earlier "exploratory" uncalibrated model, calibrate the model to observed conditions in the district, and document the changes so that the model can be accepted and used as the best-available tool for evaluating groundwater availability in Upper Trinity Groundwater Conservation District. Responsibilities on this project included compiling all well information, including water levels and pumping for the study area, distributing precipitation data and well information to the model grid, and creating datasets compatible with the Northern Trinity-Woodbine Aquifer Groundwater Availability Model.

Development of a Groundwater Availability Model (GAM) of the High Plains Aquifer System, Texas Water Development Board, TX. 2012 – Present. *Hydrogeologist*. Supporting the development of an integrated GAM of the High Plains Aquifer System (HPAS), an extremely vulnerable and complex system comprised of the southern and northern portions of the Ogallala Aquifer (including the Rita Blanca Aquifer), the Edwards-Trinity High Plains Aquifer, and the Dockum Aquifer. While three GAMs currently exist that include these aquifers, inconsistencies between the models, and in particular the hydraulic connections between the various aquifers, make integrated aquifer planning in the High Plains very difficult. In support of this effort, responsibilities include preparing a GIS geodatabase and creating maps of physiography, climate, geology, surface hydrology, hydraulic properties, and water quality; collecting historical references containing previous water chemistry studies with emphasis on pre-development conditions, evidence of cross-formational flow, and influence of irrigation practices; acquiring representative well logs from available well databases; and documenting the conceptual model in a detailed report. The integrated HPAS GAM will provide a much improved modeling tool for supporting joint water planning in the High Plains region of Texas.

Development of a Groundwater Model for the Antlers Aquifer, Choctaw and Chickasaw Tribes, Southeastern OK. 2013. *Hydrogeologist.* INTERA prepared a groundwater model of the Antlers Aquifer for the Choctaw and Chickasaw Tribes of Oklahoma that can provide a basis for future groundwater management in the region. In support of developing this aquifer model, responsibilities included collecting available hydrologic data and locating historical reports from state and federal government agencies; creating maps of physiography, climate, geology, surface hydrology, hydraulic properties, water quality, and structure; developing pumping distributions for the region; preparing maps to visualize this data; using parameter estimation software to determine the model's sensitivity to input parameters; and documenting the conceptual model in a detailed report.

Update of the Northern Trinity-Woodbine Aquifer Groundwater Availability Model, Multiple Groundwater Conservation Districts in Groundwater Management Area 8, TX. 2012 – 2014. *Hydrogeologist*. Provided technical support to update the groundwater availability model (GAM) for the Northern Trinity and Woodbine aquifers. Originally developed in 2004, the updated version of the model incorporates new data to improve the accuracy of predictions made to assess and manage groundwater resources over a 50-year period. In support of developing this conceptual model of the

Jevon Harding (cont.)

aquifers, responsibilities included preparing a GIS geodatabase; creating maps of physiography, climate, geology, and surface hydrology; calculating shallow areal recharge estimates for the study area using hydrograph separation; locating historical reports on past groundwater conditions in the study area; performing a county-wide analysis of the specific capacity measurements collected to date and preparing maps to visualize this data; and documenting the conceptual model in a detailed report.

Groundwater Availability Model for Groundwater Management Areas 3 & 7, Texas Water Development Board, TX. 2012 – 2013. *Hydrogeologist.* Supported development of a GAM focused on the Edwards-Trinity (Plateau) and Pecos Valley aquifers for use in evaluating water resources, determining desired future conditions (DFCs), and assessing future groundwater availability. Responsibilities included assisting in the development of a new conceptual model by evaluating model outputs and creating GIS maps demonstrating recharge/discharge, head conditions, aquifer boundaries, and cross-formational flow.

Water Resource Assessment, City of Crownpoint, NM, 2013. *Hydrogeologist.* Supported the update of the previous model of San Juan Basin to include Westwater Canyon formation and inform decision-making for the city water supply. Responsibilities included reviewing the previous model of the San Juan Basin to identify pumping sources near Crownpoint, NM; retrieving static and transient water level data and river stage data from state and federal agencies; performing river stage-groundwater elevation analyses to determine groundwater gradients in the region; and preparing maps to visualize the data.

Seawater Intrusion Barrier Modeling, Dominguez Gap and Alamitos Seawater Barrier, Southern California Water Replenishment, CA. 2012 – 2014. *Hydrogeologist.* The Water Replenishment District of Southern California (WRD) runs the Harbor/Dominguez Gap project to provide advanced treatment of municipal wastewater that can be recycled as input water to the Dominguez Gap Barrier. This network of seawater barrier wells owned and operated by the Los Angeles County Department of Public Works (LACDPW) helps stop saltwater encroachment into the inland aquifer. As part of the permitting process for using recycled wastewater, groundwater monitoring is required to observe water quality conditions and to anticipate potential problems before recycled water travels to downgradient drinking water wells. Each year, the Dominguez Gap Barrier Model (DGBM) is updated using the past year's injection and production data in order to determine recycled water fate and transport for permit compliance. Responsibilities have included updating model inputs to include most recent pumping data, recreating boundary conditions based on monitoring wells' behavior and the past year's injection rates for the barrier wells using Python and ArcGIS scripts, and creating final model inputs to be used in the DGBM. The annual update of this model allows the WRD to remain in compliance with permit requirements, thus allowing the continuous uninterrupted injection of the recycled wastewater barrier that protects and preserves the fresh groundwater supplies within WRD's service area.

Public Water Supply Well Field Expansion, Valparaiso City Utility, Valparaiso, IN. 2014. *Hydrogeologist.* INTERA is supporting the siting, drilling, and construction of a public water supply production well in Valparaiso, Indiana. This work includes developing a groundwater flow model to predict the new well's long-term pumping rate and the impacts to other existing wells. Responsibilities in support of this project included using TTim software to create multiple potential pumping scenarios and model the resultant drawdown conditions and creating maps illustrating the results of the analyses.

Assessment of the Impact of Groundwater Development to Supply a Natural Gas-Fired Power Plant, Oakwood Hills, McHenry County, IL. 2014. *Hydrogeologist.* INTERA conducted an assessment of the impacts of the development of a 1-2 million gallon per day (MGD) groundwater

Jevon Harding (cont.)

supply for a proposed load-following, natural gas turbine power plant to be located in Oakwood Hills, McHenry County, Illinois. The assessment satisfied requirements set forth in the Illinois Groundwater Use Act of 1983 (525 ILCS 45/) with regard to an evaluation of a proposed high-capacity "point of withdrawal's effect upon other users of the water." Assessment included seasonal variations in pumping to meet variable cooling demand for power generation and the long-term impact on nearby public, industrial, and domestic wells. Responsibilities in support of this project included using TTim software to create multiple potential pumping scenarios and model the resultant drawdown conditions and creating maps illustrating the results of the analyses.

Fatal Flaw Analysis for Water Supply and Texas Pollutant Discharge Elimination System (TPDES) Permitting for Two Proposed Power Plants, Private Energy Client, TX. 2013 – 2014. *Hydrogeologist.* Provided analyses in support of the well permitting process for two proposed power plants. Responsibilities included collecting water level and water quality data for nearby wells from state and federal government agencies; using TTim software to create multiple potential pumping scenarios and model the resultant drawdown scenarios; documenting findings in a report for the client; and provided recommendations for locations of wells and pumping scenarios that best meet water demands.

Climate Change Impacts on New Mexico's Mountain Sources of Water, National Science Foundation (NSF) New Mexico Experimental Program to Stimulate Competitive Research (EPSCoR), Albuquerque, NM. 2009 – 2012. *Research Assistant.* Developed and led a field campaign to assess the Rio Hondo watershed in northern NM. This included stream gauging, water sampling, distributed temperature sensing (DTS) measurements, and implementation of a precipitation collection network as well as laboratory stable isotope analysis of water samples. Analysis of this field data was combined with a COMSOL Multiphysics groundwater flow model and published as a master's thesis titled "Building the Foundation for a Hydrogeology Model of the Rio Hondo Watershed, NM." Other duties included assisting fellow researchers at Valles Caldera National Preserve, NM and other New Mexico field sites with tasks of piezometer installation, slug tests, stream gauging, water sampling, and DTS deployment. This project also involved overseeing and mentoring undergraduate student workers.

Relevant Publications/Reports

Harding, J.J., V. Kelley, B. Scanlon, R. Reedy, 2015. Estimating Recharge for Regional Groundwater Models in Texas. Presented at the Environmental & Water Resources Institute (EWRI) Congress 2015, May 17-21, 2015.

Deeds, N.E., J.J. Harding, T.L. Jones, A. Singh, S. Hamlin, and R.R. Reedy, 2015. Final Conceptual Model for the High Plains Aquifer System Groundwater Availability Model. Report prepared for the Texas Water Development Board. August 2015.

Ewing, J.E., J.J. Harding, T.L. Jones, Draft Conceptual Model Report for the Brazos Alluvium Aquifer Groundwater Availability Model. Draft report prepared for the Texas Water Development Board. February 2015.

Oliver, W., J. Harding, and D. Lupton, 2013. Development of a Groundwater Model for the Antlers Aquifer in Southeastern Oklahoma. Report prepared for the Choctaw and Chickasaw Nations as part of the Choctaw and Chickasaw Regional Water Plan.

Harding, J.J., 2012. Building the Foundation for a Hydrogeology Model of the Rio Hondo Watershed, NM. M.S. Thesis, New Mexico Tech, Socorro, NM.

Dennis Powers, PhD, PG

Expert Consultant

Technical Lead –
Delineation of Potential Production Areas

Dennis Powers is a Consulting Geologist with over 45 years of experience in the fields of geology and hydrogeology. A Professional Geoscientist in the State of Texas, he specializes in the detailed interpretation of subsurface data from geophysical and geological logs, and integration with surface geology or other available data, to evaluate stratigraphic and lithofacies relationships. Since 1975, Dr. Powers has been directly involved in studies of the geology and hydrology of rocks in the Delaware Basin and adjacent regions. He has examined and interpreted thousands of geophysical logs for these studies and provided expert testimony at hearings, and is experienced interacting with a variety of review and oversight organizations. Dr. Powers has completed studies of the stratigraphy and lithofacies of formations within the Delaware Basin as well as across the Capitan Reef Complex Aquifer area and back-reef shelf. This work has included interpreting more than a thousand geophysical logs to detail the stratigraphy, structure, and lithofacies of the Permian Rustler Formation and supporting new drilling, coring, and geophysical logging programs related to oil and gas exploration and water resource evaluations. In two other studies, he has interpreted additional geophysical logs to investigate structure and lithofacies extent as potential indicators of halite dissolution.

Years of Experience: 45

Education:

- PhD, 1980, Geology, Princeton University
- BS, 1967, Geology, Iowa State University

Professional Certifications:

- Professional Geoscientist, Texas, No. 167

Key Experience:

- 45 years of geological and hydrogeological expertise, including 40 years in the Permian and Delaware Basins
- 33 years in the interpretation and correlation of geophysical logs to define stratigraphy, lithology, structure, and water quality
- Expert in the geology and hydrogeology of the Rustler Formation

He has evaluated subsurface formations in the Permian Basin in southeastern New Mexico and much of west Texas as alternate sources of groundwater to serve industrial purposes. For several oil and gas clients, Dr. Powers has recently developed lithological cross sections from ground surface to depths of 2,000 to 5,000 feet. He provided the geological interpretation of thousands of geophysical logs for the Rustler GAM for the TWDB. He has interpreted thousands of additional geophysical logs of the Dockum and related formations across west Texas and has prepared dozens of cross-sections as part of proprietary studies. Since 2000, Dr. Powers has variously had responsibility for drilling, coring, logging, completing, and reporting on more than 20 shallow wells (< 2,000 feet deep) that commonly intercept or completely penetrate Dockum formations. He has published more than 125 reports and articles related to his work. Of these, at least 100 are directly based on investigations of the geology of the Delaware Basin.

Representative Project Experience

Development of Groundwater Availability Model of the Rustler Aquifer, Texas Water Development Board, TX. *Technical Lead - Geology.* Developed stratigraphic data for Rustler in Texas and developed/integrated data from New Mexico to provide sound base for elevation and thickness information for the formation. Developed data and rationale for excluding areas because of presence of halite within areas of the formation; permeability and porosity of water-bearing units are known to be limited in some areas because of halite. Developed general hydrogeologic domain outlines based on factors of depth, structure, presence of halite, and faulting.

Dennis Powers (cont.)

Evaluation of Stability of Evaporites at a Proposed Site for Global Nuclear Energy Partnership, Lea County, New Mexico. *Consulting Geologist.* Evaluated structure (thickness, elevation, continuity) of the Rustler Formation and evaporites in western Lea County, New Mexico. Interpreted geophysical logs to obtain basic structure and lithofacies across the site and immediate surroundings and integrated limited geologic data from more numerous potash drillholes to provide additional detail of the structure and continuity of these units. Compared results to other similar investigations to conclude that there is neither evidence of significant post-depositional dissolution of these units nor any significant threat in the immediate future.

Evaluation of Stability of Evaporites at the Waste Control Specialists Facility, Andrews County, Texas. *Consulting Geologist, Co-Investigator.* Review by TCEQ of the application for a license to dispose of low-level radioactive waste at the site in Andrews County, TX, questioned whether there was evidence of halite dissolution near the site in mixed evaporite units. Available geophysical logs in the immediate area of the site were interpreted for unit structure and lithofacies for the Rustler Formation as well as other units, to determine that there was no evidence of dissolution in the study area. Two other areas more distant from the site were also investigated in similar fashion, focusing on the thickness, structure, and lithofacies of the Rustler Formation to address other questions about the relationship between features and underlying evaporite and mixed evaporite-carbonate units. The Rustler Formation was cored continuously in the area.

Field Activities and Drilling to Test Hydrogeological Conceptual Model of Permian Dolomite Water-Bearing Unit, Delaware Basin. *Consulting Geologist.* From 2002-2006, evaluated and selected drilling sites and obtained and reported geological data from wells to test hydrogeologic conceptual models for a water-bearing dolomite unit that is critical to assessing the performance of the Waste Isolation Pilot Plant. Multiple reports have been prepared and results have been incorporated into understanding well properties.

Develop Geohydrological Conceptual Model of Permian Dolomite Water-Bearing Unit, Delaware Basin, NM. *Consulting Geologist; Co-Investigator.* Developed and evaluated geological data and processes that support the geohydrological conceptual model of the distribution of hydraulic properties for the Culebra Dolomite Member of the Rustler Formation. Developed detailed structure of unit, relationship to lithofacies changes in formation, and relationship to solution margin of underlying formation to provide data over a large modeling domain that extends over the Rustler Formation. The Culebra Dolomite is an integral part of all important scenarios for failure of the WIPP and these analyses and the resultant conceptual model were relied upon for performance assessment.

Investigate Continuity, Thickness, and Purity of Rustler and Salado Formations for Potential Brine Well Locations. *Consulting Geologist*. Evaluated the uppermost evaporite-bearing formations in various west Texas counties at locations for possible brine wells by a service company. Evaluations may be included with permit applications for brine wells.

Geohydrological Conceptual Model of Dewey Lake Formation, Northern Delaware Basin. *Consulting Geologist.* Served as lead geologist for drilling program to investigate anthropogenic sources of brine perched on upper Dewey Lake Formation at Waste Isolation Pilot Plant. Extended investigation to incorporate previous site-wide resistivity studies, drilling, testing, geophysical log analysis, shaft mapping, and other data to provide unit structure and conceptual model of perching of ground water on cement changes within the formation. Model can be used to estimate areas likely to be more productive, and has been used as a basis for fluid flow and solute transport within the anthropogenic brine zone to

meet regulatory agency questions. Evaluating the extent and continuity of the Dewey Lake in the area of the domain for the Rustler Formation is useful in determining the continuity and isolation of the Rustler Formation hydrological system from other units.

Investigation of Causes of Collapse Sinkhole, Northwest of Jal, NM. *Consulting Geologist.* Investigated field evidence relating to collapse of Jal sinkhole by modern solution of Rustler evaporites northwest of Jal, New Mexico, and examined and interpreted geophysical logs from wells in the surrounding area to develop structure and lithofacies of the Rustler Formation and units above and below the Rustler Formation. Focus became upper evaporite-bearing formation (Rustler) and drilling processes. Evaluation of all data indicates most likely cause of collapse was failure of casing in adjacent unused water supply well completed initially in the Capitan Reef, causing circulation of fluids and dissolution of halite to cause catastrophic collapse to the surface. Evidence from nearby well also suggests that drilling may have been done with undersaturated fluids, causing cavernous dissolution that may have contributed to casing failure and circulation. Process is likely similar to other collapse in Wink, Texas area and provides useful background for evaluating structure and continuity of the Rustler and Capitan Formations.

Mapping of Large-Diameter Shafts for Waste Isolation Pilot Plant (WIPP). *Consulting Geologist; Co-Investigator.* Intensive mapping of three large-diameter shafts at WIPP provided unparalleled exposure to late Permian rocks of the northern Delaware Basin and first-hand experience to use in interpreting the geology of the rocks as well as geophysical properties of these same rocks in drillholes. Mapping showed the existence of primary sedimentary features within the Rustler Formation and provided the basis for a modern sedimentological examination of the Rustler Formation.

Site Selection and Geologic and Hydrologic Characterization of Sand Point Landfill, Eddy County, NM. *Consulting Geologist.* Evaluated the geology and hydrology of potential landfill sites in the Carlsbad, New Mexico area, including potential sites located above the Rustler Formation and Mio-Pleistocene Gatuña Formation deposited along the Pecos River valley. Compared sites to factor matrix and selected final site for characterization for geology and hydrologic resources. Provided on-site geological control for drilling and completion of wells and drilling for geomechanical testing. Provided overall geological assessments and reports as well as hearing testimony. Evaluating the Gatuña Formation and alluvial fill along the Pecos River will be important in assessing the continuity and separation of the Rustler Formation as a hydrological unit.

Facies Variability and Post-Depositional Alteration of Late Permian Rustler Formation, Northern Delaware Basin. *Consulting Geologist; Co-Investigator.* Conducted two year investigation of Rustler Formation across much of the northern Delaware Basin to determine the nature of depositional facies within the formation. Described all available cores, integrated shaft mapping data, examined outcrops, studied core slabs and thin sections, and interpreted hundreds of geophysical logs to develop detailed data. Described detailed structure of the formation as well as numerous subdivisions and developed lithofacies relationships for subdivisions. Provided basis for later development of detailed hydrogeological conceptual model of the Culebra Dolomite Member of the Rustler Formation.

Investigation of Deformation of Late Permian Formations in Northern Delaware Basin. *Lead and Co-Investigator.* Conducted multi-year investigation of the structure and areal extent of late Permian formations in the northern Delaware Basin as part of site characterization for WIPP and as a basis for avoiding pressurized brine in locating repository areas. Developed scientific framework and justification for program as well as for implementing individual elements, including drillholes and extensive seismic

Dennis Powers (cont.)

reflection data collection. Supervised individual investigators for detailed studies and took lead for numerous field investigations.

Geological Characterization Report for the Waste Isolation Pilot Plant, Southeastern New Mexico. *Lead Editor.* Provided framework, direction, editing and revisions to geological characterization report for the WIPP, gathering existing literature and WIPP-specific studies as a basis for environmental impact studies, safety analysis, and later performance assessment for the WIPP. Report provided fundamental as well as summary information about rock systems from the Precambrian basement to the surface and over a wide area. Report continues to provide a basic framework for understanding the geology of the northern Delaware Basin as a whole.

Evaluation of Karst Processes in Northern Delaware Basin. *Consulting Geologist.* Karst processes affect a variety of rock types and areas in northern Delaware Basin, with major focus on karst developed on Rustler Formation outcrops and subcrops. Evaluated hundreds of potash log files as well as available geophysical logs to develop structure of affected rocks and determine extent of karsting. Evaluated relationship to surficial features and found clear relationship of escarpments to dissolution or halite. Dolomite units developed more complicated forms, including sinks and blind valleys.

Relevant Publications/Reports

Dr. Powers has more than 100 additional publications and reports on the geology of the Rustler.

Ewing, J.E., V.A. Kelley, T.L Jones, T. Yan, A. Singh, D.W. Powers, R.M. Holt, and J.M. Sharp, 2012. Groundwater Availability Model Report for the Rustler Aquifer. Report to Texas Water Development Board, INTERA, 434p.

Powers, D.W., 2007. Analysis Report for Task 1A of AP-114: Refinement of Rustler halite margins within the Culebra modeling domain: report to Sandia National Laboratories, October 5, 2007.

Powers, D.W., 2006. Analysis Report, Task 1B of AP-114, Identify possible area of recharge to the Culebra west and south of WIPP: report to Sandia National Laboratories, April 1, 2006 (ERMS # 543094)

Powers, D.W., R.M. Holt, R.L. Beauheim, and R.G. Richardson, 2006. Advances in depositional models of the Permian Rustler Formation, southeastern New Mexico, in Caves & Karst of Southeastern New Mexico, L. Land and others, eds., NM Geological Society Fifty-seventh Annual Field Conference Guidebook, p. 267-276.

Holt, R.M., R.L. Beauheim, and D.W. Powers, 2005. Predicting fractured zones in the Culebra Dolomite, in Faybishenko, B, Witherspoon, P.A., and Gale, J., eds., Dynamics of Fluids and Transport in Fractured Rock: AGU Geophysical Monograph Series, v. 162, p. 103-116.

Beauheim, R.L., D.W. Powers, and R.M. Holt, 2004. Predicting Fractured Zones in the Culebra Dolomite, Proceedings of the Second International Symposium on Dynamics of Fluids in Fractured Rock. LBNL-54275, Berkeley, CA: Ernest Orlando Lawrence Berkeley National Laboratory, pp. 400-406.

Powers, D.W., R.M. Holt, R.L. Beauheim, and S.A. McKenna, 2003. Geological factors related to the transmissivity of the Culebra Dolomite Member, Permian Rustler Formation, Delaware Basin, Southeastern New Mexico, in Johnson, K.S., and Neal, J.T., eds., Evaporite karst and engineering/ environmental problems in the United States: Oklahoma Geological Survey Circular 109, p. 211-218.

Holt, R.M., and D.W. Powers, 2002. Impact of Salt Dissolution on the Transmissivity of the Culebra Dolomite Member of the Rustler Formation, Delaware Basin, Southeastern New Mexico, Abstracts with Programs, Geological Society of America, v. 34, no. 6, p. 215.

John Ewing, PE

INTERA

Technical Lead –
Availability of Brackish Groundwater

John Ewing is a Senior Engineer at INTERA with 21 years of experience in groundwater flow and transport modeling. He has led modeling teams in the application of models at a variety of scales ranging from laboratory experiments to regional-scale models spanning hundreds of miles for clients that include federal and state water resources, radioactive waste management, and environmental agencies, as well as commercial industry. In support of the TWDB's Groundwater Availability Modeling Program, Mr. Ewing has served as both a project manager and lead modeler for developing aquifer GAMs. He has managed the technical contributions of several other scientists and engineers to both integrate data (e.g., aquifer structure, hydraulic properties, recharge, ET, etc.) from conceptual models into numerical models and perform model calibrations and simulations. His technical responsibilities on these projects have included determining the model boundaries based on the regional groundwater flow in the vicinity of the aquifer, integrating structural and hydraulic data from previous studies into the numerical model, generating MODFLOW packages for the steady-state, transient and predictive models, and calibrating the model to observed water-level and flow data.

Years of Experience: 21

Education:

- MS, 1996, Civil Engineering, University of Colorado
- BS, 1993, Civil Engineering, University of Colorado

Professional Certifications:

- Professional Engineer, Texas, No. 92817

Key Experience:

- 21 years in numerical modeling, including managing and/or leading modeling efforts on 8 GAMs, including the Rustler Aquifer GAM
- 17 years with MODFLOW, MT3D, and Groundwater Vistas
- Technology transfer through technical workshops including groundwater modeling for GAM stakeholders

Mr. Ewing's numerical modeling experience includes using codes such as MODFLOW, MT3D, TOUGH2(-MP), FEHM, UTCHEM, MUFTE UG, SWIFT II, UTSTREAM, IHM, and SWAT. He routinely applies automated calibration codes such as PEST, ITOUGH and UCODE and conducts sensitivity and uncertainty analyses on computing clusters using parallelization software such as MPI and PVM. He also has expertise in GIS software including ArcGIS, visualization software such as Groundwater Vistas, mView, Tecplot and GMS, and geostatistical packages including GSLIB. He is a skilled programmer using the Perl, FORTRAN, VBA, C and Java languages and has experience with Linux/Unix utilities and shell programming. Mr. Ewing has communicated the results of modeling and technical analyses to both internal review teams and project stakeholder groups. As part of his work on GAMs, he has given technical presentations and solicited stakeholder input at the conceptual model stage, described the results of the numerical model development and calibration, and provided project status updates to the TWDB and the Stakeholder Advisory Forums (SAFs). He has transferred modeling technology through the development and presentation of technical workshops for clients, project stakeholders, and other end-users of the tools.

Representative Project Experience

Groundwater Availability Model for the Rustler Aquifer, Texas Water Development Board, Austin, TX. 2011 – 2012. *Lead Modeler.* Developed and calibrated the MODFLOW GAM for the Rustler Aquifer. The model was developed for use in predicting the future availability of groundwater in the respective area over a 50-year planning period. Generated steady-state and transient models and

John Ewing (cont.)

successfully calibrated the models to observed water-level and spring flow data. Also conducted sensitivity analyses for the steady-state and transient models.

Development of Groundwater Availability Model of the Brazos River Alluvium Aquifer, Texas Water Development Board (TWDB), TX. 2013 – Present. *Project Manager.* Leading efforts to develop a groundwater model of a regional scale alluvial aquifer extending from central to south-eastern Texas. This aquifer is unique in Texas because the entirety of the aquifer is in hydraulic communication with both the Brazos River and a series of underlying major and minor aquifers. Accordingly, surface water/groundwater interaction and cross-formational flow with the underlying aquifers are significant concerns in the development of the model. A Water Availability Model (WAM) for the Brazos River already exists and the surface water/groundwater interaction processes studied here will be used to update the WAM to assess the impacts of groundwater pumping on surface water rights. Similarly, the Brazos Alluvium overlies aquifers for which three GAMs already exist. These GAMs have Desired Future Conditions (DFC) and Modeled Available Groundwater (MAG) estimates and the DFC/MAG estimates for the Brazos River Alluvium Aquifer will have to be developed so that they are consistent with the other GAMs. The draft conceptual model report has been submitted and work is currently underway on the numerical model.

Update and Revision of the Northern Trinity and Woodbine Aquifers Groundwater Availability Model, Northern Trinity, Prairielands, and Upper Trinity Groundwater Conservation Districts, TX. 2012 – 2014. *Lead Modeler.* Developing conceptual model and revising numerical model of an existing GAM of a regional aquifer system in north-central Texas. The model revision includes incorporating significant amounts of newly derived data regarding aquifer structure and lithology, hydraulic properties, recharge, natural aquifer discharge, and pumping as well as refinement of the model grid and the addition of a surficial layer to differentiate between the shallow and deep flow systems within the aquifers. The model will be used to predict the long-term availability of groundwater in the aquifers under different management scenarios.

Groundwater Availability Model Support for Groundwater Management Areas 3 and 7, Texas Water Development Board (TWDB), TX. 2012 – 2013. *Analyst.* Investigated the effects of cross-formational and lateral flow using sub-regional water balances from the existing Groundwater Availability Models (GAMs) for the Edwards-Trinity (Plateau) and Pecos Valley Alluvium aquifers, the Dockum Aquifer, and the Rustler Aquifer. Summarized analyses in tables and figures and reported results. The objective of this study was to confirm, refine, and/or modify the conceptual model of the groundwater flow system within the aquifers using newly collected and existing geochemistry data.

Development of Groundwater Availability Model of the Seymour Aquifer, Texas Water Development Board (TWDB), TX. 2003 – 2004 and 2009 – 2012. *Lead Modeler.* Acted as technical modeling lead in developing and calibrating MODFLOW Groundwater Availability Models (GAMs) for the entire Seymour Aquifer in northern Texas and for a detailed portion of the aquifer in Haskell, Knox, and Baylor counties. Models were developed for the TWDB for use in predicting the future availability of groundwater in the area. Gave technical presentations on the model development and calibration and the project status to the TWDB and the Stakeholders Advisory Forum. Wrote a significant number of programs and scripts to aid model construction, process model output, and automate sensitivity analyses.

Development of Groundwater Availability Model (GAM) of the Dockum Aquifer, Texas Water Development Board (TWDB), TX. 2007 – 2008. *Lead Modeler.* As part of TWDB's GAM Program, developed and calibrated a MODFLOW numerical model for the Dockum Aquifer for use by

John Ewing (cont.)

groundwater conservation districts and regional water planning groups to help manage aquifer usage. Gave technical presentations on the model development and calibration and the project status to the TWDB and the Stakeholders Advisory Forum. Wrote a significant number of programs and scripts to aid model construction, process model output, and automate sensitivity analyses.

Evaluation of Groundwater Models for the Nambe-Pojoaque-Tesuque Basins, Bureau of Indian Affairs (BIA), NM. 2011 – 2012. *Modeler.* Conducted comparisons of an existing model of the Española Basin that is typically used by the New Mexico Office of the State Engineer to assess impacts of groundwater withdrawals on surface water bodies with a newer model of the basin that was developed for the BIA. Because the newer model has included several factors that the older model does not consider, such as irrigation return flow recharge, the BIA would like to see the newer model used in support of calculations for litigation purposes. Provided a comparison of both conceptual and numerical factors such as grid geometry, model domain, boundary conditions, and input and output fluxes. Compared calibration to heads and vertical gradients between the two models.

Development of a Water Availability Model of the Española Basin, Santa Fe County, NM. 2005 – 2006. *Lead Modeler.* Developed and calibrated a regional groundwater flow model (MODFLOW-2000) of the Española Basin in Santa Fe County. The model uses the Hydrogeologic-Unit Flow (HUF2) package to incorporate the complex geological structure in the southern portion of the basin. Used Parallel-PEST to automate the parameter estimation process on a cluster of computers. The model was developed for the County Hydrologist to support applications to the Office of the State Engineer for new water supply wells.

Groundwater Modeling to Assess Pumping Impacts in the Lower Colorado River Basin, Lower Colorado River Authority, TX. 2005. *Modeler.* Supported INTERA's modeling efforts as part of the Groundwater for Agriculture Technical Team for the Lower Colorado River Authority. Responsibilities included developing and calibrating a groundwater flow model (MODFLOW-SURFACT) for the Gulf Coast aquifers. Used Parallel-PEST on a 20-node computer cluster to calibrate the model to hydraulic data involving pre-development and transient historical conditions.

Integrated Surface Water/Groundwater Modeling of the Northern Tampa Bay Region, Tampa Bay Water, FL. 2002. *Modeler.* Supported the development and calibration of a large- scale, transient groundwater flow model that is part of an Integrated Hydrologic Model (IHM) which uses Hydrologic Simulation Program Fortran (HSPF) to simulate the surface water behavior and MODFLOW to simulate the groundwater behavior simultaneously. Used Parallel-PEST to employ a network of more than 20 computers to expedite model calibration runs. The purpose of the model is to understand and predict the impact of groundwater withdrawals on surface water bodies.

Calibration of a Model for Pit Closure, ERA Ranger Uranium Mine, Northern Territory, Australia. 2012 – Present. *Modeler.* Supporting model construction and leading the automated flow model calibration (using PEST) of a MODFLOW model being developed to evaluate various closure scenarios for a large open pit at a uranium mine. Ported the model into a form amenable to automated PEST calibration using a combination of hydrostratigraphic zones and pilot points to history-match numerous, highly transient water-level observations. The modeling and calibration involve complicated changes to boundary conditions and aquifer properties resulting from mining operations.

Modeling of Flow and Radionuclide Transport for the Rainier Mesa Corrective Action Unit to Support Environmental Restoration Activities at the Nevada National Security Site, U.S. Department of Energy, NV. 2012 – 2013. *Modeler.* Coordinated a group of modelers developing

John Ewing (cont.)

transport models for the Rainier Mesa Corrective Action Unit (CAU). Developed a methodology and scripts to take output from various sub-CAU models and map area-weighted liquid and radionuclide fluxes onto the CAU-scale model mesh. Developed scripts to allow automated calibration of the CAU flow model to the groundwater flow direction and the magnitude of the hydraulic gradient. Devised methods to communicate complex model outputs in instructive ways. The purpose of the transport modeling is to determine the regulatory boundaries of several radionuclides of interest emanating from five distinct source zones.

Relevant Publications/Reports

Ewing, J.E., J.J. Harding, T.L. Jones, Draft Conceptual Model Report for the Brazos Alluvium Aquifer Groundwater Availability Model. Draft report prepared for the Texas Water Development Board. February 2015.

Kelley, V.A., J. Ewing, T.L. Jones, S.C. Young, N. Deeds, and S. Hamlin, eds., 2014. Final Report, Updated Groundwater Availability Model of the Northern Trinity and Woodbine Aquifers. Prepared for the North Texas, Northern Trinity, Prairielands, and Upper Trinity Groundwater Conservation Districts.

Papafotiou, A., J. Ewing, N. Deeds, and C. Kreitler, 2013. Evaluation of Simulated Cross-Formational Travel Times Water Age Measurements in Layered Aquifer Systems. Presented at the European Geosciences Union General Assembly, Vienna, Austria.

Ewing, J.E., V.A. Kelley, T.L Jones, T. Yan, A. Singh, D.W. Powers, R.M. Holt, and J.M. Sharp, 2012. Groundwater Availability Model Report for the Rustler Aquifer. Prepared for the Texas Water Development Board.

Jones, T.L., J.E. Ewing, T. Yan, J.F. Pickens, B.R. Scanlon, J. Olyphant, and A. Chastain-Howley, 2012. Conceptual Model for the Refined Seymour Aquifer Groundwater Availability Model: Haskell, Knox, and Baylor Counties. Prepared for the Texas Water Development Board.

Ewing, J.E., T. Jones, T. Yan, A. Vreugdenhil, D. Fryar, J. Pickens, K. Gordon, J. Nicot, B. Scanlon, J. Ashworth, and J. Beach, 2008. Groundwater Availability Model for the Dockum Aquifer. Prepared for the Texas Water Development Board. 486 p.

Budge, T., S.C. Young, V.A. Kelley, N.E. Deeds, and J.E. Ewing, 2007. Importance of a Properly Conceptualized Shallow Flow System on Ground Water Availability Estimates for Regional Flow Systems Near Coastlines With Dipping Stratigraphy. Presented at National Ground Water Association 2007 Ground Water Summit, April 29-May 3, Albuquerque, NM.

Doherty, J., J.E. Ewing, S.C. Young, N.E. Deeds, T. Budge, and V.A. Kelley, 2007. Assessment and Management of Model Uncertainty. Presented at National Ground Water Association 2007 Ground Water Summit, April 29-May 3, Albuquerque, NM.

Kelley, V.A., J. Ewing, K. Gordon, D. Jordan, C. Ardito, and S. Wust, 2007. Models as Tools for Hydrogeologic Reconnaissance – A Case Study in the Espanola Basin. Presented at National Ground Water Association 2007 Ground Water Summit, April 29-May 3, Albuquerque, NM.

Ewing, J., T. Jones, J. Pickens, A. Chastain-Howley, and K. Dean, 2004. Groundwater Availability Model for the Seymour Aquifer. Prepared for the Texas Water Development Board, 482 p.

Carlos Torres-Verdin, PhD

Expert Consultant

Technical Specialist –
Geophysical Well Log Analysis

Carlos Torres-Verdin is the Zarrow Centennial Professor in Petroleum Engineering, and Frank W. Jessen Professor in Petroleum Engineering at the University of Texas Petroleum and Geosystems Engineering Department. He has over 25 years of applied and research experience in the areas of well logging, formation evaluation, integrated reservoir characterization, nonlinear optimization, and inverse theory. He also serves as the Program Director of the Formation Evaluation Joint Industry Research Consortium. Dr. Torres-Verdin's industry experience includes working as a development engineer for the Mexican Petroleum Institute where he developed computer algorithms for the processing and interpretation of gravity, magnetic, and seismic data.

Years of Experience: 25

Education:

- PhD, 1991, Engineering Geoscience, University of California-Berkeley
- MSc, 1985, Electrical Engineering, The University of Texas at Austin
- BS, 1983, Geophysical Engineering, National Polytechnic Institute of México

Key Experience:

- 25+ years in well logging, borehole geophysics, formation evaluation, integrated reservoir characterization, and numerical simulation
- Current research on petrophysical, geophysical, mechanical, and geological quantification of near-borehole region from core samples, geophysical measurements, and in-situ permanent sensors
- 9 years of experience in the commercial oil and gas industry including technical leadership of reservoir geophysics group

Representative Experience

Department of Petroleum and Geosystems Engineering of The University of Texas, Austin, Texas. *Professor.* For the past 15 years, has taught undergraduate and graduate courses on well logging, formation evaluation, integrated reservoir characterization, nonlinear optimization, inverse theory, and computer programming. Dr. Torres-Verdín has conducted hundreds of research projects and his work has been sponsored by the US Department of Energy, US National Science Foundation, American Chemical Society, and numerous petroleum companies and consortiums. He has conducted training courses for oil companies in the areas of well logging, petrophysics, formation evaluation, inversion, seismic amplitude inversion, reservoir characterization, and geostatistics.

Schlumberger-Doll Research Center, Ridgefield, Connecticut. *Research Scientist.* For six years, served as a research scientist where his work focused on the numerical simulation of electromagnetic propagation in rock formations via integral and partial differential equations with applications to the deep probing of rock formations, induction logging, and cross-well electromagnetic tomography. A large part of this effort involved the development and field-testing of mathematical and physical procedures for the inference of physical properties of rocks from electromagnetic measurements, including the interpretation of data acquired in hydrocarbon producing reservoirs.

Yacimientos Petroliferos Fiscales, S.A., Buenos Aires, Argentina. *Reservoir Specialist and Technology Champion.* For two years, served as a reservoir specialist and technology champion at YPF, S.A.—the largest domestic and international oil company in Argentina. While at YPF, his work included the technical leadership of a reservoir geophysics group that assisted in developing hydrocarbon producing reservoirs. This group was responsible for the petrophysical evaluation of well logs, core data, interpretation and inversion of post-stack 3-D seismic data, outcrop studies, geostatistics, and data integration. His team developed a successful integrative methodology for the detection, delineation, and

Carlos Torres-Verdin (cont.)

petrophysical evaluation of thin sands. Several wells were drilled and evaluated by different asset teams as result of their recommendations.

Relevant Publications/Reports

Dr. Torres-Verdin has published more than 140 articles in refereed technical journals, over 180 articles in international conferences, and two book chapters. Examples include the following.

O. Ijasan, Torres-Verdín, C., and Preeg, W. E., "Estimation of porosity and fluid constituents from neutron and density logs using an interactive matrix scale (Expanded Abstract),"): Society of Petrophysicists and Well Log Analysts (SPWLA) 54th Ann. Logging Symposium. New Orleans, Louisiana, 2013.

C. Xu, Torres-Verdín, C., and Gao, S., "Electrical vs. hydraulic rock types in clastic reservoirs: pore-scale understanding verified with field observations in the Gulf of Mexico, U.S. (Expanded Abstract)," Society of Exploration Geophysicists (SEG) 83rd Ann. Internat. Mtg. Houston, TX, 2013.

S. Huang, Yang, Q., Matuszyk, P. J., and Torres-Verdín, C., "High-resolution interpretation of sonic logging measurements using stochastic inversion with spatial slowness sensitivity functions (Expanded Abstract)," Society of Exploration Geophysicists (SEG) 83rd Ann. Internat. Mtg. Houston, TX, 2013.

S. Huang, Matuszyk, P. J., and Torres-Verdín, C., "Spatial sensitivity functions for rapid and accurate simulation of borehole sonic measurements (Expanded Abstract)," Society of Exploration Geophysicists (SEG) 83rd Ann. Internat. Mtg. Houston, TX, 2013.

C. Xu, Torres-Verdín, C., Yang, Q., and Diniz-Ferreira, E., "Connate water saturation – irreducible or not: The key to reliable hydraulic rock typing in reservoirs straddling multiple capillary windows (Expanded Abstract)," Society of Petroleum Engineers (SPE) 2013 Annual Technical Conference and Exhibition. New Orleans, LA, 2013.

O. Ijasan, Torres-Verdín, C., and Preeg, W. E., "Interpretation of porosity and fluid constituents from well logs using an interactive neutron-density matrix scale," Interpretation, vol. 1, pp. T143-T155, 2013.

Z. Heidari, Torres-Verdín, C., and Preeg, W. E., "Improved estimation of mineral and fluid volumetric concentrations in thinly bedded carbonate formations," Geophysics, vol. 78, pp. D261-D269, 2013.

C. Xu, Heidari, Z., and Torres-Verdín, C., "Rock classification in carbonate reservoirs based on static and dynamic petrophysical properties estimated from conventional well logs (Expanded Abstract)," Society of Petroleum Engineers 2012 Annual International Meeting. Society of Petroleum Engineers, San Antonio, TX, 2012.

V. Shabro, Torres-Verdín, C., Javadpour, F., and Sepehrnoori, K., "Finite-difference approximation for fluid-flow simulation and calculation of permeability in porous media," Transport in Porous Media, vol. 94, pp. 775-793, 2012.

Z. Heidari, Torres-Verdín, C., and Preeg, W. E., "Improved estimation of fluid and mineral volumetric concentrations from well logs in thinly bedded and invaded formations," Geophysics, vol. 77, pp. WA79-WA98, 2012.

Q. Yang and Torres-Verdín, C., "Efficient 2D Bayesian inversion of borehole resistivity measurements (Expanded Abstract)," Society of Exploration Geophysicists 81th Annual International Meeting. Society of Exploration Geophysicists, San Antonio, TX, 2011.

Clark Griffith, EIT, GIT

INTERA

Technical Specialist –
Delineation of Existing Water Supplies

Clark Griffith is a Hydrogeologist at INTERA with 11 years of experience in the areas of groundwater mechanics, geochemistry, statistics, numerical modeling, hydrogeologic data acquisition and analysis, and contaminant transport. His experience has been gained on projects involving the development and management of groundwater resources, the protection of human health and the environment, and the disposal of hazardous and radioactive wastes. In support of geologic and hydrogeologic characterization efforts, he has conducted and analyzed hydraulic tests, performed groundwater sampling for water quality and age-dating analyses, installed vadose zone monitoring systems, and completed geologic mapping of fractures and subsurface testing of fracture connectivity. He has assisted in the development and application of flow and transport models, conducted sensitivity analyses of model parameters and results, and produced visualizations of model simulations. Mr. Griffith has used a number of data analysis, management, visualization, and modeling tools and codes including ArcGIS, Groundwater Vistas, Groundwater Modeling System, AQTESOLV, ERDAS Imagine, HydroGeoAnalyst, SATOOL, Leapfrog Hydro, and the TTim multi-aquifer transient analytic element model. In support of work for a variety of federal, state, and municipal agencies, as well as commercial industry, he has collected and analyzed hydrogeologic data to evaluate the location and availability of groundwater resources for use in oil and gas production, assess the use of groundwater for desalination operations, and as part of the environmental commissioning oversight during the design, construction, and startup of a water treatment plant. He has experience working on a variety of projects including evaluation of water resources and well data over a range of different scales, development and implementation of monitoring programs, well siting, well field permitting support, aquifer test analyses, conceptual model development, and technical support for groundwater flow and transport models.

Years of Experience: 11

Education:

- MS, 2006, Engineering Science (Hydrology), University of Mississippi
- BS, 2003, Geological Engineering, University of Mississippi

Professional Certifications:

- Engineer-in-Training, Texas, No. 40955
- Geologist-in-Training, Mississippi, No. 0045

Key Experience:

- 11 years in groundwater mechanics, geochemistry, statistics, numerical modeling, and hydrogeologic data acquisition and analysis
- Water resource projects in west Texas involving well field siting, groundwater availability, and aquifer characterization
- Organization, analysis, and visualization of water well and other hydrogeologic data using GIS and other software

Representative Project Experience

Evaluations of Groundwater Resources in West Texas, Confidential E&P Client, TX, 2014 – 2015. *Hydrogeologist.* Obtained, organized, analyzed, and visually represented water well data from publicly available sources from Texas and New Mexico state agencies and the USGS and published geologic and hydrogeologic data to assist the client in their understanding of the hydrogeologic framework and groundwater resource development options in and near multiple areas of interest in west Texas. Contributions have centered on data organization and distillation to determine different trends and nuances to the local and/or regional system affecting immediate areas of interest that are not immediately obvious, along with pointing out the good alternatives. Worked with coworkers to present geophysical log analyses in a clear and coherent manner and tie it into the bigger picture. Provide various work products, including maps, figures, and portions of reports, to communicate findings.

Clark Griffith (cont.)

Results of one assessment for an area with seemingly poor groundwater development alternatives resulted in the siting of a well targeting a deeper formation. INTERA staff oversaw field activities, including cuttings analysis, geophysical logging, and interval isolation testing to determine productive intervals, well construction, and well testing. This resulted in the successful completion of a highly productive (for the region) well in the Rustler Aquifer, which is largely underutilized in the area, and gave the client the information they needed to complete additional wells in the area, targeting similar productive intervals.

Hydrologic Investigation for Well Siting in Lea County, Confidential E&P Client, NM. 2014. *Hydrogeologist and Project Manager.* Compiled and analyzed geologic and hydrogeologic data to assist in the siting of water wells in a localized area. Data sources include water well information from the U.S. Geological Survey and New Mexico Office of the State Engineer and geophysical logs from the New Mexico Oil Conservation Division. Geophysical logs were interpreted to construct cross sections and structural surfaces for contacts from the base of the Ogallala down to the top of the Rustler Formation, and water well data were used to determine variations in saturated thickness and flow direction in the Ogallala Aquifer. Structural surfaces developed for deeper formations were used to provide logistical information for future development of a deeper, brackish groundwater source.

Evaluation of Potential Water Resources in West Texas and Eastern New Mexico, Confidential E&P Client, TX and NM. 2012 – 2014. *Hydrogeologist.* Compiled, reviewed, and presented hydrogeologic information for aquifers in nine studies spanning 18 counties in the Permian Basin region of west Texas and southeastern New Mexico. These studies were used to help the client evaluate potentially suitable water resources for hydraulic fracturing operations while minimizing impacts to existing users. These studies included detailed evaluations of water levels, water quality, well locations, geologic framework, and hydraulic properties for the Ogallala, Dockum (including the Santa Rosa Formation), Pecos Valley, Edwards-Trinity (Plateau), Rustler, Capitan Reef Complex, Edwards-Trinity (High Plains), and Roswell Artesian Basin aquifers. Brackish groundwater reservoirs not defined by the TWDB as aquifers were also evaluated as potential alternative supplies. Data collected and interpreted for these studies have included information from the TWDB Groundwater Database, BRACS database, submitted drillers reports available through TWDB and the Texas Commission on Environmental Quality, water well data from the USGS, well reports from the New Mexico Office of the State Engineer, and geophysical logs for wells in both Texas and New Mexico. One study also included the development of a MODFLOW-NWT numerical groundwater model to evaluate the sustainability of groundwater production from a brackish aquifer. The results of this model show that expected impacts of pumping of the brackish aquifer on the overlying fresh groundwater sources were very limited

Hydrologic Investigation for Well Siting in Loving County, Confidential E&P Client, TX. 2014. *Hydrogeologist.* Compiled and analyzed hydrogeologic data to assist in the siting of water wells in a localized area where the Pecos Valley Alluvium, Dockum, and Rustler aquifers are present. Well data were sourced from the TWDB's publicly available databases and include information on well construction, water quality, well production capacity, and driller's observations on lithology. Due to a lack of well information for the Rustler Aquifer in the immediate area, information on the depth to dolomite members most likely to be productive were based on geophysical logs from oil and gas wells in the area. A memorandum including posted well data, structural contour maps based on data from studies published by the TWDB, and a cross section across the area was prepared to support a recommendation to the client for well location and expected depth to target units.

Clark Griffith (cont.)

Conceptual Model Development for Paleozoic Aquifer Study, Upper Trinity Groundwater Conservation District, TX. 2014. *Hydrogeologist.* Conducted stream baseflow analysis to provide an alternative assessment of minimum recharge to the Paleozoic Aquifers in north-central Texas including Wichita, Bowie, Cisco, Canyon, and Strawn groups. These often brackish aquifers are a significant resource where the Trinity and Seymour aquifers are not present. Stream gage data from the U.S. Geological Survey (USGS) were filtered based on suitability for analysis (e.g., using only unregulated stretches), and the BFI code developed by the USGS and Bureau of Reclamation was used to separate the stream discharge associated with baseflow from the discharge due to direct runoff. The watershed for each of the analyzed gaging stations was determined, and its area and location relative to the different outcropping units of the aquifer were taken into consideration with the median baseflow for the period of record to inform estimates of groundwater recharge at different locations. This information was used in the development of a groundwater model which is now being used by the District to better understand and manage the aquifers.

Hydrologic Investigation for Well Siting in Loving, Reeves, and Ward Counties, Confidential E&P Client, TX. 2013. *Hydrogeologist.* Compiled and analyzed hydrogeologic data for the Rustler and Pecos Valley aquifers to assist in the siting of water wells. Data sources included the TWDB groundwater database and submitted driller's reports database, the TWDB BRACS database, and submitted driller's reports from the Texas Commission on Environmental Quality. Data were used to determine areas and depth intervals with favorable and unfavorable conditions for development of groundwater in a particularly water-scarce area.

Evaluation of Groundwater Resources of Midland County, INTERA Incorporated, TX. 2013. *Hydrogeologist.* Developed a comprehensive assessment of the groundwater resources of Midland County, TX, designed for use by the oil and gas industry. The study, similar in format to confidential assessments INTERA has performed for clients in Texas, New Mexico, and Oklahoma, contains information on aquifer locations and depths; well yields, locations, and water quality; water-level trends; cross sections from geophysical log correlation; and disposal well details. Various digital maps with embedded attributes and well records are designed to allow users to quickly evaluate groundwater resources in particular areas of interest. This includes finding areas with desirable water quality and well yields, identifying potential water resource conflicts such as public supply wells, and evaluating the potential for development of deeper brackish aquifers.

Permitting Support for the Waste Control Specialists (WCS) Hazardous and Radioactive Waste Disposal Facility, Andrews County, TX. 2008 – 2012. *Hydrogeologist.* Provided technical support for hydrogeologic and geologic characterization in support of obtaining and complying with permits and licenses. Technical tasks performed include the following:

- Assisted in the installation of heat dissipation sensors, thermocouple psychrometers, and advanced tensiometers within borehole arrays to provide long-term continual monitoring of matric potential within different subsurface geologic units. Periodically collected and analyzed the resulting matric potential data and prepared summary data reports for the instrument arrays.
- Provided technical oversight for deep hydraulic testing of packer-isolated confined sandstone/siltstone formations and assisted with sampling of deep and shallow groundwater for water quality and age-dating analyses.
- Mapped fractures and discontinuities on an exposed wall within a landfill cell.

Clark Griffith (cont.)

- Created geologic structure contour maps of various subsurface units based on borehole data.
- Prepared work plan for step-drawdown and slug-withdrawal testing of a confined sandstone/siltstone unit at multiple two-inch wells; led the field effort to conduct these tests, and conducted analyses and provided an interpretive report of resulting data.
- Assisted in preparation of a preliminary work plan for evaluating subsurface fracture connectivity using pressurized air and injection/monitoring borehole arrays and provided support for processing and displaying deviation data for the test boreholes.
- Setup data logging systems and helped install instruments for a landfill liner leak detection system using heat dissipation sensors and neutron logging.
- Provided evaluation and management of a variety of laboratory and field data, including a comparison of the air-entry pressure/intrinsic permeability relation of WCS samples with similar data from other sites and used chloride and water potential measurements from boreholes to characterize recharge history.
- Completed a comparison of transducer water level data from wells with barometric fluctuations.
- Prepared a hydraulic properties database for use with geostatistical analyses.
- Assisted in developing several technical reports, including a summary hydrogeologic properties report for the site, a groundwater modeling report, reports on chemical and isotopic studies of shallow groundwater, an evaluation of the impact of construction-related blasting on monitoring wells at the site, several neutron logging reports, and a report on the implications of subsurface chloride measurements on recharge history.
- Routinely documented and reviewed a variety of field data, analytical data, data analyses, and technical reports in accordance with a formal project quality assurance program.

Environmental Commissioning Support for City of Austin Water Treatment Plant #4, Austin, TX. 2010 – 2015. *Hydrogeologist/Field Geologist.* Provided technical support and field monitoring for the Environmental Commissioning Consulting (ECC) Team providing oversight of the design, construction, and startup of this new potable water treatment facility. Activities included monitoring of water levels in wells, collecting and analyzing data from vibrating-wire piezometers in the vicinity of planned tunneling activity, and providing GIS and technical support for the project. Made recommendations for groundwater sampling equipment and continual data logging and monitoring equipment for water levels in wells and streams. Helped select and install dedicated bladder pumps and sensors at multiple locations, some of which provide remote access to data via telemetry. Participated in continuous geological inspection activities to monitor for the presence of voids, moisture conditions, and potentially interconnected flow paths during shaft excavation activity through the vadose zone in an environmentally sensitive area with karstic features. Assisted in collection of groundwater samples for tritium age-dating analyses. Collected streamflow measurements, spring discharge measurements, and surface water quality samples to detect any potential impacts to springs or baseflow caused by excavation and related activities. Conducted field monitoring to observe groundwater level recovery during and after tunnel and shaft backfill activities. The ECC Team provided oversight of design deliverables and construction activities to optimize mitigation of potential environmental impacts and to monitor achievement of the environmental goals and objectives established for the project by the City.

Kim Gordon, PE, PG

INTERA

Technical Specialist –
Delineation of Injection Zones

Kimberly "Kim" Gordon is a Principal Reservoir Engineer and Geoscientist at INTERA with 16 years of professional experience providing modeling, environmental assessments, water resource evaluations, site and reservoir characterization, geologic modeling, numerical modeling, regulatory filings, and litigation support for environmental, oil and gas, and government clients. She has experience in site characterization design and conceptual model development, numerical model simulation to assess mutli-phase flow characteristics and to optimize production systems, and evaluation and remediation of chlorinated solvents and hydrocarbons. She has designed and executed field studies for site and reservoir characterization with dynamic workflows that update in real-time.

Years of Experience: 16

Education:

- BS, 1999, Geosystems Engineering and Hydrogeology, University of Texas at Austin

Professional Certifications:

- Professional Engineer, Texas, No. 107347
- Professional Geoscientist, Texas, No. 11775

Key Experience:

- 16 years in numerical modeling, water resource evaluations, and site and reservoir characterization
- TWDB projects that include development of the Dockum Aquifer GAM in west Texas
- Working with the RRC on behalf of clients to submit applications and obtain injection well permits

Ms. Gordon has used a wide variety of data including both geologic and petrophysical data to develop multiple-scale geologic models ranging from site models to regional models. She has developed and implemented a wide variety of numerical simulations for the assessment of reservoir potential and the evaluation and optimization of remedial strategies. She has assisted clients with regulatory filings and provided detailed reports for regulatory hearings. She also provides other litigation support services and expert opinions for environmental and oil and gas clients. Ms. Gordon has managed projects for environmental, government, and oil and gas clients ranging in budget from several thousand dollars to several million dollars. Her project teams have included as many as 15 scientists, geologists, engineers, and managers. Her unique qualifications as both licensed professional engineer and professional geoscientist allow her to serve as a project liaison for multidisciplinary teams of scientists, engineers, managers, and government officials.

Representative Project Experience

Texas Railroad Commission Brine Well Permit Application, Trinity Environmental SWD, L.L.C., Midland County, Texas. 2013 – 2014. *Project Manager, Project Engineer and Hydrogeologist.* Coordinated a project team of field and operations personnel, drilling engineers, and geologists. Developed an application for a brine solution-mining permit that included an area of review oil and gas and groundwater resources and the development of groundwater monitoring plan. Developed gradient maps, recommended water supply completions. Coordinated filing of application that included well permitting, review of drilling and completion plans, mechanical integrity testing plans.

Development of a Groundwater Availability Model of the Dockum Aquifer, Texas Water Development Board, Multiple Counties, TX. 2003 – 2007. *Geoscientist.* Provided support for Dockum GAM where responsibilities included developing the hydrostratigraphic model from log data and correlating available permeability data using variogram analyses. Populated simulation model grid using geostatistical techniques.

Kim Gordon (cont.)

Texas Railroad Commission Permitting, Various Clients in Texas. 2007 – 2014. *Technical Lead, Project Manager.* Coordinated filing of applications and permits to meet short turn-around project timelines ranging from 1 week to 6 months. Reviewed and analyzed log data and core data for permeability and porosity. Developed stratigraphic models, structure maps, and geologic cross sections. Included tight gas applications, salt water disposal well interval reviews, well permitting.

Development of a Geologic Conceptual Model of the Española Basin, Santa Fe County, NM. 2005 – 2006. *Geoscientist.* Used spatial data from numerous sources to construct a cohesive basin model for Santa Fe County. Data types included geophysical logs and aeromagnetic surveys. Worked with state and federal agencies to develop complete spatial datasets and framework for future model development.

Field Redevelopment, Stranded Oil Resources, Southeastern Kansas. 2013 – 2014. *Project Manager, Technical Lead.* Led project development for a $20-million field redevelopment program with multiple subcontractors. Provided work review and schedules for client management. Developed numerical reservoir simulator for optimization of field redevelopment. Reviewed geologic data, updated structure maps and reservoir geologic model. Analyzed geophysical logs and core data for petrophysical properties. Estimated oil-in-place. Recommended additional stratigraphic characterization based on initial reservoir model. Planned well field development based on reservoir modeling results. Assisted drillers with geosteering recommendations based on structure.

Basin-Wide Review of Field Development and Drilling Practices, Confidential Client, North Central Texas. 2012 – 2013. *Project Manager, Technical Lead.* Conducted a comprehensive basin-wide review of depositional history, geology, hydrogeology, and resource potential. Reviewed drilling practices and made recommendations for best drilling practices to protect air, surface water, groundwater and other resources.

Acid Gas Permit Review, Regency Gas Services, South Texas. 2012 – 2013. *Technical Lead.* Directed geologic and numerical simulation studies of subcontractors. Reviewed data and interpretations provided by government agencies. Identified transmissive units based on log data, reviewed geologic structure mapping and correlations. Compiled relevant technical data including geophysical logs, core data, and depositional history studies.

Relevant Publications/Reports

Gordon, K.D., D. Jordan, W. Oliver, D. Lupton, 2015. Alternative Water Resources for Drilling and Completions. Poster Presentation. Groundwater Resources Association of Cailifornia, Oil and Gas, and Groundwater Symposium. Long Beach, California; February 18-19, 2015.

Ewing, J.E., T.L. Jones, T. Yan, A.M. Vreugdenhil, D.G. Fryar, J.F. Pickens, K. Gordon, J.P. Nicot, B.R. Scanlon, J.B. Ashworth, J. Beach, 2008. Texas Water Development Board Final Report: Groundwater Availability Model for the Dockum Aquifer.

Kelley,V.A. , J. Ewing, K. Gordon, D. Jordan, C. Ardito, and S. Wust, 2007. Models as Tools for Hydrogeologic Reconnaissance A Case Study in the Espanola Basin. 2007 Ground Water Summit, National Ground Water Association, Albuquerque, NM, April 29-May 3, 2007.

Gordon, K., C. Ardito, J. Ewing, D. Jordon, V. Kelley, S. Wust, G. McCurry, and C. Borchert, 2006. Application of a Geologic Model to Guide Parameterization of a Regional Ground Water Flow Model for Santa Fe County. Geologic and Hydrogeologic Framework of the Española Basin, Proceedings of the 5th Annual Española Basin Workshop, Santa Fe, New Mexico, March 7-8, 2006.

Justin Sutherland, PhD, PE

carollo
Engineers...Working Wonders With Water®

Technical Specialist –
Feasibility of Desalination

Justin Sutherland is a Principal Technologist at Carollo Engineers with 16 years of experience in water quality assessments, applied drinking water research, and process evaluations, including desalination. He has led technology evaluations to find solutions for the impacts of water quality issues (e.g., radium and iron) on treatment, waste disposal, and raw water conveyance. Dr. Sutherland has performed pilot testing for desalinating brackish groundwater, evaluated practical alternatives to pilot plant studies for innovative water technologies, and developed methods for applying computer models to design reverse osmosis (RO) treatment systems.

Years of Experience: 16

Education:

- PhD, 2003, Civil Engineering, University of Missouri-Rolla
- MS, 2000, Environmental Engineering, University of Missouri-Rolla
- BS, 1998, Chemical Engineering, University of Missouri-Rolla

Professional Certifications:

- Professional Engineer, Texas

Key Experience:

- 16 years in water quality assessments, research on drinking water treatment technologies, and desalination
- Feasibility studies and pilot testing for application of desalination technology
- Knowledge of state-of-the-science technology and best practices for groundwater desalination

Representative Project Experience

Brackish Groundwater Desalination Membrane Pilot Testing Study, San Antonio Water System, Texas. *Project Engineer.* Duties included the development and execution of a four phase protocol to desalinate water from the Wilcox Aquifer and meet TCEQ's requirements for reverse osmosis membrane approval. This project included design and construction of a pilot system for testing three RO membranes, four pretreatment systems, and two RO recoveries. It also includes an evaluation of RO membranes and a concentrate management system in the presence of radium and radon.

Hickory Water Supply Project, City of San Angelo, Texas. *Project Engineer.* Duties for this project fall under two categories: radium removal and water stability. For radium removal, this includes the design construction, and operation of a raw groundwater pipe loop and an RO membrane pilot plant. Also included assessment of surrogate compounds for regulatory compliance with RO removal of radium. For water stability, this includes an evaluation of blending raw groundwater and existing surface water with the RO permeate and bench-tests with a corroded pipe from the City's distribution system to evaluate iron release under select blend scenarios.

Water Research Foundation Project #4536, Blending Requirements for Water from Direct Potable Reuse Treatment Facilities, City of Ventura, California. *Project Manager*. This project includes bench- and pilot-scale studies on the impacts of blending direct potable reuse (DPR) purified water with a drinking water facility on the potential for corrosion, disinfectant residual stability, regrowth of opportunistic pathogens from blending. This includes design and oversight of a ultrafiltration (UF)/RO/ultraviolet (UV) advanced oxidation process (AOP) demonstration pilot facility.

Testing Water Quality in a Municipal Wastewater Effluent Treated to Drinking Water Standards, Texas Water Development Board. *Project Engineer.* Duties for this ongoing project include a review of historical RO performance data and lead a verification study of virus removal by RO membranes using the Trasar compound as a surrogate.

Justin Sutherland (cont.)

Evaluating a Mobile Package Treatment System, Confidential Client. *Project Manager.* Duties for this project include developing and implementing a pilot testing program for a novel desalination technology to treat brackish groundwater, seawater, oil and gas produced water, and landfill leachate.

Evaluation of RO membrane oxidation at the Surface Water and Treatment System (SWATS), Brazos Regional Public Utility Agency. *Project Manager.* This project included evaluate of historical water quality and RO performance data, disinfection practices, a field investigation of current operating procedures, and a field autopsy of oxidized membranes.

Developing Practical Alternatives to Pilot Plant Studies for Innovative Water Technologies, Texas Water Development Board. *Project Manager.* This project includes a study of alternatives to RO pilot testing, analysis of the efficacy for using computer models for RO design, and the development of a new manual of practice for standardizing the use of computer models for RO membrane process design.

Brackish Groundwater Desalination Demonstration Project, Texas Water Development Board. *Project Manager.* Duties for this project include the development of a four-phase protocol for process testing, design and construction of a pilot system that includes a TOMCO carbonic acid injector and four upflow calcite columns for testing, analysis of contactor performance, and development of contactor design criteria and cost estimates.

Evaluation of Ultrafiltration Membrane to Meet California DHS Alternative Filtration Technology Requirements, Inge AG, Greifenberg, Germany. *Project Engineer.* Duties included operating and maintaining a membrane pilot unit to determine the log removal capabilities of the Dizzer 5000 based on MS-2 Phage and turbidity removal while treating the Santa Ana River and California SPW. Maintenance included conducting routine direct integrity monitoring using a pressure feed decay test to identify membrane fiber integrity.

Groundwater Development Project, City of San Angelo, Texas. *Project Engineer.* Duties included the evaluation of historical water quality for ground- and surface-water water sources, alternative treatment technologies (including RO and NF) for radium removal, and alternatives for disposal of radium-laden waste for a new 6-mgd groundwater treatment plant. Also designed, constructed, and operated a pilot facility to study two treatment trains with three single-use media each to control iron and remove radium from Hickory Aquifer Groundwater.

Evaluation of Enhanced Desalination Water Recovery, Eastern Municipal Water District, California. *Project Engineer.* Duties include a bench-scale evaluation of inorganic and polymeric chemical softening of a RO concentrate. Design criteria were developed for a pilot-scale process to evaluate softening as pre-treatment to downstream RO or electrodialysis reversal processes for improved water recovery from the concentrate.

Evaluation Water Softener Brine Discharges on Wastewater, City of Corona, California. *Project Engineer.* Duties included analyzing an overall TDS mass balance for the City's wastewater collection system and results from a citywide water and wastewater sampling program used to assess water softener brine contributions to the wastewater stream.

Relevant Publications/Reports

Sutherland, J., G. Juby, T. Seacord, Bryant, D., Morrison, K. "Effects of Pretreatment on RO Membranes during a Brackish Groundwater Desalination Pilot Study." *Ultrapure Water Journal*. July 2011.

Tingting Yan, EIT

INTERA

Technical Specialist – Groundwater Modeling

Tingting Yan has nine years of research and applied experience in developing and applying groundwater models, managing and analyzing data in GIS, and conducting hydrogeological studies and analyses to support water resources management. Her modeling experience includes using codes such as MODFLOW, MT3D, GMS and Argus ONE, and parameter estimation with model optimization codes such as PEST and UCODE. She is also a skilled programmer using languages and codes that include FORTRAN, Matlab, Python, and R. She has experience with GIS software such as ArcGIS and IDRISI, and she has also worked with database development using Access and GIS geodatabases. Ms. Yan applies her modeling and other technical experience to support a variety of projects focused on water resources studies, including several GAMs of aquifers in Texas, and the development and application of models and other quantitative decision support tools to evaluate water management strategies in California, New Mexico, Florida, and Mississippi for several regional and local water authorities. She provides technical support on GIS mapping, programming, and database development. Working with Texas GCDs, Ms. Yan has evaluated potential impacts on aquifer water levels and land subsidence from planned well fields, determined the reliability of alternate methods for measuring water production, developed groundwater monitoring strategies and networks, supported the development of desired future conditions scenarios, and used GAMs to evaluate various pumping scenarios to understand impacts on aquifer drawdown.

Years of Experience: 9

Education:

- MS, 2007, Hydrogeosciences, Virginia Tech
- MS, 2004, Hydrogeology and Water Resources, Nanjing University, China
- BS, 2001, Hydrogeology and Engineering Geology, Nanjing University, China

Professional Certification:

- Engineer-in-Training, Texas, No. 44547

Key Experience:

- 9 years of research and applied experience in developing groundwater models to support water resources management
- TWDB projects that include development of GAMs for the Rustler, Dockum, and High Plains aquifers in west Texas
- Development of hydrogeologic databases and management and analysis of data using GIS

Representative Project Experience

Groundwater Availability Model for the Rustler Aquifer, Texas Water Development Board, Austin, TX. 2009 – 2012. *Technical Support.* Provided technical support for the development of a GAM of the Rustler Aquifer for the TWDB. Responsibilities included various tasks involving climate data analysis; assisting with the setup and calibration of the numerical model, including model input file preparation; historical pumping-rate estimation; report writing; and development of the geodatabase.

Brackish Groundwater Assessment for Coastal Plains Groundwater Conservation District, TX. 2009 – 2012. *Hydrogeologist/GIS Analyst.* Responsible for creating interfaces of freshwater, slightly saline water, and moderately brackish groundwater to define the volumes of the three types of water in Matagorda County and for delineating transmissivity of the Chicot, Evangeline, and Jasper Aquifers to help assess the feasibility and economics of producing brackish groundwater.

Groundwater Availability Model of the Dockum Aquifer, Texas Water Development Board, TX. 2008. *Modeler.* Supported the development and calibration of a MODFLOW GAM for the Dockum Aquifer in northern Texas for the TWDB for use in predicting the future availability of groundwater

Tingting Yan (cont.)

from the aquifer. Responsibilities included preparing model structural and hydraulic data, generating the MODFLOW input package, model testing, and creating figures for the report and presentations. Wrote FORTRAN codes to facilitate data processing. Work also included creating a geodatabase for the project submission.

Groundwater Availability Model of the High Plains Aquifer System, Texas Water Development Board, TX, 2012 – Present. *Hydrogeologist.* Supported development of a GAM that incorporates all of the aquifers that comprise the High Plains Aquifer System. As part of developing the conceptual model, estimated the pumping volume by county, aquifer, and by water use category. This task involved incorporating the estimated pumping of several existing models in the area, the recent metered data, and water use survey data from TWDB. The estimated pumping was used in the numerical model to simulate water level in the study area.

Update of the Central Groundwater Availability Model for the Queen City/Sparta Aquifer, Post Oak Savannah GCD, 2014. *Modeler.* The central Queen City/Sparta groundwater availability model was updated to improve pumping associated with operating the Sandow mine from 1988 to 1999. Conducted the model update, analyzed the results, compared the difference of the updated and the original model, and worked on the documentation. The results show that the changes made to the pumping rates associated with the Sandow mine from 1988 to 2000 in the Central QCSP GAM are valid and appropriate. These pumping changes occur mostly in the Simsboro Formation and have a negligible impact on the ability of the GAM to reproduce measured water levels at the regional scale.

Updated Groundwater Availability Model of the Northern Trinity and Woodbine Aquifers, North Texas, Northern Trinity, Prairielands, and Upper Trinity Groundwater Conservation Districts. 2013 – 2014. *Hydrogeologist.* Worked for several GCDs in Groundwater Management Area 8 to update the GAM for the northern Trinity and Woodbine aquifers. The original GAM was developed in 2004 and the updated model provides the GCDs with an improved tool for assessing groundwater conditions and availability over a future 50-year planning period. Responsibilities included water-level data evaluation, pumping data collection, analysis, and implementation, as well as documentation.

Evaluation of Effectiveness and Reliability of Alternate Methods for Measuring Water Production, High Plains Water District, TX. 2012. *Hydrogeologist/GIS Analyst.* This study evaluated the uncertainty and reliability of various "alternate" water-measuring methods for the High Plains Water District. Conducted uncertainty analysis on the current groundwater monitoring network based on the GAM for the Edwards-Trinity (High Plains) Aquifer in West Texas and eastern New Mexico. The uncertainty of the monitoring network was evaluated in three ways: (1) head comparison between interpolated surfaces from GAM measurements at monitoring locations; (2) geostatistical approach, and (3) cross-validation approach. The results indicated the current monitoring network was adequate to yield a water level surface with a satisfactory approximation to reality.

Groundwater Availability Model of the Yegua-Jackson Aquifer, Texas Water Development Board, TX. 2009 – 2010. *Modeler.* Developed the conceptual and numerical model of a GAM for the Yegua-Jackson Aquifer for the TWDB. Responsibilities included collecting/analyzing data for the Yegua-Jackson Aquifer on climate, water levels, hydraulic properties, streams, springs, and water quality; developing estimates of pumping rates and locations; developing a geodatabase; making input packages for the MODFLOW model; and report writing.

Groundwater Availability Model of the Seymour Aquifer, Texas Water Development Board, TX. 2009. *Hydrogeologist.* Supported development of the conceptual and numerical model of a GAM for the

Seymour Aquifer for the TWDB. Responsibilities included collecting/analyzing Seymour Aquifer data for water levels, pumping, hydraulic properties, streams, springs, and water quality; developing a data model; making input packages for the MODFLOW model; and report writing.

Potential Impacts on Water Levels and Land Subsidence caused by Well Fields near Brazosport Water Authority Plant, Brazosport Water Authority, Brazoria County, TX, 2012. *Modeler.* This study was conducted to evaluate the impacts of future groundwater production near the Brazos River Water Authority's water treatment plant on groundwater drawdown and land subsidence. The Houston Area Groundwater Model (HAGM) (Kasmarek, 2012) and the Lower-Colorado River Basin (LCRB) model (Young and others, 2009) were used to simulate the impacts of pumping on water level and subsidence surrounding the proposed well fields. Three pumping scenarios were applied to the HAGM model and the net drawdown and subsidence due to the additional pumping were calculated and presented for each scenario. Two of the pumping scenarios were applied to the LCRB model. The results showed that in the HAGM model, beyond a five-mile radius from the well fields in the pumping scenarios, the predicted drawdowns and land subsidence is less than 0.1 feet and less than 12 feet, respectively, for any of the three pumping scenarios. The HAGM prediction of land subsidence is considered to be biased toward being too high.

Development of a Monitoring Strategy for the Upper Trinity Groundwater Conservation District, TX. 2012. *Hydrogeologist/GIS Analyst.* A greatest distance approach was developed to design groundwater monitoring networks. The approach was applied to the Upper Trinity GCD to estimate the required or optimal number of monitoring wells based on an existing monitoring network and to recommend new monitoring well locations. The influence of pumping on developing a better monitoring network was also investigated. Work included a proposal of the greatest distance approach, code development and application, an initial recommendation of Phase II wells, analysis of multiple scenarios, and documentation. The recommended new monitoring network significantly improved performance with a minimum number of additional monitoring wells.

Technical Support on Groundwater Management and Monitoring Plans for Post Oak Savannah Groundwater Conservation District, TX. 2010 – 2012. *Hydrogeologist/GIS Analyst.* Providing support on the joint planning process, changes to district rules and management plans, and studies to improve the characterization of aquifer properties and processes. Work includes evaluating and updating the current database according to management plans, hydrograph plotting, GIS mapping, and water level and well information analysis to help develop desired future conditions scenarios. She also conducted model runs to understand the impact of groundwater pumping associated with the Alcoa Permit.

Evaluation of Desired Future Conditions for the Pecan Valley Groundwater Conservation District, TX. 2010 – 2012. *Hydrogeologist/GIS Analyst.* Provided support on the evaluation of desired future conditions (DFC) and managed available groundwater with regard to the district rules, model runs to understand the impact of pumping scenarios on average drawdown, and assessment of the impacts of pumping water supply wells for hydraulic fracturing on nearby water wells and the DFCs.

Technical Assistance for Developing Groundwater Management Plans and Groundwater Resource Assessment, Brush Country Groundwater Conservation District, TX. 2010– 2012. *Hydrogeologist/Modeler.* Work included analysis of existing wells in the District to develop DFCs, model runs with multiple pumping scenarios to understand the impact of pumping on average drawdown, DFC model runs, assessment of groundwater availability, and hydrograph plotting.

Tingting Yan (cont.)

Development of a Water Availability Model of the Española Basin, Santa Fe County, NM. 2007. *Hydrogeologist.* A regional groundwater flow model (MODFLOW-2000) of the Española Basin was developed and calibrated for the County Hydrologist to support the County's application to the State Engineer for new water supply wells. Work included the development of isopach and structure maps of the study area. Input data and output hydrographs from the numerical model (MODFLOW-2000) were processed, shape files were made, and maps were plotted to meet the client's requirements.

Conceptual and Numerical Model Development of the North Orange County Basin, Orange County Water District, CA. 2014 – Present. *Modeler.* Participated in the conceptual and numerical model development for northern portion of the Orange County Basin in support of flow and transport modeling. Estimated water budget on areal recharge, mountain-front recharge, pumping, storage change, and inter-basin flow. Evaluated boundary conditions for the numerical model. Future work includes developing and calibrating the numerical flow and transport model.

Model Update for the West Coast Basin Barrier Project, California. 2014. *Hydrogeologist.* The West Coast Basin Barrier Project (WCBBP) was established to protect the West Coast Ground Water Basin from seawater intrusion by creating a pressure ridge through injection. The original WCBBP model was developed in 1993 and has been updated to December 2012 to predict the residence and travel times of the injected blended water in the primary underlying aquifers. In early 2014, the model was updated further to include monthly stress periods in 2013. Tasks included collecting water level data in 2013, interpolating them temporarily and spatially, and updating the constant head boundary package for the updated model.

Update of a Groundwater Flow and Transport Model for the Alamitos Barrier Area, Orange County Water District, CA. 2014. *Hydrogeologist.* The Alamitos Barrier is a set of injection wells that helps protect aquifers in Orange and Los Angeles Counties from seawater intrusion. In 2010, helped develop a flow and transport model that assesses the flow of recycled water from the barrier to inland production wells and evaluates the transport of chloride and barrier performance. Tasks included updating the constant head boundary condition of model to reflect most recent data.

Relevant Publications/Reports

Ewing, J.E., V.A. Kelley, T.L Jones, T. Yan, A. Singh, D.W. Powers, R.M. Holt, and J.M. Sharp, 2012. Groundwater Availability Model Report for the Rustler Aquifer. Prepared for the Texas Water Development Board.

Jones, T.L., J.E. Ewing, T. Yan, J.F. Pickens, B.R. Scanlon, J. Olyphant, and A. Chastain-Howley, 2012. Conceptual Model for the Refined Seymour Aquifer Groundwater Availability Model: Haskell, Knox, and Baylor Counties. Prepared for the Texas Water Development Board.

Deeds, N. E., T. Yan, A. Singh, T. L. Jones, V. A. Kelley, P. R. Knox, and S. C. Young, 2010. Groundwater Availability Model for the Yegua-Jackson Aquifer. Prepared for the Texas Water Development Board.

Ewing, J. E., T. L. Jones, T. Yan, A. M. Vreugdenhil, D. G. Fryar, J. F. Pickens, K. Gordon, J. P. Nicot, B. R. Scanlon, J. B. Ashworth, and J. Beach, 2008. Groundwater Availability Model for the Dockum Aquifer. Prepared for the Texas Water Development Board.

4.1 Proposed Staff's Experience on Similar Projects

All of the INTERA Team members have long track records of successfully completing projects on time and within budget. Historically, our clients have been extremely satisfied with the quality of our technical work products and our cost and schedule performance. **Figure 4-2** provides a summary of several representative projects that serve to demonstrate the experience of our proposed personnel in all areas relevant to evaluating brackish groundwater in the Rustler Aquifer. This includes: conducting studies on structure, stratigraphy, depositional systems, and important hydrologic processes (e.g., recharge, groundwater-surface water interaction, water quality, pumping, etc.); interpreting and correlating geophysical logs to define hydrostratigraphy and water quality; developing GAMs of other aquifers in Texas; and using models and other quantitative tools to support water planning in Texas, including evaluating existing water supplies and determining groundwater availability. Our project experience includes performing numerous hydrogeologic studies, through funding from the TWDB and various GCDs, of major and minor aquifers across the state, including the Rustler.

More detailed descriptions of the projects that appear in Figure 4-2 are provided below. To ensure that the experience and lessons learned from these projects are successfully transferred to our work on evaluating brackish groundwater in the Rustler Aquifer, the personnel we are proposing served in similar roles on the majority of the projects described below. The names and roles of these personnel are provided in the "project title boxes" shown at the beginning of each description.

PROJECT INTERA

Groundwater Availability Model for the Rustler Aquifer, Delaware Basin, Texas

Client: Texas Water Development Board

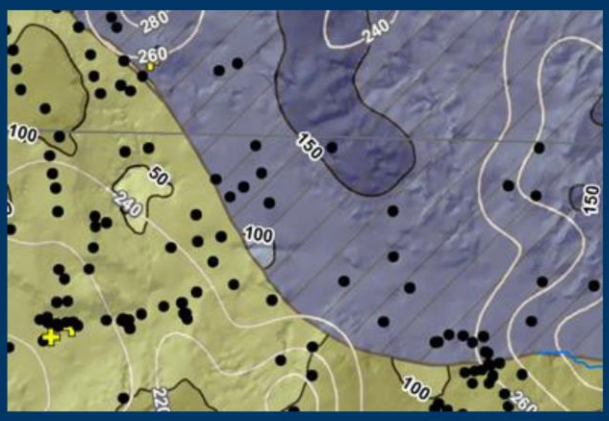
Period of Performance: 2010 – 2012

Cost: $250,000

Proposed Personnel That Worked on Project and Role:
John Ewing / Technical Lead - Modeling
Van Kelley / Project Manager
Daniel Lupton / Technical Specialist – Stratigraphy
John Pickens / Project Principal
Dennis Powers / Technical Lead – Structure
Jack Sharp / Senior Technical Advisor
Tingting Yan / Technical Specialist – GIS, data model

As part of TWDB's Groundwater Availability Modeling Program, INTERA developed a three-dimensional groundwater model for the Rustler Aquifer—located in the Trans-Pecos area of west Texas and southern New Mexico. Groundwater in the Rustler occurs in partly dissolved dolomite, limestone, and gypsum, and most of the water production comes from fractures and solution openings in the upper part of the Rustler Formation. The GAM was developed using the groundwater simulation code MODFLOW-NWT. The model consists of a lower layer representing the Rustler Aquifer and an upper layer representing the overlying Dewey Lake Formation and Dockum Group. While there is a general lack of hydrogeologic property data for the Rustler Aquifer in Texas, the available data provide good evidence for significant variability in the aquifer properties resulting from structural complexity within the basin, variability in lithology, and the effects of post-depositional processes. As a result of this complexity, parameterization of the Rustler Aquifer GAM relied heavily on the conceptual models we developed while trying to honor the sparse property data available. The model incorporates the available information on structure, hydrostratigraphy, hydraulic properties, streamflow, recharge, evapotranspiration, and pumping for the Rustler Aquifer.

Perhaps one of the most important contributions of INTERA's work on the Rustler Aquifer GAM is the development of a detailed structure for the aquifer and the Rustler Formation as a whole. This effort was led by Dr. Dennis Powers. The structure for the Rustler Aquifer GAM was developed in coordination

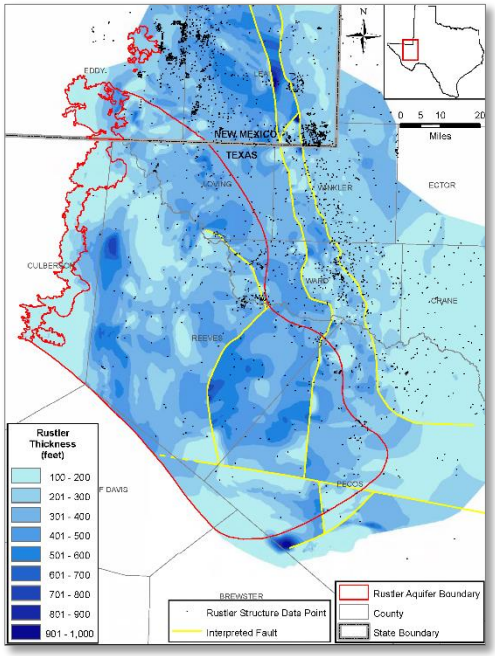


Project Name, Location, Client	General hydrogeology (hydrostratigraphy, aquifer properties, conceptual models, etc.)	Hydrogeology of Rustler Aquifer	Interpretation and use of geophysical well logs (delineate hydrostratigraphic units, fresh and brackish groundwater, etc.)	Use of data from TWEB GAMs and other TWDB contracted studies	Delineation/Quantification of fresh and brackish groundwater	Delineation of hydrogeologic barriers and evaluation of impacts on groundwater flow and water quality	Modeling to determine groundwater availability	Use of TWDB BRACS and Groundwater databases	Development and use of GIS (visualize hydrostratigraphic units, estimate fresh and brackish groundwater, etc.)	Communication with public and other stakeholders	Technology transfer	Production of reports	Completion on schedule and within approved budget
	Relevant Areas of Experience												
Groundwater Availability Model for the Rustler Aquifer, Delaware Basin, Texas, Texas Water Development Board	■	■	■	■	■	■	■	■	■	■	■	■	■
Evaluation of Groundwater Resources in the Rustler Aquifer on Oil and Gas Leases Near Rustler Hills, Culberson County, Texas, , Confidential E&P Company	■	■	■	■	■		■	■	■			■	■
Evaluations of Groundwater Resources in the Rustler Aquifer on Property Holdings Throughout the Delaware Basin, West Texas, Confidential E&P Company	■	■	■	■	■			■	■			■	■
Evaluation of Occurrence and Distribution of Productive Groundwater Intervals Within the Pecos Valley Aquifer, West Texas, Confidential E&P Company	■	■	■	■		■		■	■			■	■
Hydrogeologic Characterization and Regional Modeling of the Rustler Formation at the Waste Isolation Pilot Plant, Southeast New Mexico, Sandia National Laboratories	■	■	■		■	■			■	■	■	■	+
Geologic and Hydrogeologic Characterization for Permitting and Licensing of a Waste Disposal Facility, Andrews County, Texas, Waste Control Specialists	■	■	■		■	■			■	■	■	■	■
Development of a Brackish Water Supply and Evaluation of Groundwater Inflow for the Ochoa Potash Mine Project, Southeast New Mexico, Intercontinental Potash Corporation	■	■	■	■		■		■	■		■	■	■
Groundwater Availability Model for the Dockum Aquifer, West Texas, Texas Water Development Board	■			■	■	■	■	■	■	■	■	■	■
Development of Sequence Stratigraphy and Depositional Environments for the Gulf Coast Aquifer System, Texas Water Development Board	■		■	■	■	■		■	■	■	■	■	■
Groundwater Availability Model for the High Plains Aquifer System, West Texas, Texas Water Development Board	■		■	■		■	■	■	■	■	■	■	■
Fresh and Brackish Groundwater Availability Assessment, Nueces and San Patricio Counties, Texas, City of Corpus Christi	■		■	■	■			■	■			■	■
Evaluation of Hydraulic Fracturing on Groundwater Availability and Production, DeWitt County, Texas, Pecan Valley Groundwater Conservation District	■		■	■	■	■	■	■	■	■		■	■
Groundwater Availability Assessment in the Carrizo-Wilcox Aquifer in the Presence of Faulting, Central Texas, Confidential Commercial Client	■		■	■		■	■	■	■	■		■	■
Hydrogeologic Characterization and Modeling for the Evergreen Underground Water Conservation District, South Texas, South Texas Energy and Economic Roundtable	■		■	■	■	■	■	■	■	■		■	+
Characterization of Fresh and Brackish Groundwater Resources in Matagorda County, Texas, Coastal Plains Groundwater Conservation District	■		■	■	■			■	■	■		■	■

Note: + signifies project still ongoing

Figure 4-2. Representative project experience of proposed staff

with development of structure for the Trans-Pecos area in west Texas by the TWDB BRACS program as part of a pilot program to evaluate brackish groundwater systems. The primary source of data for identifying the structural top and bottom of the Rustler Formation was geophysical logs obtained from numerous sources including, but not limited to, the BRACS, the TWDB's Capitan Aquifer structure project, and the New Mexico Oil Conservation Division. The resulting structure identified numerous faults within the Rustler Formation. Significant vertical displacement across some of these faults divides the aquifer, in some areas, into relatively isolated flow domains. Important products included structure (elevation) maps of the top and base of the formation, general limits of halite within portions of the formation that strongly relate to hydraulic properties of important members, summary Rustler groundwater quality, and a division of the formation areally into hydrologic domains that reflect basic geologic character of the formation, including structure.



The modeling used the industry-standard approach that has been accepted and standardized in the TWDB groundwater availability requirements. This standard approach includes model calibration and model sensitivity analysis. The model was calibrated for two time periods, one representing steady-state conditions and the other representing transient conditions. The steady-state calibration considers a "predevelopment" time period prior to extensive aquifer development. The transient calibration period ran from 1919 through 2008 to include as many water-level observations as possible and to incorporate the historical period of greatest groundwater development in the 1960s and 1970s. Both the steady-state and transient calibrations reproduced aquifer water levels well and within the uncertainty in the water-level estimates. The Rustler Aquifer GAM provides a documented, publicly-available, integrated tool for use by state planners, RWPGs, GCDs, GMAs, and other stakeholders in estimating modeled available groundwater, supporting the regional planning process, and assessing various proposed water management strategies on the aquifer system.

PROJECT INTERA

Evaluation of Groundwater Resources in the Rustler Aquifer on Oil and Gas Leases Near Rustler Hills, Culberson County, Texas

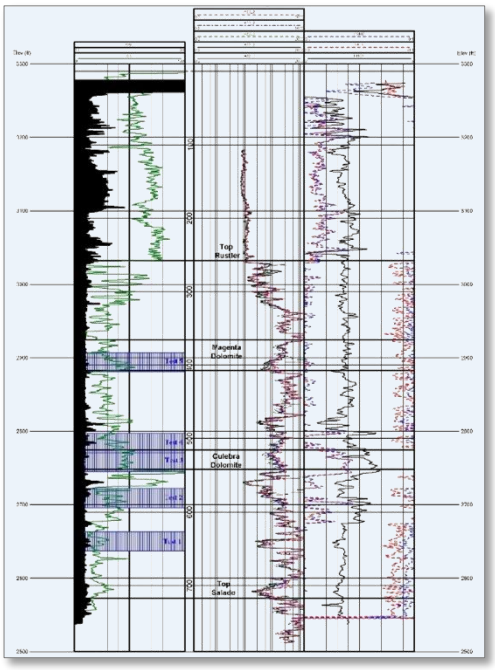
Client: Confidential Oil and Gas E&P Company

Period of Performance: 2013 – 2014

Cost: $150,000

Proposed Personnel That Worked on Project and Role:
Daniel Lupton / Project Manager
Dennis Powers / Technical Lead – Log analysis and hydrostratigraphy

INTERA completed a water resources evaluation of the client's leases in Culberson County just east of the Rustler Hills that involved the identification of potential production zones capable of providing a water supply to support oil and gas production operations. We started by examining the BEG's published surface geologic maps and the TWDB's published aquifer boundaries. Through our review of this information, we identified the Rustler Aquifer as the most viable target for developing a rig water supply. To map the structure of the Rustler Formation and its constituent members, INTERA enlisted the support of Dr. Dennis Powers. We developed four cross sections through the area and identified the depths to the top and bottom of the Rustler Formation.



Once the structure in the area was determined, we assembled all publically available groundwater data from the TWDB Groundwater Database, Driller's Reports from the online Submitted Driller's Database (post 2002) and the TCEQ's scanned images database (Submitted Driller's Reports pre-2002). Production values, water quality, construction and various other well parameters were plotted on maps of the Rustler Formation to determine hydrogeologic parameters for the unit. Due to the undesirable quality of the Rustler water in the area, very few water well records were available and the records that were available did not contain useable data. In light of this, to derive variables for use in well spacing calculations, INTERA used the TWDB GAM of the Rustler Aquifer (which we developed) to extract values for both horizontal and vertical hydraulic conductivity, storativity, and saturated thickness. These values, along with pumping rates estimated from local Rustler wells were input into a solver for the transient groundwater flow equation in an effort to better understand drawdown, well spacing, and well field geometries.

After submitting and presenting the results of the groundwater evaluation, INTERA and Dr. Powers were retained to provide oversight for a drilling and testing program in the Rustler Aquifer. Our efforts included a field survey of the Rustler Hills area immediately to the west of the drill site where we collected strike and dip measurements of the Culebra Dolomite Member of the Rustler Formation. This enabled us to approximate the depth at which the Culebra would be encountered at the drill site and provided a cross check with depths derived from the structural cross sections. INTERA subsequently provided oversight for the drilling program and performed detailed geologic logging of the formation cuttings in five foot increments. After completing the drilling, geophysical logs were run and we designated specific intervals in the Rustler Formation for packer testing to determine hydraulic properties. The drilling activities and results from the packer testing were documented in a report that included recommendations for completing future water supply wells in the Rustler Aquifer.

PROJECT INTERA

Evaluations of Groundwater Resources in the Rustler Aquifer on Property Holdings Throughout the Delaware Basin, West Texas

Client: Confidential Oil and Gas E&P Company

Period of Performance: 2013 – 2014

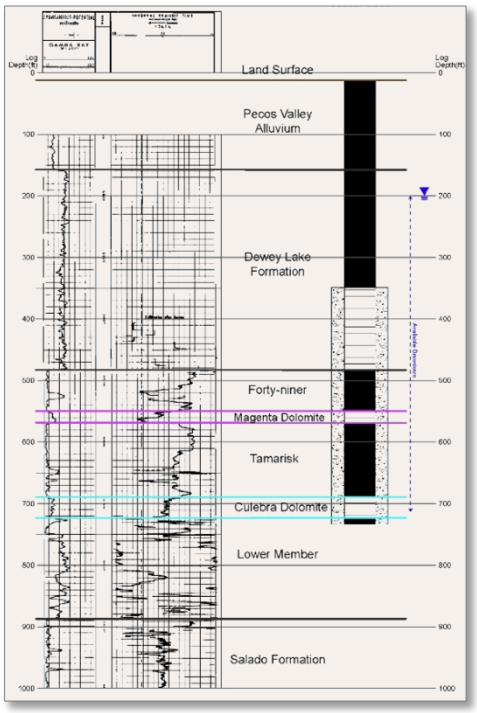
Cost: $125,000

Proposed Personnel That Worked on Project and Role:

Clark Griffith / Technical Specialist – Data management
Daniel Lupton / Project Manager
Dennis Powers / Technical Lead – Log analysis and hydrostratigraphy

To complete several groundwater resource evaluations for lease areas in the Delaware Basin, INTERA and Dr. Dennis Powers developed a standardized process that consisted of first assembling all relevant groundwater and related data from the TWDB's Groundwater Database, the online Submitted Driller's Report Database, and the TCEQ's scanned images database (for Submitted Driller's Reports pre-2002). This data was then combined with very detailed (i.e., high well density) cross sections across the leases of interest. To obtain high well density data, we acquired well logs using our subscription to IHS's Permian Basin raster log database—the largest repository of geophysical logs for the Permian Basin. Log type was mainly gamma and

neutron density run through cased hole. These logs provided the necessary detail to parse the Rustler Formation into its constituent member units (e.g., Culebra Dolomite, Magenta Dolomite, etc.) and subsequently determine the degree of halite cementation, which is known to reduce transmissivity in the portions of the units that are productive.



After developing a detailed structure for the Rustler Formation and organizing all of the hydraulic data, we used the water wells that were completed in the Rustler to establish likely hydraulic trends. In general, the Submitted Driller's Reports post 2002 provided the most useful dataset due to the increased usage of the Rustler as a source water for hydraulic fracturing operations. Specific capacity measurements (gallons per minute [gpm] per foot of drawdown) along with well construction specifications were used to determine interval specific hydraulic conductivities for the member units of the Rustler Formation. This data was input into a solver for the transient groundwater flow equation and drawdown from various proposed wellfield geometries was calculated. The well field geometries were modified until an ideal wellfield geometry on the clients lease areas was calculated. INTERA presented the results of our evaluations to the client and documented the evaluation activities, conclusions, and recommendations in formal reports.

PROJECT INTERA

Evaluation of Occurrence and Distribution of Productive Groundwater Intervals within the Pecos Valley Aquifer, West Texas

Client: Confidential Oil and Gas E&P Company

Period of Performance: 2014 – 2015

Cost: $200,000

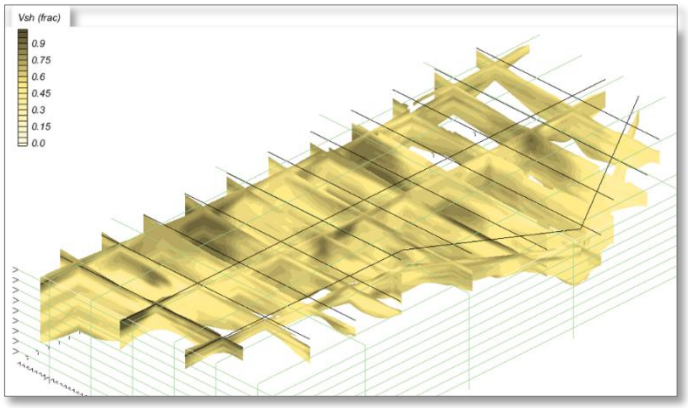
Proposed Personnel That Worked on Project and Role:

Kim Gordon / Technical Specialist
Clark Griffith / Technical Specialist – Data management
Daniel Lupton / Project Manager
Dennis Powers / Technical Lead – Log analysis and hydrostratigraphy

INTERA was retained by a confidential oil and gas client to evaluate the occurrence and distribution of productive intervals within the Pecos Valley Aquifer within the Pecos Trough overlying the Delaware Basin and immediately adjacent to the Central Basin Platform. We started by sorting through a private database with over 10,000 picks for the top of the Rustler Formation. The study area was heavily affected by the preferential dissolution of evaporites underlying the Rustler Formation (this dissolution had also caused faulting and down warping of the Rustler). Conventional models of the area have the Pecos and Loving Troughs idealized as a series of two synclines separated by an anticline in the middle. In reality, both of the troughs represent a series of normal faults with throw mainly down towards the basin axis. When interpolating the large number of picks, particular attention was given to any discrepancies between a well and the wells surrounding it to identify the presence of nearby faults. This resulted in an extremely high resolution top of the Rustler Aquifer raster surface that incorporated the significant faulting and complex structure in the area.

Once the top of the Rustler surface was determined, we used 1,395 gamma logs to pick the top of the Dewey Lake Formation. However, separating the remnant and discontinuous Dockum Formation, Cretaceous Units, and Pecos Valley Alluvium proved very difficult (and in some cases, it was not

possible) given the complex structure and lack of any data other than gamma logs. To account for the Cretaceous Limestones, we evaluated all of the Submitted Driller's Reports lithologic logs for limestone higher up in the interval. For the leases of interest to the client, deep wells that went through the Pecos Valley Alluvium and Dewey Lake did not report any limestones in their logs. After determining that the majority of the sediments above the Dewey Lake Formation were clastic in nature, 250 gamma logs were digitized and subsequently normalized and converted to a percent shale using the 90th percentile value over the entire Dewey Lake on each log as a 100 percent shale value and standardized 5 API units to represent a 100 percent sand. After making the calculations, each gamma log was evaluated to ascertain the quality of the conversion for each of the logs.



Data for the volume shale on a 0.5 foot vertical resolution was brought into a GSLib compiler and a 23 layer model with 118 rows and 61 columns was created to interpolate, using the zonal mean algorithm, the volume shale calculations (also known as percent sand). This resulted in a three-dimensional volumetric distribution of percent sand. The model was used to create two maps for the client: 1) thickness of volume shale less than 50 percent between ground surface and 600 feet below ground surface, and 2) thickness of volume shale less than 50 percent between ground surface and the top of the Dewey Lake Formation. Both of the maps showed a strong correlation between areas of high percent sand (low volume shale) and high producing water wells. The client is currently integrating the three-dimensional volume shale model into their Vision Space software in support of water well drilling operations.

PROJECT INTERA

Hydrogeologic Characterization and Regional Modeling of the Rustler Formation at the Waste Isolation Pilot Plant, Southeast New Mexico

Client: Sandia National Laboratories (U.S. Department of Energy)

Period of Performance: 1985 – ongoing

Cost: $18,300,000

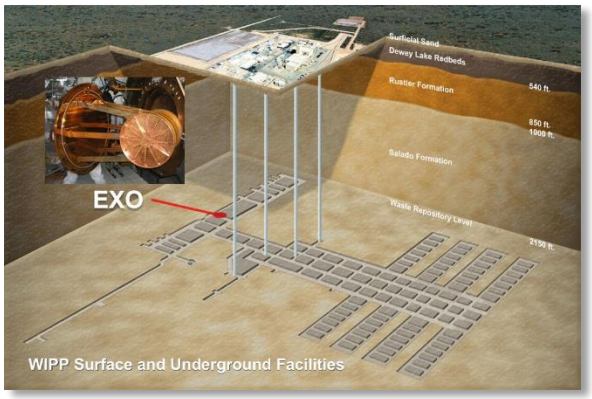
Proposed Personnel That Worked on Project and Role:

Van Kelley / Technical Specialist – Hydrogeology and modeling
John Pickens / Project Manager
Dennis Powers / Technical Lead – Rustler characterization

The WIPP is a U.S. Department of Energy (DOE) facility that operates as a deep geologic repository for the disposal of defense-generated radioactive wastes in the bedded salt of the Salado Formation. INTERA was contracted by Sandia National Laboratories to conduct field hydrogeological characterization of the Rustler and Salado Formations, including data documentation, data interpretation, and modeling in support of site characterization and performance assessment of the site and underground facility for long-term waste isolation. The information collected in the various site characterization programs was incorporated into the WIPP parameter database in support of the performance assessment modeling for site licensing and compliance. INTERA provided a full-time, on-site field team to perform hydrogeologic testing and characterization of the various geologic units. Details concerning INTERA's site characterization of the Rustler Formation for the WIPP project are discussed below.

Deep Borehole Permeability Testing and Test Interpretation—INTERA conducted detailed hydrogeologic characterization of the Rustler Formation, which overlies the repository horizon at the

WIPP site. The most transmissive unit of the Rustler Formation is the Culebra dolomite which is considered by regulators to be the principal potential off-site pathway in the event the WIPP repository is breached. The INTERA field team was involved in the design, development, and implementation of hydrologic field testing, as well as compilation and publication of hydrologic data reports documenting these activities. In addition, INTERA performed hydraulic tests on other hydrogeologic units overlying and underlying the repository horizon to provide further characterization of the three-dimensional groundwater flow system at the WIPP site.



Deep Borehole Tracer Testing of the Culebra Dolomite—INTERA designed and developed testing equipment and instrumentation, and designed, conducted, and interpreted several tracer tests performed in the fractured Culebra dolomite member of the Rustler Formation at the WIPP site. The most extensive tracer testing involved pumping one well to establish a steady convergent flow field, injecting conservative tracers at three surrounding wells, and sampling the pumping well discharge to establish tracer breakthrough curves. Other testing involved pumping one well to establish a steady convergent flow field, injecting conservative tracers at six surrounding wells, and sampling the pumping well discharge to establish tracer breakthrough curves. INTERA interpreted the tracer tests using conceptualizations consisting of either heterogeneity in fracture spacing or hydraulic anisotropy to interpret the conservative tracer tests. Parameter values and ranges for fracture porosity and spacing were interpreted for use in performance assessment simulations.

Permeability Testing and Test Interpretation in the Waste-Handling Shaft—INTERA conducted and interpreted hydraulic tests (pulse-injection tests) in low-permeability halite, anhydrite, mudstones, and claystones at various depths in the WIPP facility waste-handling shaft (WHS). The WHS testing program was designed to provide information on the distribution of permeability, formation pressure, and possible construction damage or stress-release fracturing at various radial distances from the shaft wall in the Salado Formation containing the repository horizon and in the overlying Rustler Formation. The testing program was conducted under severe time and space constraints, due to underground mining operations and limited access to the WHS conveyance system. The tests were successfully completed under these constraints and results of the test interpretations showed permeabilities of the formations ranging from 10^{-22} to 10^{-20} square meters.

Multipacker Monitoring System to Monitor Shaft Construction Effects—INTERA designed and supervised the installation of a long-term multipacker pressure monitoring system to monitor hydrologic disturbance in the Rustler and Salado formations from construction of the air-intake shaft. Interpretation of the pressure response data yielded permeabilities for the important hydrostratigraphic units.

All of INTERA's hydrogeological characterization and modeling efforts in the Rustler Formation were used to support the 1996 license application for the WIPP and resulted in the facility becoming the U.S.'s first operating underground repository for radioactive wastes. Because of the quality of our work, INTERA has maintained a nearly continuous presence on the WIPP program since 1985 and we continue to provide support in the area of hydrogeologic testing and monitoring of the Rustler as part of the ongoing license renewal and environmental monitoring programs. Our work at WIPP provides us with more than 30 years of corporate experience in the characterization of the Rustler Formation—experience that will prove invaluable in evaluating brackish groundwater in the Rustler Aquifer.

PROJECT INTERA

Geologic and Hydrogeologic Characterization for Permitting and Licensing of a Waste Disposal Facility, Andrews County, Texas

Client: Waste Control Specialists

Period of Performance: 2003 – 2013

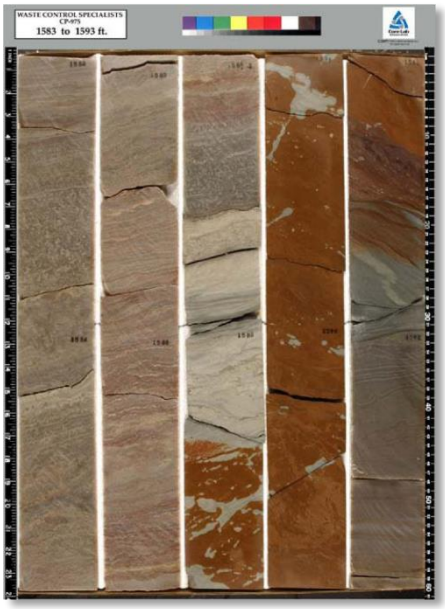
Cost: $10,700,000

Proposed Personnel That Worked on Project and Role:
Clark Griffith / Technical Specialist
John Pickens / Technical Lead
Dennis Powers / Technical Lead – Rustler characterization

For 10 years, INTERA provided scientific and engineering services to support obtaining permits and licenses for the Waste Control Specialists hazardous and radioactive waste disposal facility located in Andrews County, Texas. Our support, which encompassed geologic and hydrogeologic characterization (including a detailed drilling, testing, and sampling program), groundwater flow and transport modeling, performance assessment modeling, regulatory negotiations, and stakeholder communications, played an integral role in obtaining all permits and licenses, including a license to accept and dispose of low-level radioactive waste (LLW) from the U.S. Department of Energy and Texas LLW Compact members. INTERA's geologic and hydrogeologic evaluation included literature reviews, borehole drilling and well/piezometer installation, borehole geophysics, evaluation of surface geophysical surveys (seismic and resistivity), surface mapping, excavation structural mapping and analysis, and development of comprehensive geologic and hydrogeologic conceptual models of the area. A three-dimensional representation of the geology at the site was constructed using available borehole information. Various geostatistical techniques were used in the development of the model. Existing contour maps for the unit tops and thicknesses were also incorporated into the model.

The site, situated on the western boundary of the southern High Plains, is just west of the southwestern limit of the Ogallala Aquifer. To define the dry line, or limit of saturation, of the Ogallala Aquifer in northwestern Andrews County, we used borings, installed wells, and excavated a large transect to examine the subsurface geology in detail. Based on our evaluation, the dry line occurs in the vicinity of the red bed ridge, a prominent subsurface buried ridge developed on the upper surface of the Triassic Dockum Group in eastern New Mexico and west Texas. INTERA also evaluated the hydrogeologic conditions within the Dockum Aquifer in west Texas and eastern New Mexico, developing a hydrogeologic conceptual model that considers the water table in the Ogallala Aquifer to be refracted to depth at the dry line, or line of approximately zero saturated thickness in the Ogallala Aquifer. Our analysis determined that the refracted water table exists at depth at approximately the elevation of the potentiometric surface of sandstone in the Cooper Canyon Formation which comprises the upper part of the Dockum Group in this area. The confined condition in the low permeability sandstones in the Cooper Canyon Formation is maintained within a hydrodynamic continuum comprising the Ogallala Aquifer as the uppermost saturated unit to the east and north of the dry line. Saturated and unsaturated zones in the sandstones occur in the upper Cooper Canyon Formation depending on the proximity of the sandstones to the saturated Ogallala Aquifer, whether they are continuous or discontinuous, and the degree to which syndepositional trapped air remains in the system.

As part of the project, Dr. Dennis Powers evaluated the local geology of the Rustler Formation in the vicinity of a proposed waste disposal facility in west Texas. His evaluation was based on field data,



geophysical logging, and examination of slabbed core from a borehole drilled through the Rustler Formation near the facility. The standard for the Rustler Formation within the Delaware Basin, and even beyond, is five members with stratigraphic continuity. At the location of the cored borehole, one of the dolomite members within the formation was not identifiable. The remaining four members of the Rustler Formation show variations to the basic lithologic sequences that are present elsewhere, but are consistent with the Delaware Basin standard. Dr. Powers prepared a detailed description of each of the four identifiable members of the Rustler Formation present in the borehole including discussions on depositional environment, lithology, bedding characteristics, deformation, and alteration. He also evaluated the stratigraphic continuity and thickness of these members relative to other boreholes in the area and found little variability. Dr. Powers related observed thinning of halite beds in the Rustler Formation to subsidence and uplift within the Central Basin Platform.

Dr. Powers, in conjunction with Dr. Robert Holt, also conducted an investigation to evaluate halite dissolution in the vicinity of WCS facility. Because the facility is located over the Permian-age halite bearing Salado and Rustler Formations, the possibility of dissolution and its effects on the long-term performance of the facility required evaluation. Dr. Powers developed three conceptual hydrologic models of dissolution processes (shallow, deep, and stratabound) based on his previous experience at the WIPP site and on features found in the Delaware Basin west of the proposed facility.

Geophysical logs in the area of the facility provided stratigraphic and lithofacies data from the underlying halite-bearing units of the Rustler and Salado Formations. These units proved to be continuous and variations in thickness and lithofacies were found to be depositional with no discernible post-depositional dissolution. These, and deeper, formations are modestly deformed, but the structural trends differ from local changes in evaporite thickness. Therefore, deformation is not related to thickness differences. Some thickness changes occur in the middle of the Salado, indicating depositional variations. Deeply buried bedded halite is difficult to dissolve, and since formation fluids at depth are commonly saline and slow moving, this further limits the dissolution process. As a result, no features in the study area indicated past dissolution, and the hydrologic systems at the WCS facility limit the potential for future dissolution.

PROJECT INTERA

Development of a Brackish Water Supply and Evaluation of Groundwater Inflow for the Ochoa Potash Mine Project, Southeast New Mexico

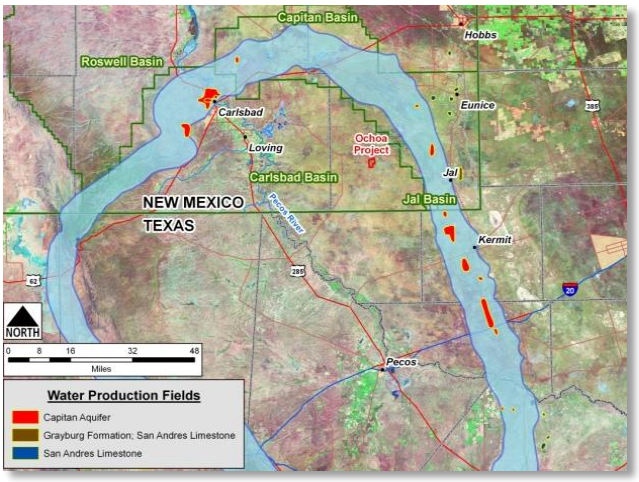
Client: Intercontinental Potash Corporation

Period of Performance: 2003 – 2013

Cost: $3,000,000

Proposed Personnel That Worked on Project and Role:
Daniel Lupton / Technical Specialist – Water quality, well logging/testing
John Pickens / Technical Lead and Advisor

INTERA led the environmental permitting and development of a water supply for Intercontinental Potash Corporation's (ICP) Ochoa Project. This project consists of over 100,000 acres of potassium minerals that will be mined underground using a modified long-wall method and processed at a proposed mill to produce sulphate of potash (SOP) and sulfate of potash magnesia (SOPM). The project is planned to produce 568,000 tons of SOP and 275,000 tons of SOMP annually. INTERA obtained, in accordance with the



overall project schedule, the environmental permits necessary to construct the mine and associated processing and load-out facilities and to develop the water supply for the mine.

After evaluating the available water resources in the project area, including the Rustler Aquifer, INTERA identified the Capitan Reef Complex Aquifer as the most viable source for a mine water supply. Because the Capitan contains brackish water and has a history of use for supporting oil and gas production, the selection of this aquifer helps protect limited fresh water resources while garnering acceptance from the public and regulatory agencies. To demonstrate that the Capitan can accommodate the project's required production rate, we drilled several deep wells (to over 5,300 feet below ground surface) and performed aquifer tests. Results from the aquifer tests were incorporated into a groundwater flow model that was subsequently accepted by state and federal agencies as part of the Environmental Impact Statement process to permit the project. Model results showed that the projected pumping rates can be sustained by the aquifer beyond the 50-year mine plan, with minimal impacts to other water users and resources.

INTERA also provided site-specific information on formation hydraulic parameters for estimating groundwater inflow to a proposed mine shaft for the project. This included the design, field implementation, and analysis of hydrogeological testing, and subsequent groundwater inflow estimates. An exploratory borehole was drilled near the proposed mine shaft location and given project constraints, the hydrogeological testing was conducted as the borehole was advanced to the target depth. We reviewed the continuous core retrieved from the borehole and used the drilling fluid management (gain/loss) to select, in real time, the formation intervals to be tested. A series of drill-stem tests (DSTs) using a dual-packer configuration were completed across numerous potential zones of inflow within selected sands of the Dockum Group (Triassic) and dolomites of the Rustler Formation (Permian). The selected formation intervals were isolated between two mechanical packers and a downhole valve assembly was activated to obtain two inflow (pressure decline) periods and two shut-in (pressure recovery) periods. The change in interval pressure during the DSTs was recorded using downhole pressure sensors. We analyzed the DST pressure responses and estimated the formation hydraulic conductivity and formation pressure of the testing of the potential inflow zones. The results of the DST analyses were then used to estimate the potential rate of groundwater inflow into the large-diameter mine shaft at each of the potential inflow zones. These estimates were provided to the shaft contractor for use in developing water control strategies to implement during the shaft sinking process.

PROJECT INTERA

Groundwater Availability Model for the Dockum Aquifer, West Texas

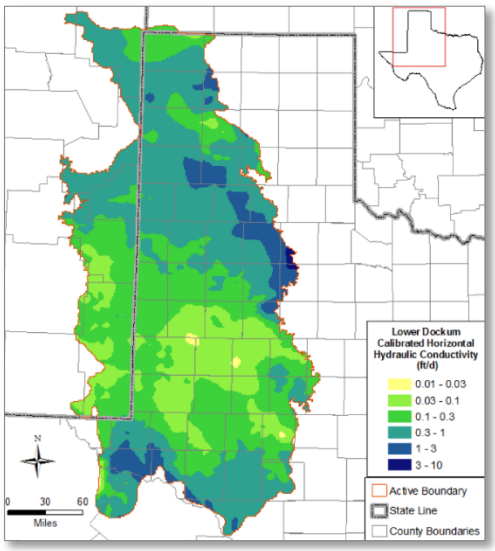
Client: Texas Water Development Board

Period of Performance: 2006 – 2008

Cost: $450,000

Proposed Personnel That Worked on Project and Role:
John Ewing / Technical Lead – Modeling
Van Kelley / Project Manager
John Pickens / Project Principal
Tingting Yan / Technical Specialist – GIS and pumping data

The TWDB coordinates regional water planning through a process based on public participation. As part of this process, TWDB has developed GAMs for all of the major and minor aquifers in Texas that can be used by RWPGs, GCDs, river authorities, and state planners to evaluate groundwater availability and support the establishment of water management strategies and drought planning. The models serve as tools for making predictions of groundwater availability through 2050 based on current projections of groundwater demands during drought-of-record conditions. In support of the TWDB's Groundwater Availability Modeling Program, INTERA led the development of a three-dimensional model of the Dockum Aquifer. The Dockum Aquifer, a minor aquifer in Texas, underlies the Ogallala Aquifer and Edwards-Trinity Aquifer in the Texas panhandle and in portions of west Texas. Although use of groundwater from the Dockum Aquifer is not widespread due to poor water quality, low yields, declining water levels, and deep pumping depths, locally it is important for municipal, agricultural, and industrial uses. The majority of groundwater pumped from the Dockum is used for irrigation purposes. The Dockum Aquifer GAM presented a challenge in that the aquifer constitutes only a small portion of the overall Dockum Group, predominately around the periphery of the Triassic depositional basin, due to high TDS concentrations in the central portion of the basin. The entirety of the Dockum Group was included in the model. In addition, the amount of data available for the Dockum Aquifer and Group was significantly less than is typically available for a major Texas aquifer.



To develop the conceptual model of the Dockum Aquifer, we integrated data on the geology and hydrostratigraphy of the aquifer, the structure of the aquifer, recharge to and discharge from the aquifer, regional flow within the aquifer, transient water levels in the aquifer, cross-formational flow from the aquifer to overlying and underlying units, aquifer interaction with surface water, the hydraulic properties of the aquifer, and the quality of the water in the aquifer. A key component to developing the model was the conceptualization of groundwater flow. In general, water recharging the aquifer never reaches the deep, confined portions of the aquifer; rather, it is all shallow recharge that remains in the outcrop areas and discharges to surface-water bodies or through springs. The majority of pumping from the Dockum Aquifer occurs in the outcrop areas and in the shallow subcrop and where the dominant lithology is sand and/or sandy gravel conglomerate.

The Dockum Aquifer GAM was developed using MODFLOW2000 and consists of two layers representing the upper and lower portions of the Dockum Group and a third upper layer that rudimentarily represents the Ogallala Aquifer and other younger sediments overlying the Dockum. The model, calibrated to steady-state aquifer conditions prior to the advent of significant pumpage and to transient aquifer conditions from January 1980 through December 1997, incorporated yearly variations

in pumping, ET, streamflow, and recharge. All aquifer properties are consistent for both steady-state and transient aquifer conditions. Average model recharge under steady-state conditions was determined to be less than during transient conditions based on data and postulated to be primarily a result of land-use changes within portions of the Dockum Aquifer outcrop.

Consistent with Texas state water planning policy, stakeholders were contacted during all stages to solicit additional information regarding the Dockum Aquifer including data on water levels, hydraulic properties, and water quality. These stakeholders included 20 GCDs, several of the river authorities in the area, and members of the general public. In addition, four SAFs were planned and conducted by INTERA. The first forum, held at the beginning of the project, introduced the GAM team members and the objectives of the GAM modeling, and presented the data needs. The second forum, held after submittal of the draft conceptual model report, provided a detailed presentation of the conceptual model to the stakeholders and solicited feedback on the model developed for the aquifer. The third forum presented the model calibration and sensitivity analysis and the fourth forum provided a training seminar to explain the model structure, assumptions, results, limitations, and applicability. All data, including source data, derived data, and model data, for the project was provided to the TWDB in a GIS-based geodatabase that includes metadata.

PROJECT INTERA

Development of Sequence Stratigraphy and Depositional Environments for the Gulf Coast Aquifer System, TX

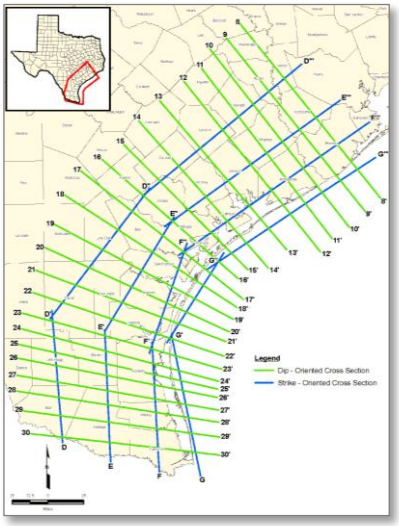
Client: Texas Water Development Board

Period of Performance: 2009 – 2013

Cost: $600,000

Proposed Personnel That Worked on Project and Role:
Van Kelley / Sr. Technical Reviewer
Daniel Lupton / Technical Specialist – Log analysis and stratigraphy

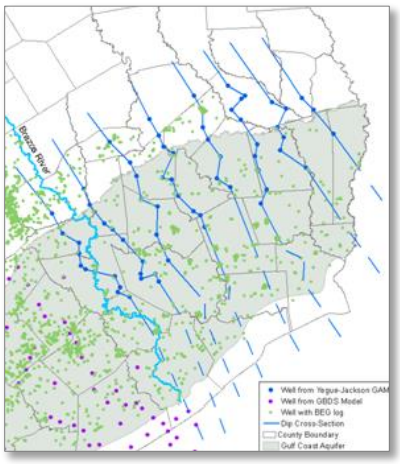
INTERA was part of the team that redefined the structure of the southern portion of the Gulf Coast Aquifer in Texas. The project team was led by INTERA's Dr. Steve Young (the project was started during his tenure with another consulting firm).To provide the geologic framework for future revisions to the Gulf Coast Aquifer GAMs, INTERA staff redefined the structure and the sand and clay percentages for each unit of the southern portion of the Gulf Coast Aquifer. The structure of the Gulf Coast Aquifer system is comprised of, from shallowest to deepest, the Chicot Aquifer, the Evangeline Aquifer, the Burkeville Confining Unit, and the Jasper Aquifer, with parts of the Catahoula Formation acting as the Catahoula Confining System. In this study, aquifer units were subdivided on the basis of chronostratigraphic correlation to yield sub-aquifer layers. The boundaries for the geologic units were traced from outcrop formation boundaries to identifiable flooding surfaces in the deeper subsurface, where paleontological biomarkers were used to constrain geologic ages of surfaces at nearshore and offshore geophysical log locations.



More than 900 geophysical logs were analyzed to define the structure and/or lithology of the Gulf Coast Aquifer system, and over 450 of these logs were used in the chronostratigraphic correlations to define the surfaces for 10 of the geologic units comprising the aquifer system. The surfaces for these geologic units along 23 dip-oriented cross-sections and four strike-oriented cross-sections were developed. Using 706 geophysical logs, a continual profile of lithology was generated through the stratigraphic column for the Gulf Coast Aquifer using a four-class system consisting of: (1) sand; (2) clay; (3) sand-with-clay;

and (4) clay-with-sand. The four-class system provides more specificity than the commonly used "binary" system, which aggregates deposits into an alternating series of clay beds and sand beds. Based on the lithology, maps of sand percentages and total sand thickness were constructed for the Chicot, Evangeline, and Jasper aquifers and their respective sub-aquifer layers.

To assist in the development of hydraulic conductivity distributions for each geologic unit, depositional facies maps were developed. The depositional facies provide information on factors that affect groundwater flow, such as the sorting, arrangement, and sizes of the particles in a deposit and how the deposit is, or is not, interconnected to similar and different deposits. For each of the 706 geophysical logs used for the lithologic interpretation, an estimate of the water quality was made for each interval assigned a lithology classification. For each of these intervals, the water quality was classified as fresh, slightly saline, or moderately saline. These classifications are based on the concentration of total dissolved solids (TDS) where fresh water is defined as having a TDS concentration less than 1,000 mg/L, slightly saline water has a TDS concentration between 1,000 and 3,000 mg/L, and moderately saline water has a TDS concentration between 3,000 and 10,000 mg/L.



INTERA also developed the structure of the portion of the Texas Gulf Coast Aquifer north of the Brazos River. Our approach to this study was based on the mapping of two key types of chronostratigraphic surfaces; erosional unconformities and marine flooding surfaces. The approach constrained the correlations in the fluvial section as much as possible by: incorporating microfaunal age control from offshore wells; correlating marine flooding-event shales in the lower part of the Miocene to help establish general structure; following marine shales (marker beds) as far landward as possible; and tying key marker beds to outcrop formation boundaries using genetic and sequence stratigraphic concepts. Loop-tying within the cross section grid and reference to deeper mapped structure horizons from the professional literature provided added quality assurance. Microfaunal age control information for offshore wells was obtained from several sources including the MMS. The geophysical logs were interpreted for water quality using an approach that involved assigning a water quality classification based on total dissolved solids (TDS) concentration to each lithologic interval identified in a geophysical log. The water quality classifications include the following three groups: fresh, slightly saline, and moderately saline. The results of these analyses were tabulated and interpreted to produce water quality maps of the Chicot, Evangeline, and Jasper aquifers.

PROJECT INTERA

Groundwater Availability Model for the High Plains Aquifer System, West Texas

Client: Texas Water Development Board

Period of Performance: 2012 – 2015

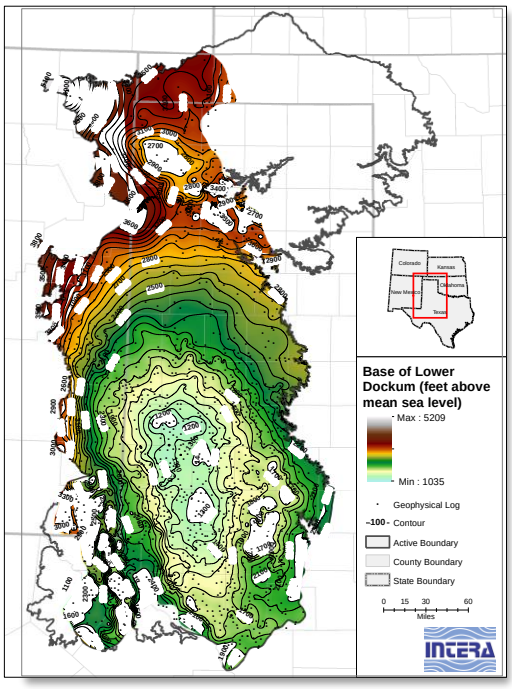
Cost: $900,000

Proposed Personnel That Worked on Project and Role:

Jevon Harding / Technical Specialist – Water Quality
Van Kelley / Project Principal
Daniel Lupton / Technical Specialist – Stratigraphy

INTERA led the development of a model of the High Plains Aquifer System (HPAS), which includes the Ogallala Aquifer, and three minor aquifers, including the Edwards-Trinity (High Plains), the Rita Blanca, and the Dockum. Our efforts included completing and delivering a conceptual model report that synthesized all of the data and analyses required to describe the primary aquifer characteristics, including structure, aquifer properties, water levels and groundwater flow, water quality, natural recharge and

discharge to springs and streams, and pumping. The largest effort for the conceptual model was the development of regional structural surfaces. To accomplish this, we worked with the BEG to analyze and correlate more than 2,000 geophysical logs to provide point elevations and regional cross-sections for all of the High Plains Aquifer System units, including the Edwards-Trinity Plateau and Pecos Valley Alluvium aquifers. INTERA used the point stratigraphic elevations to create regional surfaces. The challenge in creating these surfaces was not the basic interpolation, but in enforcing the pinchouts, outcrops, and subcrops, and avoiding surface inversions. The geophysical log data and correlations were delivered as part of the conceptual model formatted for direct import to the TWDB BRACS database.



The second most significant component of the conceptual model development was the estimates of recharge and discharge in the HPAS. INTERA worked with BEG to create both pre-development and current-day estimates of recharge in High Plains aquifers, the largest of which is the Ogallala. Because agricultural development significantly affected recharge in the southern portion of the region due to breaking up surface soils and adding irrigation return flow, an approach for implementing recharge had to include a gradual transition between the predevelopment and current-day fluxes. The "breakthrough" to the water table of agriculturally enhanced recharge was timed based on the appearance of nitrates and higher TDS in measurements in the region. This allowed a spatially dependent breakthrough time to be implemented model-wide.

The third large component of the conceptual model development was estimating historical pumping in the Ogallala Aquifer. Because the irrigation surveys of the earlier decades are considered highly uncertain, INTERA developed a unique automated tool for interpolating water levels across various time periods and estimating groundwater production based on change in volume in place. Because recharge in the Ogallala Aquifer is dwarfed by pumping rates, this volume-based calculation proved very useful in constraining early pumping estimates. INTERA also compiled a large, master database of well locations in the region, using the TWDB Groundwater Database, TCEQ PWS database, several of the large groundwater district databases, and well driller databases.

Development and calibration of the HPAS GAM was performed with the help of PEST. Pilot points were used to allow PEST to adjust both recharge and hydraulic conductivities within carefully chosen bounds, to modify our initial estimates of these parameters and result in a well-calibrated model. PEST was run in parallel on INTERA's Austin-based 88 node cluster, as well as on INTERA's Gainesville-based 96-node computing cluster. Because the HPAS GAM will be used for predictive simulations, INTERA performed several "proof of concept" predictive simulations with the model. This includes predictive simulation of the "50/50 rule" that is in place for much of the Ogallala Aquifer, and has the goal of 50% of the aquifer saturated thickness remaining after 50 years.

INTERA recognizes the importance of the stakeholder process to GAM development, and held six public stakeholder meetings as part of the HPAS GAM project. In coordination with TWDB staff, we set up the meeting locations and dates, informed stakeholders, led the meetings, and delivered the results from these meetings (accessible presentation compliant with state regulations, notes, signup sheets, etc.) to the TWDB. INTERA met all of the project milestones and delivered the final report in August 2015.

PROJECT INTERA

Fresh and Brackish Groundwater Availability Assessment, Corpus Christi, TX

Client: City of Corpus Christi

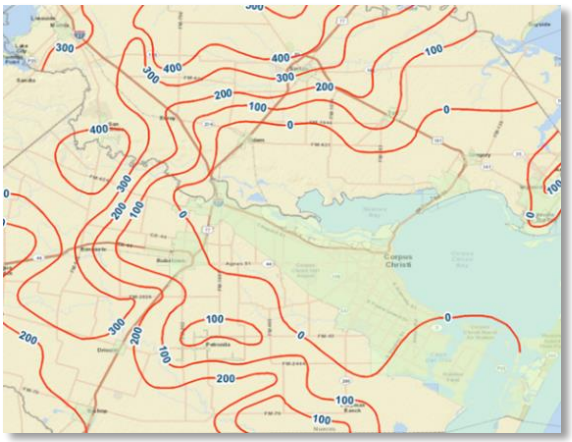
Period of Performance: 2013

Cost: $50,000

Proposed Personnel That Worked on Project and Role:

Van Kelley / Project Principal
Daniel Lupton / Technical Specialist – Hydrostratigraphy

INTERA was retained by the City of Corpus Christi to perform an assessment of groundwater resources in the Gulf Coast Aquifer System underlying San Patricio and Nueces Counties and to identify potential water supply sources for the City of Corpus Christi. As part of this assessment, INTERA conducted a comprehensive, up-to-date compilation of groundwater resources data, aquifer properties, and published and available data that were used to characterize aquifer hydraulic properties and groundwater water quality. INTERA assembled data and reports from the TWDB, the United States Geological Survey, and from consultant reports to map hydrogeologic and water quality data for Neuces and San Patricio counties. Of particular interest for estimating water quality were wells that had both screened interval and water quality data. These wells provide a point source measurement of water quality and, when juxtaposed against resistivity logs in the area, can provide a means to validate resistivity-based water quality calculations. A total of 842 wells were evaluated as part of the assessment, including 384 wells with screen information and 275 wells with at least one set of water quality measurements. Water quality data were used to evaluate TDS, iron, and arsenic concentrations across the two counties. Data were summarized visually on maps and indicate that 80% of the wells have TDS measurements greater than 1,000 mg/L, which is the lower concentration limit used by TWDB to define brackish groundwater, that iron concentrations are generally below the federal secondary drinking water standard for iron of 300 µg/L across the two counties but there are a few wells where iron concentrations are above 1000 µg/L, and that 60% of the wells sampled for arsenic had concentrations above the federal drinking water standards of 10 µg/L.



In addition, INTERA assembled available logs from public sources including those from the TWDB BRACS group, the Bureau of Economic Geology, and from studies by other consultants along with logs from several commercial log databases. This effort resulted in 4,300 geophysical logs with a top logging interval above 500 feet. INTERA was able to acquire TIFF images for 925 logs and 102 of these logs were digitized into Log ASCII Standard (LAS) that allowed for the geophysical well data to be processed using spreadsheets and computer programs. INTERA evaluated methods for estimating TDS from geophysical logs from state and federal agencies and for developing water quality maps showing thickness of saline sands and depths to fresh waters based on an integration of geophysical log information and measured water quality parameters. Based on our review of previous studies, INTERA determined that the most promising method for estimating TDS concentration in this area was the R_{wa} method. To evaluate the accuracy of this method, INTERA identified 28 locations where a water well with a measured TDS concentration and screen information was near a geophysical log that could be used to calculate TDS concentrations using the R_{wa} method. For about 70% of the pairs, the difference between the predicted and the calculated values is less than 50%. Among the options available to improve the application of the R_{wa} method in the future is to gather data on the

spatial variability of the input parameters and to investigate whether this spatial variability can be correlated with the different geological formations. Potential water quality problems with drinking water supplies were identified using location of oil and gas injection wells and analysis of TWDB groundwater data. Based on estimated transmissivity values from pumping tests and the TWDB GAMs, INTERA identified and ranked several areas as potential groundwater resources for Corpus Christi.

PROJECT INTERA

Evaluation of Hydraulic Fracturing on Groundwater Availability and Production in DeWitt County, TX

Client: Pecan Valley Groundwater Conservation District

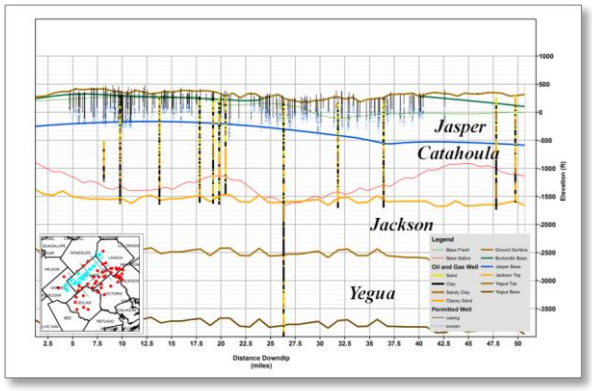
Period of Performance: 2013

Cost: $50,000

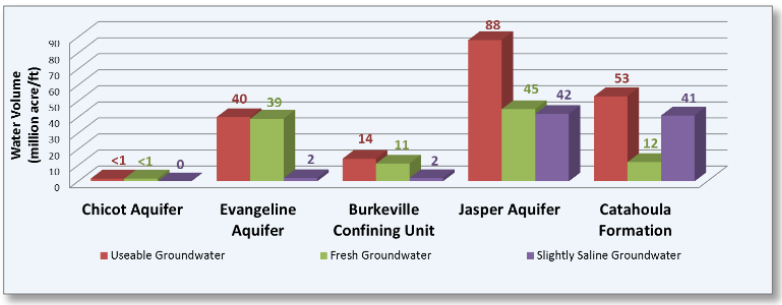
Proposed Personnel That Worked on Project and Role:

Van Kelley / Project Principal
Daniel Lupton / Technical Specialist – Log analysis/hydrostratigraphy

INTERA developed a conceptual model for the groundwater flow system in the Pecan Valley GCD and performed a series of groundwater simulations to evaluate the impacts of hydraulic fracturing on groundwater availability from the Gulf Coast Aquifer. The evaluation considered both local and regional impacts to groundwater availability. The local impacts focused on estimating drawdown that occurs at existing wells within two miles of the pumping wells. As part of the project, INTERA developed a methodology for estimating local drawdown impacts using the analytical code TTIM and the aquifer hydraulic properties from TWDB's Central Gulf Coast GAM. The district was trained on applying the analytical model and on performing aquifer tests to improve the estimates of the aquifer properties. The application of the analytical model demonstrated that local pumping impacts could be significant in the Jasper Aquifer. As a result of these findings, additional work is planned for conducting pumping tests in the Jasper and developing groundwater rules to encourage pumping in the Catahoula Formation.



To help evaluate the depth to which water supply wells can be drilled and still obtain fresh water, INTERA analyzed approximately 20 geophysical logs and developed maps of TDS concentration contours, sand and clay thicknesses, and aquifer boundaries. An evaluation of regional impacts primarily focused on estimating the impacts of hydraulic fracturing on Pecan Valley GCD's DFC. Based on estimates of water use by individual fracturing operations and the number of anticipated operations over the next 50 years, INTERA adjusted the pumping estimates for the county and then re-ran the GAM simulations used to generate the DFCs. Three different hydraulic fracturing scenarios were considered. All three scenarios assumed that the hydraulic fracturing would occur from 2010 to 2035, that the maxim number of fracturing operations would occur from 2015 to 2025, and that each operation would use 17.5 AFY. The three scenarios differed in their maximum number of events with number of events per year set at 150, 300, or 450. The revised



GAM simulations showed only a modest change in the DFCs and therefore indicate that hydraulic fracturing is not a major threat to groundwater availability at the regional scale over the next 50 years. The GAM simulations, while not designed to specifically predict local impacts caused by pumping associated with hydraulic fracturing, did provide indication that there may be local impacts of concern based on the number of additional gird cells in the GAM model that go dry when hydraulic fracturing is added to the DFC runs. Solutions presented to manage potential problems that could arise from local-scale impacts of fracturing operations include performance of comprehensive groundwater monitoring to improve the District's understanding of the spatial variability in the aquifer properties or pumping rates and to reduce the predictive uncertainty in the GAM drawdown predictions.

PROJECT INTERA

Groundwater Availability Assessment in the Carrizo-Wilcox Aquifer in the Presence of Faulting, TX

Client: Confidential

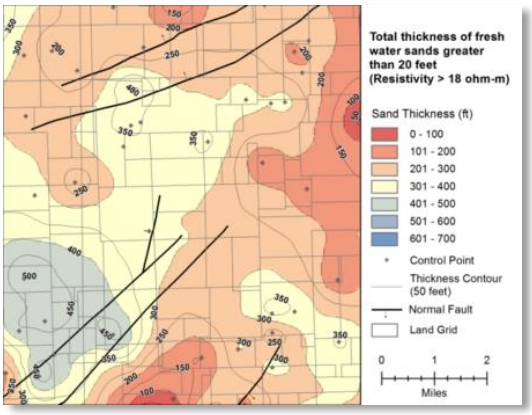
Period of Performance: 2013 – 2014

Cost: $150,000

Proposed Personnel That Worked on Project and Role:

Clark Griffith / Technical Specialist - GIS
Van Kelley / Project Manager
Daniel Lupton / Technical Specialist – Log analysis/hydrostratigraphy

Groundwater quality in the Carrizo-Wilcox Aquifer becomes very complex in the eastern portion of Texas. INTERA evaluated the groundwater availability and water quality in in a study area approximately 485 square miles in Anderson, Cherokee, and Houston counties. INTERA used 287 geophysical logs to perform a detailed local scale study of the hydrostratigraphy involving mapping of sand thicknesses, faulting and water quality of the Carrizo-Wilcox Aquifer. Faulting played a significant role in the occurrence and distribution of fresh-water sands in the Simsboro Formation, and to a lesser degree, in the Carrizo Formation. Figures detailing the distribution of fresh-water sands greater than 40 feet thick clearly show that fresh-water sands in the Simsboro were most prevalent updip of the two main faults in the western portion of the study area. It is plausible that the faulting has reduced transmissivity of the Simsboro across the fault zone in that particular area by juxtaposing permeable units against non-permeable units. The study clearly identified the potential target areas that would provide the highest potential production capacity while meeting the water quality constraints. INTERA also developed the cost for an aquifer testing program consisting of two test wells and two observation wells.



PROJECT INTERA

Hydrogeologic Characterization and Modeling for the Evergreen Underground Water Conservation District, TX

Client: South Texas Energy and Economic Roundtable

Period of Performance: 2015 – ongoing

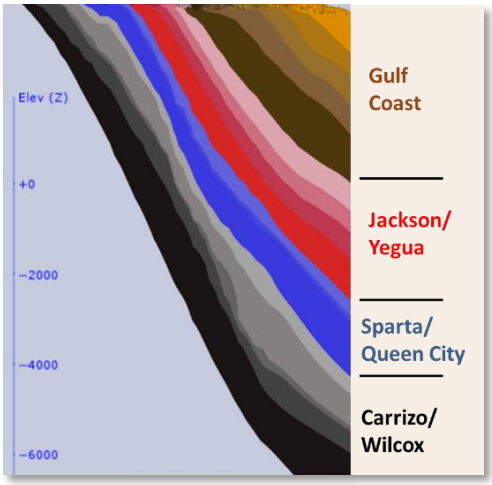
Cost: $300,000

Proposed Personnel That Worked on Project and Role:

Clark Griffith / Technical Specialist – GIS and data analysis
Van Kelley / Project Principal
Daniel Lupton / Technical Specialist – Log analysis/hydrostratigraphy

The Evergreen Underground Water Conservation District (EUWCD), which is responsible for managing groundwater resources in Karnes, Wilson, Atascosa, and Frio Counties, has retained INTERA as part of the South Texas Energy and Economic Roundtable (STEER) Water Sustainability Committee to develop a comprehensive understanding of the groundwater resources in the EUWCD that includes aquifer structure, aquifer lithology, aquifer hydraulic

properties, water levels and water level trends, groundwater quality, well completions, and groundwater use within the EUWCD. The goal of our work is to provide the data needed to support the effective management of groundwater within the EUWCD on an aquifer by aquifer basis or in specific groundwater management zones (GMZs). This includes providing the information needed to evaluate and develop rules for well spacing and the permitting of groundwater wells. Our activities include characterizing the Gulf Coast Aquifer System, the Yegua-Jackson Aquifer, the Carrizo-Wilcox, the Queen City, and the Sparta aquifers with respect to dissolved solid concentration, sand thickness, and estimated transmissivity. Geophysical logs have been assembled from various sources and are being analyzed to develop continuous vertical profiles of sand and clay distribution and TDS concentrations. Hydraulic head data, from TWDB and EUWCD databases, is being used to help estimate vertical and horizontal hydraulic gradients and develop baseline water level trends. Measured TDS concentration, specific conductivity values, temperature data and other relevant water quality parameters are being assembled and reviewed. The water quality data will be used in conjunction with the geophysical log data to delineate zones of fresh, brackish, and saline groundwater.



Water quality data from wells in close to proximity to wells with geophysical logs are being used to develop the relationships between resistivity and TDS concentration. Based on the established drawdown limit for the GMZs, INTERA is supporting EUWCD in developing well spacing rules that consider both horizontal and vertical distances between wells through the use of the analytical element model TTIM to simulate drawdown responses and help determine vertical well spacing that promotes the use of groundwater that is brackish and/or below the primary zones of pumping in an area. INTERA is also performing groundwater availability model simulations to evaluate alternative DFCs. Based on comparisons between measured and model aquifer properties, sensitivity and uncertainty analyses are being performed to evaluate uncertainty in the calculated DFCs. To determine the impacts of pumping at radial distances less than two miles, we are developing analytical groundwater models that are based on stratigraphy derived from geophysical logs. A key component of the analytical model is to identify hydrogeological barriers to flow such as shales and faults. The hydrogeological barriers are being mapped based on the interpretation of over 1,000 geophysical logs.

PROJECT INTERA

Characterization of Fresh and Brackish Groundwater Resources in Matagorda County, TX

Client: Coastal Plains Groundwater Conservation District

Period of Performance: 2009 – 2012

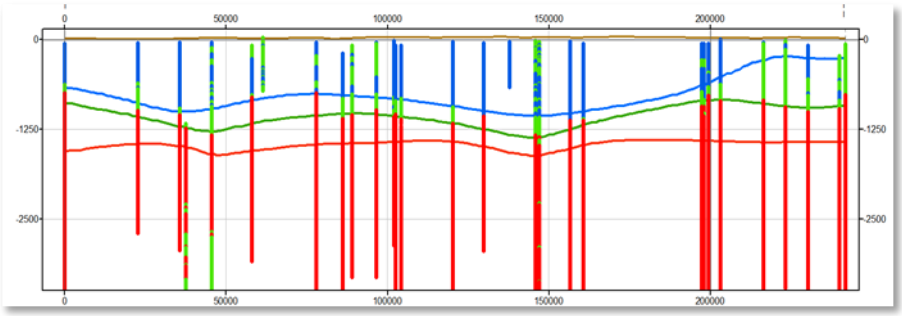
Cost: $50,000

Proposed Personnel That Worked on Project and Role:

Daniel Lupton / Technical Specialist – Log analysis/hydrostratigraphy
Tingting Yan / Technical Specialist – GIS and data analysis

In support of the Coastal Plains GCD planning efforts, INTERA estimated the availability of fresh and brackish groundwater in Matagorda County by integrating the results from water quality sampling at approximately 200 water wells and calculating TDS concentrations from 100 geophysical logs. The total volume of freshwater and brackish water resources was estimated to be 136 million acre-feet and 129 million acre-feet, respectively. Based on transmissivity values generated for aquifer

regions containing slightly saline (1,000 to 3,000 mg/L TDS) waters, we estimated that 41 million AFY of the brackish water can be economically developed. We subsequently developed several approaches for predicting the impacts that pumping brackish water would have on the freshwater resources in the county, and made recommendations for developing the brackish resource. In addition, INTERA mapped the locations and placements of approximately 200 waste injection wells that could impact groundwater quality. These wells are located near the boundary of the moderately saline waters, which have a TDS concentration of less than 10,000 mg/L. We also mapped the salt domes in the area and demonstrated how their formation affects the salinity and the stratigraphy of the Gulf Coast Aquifer.



INTERA performed a series of regional model runs, using the TWDB's Central Gulf Coast GAM, to evaluate the reasonableness of the current DFCs and recommendations for alternative DFCs for the next round of regional planning. The evaluation includes comparing predictive model results between the Central Gulf Coast GAM and the Lower Colorado River Basin model and comparing measured water level changes and known groundwater pumping rates with those used in the development of the two groundwater models. Based on the model results, INTERA will recommend changes to the groundwater management plan and the groundwater rules. We will also support the Coastal Plains GCD in developing a monitoring plan to demonstrate conformance with GMA-15 DFCs.

4.2 Ability to Meet Project Completion Deadlines

While meeting the technical, schedule, and cost commitments on projects has been an INTERA hallmark for more than 40 years, in 2011 we formally defined the way we go about conducting business in a new vision statement—*Delivering Excellence with Every Solution*. An integral part of delivering "excellence" is not only providing technically-sound and reliable work products, but doing so in accordance with our client's schedule and budget requirements. We work diligently every day to meet each client's quality and service expectations. An excellent example of INTERA's ability to meet project completion deadlines and budgets is our work over the past 15 years for the TWDB. All of our projects for the TWDB have been completed in accordance with the contractually-specified completion dates and budgets. To demonstrate this, **Table 4-1** provides a summary of the completion dates and budgets specified in the contracts, and the actual completion dates and final costs for many of the projects we have performed for the TWDB.

INTERA's project managers are ultimately responsible for delivering projects in accordance with client-specified schedules and budgets. To lead our evaluation of brackish groundwater in the Rustler Aquifer, we are proposing one of our most experienced project managers, Mr. Van Kelley. Over the past 30+ years, he has consistently demonstrated the ability to meet completion deadlines and agreed-upon budgets on hundreds of projects, both for the TWDB and a host of other agencies and organizations. Several of the TWDB projects that he has successfully delivered are shaded in "blue" in Table 4-1.

Lastly, INTERA also brings proven experience in completing projects for the TWDB to meet legislatively-mandated deadlines. The very first projects we completed for the Board (developing GAMs

Table 4-1. Summary of INTERA's Schedule and Cost Performance on TWDB Projects

Project	Contract Completion Date (Final Report)	Contract Budget	Delivery Date (Final Report)	Final Cost
GAM for Northern Carrizo-Wilcox Aquifer	January 2003	$700,000	January 2003	$699,806
GAM for Southern Carrizo-Wilcox Aquifer	January 2003	$550,000	January 2003	$550,000
GAM for Seymour Aquifer	September 2004	$650,000	September 2004	$650,000
GAMs for Queen City and Sparta Aquifers (3 models)	October 2004	$600,000	October 2004	$600,000
Structural Framework for Yegua-Jackson Aquifer	September 2007	$150,000	September 2007	$150,000
GAM for Dockum Aquifer	October 2008	$450,000	October 2008	$450,000
GAM for Yegua-Jackson Aquifer	March 2010	$400,000	March 2010	$400,000
GAM for Local Portion of Seymour Aquifer	February 2011	$200,000	February 2011	$200,000
Assessment of Modeling Approaches to Brackish Aquifers	November 2011	$60,000	November 2011	$60,000
Bibliography for the BRACS Program	November 2011	$100,000	November 2011	$100,000
Evaluation of Aquifer Tests in GMA-8	May 2012	$200,000	May 2012	$200,000
Update Hydrostratigraphy of Northern Gulf Coast Aquifer	July 2012	$300,000	July 2012	$300,000
GAM for the Rustler Aquifer	August 2012	$250,000	August 2012	$250,000
GAM for High Plains Aquifer System	August 2015	$900,000	August 2015	$900,000

NOTE: Projects shaded in "blue" managed by INTERA's Mr. Van Kelley (INTERA's proposed Project Manager for evaluating brackish groundwater in the Rustler)

of the northern and southern portions of the Carrizo-Wilcox Aquifer) had to be delivered to meet a legislative mandate. INTERA was the only contractor to be awarded contracts for developing two models, and we were the first to deliver both of our final reports to the TWDB. The evaluation of brackish groundwater in the Rustler Aquifer must be completed to meet a similar deadline—House Bill 30 passed by the 84th Texas Legislature directs the TWDB to conduct studies on and report to the legislature on the Rustler (and three other aquifers) by December 1, 2016. INTERA fully understands the importance of completing our work on the Rustler by August 31, 2016 to enable TWDB to prepare the report to the legislature, and that contract extensions for the study cannot be granted. INTERA's expertise, experience, and proven track record of delivering on our project schedule and budget commitments provides added assurance to the TWDB that we will meet the August 31, 2016 deadline.

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SECTION 5:
HUB Plan and Forms

INTERA
GEOSCIENCE & ENGINEERING SOLUTIONS

SECTION 5:
HUB Plan and Forms

SECTION 5: HISTORICALLY UNDERUTILIZED BUSINESSES SUBCONTRACTING PLAN

INTERA's historically underutilized businesses (HUB) subcontracting plan, including applicable forms, is provided on the following pages.

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Rev 09/15

HUB Subcontracting Plan (HSP)

In accordance with Texas Gov't Code §2161.252, the contracting agency has determined that subcontracting opportunities are probable under this contract. Therefore, all respondents, including State of Texas certified Historically Underutilized Businesses (HUBs) must complete and submit this State of Texas HUB Subcontracting Plan (HSP) with their response to the bid requisition (solicitation).

NOTE: Responses that do not include a completed HSP shall be rejected pursuant to Texas Gov't Code §2161.252(b).

The HUB Program promotes equal business opportunities for economically disadvantaged persons to contract with the State of Texas in accordance with the goals specified in the 2009 State of Texas Disparity Study. The statewide HUB goals defined in 34 Texas Administrative Code (TAC) §20.13 are:

- ***11.2 percent for heavy construction other than building contracts,***
- ***21.1 percent for all building construction, including general contractors and operative builders' contracts,***
- ***32.9 percent for all special trade construction contracts,***
- ***23.7 percent for professional services contracts,***
- ***26.0 percent for all other services contracts, and***
- ***21.1 percent for commodities contracts.***

- - Agency Special Instructions/Additional Requirements - -

*In accordance with 34 TAC §20.14(d)(1)(D)(iii), a respondent (prime contractor) may demonstrate good faith effort to utilize Texas certified HUBs for its subcontracting opportunities if the total value of the respondent's subcontracts with Texas certified HUBs meets or exceeds the statewide HUB goal or the agency specific HUB goal, whichever is higher. When a respondent uses this method to demonstrate good faith effort, the respondent must identify the HUBs with which it will subcontract. If using existing contracts with Texas certified HUBs to satisfy this requirement, only the aggregate percentage of the contracts expected to be subcontracted to HUBs with which the respondent **does not** have a **continuous contract*** in place for **more than five (5) years** shall qualify for meeting the HUB goal. This limitation is designed to encourage vendor rotation as recommended by the 2009 Texas Disparity Study.*

SECTION-1 RESPONDENT AND REQUISITION INFORMATION

a. Respondent (Company) Name: INTERA Incorporated — State of Texas VID #: 1743010638900

Point of Contact: Van Kelley, PG — Phone #: (512) 425-2047

E-mail Address: vkelley@intera.com — Fax #: (512) 727-4821

b. Is your company a State of Texas certified HUB? ☐ - Yes ☑ - No

c. Requisition #: RFQ: 580-16-RFQ0008 — Bid Open Date: 11/24/2015 (mm/dd/yyyy)

1

Rev. 09/15

Enter your company's name here: INTERA Incorporated Requisition #: RFQ: 580-16-RFQ0008

SECTION-2: RESPONDENT's SUBCONTRACTING INTENTIONS

After dividing the contract work into reasonable lots or portions to the extent consistent with prudent industry practices, and taking into consideration the scope of work to be performed under the proposed contract, including all potential subcontracting opportunities, the respondent must determine what portions of work, **including contracted staffing, goods, services, transportation and delivery will be subcontracted**. Note: In accordance with 34 TAC §20.11, a "Subcontractor" means a person who contracts with a prime contractor to work, to supply commodities, or to contribute toward completing work for a governmental entity.

a. Check the appropriate box (Yes or No) that identifies your subcontracting intentions:

☑ - *Yes*, I will be subcontracting portions of the contract. (If *Yes*, complete Item b of this SECTION and continue to Item c of this SECTION.)

☐ - *No*, I will not be subcontracting any portion of the contract, and I will be fulfilling the entire contract with my own resources, including employees, goods, services, transportation and delivery. (If *No*, continue to SECTION 3 and SECTION 4.)

b. List all the portions of work (subcontracting opportunities) you will subcontract. Also, based on the total value of the contract, identify the percentages of the contract you expect to award to Texas certified HUBs, and the percentage of the contract you expect to award to vendors that are not a Texas certified HUB (i.e., Non-HUB).

Item #	Subcontracting Opportunity Description	HUBs		Non-HUBs
		Percentage of the contract expected to be subcontracted to HUBs with which you do not have a continuous contract* in place for more than five (5) years.	Percentage of the contract expected to be subcontracted to HUBs with which you have a continuous contract* in place for more than five (5) years.	Percentage of the contract expected to be subcontracted to non-HUBs.
1	See attached opportunity description 2b, Page 5-23.	0%	0%	10%
2	See attached opportunity description 2b, Page 5-23.	0%	0%	12.5%
3	See attached opportunity description 2b, Page 5-23.	0%	0%	10 %
4	See attached opportunity description 2b, Page 5-23.	0%	0%	3%
5	See attached opportunity description 2b, Page 5-24.	0%	0%	1.5%
6		%	%	%
7		%	%	%
8		%	%	%
9		%	%	%
10		%	%	%
11		%	%	%
12		%	%	%
13		%	%	%
14		%	%	%
15		%	%	%
	Aggregate percentages of the contract expected to be subcontracted:	0%	0%	37%

(Note: If you have more than fifteen subcontracting opportunities, a continuation sheet is available online at http://window.state.tx.us/procurement/prog/hub/hub-subcontracting-plan/).

c. Check the appropriate box (Yes or No) that indicates whether you will be using **only** Texas certified HUBs to perform **all** of the subcontracting opportunities you listed in SECTION 2, Item b.

☐ - *Yes* (If *Yes*, continue to SECTION 4 and complete an "HSP Good Faith Effort - Method A (Attachment A)" for **each** of the subcontracting opportunities you listed.)

☑ - *No* (If *No*, continue to Item d, of this SECTION.)

d. Check the appropriate box (Yes or No) that indicates whether the aggregate expected percentage of the contract you will subcontract **with Texas certified HUBs** with which you **do not** have a **continuous contract*** in place with for **more than five (5) years**, **meets or exceeds** the HUB goal the contracting agency identified on page 1 in the "**Agency Special Instructions/Additional Requirements**."

☐ - *Yes* (If *Yes*, continue to SECTION 4 and complete an "HSP Good Faith Effort - Method A (Attachment A)" for **each** of the subcontracting opportunities you listed.)

☑ - *No* (If *No*, continue to SECTION 4 and complete an "HSP Good Faith Effort - Method B (Attachment B)" for **each** of the subcontracting opportunities you listed.)

***Continuous Contract**: Any existing written agreement (including any renewals that are exercised) between a prime contractor and a HUB vendor, where the HUB vendor provides the prime contractor with goods or service, to include transportation and delivery under the same contract for a specified period of time. The frequency the HUB vendor is utilized or paid during the term of the contract is not relevant to whether the contract is considered continuous. Two or more contracts that run concurrently or overlap one another for different periods of time are considered by CPA to be individual contracts rather than renewals or extensions to the original contract. In such situations the prime contractor and HUB vendor are entering (have entered) into "new" contracts.*

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Enter your company's name here: INTERA Incorporated Requisition #: RFQ: 580-16-RFQ0008

SECTION-2 RESPONDENT's SUBCONTRACTING INTENTIONS (CONTINUATION SHEET)

This page can be used as a continuation sheet to the HSP Form's page 2, Section 2, Item b. Continue listing the portions of work (subcontracting opportunities) you will subcontract. Also, based on the total value of the contract, identify the percentages of the contract you expect to award to Texas certified HUBs, and the percentage of the contract you expect to award to vendors that are not a Texas certified HUB (i.e., Non-HUB).

Item #	Subcontracting Opportunity Description	HUBs		Non-HUBs
		Percentage of the contract expected to be subcontracted to HUBs with which you do not have a continuous contract* in place for more than five (5) years.	Percentage of the contract expected to be subcontracted to HUBs with which you have a continuous contract* in place for more than five (5) years.	Percentage of the contract expected to be subcontracted to non-HUBs.
16	N/A	%	%	%
17		%	%	%
18		%	%	%
19		%	%	%
20		%	%	%
21		%	%	%
22		%	%	%
23		%	%	%
24		%	%	%
25		%	%	%
26		%	%	%
27		%	%	%
28		%	%	%
29		%	%	%
30		%	%	%
31		%	%	%
32		%	%	%
33		%	%	%
34		%	%	%
35		%	%	%
36		%	%	%
37		%	%	%
38		%	%	%
39		%	%	%
40		%	%	%
41		%	%	%
42		%	%	%
43		%	%	%
	Aggregate percentages of the contract expected to be subcontracted:	%	%	%

**Continuous Contract: Any existing written agreement (including any renewals that are exercised) between a prime contractor and a HUB vendor, where the HUB vendor provides the prime contractor with goods or service, to include transportation and delivery under the same contract for a specified period of time. The frequency the HUB vendor is utilized or paid during the term of the contract is not relevant to whether the contract is considered continuous. Two or more contracts that run concurrently or overlap one another for different periods of time are considered by CPA to be individual contracts rather than renewals or extensions to the original contract. In such situations the prime contractor and HUB vendor are entering (have entered) into "new" contracts.*

HSP – SECTION 2
(Continuation Sheet)

HSP Good Faith Effort - Method B (Attachment B)

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Enter your company's name here: INTERA Incorporated Requisition #: RFQ: 580-16-RFQ0008

IMPORTANT: If you responded "***No***" to **SECTION 2, Items c** and **d** of the completed HSP form, you must submit a completed "HSP Good Faith Effort - Method B (Attachment B)" for **each** of the subcontracting opportunities you listed in **SECTION 2, Item b** of the completed HSP form. You may photo-copy this page or download the form at http://window.state.tx.us/procurement/prog/hub/hub-forms/hub-sbcont-plan-gfe-achm-b.pdf.

SECTION B-1: SUBCONTRACTING OPPORTUNITY

Enter the item number and description of the subcontracting opportunity you listed in SECTION 2, Item b, of the completed HSP form for which you are completing the attachment.

Item Number: 1 Description: See Subcontracting Opportunity Description for Section B-1, Page 5-25.

SECTION B 2: MENTOR PROTÉGÉ PROGRAM

If respondent is participating as a Mentor in a State of Texas Mentor Protégé Program, submitting its Protégé (Protégé must be a State of Texas certified HUB) as a subcontractor to perform the subcontracting opportunity listed in **SECTION B-1**, constitutes a good faith effort to subcontract with a Texas certified HUB towards that specific portion of work.

Check the appropriate box (Yes or No) that indicates whether you will be subcontracting the portion of work you listed in SECTION B-1 to your Protégé.

☐ - Yes (If *Yes*, continue to SECTION B-4.)

☑ - No / Not Applicable (If *No* or *Not Applicable*, continue to SECTION B-3 and SECTION B-4.)

SECTION B 3: NOTIFICATION OF SUBCONTRACTING OPPORTUNITY

When completing this section you MUST comply with items **a, b, c** and **d**, thereby demonstrating your Good Faith Effort of having notified Texas certified HUBs and trade organizations or development centers about the subcontracting opportunity you listed in SECTION B-1. Your notice should include the scope of work, information regarding the location to review plans and specifications, bonding and insurance requirements, required qualifications, and identify a contact person. When sending notice of your subcontracting opportunity, you are encouraged to use the attached HUB Subcontracting Opportunity Notice form, which is also available online at http://www.window.state.tx.us/procurement/prog/hub/hub-subcontracting-plan.

Retain supporting documentation (i.e., certified letter, fax, e-mail) demonstrating evidence of your good faith effort to notify the Texas certified HUBs and trade organizations or development centers. Also, be mindful that a working day is considered a normal business day of a state agency, not including weekends, federal or state holidays, or days the agency is declared closed by its executive officer. The initial day the subcontracting opportunity notice is sent/provided to the HUBs and to the trade organizations or development centers is considered to be "day zero" and does not count as one of the seven (7) working days.

a. Provide written notification of the subcontracting opportunity you listed in SECTION B-1, to three (3) or more Texas certified HUBs. Unless the contracting agency specified a different time period, you must allow the HUBs at least seven (7) working days to respond to the notice prior to you submitting your bid response to the contracting agency. When searching for Texas certified HUBs and verifying their HUB status, ensure that you use the State of Texas' Centralized Master Bidders List (CMBL) - Historically Underutilized Business (HUB) Directory Search located at http://mycpa.cpa.state.tx.us/tpasscmblsearch/index.jsp. HUB status code "**A**" signifies that the company is a Texas certified HUB.

b. List the **three (3) Texas certified HUBs** you notified regarding the subcontracting opportunity you listed in SECTION B-1. Include the company's Texas Vendor Identification (VID) Number, the date you sent notice to that company, and indicate whether it was responsive or non-responsive to your subcontracting opportunity notice.

Company Name	Texas VID (Do not enter Social Security Numbers.)	Date Notice Sent (mm/dd/yyyy)	Did the HUB Respond?
ACI Group, LLC	1550826239900	11/12/2015	☐ - Yes ☑ - No
Horizon Environmental Services	1742480982400	11/12/2015	☐ - Yes ☑ - No
Medina Consulting Company	1141843448300	11/12/2015	☐ - Yes ☑ - No

c. Provide written notification of the subcontracting opportunity you listed in SECTION B-1 to two (2) or more trade organizations or development centers in Texas to assist in identifying potential HUBs by disseminating the subcontracting opportunity to their members/participants. Unless the contracting agency specified a different time period, you must provide your subcontracting opportunity notice to trade organizations or development centers at least seven (7) working days prior to submitting your bid response to the contracting agency. A list of trade organizations and development centers that have expressed an interest in receiving notices of subcontracting opportunities is available on the Statewide HUB Program's webpage at http://www.window.state.tx.us/procurement/prog/hub/mwb-links-1/.

d. List **two (2) trade organizations or development centers** you notified regarding the subcontracting opportunity you listed in SECTION B-1. Include the date when you sent notice to it and indicate if it accepted or rejected your notice.

Trade Organizations or Development Centers	Date Notice Sent (mm/dd/yyyy)	Was the Notice Accepted?
Hispanic Contractors Association de San Antonio	11/12/2015	☑ - Yes ☐ - No
Houston Minority Supplier Development Council	11/12/2015	☑ - Yes ☐ - No
Southwest Minority Supplier Development Council	11/12/2015	✓ Yes

Page 1 of 2
(Attachment B)

HSP Good Faith Effort - Method B (Attachment B) Cont.

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Enter your company's name here: INTERA Incorporated Requisition #: RFQ: 580-16-RFQ0008

SECTION B-4: SUBCONTRACTOR SELECTION

Enter the item number and description of the subcontracting opportunity you listed in **SECTION 2, Item b,** of the completed HSP form for which you are completing the attachment.

a. Enter the item number and description of the subcontracting opportunity for which you are completing this Attachment B continuation page.

Item Number: 1 Description: See Subcontractor Selection Description for Section B-4, Page 5-27.

b. List the subcontractor(s) you selected to perform the subcontracting opportunity you listed in **SECTION B-1**. Also identify whether they are a Texas certified HUB and their Texas Vendor Identification (VID) Number or federal Employer Identification Number (EIN), the approximate dollar value of the work to be subcontracted, and the expected percentage of work to be subcontracted. When searching for Texas certified HUBs and verifying their HUB status, ensure that you use the State of Texas' Centralized Master Bidders List (CMBL) - Historically Underutilized Business (HUB) Directory Search located at http://mycpa.cpa.state.tx.us/tpasscmblsearch/index.jsp. HUB status code "**A**" signifies that the company is a Texas certified HUB.

Company Name	Texas certified HUB	Texas VID or federal EIN Do not enter Social Security Numbers. If you do not know their VID / EIN, leave their VID / EIN field blank.	Approximate Dollar Amount	Expected Percentage of Contract
Dr. Dennis Powers, PG	☐ - Yes ☑ - No	N/A	$ 20,000	10%
	☐ - Yes ☐ - No		$	%
	☐ - Yes ☐ - No		$	%
	☐ - Yes ☐ - No		$	%
	☐ - Yes ☐ - No		$	%
	☐ - Yes ☐ - No		$	%
	☐ - Yes ☐ - No		$	%
	☐ - Yes ☐ - No		$	%
	☐ - Yes ☐ - No		$	%
	☐ - Yes ☐ - No		$	%

c. If any of the subcontractors you have selected to perform the subcontracting opportunity you listed in **SECTION B-1** is **not** a Texas certified HUB, provide written justification for your selection process (attach additional page if necessary):

In selecting our subcontractor for Item 1, INTERA first solicited interest from Historically Underutilized Businesses (HUBs) under the NIPG Code 91855--Geological Consulting and Study. After identifying potential HUBs from the State of Texas' Centralized Master Bidders List in this category, and reviewing company information on their respective web sites, we developed a list of three firms to solicit interest regarding the subcontracting opportunity but received no responses. We also provided written notification to three trade organizations/development centers, but did not receive any responses.

After completing B3.b and B3.d of the HSP Good Faith Effort – Method B and receiving no positive responses, we evaluated non-HUB firms, organizations, and independent subcontractors. Dr. Dennis Powers meets or exceeds all expertise and qualification requirements defined in the Subcontracting Opportunity Notification Form. His unique and extensive experience with the Rustler Formation interpreting structure, facies, and syn- and post-depositional processes will enable him to support INTERA in understanding Rustler lithology within the aquifer area. Dr. Powers was also instrumental in development of the Rustler GAM structure collaborating with the BRACS Group. Dr. Powers has unique geological and hydrogeological expertise in the Rustler Formation in the Delaware Basin and they have published numerous journal articles and reports on the subject of Rustler structure, depositional environments, alteration, and controls on hydraulic properties.

REMINDER: As specified in SECTION 4 of the completed HSP form, if you (respondent) are awarded any portion of the requisition, you are required to provide notice as soon as practical to **all** the subcontractors (HUBs and Non-HUBs) of their selection as a subcontractor. The notice must specify at a minimum the contracting agency's name and its point of contact for the contract, the contract award number, the subcontracting opportunity it (the subcontractor) will perform, the approximate dollar value of the subcontracting opportunity and the expected percentage of the total contract that the subcontracting opportunity represents. A copy of the notice required by this section must also be provided to the contracting agency's point of contact for the contract no later than ten (10) working days after the contract is awarded.

HSP Good Faith Effort - Method B (Attachment B)

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Enter your company's name here: INTERA Incorporated Requisition #: RFQ: 580-16-RFQ0008

IMPORTANT: If you responded "***No***" to **SECTION 2, Items c** and **d** of the completed HSP form, you must submit a completed "HSP Good Faith Effort - Method B (Attachment B)" for **each** of the subcontracting opportunities you listed in **SECTION 2, Item b** of the completed HSP form. You may photo-copy this page or download the form at http://window.state.tx.us/procurement/prog/hub/hub-forms/hub-sbcont-plan-gfe-achm-b.pdf.

SECTION B-1: SUBCONTRACTING OPPORTUNITY

Enter the item number and description of the subcontracting opportunity you listed in SECTION 2, Item b, of the completed HSP form for which you are completing the attachment.

Item Number: 2 Description: See Subcontracting Opportunity Description for Section B-1, Page 5-25.

SECTION B 2: MENTOR PROTÉGÉ PROGRAM

If respondent is participating as a Mentor in a State of Texas Mentor Protégé Program, submitting its Protégé (Protégé must be a State of Texas certified HUB) as a subcontractor to perform the subcontracting opportunity listed in **SECTION B-1**, constitutes a good faith effort to subcontract with a Texas certified HUB towards that specific portion of work.

Check the appropriate box (Yes or No) that indicates whether you will be subcontracting the portion of work you listed in SECTION B-1 to your Protégé.

☐ - Yes (If *Yes*, continue to SECTION B-4.)

☑ - No / Not Applicable (If *No* or *Not Applicable*, continue to SECTION B-3 and SECTION B-4.)

SECTION B 3: NOTIFICATION OF SUBCONTRACTING OPPORTUNITY

When completing this section you MUST comply with items **a, b, c and d**, thereby demonstrating your Good Faith Effort of having notified Texas certified HUBs and trade organizations or development centers about the subcontracting opportunity you listed in SECTION B-1. Your notice should include the scope of work, information regarding the location to review plans and specifications, bonding and insurance requirements, required qualifications, and identify a contact person. When sending notice of your subcontracting opportunity, you are encouraged to use the attached HUB Subcontracting Opportunity Notice form, which is also available online at http://www.window.state.tx.us/procurement/prog/hub/hub-subcontracting-plan.

Retain supporting documentation (i.e., certified letter, fax, e-mail) demonstrating evidence of your good faith effort to notify the Texas certified HUBs and trade organizations or development centers. Also, be mindful that a working day is considered a normal business day of a state agency, not including weekends, federal or state holidays, or days the agency is declared closed by its executive officer. The initial day the subcontracting opportunity notice is sent/provided to the HUBs and to the trade organizations or development centers is considered to be "day zero" and does not count as one of the seven (7) working days.

a. Provide written notification of the subcontracting opportunity you listed in SECTION B-1, to three (3) or more Texas certified HUBs. Unless the contracting agency specified a different time period, you must allow the HUBs at least seven (7) working days to respond to the notice prior to you submitting your bid response to the contracting agency. When searching for Texas certified HUBs and verifying their HUB status, ensure that you use the State of Texas' Centralized Master Bidders List (CMBL) - Historically Underutilized Business (HUB) Directory Search located at http://mycpa.cpa.state.tx.us/tpasscmblsearch/index.jsp. HUB status code "**A**" signifies that the company is a Texas certified HUB.

b. List the **three (3) Texas certified HUBs** you notified regarding the subcontracting opportunity you listed in SECTION B-1. Include the company's Texas Vendor Identification (VID) Number, the date you sent notice to that company, and indicate whether it was responsive or non-responsive to your subcontracting opportunity notice.

Company Name	Texas VID (Do not enter Social Security Numbers.)	Date Notice Sent (mm/dd/yyyy)	Did the HUB Respond?
ACI Group, LLC	1550826239900	11/12/2015	☐ - Yes ☑ - No
Horizon Environmental Services	1742480982400	11/12/2015	☐ - Yes ☑ - No
Round Rock Geophysics	1272033178900	11/12/2015	☐ - Yes ☑ - No

c. Provide written notification of the subcontracting opportunity you listed in SECTION B-1 to two (2) or more trade organizations or development centers in Texas to assist in identifying potential HUBs by disseminating the subcontracting opportunity to their members/participants. Unless the contracting agency specified a different time period, you must provide your subcontracting opportunity notice to trade organizations or development centers at least seven (7) working days prior to submitting your bid response to the contracting agency. A list of trade organizations and development centers that have expressed an interest in receiving notices of subcontracting opportunities is available on the Statewide HUB Program's webpage at http://www.window.state.tx.us/procurement/prog/hub/mwb-links-1/.

d. List **two (2) trade organizations or development centers** you notified regarding the subcontracting opportunity you listed in SECTION B-1. Include the date when you sent notice to it and indicate if it accepted or rejected your notice.

Trade Organizations or Development Centers	Date Notice Sent (mm/dd/yyyy)	Was the Notice Accepted?
Hispanic Contractors Association de San Antonio	11/12/2015	☑ - Yes ☐ - No
Houston Minority Supplier Development Council	11/12/2015	☑ - Yes ☐ - No
Southwest Minority Supplier Development Council	11/12/2015	✓ Yes

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(Attachment B)

HSP Good Faith Effort - Method B (Attachment B) Cont.

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Enter your company's name here: INTERA Incorporated Requisition #: RFQ: 580-16-RFQ0008

SECTION B-4: SUBCONTRACTOR SELECTION

Enter the item number and description of the subcontracting opportunity you listed in **SECTION 2, Item b,** of the completed HSP form for which you are completing the attachment.

a. Enter the item number and description of the subcontracting opportunity for which you are completing this Attachment B continuation page.

Item Number: 2 **Description:** See Subcontractor Selection Description for Section B-4, Page 5-27.

b. List the subcontractor(s) you selected to perform the subcontracting opportunity you listed in **SECTION B-1**. Also identify whether they are a Texas certified HUB and their Texas Vendor Identification (VID) Number or federal Employer Identification Number (EIN), the approximate dollar value of the work to be subcontracted, and the expected percentage of work to be subcontracted. When searching for Texas certified HUBs and verifying their HUB status, ensure that you use the State of Texas' Centralized Master Bidders List (CMBL) - Historically Underutilized Business (HUB) Directory Search located at http://mycpa.cpa.state.tx.us/tpasscmblsearch/index.jsp. HUB status code "**A**" signifies that the company is a Texas certified HUB.

Company Name	Texas certified HUB	Texas VID or federal EIN Do not enter Social Security Numbers. If you do not know their VID / EIN, leave their VID / EIN field blank.	Approximate Dollar Amount	Expected Percentage of Contract
Dr. Carlos Torres-Verdin	☐ - Yes ☑ - No	N/A	$ 25,000	12.5%
	☐ - Yes ☐ - No		$	%
	☐ - Yes ☐ - No		$	%
	☐ - Yes ☐ - No		$	%
	☐ - Yes ☐ - No		$	%
	☐ - Yes ☐ - No		$	%
	☐ - Yes ☐ - No		$	%
	☐ - Yes ☐ - No		$	%
	☐ - Yes ☐ - No		$	%
	☐ - Yes ☐ - No		$	%

c. If any of the subcontractors you have selected to perform the subcontracting opportunity you listed in **SECTION B-1** is **not** a Texas certified HUB, provide written justification for your selection process (attach additional page if necessary):

In selecting our subcontractor for Item 2, INTERA first solicited interest from Historically Underutilized Businesses (HUBs) under the NIPG Code 91855--Geological Consulting and Study. After identifying potential HUBs from the State of Texas' Centralized Master Bidders List in this category, and reviewing company information on their respective web sites, we developed a list of three firms to solicit interest regarding the subcontracting opportunity but received no responses. We also provided written notification to three trade organizations/development centers, but did not receive any responses.

After completing B3.b and B3.d of the HSP Good Faith Effort – Method B and receiving no positive responses, we evaluated non-HUB firms, organizations, and independent subcontractors. Dr. Torres-Verdin's meets or exceeds all expertise and qualification requirements defined in the Subcontracting Opportunity Notification Form. His unique understanding of the evaluation of geophysical logs in complex alternating depositional environments is the primary reason that he was selected to perform this work. These complex environments are typified by the Rustler Aquifer where not only is there a transition from evaporite to dolomite to siltstone but the water quality of the system can change markedly in a small geographic distance. Dr. Torres-Verdin has relevant experience that will help guide the process of determining water quality from electric log signature.

REMINDER: As specified in SECTION 4 of the completed HSP form, if you (respondent) are awarded any portion of the requisition, you are required to provide notice as soon as practical to **all** the subcontractors (HUBs and Non-HUBs) of their selection as a subcontractor. The notice must specify at a minimum the contracting agency's name and its point of contact for the contract, the contract award number, the subcontracting opportunity it (the subcontractor) will perform, the approximate dollar value of the subcontracting opportunity and the expected percentage of the total contract that the subcontracting opportunity represents. A copy of the notice required by this section must also be provided to the contracting agency's point of contact for the contract no later than ten (10) working days after the contract is awarded.

HSP Good Faith Effort - Method B (Attachment B)

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Enter your company's name here: INTERA Incorporated Requisition #: RFQ: 580-16-RFQ0008

IMPORTANT: If you responded "***No***" to **SECTION 2, Items c** and **d** of the completed HSP form, you must submit a completed "HSP Good Faith Effort - Method B (Attachment B)" for **each** of the subcontracting opportunities you listed in **SECTION 2, Item b** of the completed HSP form. You may photo-copy this page or download the form at http://window.state.tx.us/procurement/prog/hub/hub-forms/hub-sbcont-plan-gfe-achm-b.pdf.

SECTION B-1: SUBCONTRACTING OPPORTUNITY

Enter the item number and description of the subcontracting opportunity you listed in SECTION 2, Item b, of the completed HSP form for which you are completing the attachment.

Item Number: 3 Description: See Subcontracting Opportunity Description for Section B-1, Page 5-25.

SECTION B 2: MENTOR PROTÉGÉ PROGRAM

If respondent is participating as a Mentor in a State of Texas Mentor Protégé Program, submitting its Protégé (Protégé must be a State of Texas certified HUB) as a subcontractor to perform the subcontracting opportunity listed in **SECTION B-1**, constitutes a good faith effort to subcontract with a Texas certified HUB towards that specific portion of work.

Check the appropriate box (Yes or No) that indicates whether you will be subcontracting the portion of work you listed in SECTION B-1 to your Protégé.

☐ - Yes (If *Yes*, continue to SECTION B-4.)

☑ - No / Not Applicable (If *No* or *Not Applicable*, continue to SECTION B-3 and SECTION B-4.)

SECTION B 3: NOTIFICATION OF SUBCONTRACTING OPPORTUNITY

When completing this section you MUST comply with items **a, b, c** and **d**, thereby demonstrating your Good Faith Effort of having notified Texas certified HUBs and trade organizations or development centers about the subcontracting opportunity you listed in SECTION B-1. Your notice should include the scope of work, information regarding the location to review plans and specifications, bonding and insurance requirements, required qualifications, and identify a contact person. When sending notice of your subcontracting opportunity, you are encouraged to use the attached HUB Subcontracting Opportunity Notice form, which is also available online at http://www.window.state.tx.us/procurement/prog/hub/hub-subcontracting-plan.

Retain supporting documentation (i.e., certified letter, fax, e-mail) demonstrating evidence of your good faith effort to notify the Texas certified HUBs and trade organizations or development centers. Also, be mindful that a working day is considered a normal business day of a state agency, not including weekends, federal or state holidays, or days the agency is declared closed by its executive officer. The initial day the subcontracting opportunity notice is sent/provided to the HUBs and to the trade organizations or development centers is considered to be "day zero" and does not count as one of the seven (7) working days.

a. Provide written notification of the subcontracting opportunity you listed in SECTION B-1, to three (3) or more Texas certified HUBs. Unless the contracting agency specified a different time period, you must allow the HUBs at least seven (7) working days to respond to the notice prior to you submitting your bid response to the contracting agency. When searching for Texas certified HUBs and verifying their HUB status, ensure that you use the State of Texas' Centralized Master Bidders List (CMBL) - Historically Underutilized Business (HUB) Directory Search located at http://mycpa.cpa.state.tx.us/tpasscmblsearch/index.jsp. HUB status code "**A**" signifies that the company is a Texas certified HUB.

b. List the **three (3) Texas certified HUBs** you notified regarding the subcontracting opportunity you listed in SECTION B-1. Include the company's Texas Vendor Identification (VID) Number, the date you sent notice to that company, and indicate whether it was responsive or non-responsive to your subcontracting opportunity notice.

Company Name	Texas VID (Do not enter Social Security Numbers.)	Date Notice Sent (mm/dd/yyyy)	Did the HUB Respond?
Geosearch, LP	1742943057600	11/12/2015	☐ - Yes ☑ - No
Round Rock Geophysics, LLC	1272033178900	11/12/2015	☐ - Yes ☑ - No
Tessellations Incorporated	1760569618000	11/12/2015	☐ - Yes ☑ - No

c. Provide written notification of the subcontracting opportunity you listed in SECTION B-1 to two (2) or more trade organizations or development centers in Texas to assist in identifying potential HUBs by disseminating the subcontracting opportunity to their members/participants. Unless the contracting agency specified a different time period, you must provide your subcontracting opportunity notice to trade organizations or development centers at least seven (7) working days prior to submitting your bid response to the contracting agency. A list of trade organizations and development centers that have expressed an interest in receiving notices of subcontracting opportunities is available on the Statewide HUB Program's webpage at http://www.window.state.tx.us/procurement/prog/hub/mwb-links-1/.

d. List **two (2) trade organizations or development centers** you notified regarding the subcontracting opportunity you listed in SECTION B-1. Include the date when you sent notice to it and indicate if it accepted or rejected your notice.

Trade Organizations or Development Centers	Date Notice Sent (mm/dd/yyyy)	Was the Notice Accepted?
Hispanic Contractors Association de San Antonio	11/12/2015	☑ - Yes ☐ - No
Houston Minority Supplier Development Council	11/12/2015	☑ - Yes ☐ - No
Southwest Minority Supplier Development Council	11/12/2015	✓ Yes

Page 1 of 2
(Attachment B)

HSP Good Faith Effort - Method B (Attachment B) Cont.

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Enter your company's name here: INTERA Incorporated Requisition #: RFQ: 580-16-RFQ0008

SECTION B-4: SUBCONTRACTOR SELECTION

Enter the item number and description of the subcontracting opportunity you listed in **SECTION 2, Item b,** of the completed HSP form for which you are completing the attachment.

a. Enter the item number and description of the subcontracting opportunity for which you are completing this Attachment B continuation page.

Item Number: 3 Description: See Subcontractor Selection Description for Section B-4, Page 5-27.

b. List the subcontractor(s) you selected to perform the subcontracting opportunity you listed in **SECTION B-1**. Also identify whether they are a Texas certified HUB and their Texas Vendor Identification (VID) Number or federal Employer Identification Number (EIN), the approximate dollar value of the work to be subcontracted, and the expected percentage of work to be subcontracted. When searching for Texas certified HUBs and verifying their HUB status, ensure that you use the State of Texas' Centralized Master Bidders List (CMBL) - Historically Underutilized Business (HUB) Directory Search located at http://mycpa.cpa.state.tx.us/tpasscmblsearch/index.jsp. HUB status code "**A**" signifies that the company is a Texas certified HUB.

Company Name	Texas certified HUB	Texas VID or federal EIN Do not enter Social Security Numbers. If you do not know their VID / EIN, leave their VID / EIN field blank.	Approximate Dollar Amount	Expected Percentage of Contract
Drillinginfo, Inc.	☐ - Yes ☑ - No	1742934857000	$ 15,000	7.5%
The Subsurface Library	☐ - Yes ☑ - No	N/A	$ 5,000	2.5%
	☐ - Yes ☐ - No		$	%
	☐ - Yes ☐ - No		$	%
	☐ - Yes ☐ - No		$	%
	☐ - Yes ☐ - No		$	%
	☐ - Yes ☐ - No		$	%
	☐ - Yes ☐ - No		$	%
	☐ - Yes ☐ - No		$	%
	☐ - Yes ☐ - No		$	%

c. If any of the subcontractors you have selected to perform the subcontracting opportunity you listed in **SECTION B-1** is **not** a Texas certified HUB, provide written justification for your selection process (attach additional page if necessary):

In selecting our subcontractor for Item 3, INTERA first solicited interest from Historically Underutilized Businesses (HUBs) under the NIPG Code 91855--Geological Consulting and Study. After identifying potential HUBs from the State of Texas' Centralized Master Bidders List in this category, and reviewing company information on their respective web sites, we developed a list of three firms to solicit interest regarding the subcontracting opportunity, but received no positive responses. We also provided written notification to three trade organizations/development centers, but did not receive any responses.

After completing B3.b and B3.d of the HSP Good Faith Effort – Method B and receiving no positive responses, we evaluated non-HUB firms, organizations, and independent subcontractors. The Subsurface Library and Drillinginfo are the only commercial suppliers of well logs that have agreed to redact their private well logs so that the logs can be released to the public. The two firms will redact the well logs by not releasing the portions of the well logs that extend below the depth of the aquifers of interest. Both The Subsurface Library and Drillinginfo have some of the largest libraries of well logs that can be searched, acquired, and used on the project.

REMINDER: As specified in SECTION 4 of the completed HSP form, if you (respondent) are awarded any portion of the requisition, you are required to provide notice as soon as practical to **all** the subcontractors (HUBs and Non-HUBs) of their selection as a subcontractor. The notice must specify at a minimum the contracting agency's name and its point of contact for the contract, the contract award number, the subcontracting opportunity it (the subcontractor) will perform, the approximate dollar value of the subcontracting opportunity and the expected percentage of the total contract that the subcontracting opportunity represents. A copy of the notice required by this section must also be provided to the contracting agency's point of contact for the contract no later than ten (10) working days after the contract is awarded.

Page 2 of 2

(Attachment B)

HSP Good Faith Effort - Method B (Attachment B)

Rev 09/15

Enter your company's name here: INTERA Incorporated Requisition #: RFQ: 580-16-RFQ0008

IMPORTANT: If you responded "***No***" to **SECTION 2, Items c** and **d** of the completed HSP form, you must submit a completed "HSP Good Faith Effort - Method B (Attachment B)" for **each** of the subcontracting opportunities you listed in **SECTION 2, Item b** of the completed HSP form. You may photo-copy this page or download the form at http://window.state.tx.us/procurement/prog/hub/hub-forms/hub-sbcont-plan-gfe-achm-b.pdf.

SECTION B-1: SUBCONTRACTING OPPORTUNITY

Enter the item number and description of the subcontracting opportunity you listed in SECTION 2, Item b, of the completed HSP form for which you are completing the attachment.

Item Number: 4 Description: See Subcontracting Opportunity Description for Section B-1, Page 5-25.

SECTION B 2: MENTOR PROTÉGÉ PROGRAM

If respondent is participating as a Mentor in a State of Texas Mentor Protégé Program, submitting its Protégé (Protégé must be a State of Texas certified HUB) as a subcontractor to perform the subcontracting opportunity listed in **SECTION B-1**, constitutes a good faith effort to subcontract with a Texas certified HUB towards that specific portion of work.

Check the appropriate box (Yes or No) that indicates whether you will be subcontracting the portion of work you listed in SECTION B-1 to your Protégé.

☐ - Yes (If *Yes*, continue to SECTION B-4.)

☑ - No / Not Applicable (If *No* or *Not Applicable*, continue to SECTION B-3 and SECTION B-4.)

SECTION B 3: NOTIFICATION OF SUBCONTRACTING OPPORTUNITY

When completing this section you MUST comply with items **a, b, c and d**, thereby demonstrating your Good Faith Effort of having notified Texas certified HUBs and trade organizations or development centers about the subcontracting opportunity you listed in SECTION B-1. Your notice should include the scope of work, information regarding the location to review plans and specifications, bonding and insurance requirements, required qualifications, and identify a contact person. When sending notice of your subcontracting opportunity, you are encouraged to use the attached HUB Subcontracting Opportunity Notice form, which is also available online at http://www.window.state.tx.us/procurement/prog/hub/hub-subcontracting-plan.

Retain supporting documentation (i.e., certified letter, fax, e-mail) demonstrating evidence of your good faith effort to notify the Texas certified HUBs and trade organizations or development centers. Also, be mindful that a working day is considered a normal business day of a state agency, not including weekends, federal or state holidays, or days the agency is declared closed by its executive officer. The initial day the subcontracting opportunity notice is sent/provided to the HUBs and to the trade organizations or development centers is considered to be "day zero" and does not count as one of the seven (7) working days.

a. Provide written notification of the subcontracting opportunity you listed in SECTION B-1, to three (3) or more Texas certified HUBs. Unless the contracting agency specified a different time period, you must allow the HUBs at least seven (7) working days to respond to the notice prior to you submitting your bid response to the contracting agency. When searching for Texas certified HUBs and verifying their HUB status, ensure that you use the State of Texas' Centralized Master Bidders List (CMBL) - Historically Underutilized Business (HUB) Directory Search located at http://mycpa.cpa.state.tx.us/tpasscmb/search/index.jsp. HUB status code "**A**" signifies that the company is a Texas certified HUB.

b. List the **three (3) Texas certified HUBs** you notified regarding the subcontracting opportunity you listed in SECTION B-1. Include the company's Texas Vendor Identification (VID) Number, the date you sent notice to that company, and indicate whether it was responsive or non-responsive to your subcontracting opportunity notice.

Company Name	Texas VID (Do not enter Social Security Numbers.)	Date Notice Sent (mm/dd/yyyy)	Did the HUB Respond?
ACI Group, LLC	1550826239900	11/12/2015	☐ - Yes ☑ - No
Horizon Environmental Services	1742480982400	11/12/2015	☐ - Yes ☑ - No
Medina Consulting Company	1141843448300	11/12/2015	☐ - Yes ☑ - No

c. Provide written notification of the subcontracting opportunity you listed in SECTION B-1 to two (2) or more trade organizations or development centers in Texas to assist in identifying potential HUBs by disseminating the subcontracting opportunity to their members/participants. Unless the contracting agency specified a different time period, you must provide your subcontracting opportunity notice to trade organizations or development centers at least seven (7) working days prior to submitting your bid response to the contracting agency. A list of trade organizations and development centers that have expressed an interest in receiving notices of subcontracting opportunities is available on the Statewide HUB Program's webpage at http://www.window.state.tx.us/procurement/prog/hub/mwb-links-1/.

d. List **two (2) trade organizations or development centers** you notified regarding the subcontracting opportunity you listed in SECTION B-1. Include the date when you sent notice to it and indicate if it accepted or rejected your notice.

Trade Organizations or Development Centers	Date Notice Sent (mm/dd/yyyy)	Was the Notice Accepted?
Hispanic Contractors Association de San Antonio	11/12/2015	☑ - Yes ☐ - No
Houston Minority Supplier Development Council	11/12/2015	☑ - Yes ☐ - No
Southwest Minority Supplier Development Council	11/12/2015	✓ Yes

Page 1 of 2
(Attachment B)

HSP Good Faith Effort - Method B (Attachment B) Cont.

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Enter your company's name here: INTERA Incorporated Requisition #: RFQ: 580-16-RFQ0008

SECTION B-4: SUBCONTRACTOR SELECTION

Enter the item number and description of the subcontracting opportunity you listed in **SECTION 2, Item b,** of the completed HSP form for which you are completing the attachment.

a. Enter the item number and description of the subcontracting opportunity for which you are completing this Attachment B continuation page.

Item Number: 4 **Description:** See Subcontractor Selection Description for Section B-4, Page 5-27.

b. List the subcontractor(s) you selected to perform the subcontracting opportunity you listed in **SECTION B-1**. Also identify whether they are a Texas certified HUB and their Texas Vendor Identification (VID) Number or federal Employer Identification Number (EIN), the approximate dollar value of the work to be subcontracted, and the expected percentage of work to be subcontracted. When searching for Texas certified HUBs and verifying their HUB status, ensure that you use the State of Texas' Centralized Master Bidders List (CMBL) - Historically Underutilized Business (HUB) Directory Search located at http://mycpa.cpa.state.tx.us/tpasscmblsearch/index.jsp. HUB status code "**A**" signifies that the company is a Texas certified HUB.

Company Name	Texas certified HUB	Texas VID or federal EIN Do not enter Social Security Numbers. If you do not know their VID / EIN, leave their VID / EIN field blank.	Approximate Dollar Amount	Expected Percentage of Contract
Dr. John M. Sharp, PG	☐ - Yes ☑ - No	N/A	$ 6,000	3 %
	☐ - Yes ☐ - No		$	%
	☐ - Yes ☐ - No		$	%
	☐ - Yes ☐ - No		$	%
	☐ - Yes ☐ - No		$	%
	☐ - Yes ☐ - No		$	%
	☐ - Yes ☐ - No		$	%
	☐ - Yes ☐ - No		$	%
	☐ - Yes ☐ - No		$	%
	☐ - Yes ☐ - No		$	%

c. If any of the subcontractors you have selected to perform the subcontracting opportunity you listed in **SECTION B-1** is **not** a Texas certified HUB, provide written justification for your selection process (attach additional page if necessary):

In selecting our subcontractor for Item 4, INTERA first solicited interest from Historically Underutilized Businesses (HUBs) under the NIPG Code 91855--Geological Consulting and Study. After identifying potential HUBs from the State of Texas' Centralized Master Bidders List in this category, and reviewing company information on their respective web sites, we developed a list of three firms to solicit interest regarding the subcontracting opportunity but received no responses. We also provided written notification to three trade organizations/development centers, but did not receive any responses.

After completing B3.b and B3.d of the HSP Good Faith Effort – Method B and receiving no positive responses, we evaluated non-HUB firms, organizations, and independent subcontractors. Dr. John Sharp, Jr. meets or exceeds all expertise and qualification requirements defined in the Subcontracting Opportunity Notification Form. His expertise and experience in Trans-Pecos hydrogeology and the fact that he provided Senior Technical Review for the Rustler GAM contract will benefit the subject project. Dr. Sharp has studied regional flow systems in the Trans-Pecos for over 20 years and has a body of publications documenting his experience in flow systems in the area. Dr. Sharp is also very knowledgeable of the Texas GAM Program.

REMINDER: As specified in SECTION 4 of the completed HSP form, if you (respondent) are awarded any portion of the requisition, you are required to provide notice as soon as practical to **all** the subcontractors (HUBs and Non-HUBs) of their selection as a subcontractor. The notice must specify at a minimum the contracting agency's name and its point of contact for the contract, the contract award number, the subcontracting opportunity it (the subcontractor) will perform, the approximate dollar value of the subcontracting opportunity and the expected percentage of the total contract that the subcontracting opportunity represents. A copy of the notice required by this section must also be provided to the contracting agency's point of contact for the contract no later than ten (10) working days after the contract is awarded.

HSP Good Faith Effort - Method B (Attachment B)

Rev 09/15

Enter your company's name here: INTERA Incorporated Requisition #: RFQ: 580-16-RFQ0008

IMPORTANT: If you responded "*No*" to **SECTION 2, Items c** and **d** of the completed HSP form, you must submit a completed "HSP Good Faith Effort - Method B (Attachment B)" for **each** of the subcontracting opportunities you listed in **SECTION 2, Item b** of the completed HSP form. You may photo-copy this page or download the form at http://window.state.tx.us/procurement/prog/hub/hub-forms/hub-sbcont-plan-gfe-achm-b.pdf.

SECTION B-1: SUBCONTRACTING OPPORTUNITY

Enter the item number and description of the subcontracting opportunity you listed in SECTION 2, Item b, of the completed HSP form for which you are completing the attachment.

Item Number: 5 Description: See Subcontracting Opportunity Description for Section B-1, Page 5-26.

SECTION B 2: MENTOR PROTÉGÉ PROGRAM

If respondent is participating as a Mentor in a State of Texas Mentor Protégé Program, submitting its Protégé (Protégé must be a State of Texas certified HUB) as a subcontractor to perform the subcontracting opportunity listed in **SECTION B-1**, constitutes a good faith effort to subcontract with a Texas certified HUB towards that specific portion of work.

Check the appropriate box (Yes or No) that indicates whether you will be subcontracting the portion of work you listed in SECTION B-1 to your Protégé.

☐ - **Yes** (If *Yes*, continue to SECTION B-4.)

☑ - **No / Not Applicable** (If *No* or *Not Applicable*, continue to SECTION B-3 and SECTION B-4.)

SECTION B 3: NOTIFICATION OF SUBCONTRACTING OPPORTUNITY

When completing this section you MUST comply with items **a, b, c and d**, thereby demonstrating your Good Faith Effort of having notified Texas certified HUBs and trade organizations or development centers about the subcontracting opportunity you listed in SECTION B-1. Your notice should include the scope of work, information regarding the location to review plans and specifications, bonding and insurance requirements, required qualifications, and identify a contact person. When sending notice of your subcontracting opportunity, you are encouraged to use the attached HUB Subcontracting Opportunity Notice form, which is also available online at http://www.window.state.tx.us/procurement/prog/hub/hub-subcontracting-plan.

Retain supporting documentation (i.e., certified letter, fax, e-mail) demonstrating evidence of your good faith effort to notify the Texas certified HUBs and trade organizations or development centers. Also, be mindful that a working day is considered a normal business day of a state agency, not including weekends, federal or state holidays, or days the agency is declared closed by its executive officer. The initial day the subcontracting opportunity notice is sent/provided to the HUBs and to the trade organizations or development centers is considered to be "day zero" and does not count as one of the seven (7) working days.

a. Provide written notification of the subcontracting opportunity you listed in SECTION B-1, to three (3) or more Texas certified HUBs. Unless the contracting agency specified a different time period, you must allow the HUBs at least seven (7) working days to respond to the notice prior to you submitting your bid response to the contracting agency. When searching for Texas certified HUBs and verifying their HUB status, ensure that you use the State of Texas' Centralized Master Bidders List (CMBL) - Historically Underutilized Business (HUB) Directory Search located at http://mycpa.cpa.state.tx.us/tpasscmblsearch/index.jsp. HUB status code "**A**" signifies that the company is a Texas certified HUB.

b. List the **three (3) Texas certified HUBs** you notified regarding the subcontracting opportunity you listed in SECTION B-1. Include the company's Texas Vendor Identification (VID) Number, the date you sent notice to that company, and indicate whether it was responsive or non-responsive to your subcontracting opportunity notice.

Company Name	Texas VID (Do not enter Social Security Numbers.)	Date Notice Sent (mm/dd/yyyy)	Did the HUB Respond?
Ash & Associates, LLC	1710965525200	11/12/2015	☐ - Yes ☑ - No
MBCO Engineering, LLC	1472783752900	11/12/2015	☐ - Yes ☑ - No
Porras Nance Engineering	1743081249900	11/12/2015	☐ - Yes ☑ - No

c. Provide written notification of the subcontracting opportunity you listed in SECTION B-1 to two (2) or more trade organizations or development centers in Texas to assist in identifying potential HUBs by disseminating the subcontracting opportunity to their members/participants. Unless the contracting agency specified a different time period, you must provide your subcontracting opportunity notice to trade organizations or development centers at least seven (7) working days prior to submitting your bid response to the contracting agency. A list of trade organizations and development centers that have expressed an interest in receiving notices of subcontracting opportunities is available on the Statewide HUB Program's webpage at http://www.window.state.tx.us/procurement/prog/hub/mwb-links-1/.

d. List **two (2) trade organizations or development centers** you notified regarding the subcontracting opportunity you listed in SECTION B-1. Include the date when you sent notice to it and indicate if it accepted or rejected your notice.

Trade Organizations or Development Centers	Date Notice Sent (mm/dd/yyyy)	Was the Notice Accepted?
Hispanic Contractors Association de San Antonio	11/12/2015	☑ - Yes ☐ - No
Houston Minority Supplier Development Council	11/12/2015	☑ - Yes ☐ - No
Southwest Minority Supplier Development Council	11/12/2015	✓ Yes

HSP Good Faith Effort - Method B (Attachment B) Cont.

Rev. 09/15

Enter your company's name here: INTERA Incorporated Requisition #: RFQ: 580-16-RFQ0008

SECTION B-4: SUBCONTRACTOR SELECTION

Enter the item number and description of the subcontracting opportunity you listed in **SECTION 2, Item b,** of the completed HSP form for which you are completing the attachment.

a. Enter the item number and description of the subcontracting opportunity for which you are completing this Attachment B continuation page.

Item Number: 5 Description: See Subcontractor Selection Description for Section B-4, Page 5-28.

b. List the subcontractor(s) you selected to perform the subcontracting opportunity you listed in **SECTION B-1**. Also identify whether they are a Texas certified HUB and their Texas Vendor Identification (VID) Number or federal Employer Identification Number (EIN), the approximate dollar value of the work to be subcontracted, and the expected percentage of work to be subcontracted. When searching for Texas certified HUBs and verifying their HUB status, ensure that you use the State of Texas' Centralized Master Bidders List (CMBL) - Historically Underutilized Business (HUB) Directory Search located at http://mycpa.cpa.state.tx.us/tpasscmblsearch/index.jsp. HUB status code "**A**" signifies that the company is a Texas certified HUB.

Company Name	Texas certified HUB	Texas VID or federal EIN Do not enter Social Security Numbers. If you do not know their VID / EIN, leave their VID / EIN field blank.	Approximate Dollar Amount	Expected Percentage of Contract
Carollo Engineers (Dr. Justin Sutherland)	☐ - Yes ☑ - No	N/A	$ 3,000	1.5%
	☐ - Yes ☐ - No		$	%
	☐ - Yes ☐ - No		$	%
	☐ - Yes ☐ - No		$	%
	☐ - Yes ☐ - No		$	%
	☐ - Yes ☐ - No		$	%
	☐ - Yes ☐ - No		$	%
	☐ - Yes ☐ - No		$	%
	☐ - Yes ☐ - No		$	%
	☐ - Yes ☐ - No		$	%

c. If any of the subcontractors you have selected to perform the subcontracting opportunity you listed in **SECTION B-1** is **not** a Texas certified HUB, provide written justification for your selection process (attach additional page if necessary):

In selecting our subcontractor for Item 5, INTERA first solicited interest from Historically Underutilized Businesses (HUBs) under the NIPG Code 92597--Water Supply, Treatment, and Distribution/Engineering. After identifying potential HUBs from the State of Texas' Centralized Master Bidders List in this category, and reviewing company information on their respective web sites, we developed a list of three firms to solicit interest regarding the subcontracting opportunity but received no responses. We also provided written notification to three trade organizations/development centers, but did not receive any responses.

After completing B3.b and B3.d of the HSP Good Faith Effort – Method B and receiving no positive responses, we evaluated non-HUB firms, organizations, and independent subcontractors. Dr. Justin Sutherland (Carollo Engineers) meets or exceeds the qualifications listed in the Subcontracting Opportunity Announcement. His experience and expertise with conducting pilot tests on brackish groundwater and his ability to design innovative treatment approaches for desalinating groundwater in a cost-effectively manner will greatly benefit the project.

REMINDER: As specified in SECTION 4 of the completed HSP form, if you (respondent) are awarded any portion of the requisition, you are required to provide notice as soon as practical to **all** the subcontractors (HUBs and Non-HUBs) of their selection as a subcontractor. The notice must specify at a minimum the contracting agency's name and its point of contact for the contract, the contract award number, the subcontracting opportunity it (the subcontractor) will perform, the approximate dollar value of the subcontracting opportunity and the expected percentage of the total contract that the subcontracting opportunity represents. A copy of the notice required by this section must also be provided to the contracting agency's point of contact for the contract no later than ten (10) working days after the contract is awarded.

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Enter your company's name here: INTERA Incorporated Requisition #: RFQ: 580-16-RFQ0008

SECTION-3 SELF PERFORMING JUSTIFICATION (If you responded "No" to SECTION 2, Item a, you must complete this SECTION and continue to SECTION 4.)

If you responded "No" to SECTION 2, Item a, in the space provided below **explain how** your company will perform the entire contract with its own employees, supplies, materials and/or equipment, to include transportation and delivery.

SECTION-4: AFFIRMATION

As evidenced by my signature below, I affirm that I am an authorized representative of the respondent listed in SECTION 1, and that the information and supporting documentation submitted with the HSP is true and correct. Respondent understands and agrees that, if awarded any portion of the requisition:

- The respondent will provide notice as soon as practical to all the subcontractors (HUBs and Non-HUBs) of their selection as a subcontractor for the awarded contract. The notice must specify at a minimum the contracting agency's name and its point of contact for the contract, the contract award number, the subcontracting opportunity they (the subcontractor) will perform, the approximate dollar value of the subcontracting opportunity and the expected percentage of the total contract that the subcontracting opportunity represents. A copy of the notice required by this section must also be provided to the contracting agency's point of contact for the contract no later than ten (10) working days after the contract is awarded.
- The respondent must submit monthly compliance reports (Prime Contractor Progress Assessment Report – PAR) to the contracting agency, verifying its compliance with the HSP, including the use of and expenditures made to its subcontractors (HUBs and Non-HUBs). (The PAR is available at http://www.window.state.tx.us/procurement/prog/hub/hub-forms/progressassessmentrpt.xls).
- The respondent must seek approval from the contracting agency prior to making any modifications to its HSP, including the hiring of additional or different subcontractors and the termination of a subcontractor the respondent identified in its HSP. If the HSP is modified without the contracting agency's prior approval, respondent may be subject to any and all enforcement remedies available under the contract or otherwise available by law, up to and including debarment from all state contracting.
- The respondent must, upon request, allow the contracting agency to perform on-site reviews of the company's headquarters and/or work-site where services are being performed and must provide documentation regarding staffing and other resources.

Signature	Van Kelley, PG	Project Manager	11/23/2015
	Printed Name	Title	Date (mm/dd/yyyy)

Reminder:

- If you responded **"Yes"** to **SECTION 2, Items c or d**, you must complete an "HSP Good Faith Effort - Method A (Attachment A)" for **each** of the subcontracting opportunities you listed in SECTION 2, Item b.
- If you responded **"No" SECTION 2, Items c and d**, you must complete an "HSP Good Faith Effort - Method B (Attachment B)" for **each** of the subcontracting opportunities you listed in SECTION 2, Item b.

Subcontracting Opportunity Announcement #1

Rev. 09/15

HUB Subcontracting Opportunity Notification Form

In accordance with Texas Gov't Code, Chapter 2161, each state agency that considers entering into a contract with an expected value of $100,000 or more shall, before the agency solicits bids, proposals, offers, or other applicable expressions of interest, determine whether subcontracting opportunities are probable under the contract. The state agency I have identified below in **Section B** has determined that subcontracting opportunities are probable under the requisition to which my company will be responding.

34 Texas Administrative Code, §20.14 requires all respondents (prime contractors) bidding on the contract to provide notice of each of their subcontracting opportunities to at least three (3) Texas certified HUBs (who work within the respective industry applicable to the subcontracting opportunity), and allow the HUBs at least seven (7) working days to respond to the notice prior to the respondent submitting its bid response to the contracting agency. In addition, at least seven (7) working days prior to submitting its bid response to the contracting agency, the respondent must provide notice of each of its subcontracting opportunities to two (2) or more trade organizations or development centers (in Texas) that serves members of groups (i.e., Asian Pacific American, Black American, Hispanic American, Native American, Woman, Service Disabled Veteran) identified in Texas Administrative Code, §20.11(19)(C).

We respectfully request that vendors interested in bidding on the subcontracting opportunity scope of work identified in **Section C, Item 2**, reply no later than the date and time identified in **Section C, Item 1**. Submit your response to the point-of-contact referenced in **Section A**.

SECTION: A PRIME CONTRACTOR'S INFORMATION

Company Name: INTERA Incorporated
State of Texas VID #: 1743010638900
Point-of-Contact: Mr. Van Kelley, PG
Phone #: 512-425-2047
E-mail Address: vkelley@intera.com
Fax #: 512-727-4821

SECTION: B CONTRACTING STATE AGENCY AND REQUISITION INFORMATION

Agency Name: Texas Water Development Board
Point-of-Contact: Ms. Tina Newstrom
Phone #: 512-463-7825
Requisition #: Request for Qualifications to Conduct a Study of Brackish Groundwater Production Zones in the Rustler Aquifer. RFP #580-16-RFQ0008
Bid Open Date: 11/24/2015 (mm/dd/yyyy)

SECTION: C SUBCONTRACTING OPPORTUNITY RESPONSE DUE DATE, DESCRIPTION, REQUIREMENTS AND RELATED INFORMATION

1. Potential Subcontractor's Bid Response Due Date:

If you would like for our company to consider your company's bid for the subcontracting opportunity identified below in Item 2, we must receive your bid response no later than **5:00 PM** Central Time on **11/23/2015** Date (mm/dd/yyyy).

In accordance with 34 TAC §20.14, each notice of subcontracting opportunity shall be provided to at least three (3) Texas certified HUBs, and allow the HUBs at least seven (7) working days to respond to the notice prior to submitting our bid response to the contracting agency. In addition, at least seven (7) working days prior to us submitting our bid response to the contracting agency, we must provide notice of each of our subcontracting opportunities to two (2) or more trade organizations or development centers (in Texas) that serves members of groups (i.e., Asian Pacific American, Black American, Hispanic American, Native American, Woman, Service Disabled Veteran) identified in Texas Administrative Code, §20.11(19)(C).

(A working day is considered a normal business day of a state agency, not including weekends, federal or state holidays, or days the agency is declared closed by its executive officer. The initial day the subcontracting opportunity notice is sent/provided to the HUBs and to the trade organizations or development centers is considered to be "day zero" and does not count as one of the seven (7) working days.)

2. Subcontracting Opportunity Scope of Work:

INTERA requires technical consulting services from a professional geoscientist with specialized expertise and experience with geologic interpretation and correlation in the Rustler Formation and other Permian Formations in the Delaware Basin of west Texas and southeastern New Mexico.

3. Required Qualifications: ☐ - Not Applicable

These services must be provided by a registered Texas Professional Geoscientist (PG) with a minimum of 25 years of experience in both field and desktop based categorization of constituent members of the Rustler Formation (e.g., Culebra Dolomite, Magenta Dolomite, etc.). The professional is also required to have proven experience with the evaluation of geophysical logs to determine the extent of halite cementation within the various Member units of the Rustler Formation. This experience must be demonstrated through scientific publications in peer-reviewed journals.

4. Bonding/Insurance Requirements: ☐ - Not Applicable

Subcontractor is solely responsible for obtaining sufficient insurance in accordance with the general standards and practices of the industry or governmental entity.

5. Location to review plans/specifications: ☐ - Not Applicable

Request for Qualifications is available on the Texas Water Development Board's website at:
www.twdb.texas.gov/about/contract_admin/request/rfq0008/index.asp or
the Electronic State Business Daily at: esbd.cpa.state.tx.us/bid_show.cfm?bidid=121146

Subcontracting Opportunity Announcement #2

Rev. 09/15

HUB Subcontracting Opportunity Notification Form

In accordance with Texas Gov't Code, Chapter 2161, each state agency that considers entering into a contract with an expected value of $100,000 or more shall, before the agency solicits bids, proposals, offers, or other applicable expressions of interest, determine whether subcontracting opportunities are probable under the contract. The state agency I have identified below in **Section B** has determined that subcontracting opportunities are probable under the requisition to which my company will be responding.

34 Texas Administrative Code, §20.14 requires all respondents (prime contractors) bidding on the contract to provide notice of each of their subcontracting opportunities to at least three (3) Texas certified HUBs (who work within the respective industry applicable to the subcontracting opportunity), and allow the HUBs at least seven (7) working days to respond to the notice prior to the respondent submitting its bid response to the contracting agency. In addition, at least seven (7) working days prior to submitting its bid response to the contracting agency, the respondent must provide notice of each of its subcontracting opportunities to two (2) or more trade organizations or development centers (in Texas) that serves members of groups (i.e., Asian Pacific American, Black American, Hispanic American, Native American, Woman, Service Disabled Veteran) identified in Texas Administrative Code, §20.11(19)(C).

We respectfully request that vendors interested in bidding on the subcontracting opportunity scope of work identified in **Section C, Item 2**, reply no later than the date and time identified in **Section C, Item 1**. Submit your response to the point-of-contact referenced in **Section A**.

SECTION: A PRIME CONTRACTOR'S INFORMATION

Company Name: INTERA Incorporated
State of Texas VID #: 1743010638900
Point-of-Contact: Mr. Van Kelley, PG
Phone #: 512-425-2047
E-mail Address: vkelley@intera.com
Fax #: 512-727-4821

SECTION: B CONTRACTING STATE AGENCY AND REQUISITION INFORMATION

Agency Name: Texas Water Development Board
Point-of-Contact: Ms. Tina Newstrom
Phone #: 512-463-7825
Requisition #: Request for Qualifications to Conduct a Study of Brackish Groundwater Production Zones in the Rustler Aquifer. RFP #580-16-RFQ0008
Bid Open Date: 11/24/2015 (mm/dd/yyyy)

SECTION: C SUBCONTRACTING OPPORTUNITY RESPONSE DUE DATE, DESCRIPTION, REQUIREMENTS AND RELATED INFORMATION

1. Potential Subcontractor's Bid Response Due Date:

If you would like for our company to consider your company's bid for the subcontracting opportunity identified below in Item 2, we must receive your bid response no later than **5:00 PM** (Central Time) on **11/23/2015** (Date (mm/dd/yyyy)).

In accordance with 34 TAC §20.14, each notice of subcontracting opportunity shall be provided to at least three (3) Texas certified HUBs, and allow the HUBs at least seven (7) working days to respond to the notice prior to submitting our bid response to the contracting agency. In addition, at least seven (7) working days prior to us submitting our bid response to the contracting agency, we must provide notice of each of our subcontracting opportunities to two (2) or more trade organizations or development centers (in Texas) that serves members of groups (i.e., Asian Pacific American, Black American, Hispanic American, Native American, Woman, Service Disabled Veteran) identified in Texas Administrative Code, §20.11(19)(C).

(A working day is considered a normal business day of a state agency, not including weekends, federal or state holidays, or days the agency is declared closed by its executive officer. The initial day the subcontracting opportunity notice is sent/provided to the HUBs and to the trade organizations or development centers is considered to be "day zero" and does not count as one of the seven (7) working days.)

2. Subcontracting Opportunity Scope of Work:

INTERA requires technical consulting services from a professional petrophysicist to oversee the analysis and interpretation of a number of geophysical logs run through the Rustler Formation in west Texas and southeastern New Mexico. The results will include the development of a petrophysical workflow that will guide the calculation of formation parameters within the Rustler Aquifer.

3. Required Qualifications: ☐ - Not Applicable

The petrophysicist must have at least 25 years of experience in developing algorithms used to correct porosity measurements from neutron logs to formation parameters, a proven track record in the calculation of water resistivity (Rw) from true deep resistivity (Rt) from a variety of geophysical logs, and be able to determine correction factors for the logs by grouping them into geographic regions. The professional will possess in-depth research skills as evidenced by at least two of the following: publishing multiple scientific articles/papers involving log analysis in peer-reviewed journals, serving as editor/co-editor of professional journals focused on log analysis, and conducting well log analysis workshops and training courses for the oil and gas industry.

4. Bonding/Insurance Requirements: ☐ - Not Applicable

Subcontractor is solely responsible for obtaining sufficient insurance in accordance with the general standards and practices of the industry or governmental entity.

5. Location to review plans/specifications: ☐ - Not Applicable

Request for Qualifications is available on the Texas Water Development Board's website at:
www.twdb.texas.gov/about/contract_admin/request/rfq0008/index.asp or
the Electronic State Business Daily at: esbd.cpa.state.tx.us/bid_show.cfm?bidid=121146

Subcontracting Opportunity Announcement #3

Rev. 09/15

HUB Subcontracting Opportunity Notification Form

In accordance with Texas Gov't Code, Chapter 2161, each state agency that considers entering into a contract with an expected value of $100,000 or more shall, before the agency solicits bids, proposals, offers, or other applicable expressions of interest, determine whether subcontracting opportunities are probable under the contract. The state agency I have identified below in **Section B** has determined that subcontracting opportunities are probable under the requisition to which my company will be responding.

34 Texas Administrative Code, §20.14 requires all respondents (prime contractors) bidding on the contract to provide notice of each of their subcontracting opportunities to at least three (3) Texas certified HUBs (who work within the respective industry applicable to the subcontracting opportunity), and allow the HUBs at least seven (7) working days to respond to the notice prior to the respondent submitting its bid response to the contracting agency. In addition, at least seven (7) working days prior to submitting its bid response to the contracting agency, the respondent must provide notice of each of its subcontracting opportunities to two (2) or more trade organizations or development centers (in Texas) that serves members of groups (i.e., Asian Pacific American, Black American, Hispanic American, Native American, Woman, Service Disabled Veteran) identified in Texas Administrative Code, §20.11(19)(C).

We respectfully request that vendors interested in bidding on the subcontracting opportunity scope of work identified in **Section C, Item 2**, reply no later than the date and time identified in **Section C, Item 1**. Submit your response to the point-of-contact referenced in **Section A**.

SECTION: A PRIME CONTRACTOR'S INFORMATION

Company Name: INTERA Incorporated
State of Texas VID #: 1743010638900
Point-of-Contact: Mr. Van Kelley, PG
Phone #: 512-425-2047
E-mail Address: vkelley@intera.com
Fax #: 512-727-4821

SECTION: B CONTRACTING STATE AGENCY AND REQUISITION INFORMATION

Agency Name: Texas Water Development Board
Point-of-Contact: Ms. Tina Newstrom
Phone #: 512-463-7825
Requisition #: Request for Qualifications to Conduct a Study of Brackish Groundwater Production Zones in the Rustler Aquifer. RFQ #580-16-RFQ0008
Bid Open Date: 11/24/2015 (mm/dd/yyyy)

SECTION: C SUBCONTRACTING OPPORTUNITY RESPONSE DUE DATE, DESCRIPTION, REQUIREMENTS AND RELATED INFORMATION

1. Potential Subcontractor's Bid Response Due Date:

If you would like for our company to consider your company's bid for the subcontracting opportunity identified below in Item 2, we must receive your bid response no later than **5:00 PM** (Central Time) on **11/23/2015** (Date (mm/dd/yyyy)).

In accordance with 34 TAC §20.14, each notice of subcontracting opportunity shall be provided to at least three (3) Texas certified HUBs, and allow the HUBs at least seven (7) working days to respond to the notice prior to submitting our bid response to the contracting agency. In addition, at least seven (7) working days prior to us submitting our bid response to the contracting agency, we must provide notice of each of our subcontracting opportunities to two (2) or more trade organizations or development centers (in Texas) that serves members of groups (i.e., Asian Pacific American, Black American, Hispanic American, Native American, Woman, Service Disabled Veteran) identified in Texas Administrative Code, §20.11(19)(C).

(A working day is considered a normal business day of a state agency, not including weekends, federal or state holidays, or days the agency is declared closed by its executive officer. The initial day the subcontracting opportunity notice is sent/provided to the HUBs and to the trade organizations or development centers is considered to be "day zero" and does not count as one of the seven (7) working days.)

2. Subcontracting Opportunity Scope of Work:

INTERA requires the services of a company specializing in the acquisition and commercial distribution of geophysical borehole logs. Specifically, the company will have an established database containing geophysical borehole logs that are readily searchable by API numbers, log type, top and bottom logging interval, formation at total depth, and other search criteria.

3. Required Qualifications: ☐ - Not Applicable

The successful execution of the subject project requires that the company be able to furnish specific geophysical logs in a redacted manner such that they: 1) retain important information related to characterizing the water quality of groundwater resources, 2) can be released to state agencies for public distribution; and 3) can be acquired at a competitive price. The company's database must contain logs located within the footprint of the Rustler Aquifer in western Texas and southeastern New Mexico. In addition, the company must provide at least 300 geophysical logs that are geographically distributed where it has been confirmed that the top logging interval is above the top of the Rustler Formation and the bottom logging interval is below the base of the Rustler Formation.

4. Bonding/Insurance Requirements: ☐ - Not Applicable

Subcontractor is solely responsible for obtaining sufficient insurance in accordance with the general standards and practices of the industry or governmental entity.

5. Location to review plans/specifications: ☐ - Not Applicable

Request for Qualifications is available on the Texas Water Development Board's website at:
www.twdb.texas.gov/about/contract_admin/request/rfq0008/index.asp or
the Electronic State Business Daily at: esbd.cpa.state.tx.us/bid_show.cfm?bidid=121146

Subcontracting Opportunity Announcement #4

Rev. 09/15

HUB Subcontracting Opportunity Notification Form

In accordance with Texas Gov't Code, Chapter 2161, each state agency that considers entering into a contract with an expected value of $100,000 or more shall, before the agency solicits bids, proposals, offers, or other applicable expressions of interest, determine whether subcontracting opportunities are probable under the contract. The state agency I have identified below in **Section B** has determined that subcontracting opportunities are probable under the requisition to which my company will be responding.

34 Texas Administrative Code, §20.14 requires all respondents (prime contractors) bidding on the contract to provide notice of each of their subcontracting opportunities to at least three (3) Texas certified HUBs (who work within the respective industry applicable to the subcontracting opportunity), and allow the HUBs at least seven (7) working days to respond to the notice prior to the respondent submitting its bid response to the contracting agency. In addition, at least seven (7) working days prior to submitting its bid response to the contracting agency, the respondent must provide notice of each of its subcontracting opportunities to two (2) or more trade organizations or development centers (in Texas) that serves members of groups (i.e., Asian Pacific American, Black American, Hispanic American, Native American, Woman, Service Disabled Veteran) identified in Texas Administrative Code, §20.11(19)(C).

We respectfully request that vendors interested in bidding on the subcontracting opportunity scope of work identified in **Section C, Item 2**, reply no later than the date and time identified in **Section C, Item 1**. Submit your response to the point-of-contact referenced in **Section A**.

SECTION: A PRIME CONTRACTOR'S INFORMATION

Company Name: INTERA Incorporated
State of Texas VID #: 1743010638900
Point-of-Contact: Mr. Van Kelley, PG
Phone #: 512-425-2047
E-mail Address: vkelley@intera.com
Fax #: 512-727-4821

SECTION: B CONTRACTING STATE AGENCY AND REQUISITION INFORMATION

Agency Name: Texas Water Development Board
Point-of-Contact: Ms. Tina Newstrom
Phone #: 512-463-7825
Requisition #: Request for Qualifications to Conduct a Study of Brackish Groundwater Production Zones in the Rustler Aquifer. RFQ #580-16-RFQ0008
Bid Open Date: 11/24/2015 (mm/dd/yyyy)

SECTION: C SUBCONTRACTING OPPORTUNITY RESPONSE DUE DATE, DESCRIPTION, REQUIREMENTS AND RELATED INFORMATION

1. Potential Subcontractor's Bid Response Due Date:

If you would like for our company to consider your company's bid for the subcontracting opportunity identified below in Item 2, we must receive your bid response no later than **5:00 PM** (Central Time) on **11/23/2015** (Date (mm/dd/yyyy)).

In accordance with 34 TAC §20.14, each notice of subcontracting opportunity shall be provided to at least three (3) Texas certified HUBs, and allow the HUBs at least seven (7) working days to respond to the notice prior to submitting our bid response to the contracting agency. In addition, at least seven (7) working days prior to us submitting our bid response to the contracting agency, we must provide notice of each of our subcontracting opportunities to two (2) or more trade organizations or development centers (in Texas) that serves members of groups (i.e., Asian Pacific American, Black American, Hispanic American, Native American, Woman, Service Disabled Veteran) identified in Texas Administrative Code, §20.11(19)(C).

(A working day is considered a normal business day of a state agency, not including weekends, federal or state holidays, or days the agency is declared closed by its executive officer. The initial day the subcontracting opportunity notice is sent/provided to the HUBs and to the trade organizations or development centers is considered to be "day zero" and does not count as one of the seven (7) working days.)

2. Subcontracting Opportunity Scope of Work:

Services are requested from a technical expert to review hydrogeological data to identify geological constraints that could act as hydraulic barriers to groundwater flow.

3. Required Qualifications: ☐ - Not Applicable

The respondent will need to have a Ph.D in the geological sciences and have at least 30 years of experience conducting research regarding groundwater flow, flow and transport, hydrogeophysics, and sedimentary basin hydrogeology. The respondent will need to demonstrate their expertise and capabilities through conference presentations, reports, peer-reviewed journal articles, books, and field guides. Demonstration should include a list of 100 or more peer-review articles in journals, experience as an editor or manuscript reviewer of at least 10 scientific journals, and a reviewer of water research proposals for at least 10 major agencies. The respondent should also be aware of the water resources in Texas and knowledgeable about the Groundwater Availability Program managed by the Texas Water Development Board.

4. Bonding/Insurance Requirements: ☐ - Not Applicable

Subcontractor is solely responsible for obtaining sufficient insurance in accordance with the general standards and practices of the industry or governmental entity.

5. Location to review plans/specifications: ☐ - Not Applicable

Request for Qualifications is available on the Texas Water Development Board's website at:
www.twdb.texas.gov/about/contract_admin/request/rfq0008/index.asp or
the Electronic State Business Daily at: esbd.cpa.state.tx.us/bid_show.cfm?bidid=121146

Subcontracting Opportunity Announcement #5

Rev. 09/15

HUB Subcontracting Opportunity Notification Form

In accordance with Texas Gov't Code, Chapter 2161, each state agency that considers entering into a contract with an expected value of $100,000 or more shall, before the agency solicits bids, proposals, offers, or other applicable expressions of interest, determine whether subcontracting opportunities are probable under the contract. The state agency I have identified below in **Section B** has determined that subcontracting opportunities are probable under the requisition to which my company will be responding.

34 Texas Administrative Code, §20.14 requires all respondents (prime contractors) bidding on the contract to provide notice of each of their subcontracting opportunities to at least three (3) Texas certified HUBs (who work within the respective industry applicable to the subcontracting opportunity), and allow the HUBs at least seven (7) working days to respond to the notice prior to the respondent submitting its bid response to the contracting agency. In addition, at least seven (7) working days prior to submitting its bid response to the contracting agency, the respondent must provide notice of each of its subcontracting opportunities to two (2) or more trade organizations or development centers (in Texas) that serves members of groups (i.e., Asian Pacific American, Black American, Hispanic American, Native American, Woman, Service Disabled Veteran) identified in Texas Administrative Code, §20.11(19)(C).

We respectfully request that vendors interested in bidding on the subcontracting opportunity scope of work identified in **Section C, Item 2**, reply no later than the date and time identified in **Section C, Item 1**. Submit your response to the point-of-contact referenced in **Section A**.

SECTION: A PRIME CONTRACTOR'S INFORMATION

Company Name: INTERA Incorporated
State of Texas VID #: 1743010638900
Point-of-Contact: Mr. Van Kelley, PG
Phone #: 512-425-2047
E-mail Address: vkelley@intera.com
Fax #: 512-727-4821

SECTION: B CONTRACTING STATE AGENCY AND REQUISITION INFORMATION

Agency Name: Texas Water Development Board
Point-of-Contact: Ms. Tina Newstrom
Phone #: 512-463-7825
Requisition #: Request for Qualifications to Conduct a Study of Brackish Groundwater Production Zones in the Rustler Aquifer. RFQ #580-16-RFQ0008
Bid Open Date: 11/24/2015 (mm/dd/yyyy)

SECTION: C SUBCONTRACTING OPPORTUNITY RESPONSE DUE DATE, DESCRIPTION, REQUIREMENTS AND RELATED INFORMATION

1. Potential Subcontractor's Bid Response Due Date:

If you would like for our company to consider your company's bid for the subcontracting opportunity identified below in Item 2, we must receive your bid response no later than **5:00 PM** (Central Time) on **11/23/2015** (Date (mm/dd/yyyy)).

In accordance with 34 TAC §20.14, each notice of subcontracting opportunity shall be provided to at least three (3) Texas certified HUBs, and allow the HUBs at least seven (7) working days to respond to the notice prior to submitting our bid response to the contracting agency. In addition, at least seven (7) working days prior to us submitting our bid response to the contracting agency, we must provide notice of each of our subcontracting opportunities to two (2) or more trade organizations or development centers (in Texas) that serves members of groups (i.e., Asian Pacific American, Black American, Hispanic American, Native American, Woman, Service Disabled Veteran) identified in Texas Administrative Code, §20.11(19)(C).

(A working day is considered a normal business day of a state agency, not including weekends, federal or state holidays, or days the agency is declared closed by its executive officer. The initial day the subcontracting opportunity notice is sent/provided to the HUBs and to the trade organizations or development centers is considered to be "day zero" and does not count as one of the seven (7) working days.)

2. Subcontracting Opportunity Scope of Work:

Services are required from a technical expert to assess the feasibility of desalination of brackish groundwater in Texas.

3. Required Qualifications: ☐ - Not Applicable

The expert must be have a PhD in civil engineering, or a related discipline, be a registered Professional Engineer in Texas, have 15 years of experience in water quality assessments, and have knowledge regarding the potential problems associated with desalination of a blend of brackish groundwater and ocean water. Additional experience requirements include: conducting pilot testing of multiple desalination systems in Texas; a proven track record of applying the four-phase protocol to meet the Texas Commission of Environmental Quality requirements for reverse osmosis membrane systems; and the design of a water treatment system that has successfully removed radium from groundwater.

4. Bonding/Insurance Requirements: ☐ - Not Applicable

Subcontractor is solely responsible for obtaining sufficient insurance in accordance with the general standards and practices of the industry or governmental entity.

5. Location to review plans/specifications: ☐ - Not Applicable

Request for Qualifications is available on the Texas Water Development Board's website at:
www.twdb.texas.gov/about/contract_admin/request/rfq0008/index.asp or
the Electronic State Business Daily at: esbd.cpa.state.tx.us/bid_show.cfm?bidid=121146

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OPPORTUNITY DESCRIPTIONS

Section 2: Subcontracting Intentions

2.b: Item #1 — Subcontracting Opportunity Description Utilized

Services are needed from a professional geoscientist with specialized expertise and experience with geologic interpretation and correlation in the Rustler Formation and other Permian Formations in the Delaware Basin of west Texas and southeastern New Mexico. These services must be provided by a registered Texas Professional Geoscientist (PG) with a minimum of 25 years of experience in both field and desktop based categorization of constituent members of the Rustler Formation (e.g., Culebra Dolomite, Magenta Dolomite, etc.). The professional is also required to have proven experience with the evaluation of geophysical logs to determine the extent of halite cementation within the various Member units of the Rustler Formation. This experience must be demonstrated through scientific publications in peer-reviewed journals.

2.b: Item #2 — Subcontracting Opportunity Description Utilized

Services are needed from a professional petrophysicist to oversee the analysis and interpretation of a number of geophysical logs run through the Rustler Formation in west Texas and southeastern New Mexico. The results will include the development of a petrophysical workflow that will guide the calculation of formation parameters within the Rustler Aquifer. The petrophysicist must have at least 25 years of experience in developing algorithms used to correct porosity measurements from neutron logs to formation parameters, a proven track record in the calculation of water resistivity (Rw) from true deep resistivity (Rt) from a variety of geophysical logs, and be able to determine correction factors for the logs by grouping them into geographic regions. The professional will possess in-depth research skills as evidenced by at least two of the following: publishing multiple scientific articles/papers involving log analysis in peer-reviewed journals, serving as editor/co-editor of professional journals focused on log analysis, and conducting well log analysis workshops and training courses for the oil and gas industry.

2.b: Item #3 — Subcontracting Opportunity Description Utilized

Services are needed by a company specializing in the acquisition and commercial distribution of geophysical borehole logs. Specifically, the company will have an established database containing geophysical borehole logs that are readily searchable by API numbers, log type, top and bottom logging interval, formation at total depth, and other search criteria. The successful execution of the subject project requires that the company be able to furnish specific geophysical logs in a redacted manner such that they: 1) retain important information related to characterizing the water quality of groundwater resources, 2) can be released to state agencies for public distribution; and 3) can be acquired at a competitive price. The company's database must contain logs located within the footprint of the Rustler Aquifer in western Texas and southeastern New Mexico. In addition, the company must provide at least 300 geophysical logs that are geographically distributed where it has been confirmed that the top logging interval is above the top of the Rustler Formation and the bottom logging interval is below the base of the Rustler Formation.

2.b: Item #4 — Subcontracting Opportunity Description Utilized

Services are requested from a technical expert to review hydrogeological data to identify geological constraints that could act as hydraulic barriers to groundwater flow. The respondent will need to have a

Ph.D in the geological sciences and have at least 30 years of experience conducting research regarding groundwater flow, flow and transport, hydrogeophysics, and sedimentary basin hydrogeology. The respondent will need to demonstrate their expertise and capabilities through conference presentations, reports, peer-reviewed journal articles, books, and field guides. Demonstration should include a list of 100 or more peer-review articles in journals, experience as an editor or manuscript reviewer of at least 10 scientific journals, and a reviewer of water research proposals for at least 10 major agencies. The respondent should also be aware of the water resources in Texas and knowledgeable about the Groundwater Availability Program managed by the Texas Water Development Board.

2.b: Item #5 — Subcontracting Opportunity Description Utilized

Services are required from a technical expert to assess the feasibility of desalination of brackish groundwater in Texas. The expert must be have a PhD in civil engineering, or a related discipline, be a registered Professional Engineer in Texas, have 15 years of experience in water quality assessments, and have knowledge regarding the potential problems associated with desalination of a blend of brackish groundwater and ocean water. Additional experience requirements include: conducting pilot testing of multiple desalination systems in Texas; a proven track record of applying the four-phase protocol to meet the Texas Commission of Environmental Quality requirements for reverse osmosis membrane systems; and the design of a water treatment system that has successfully removed radium from groundwater.

HSP GOOD FAITH EFFORT – METHOD B

Section B-1: Subcontracting Opportunity

Item #1 — Subcontracting Opportunity Description Utilized

Services are needed from a professional geoscientist with specialized expertise and experience with geologic interpretation and correlation in the Rustler Formation and other Permian Formations in the Delaware Basin of west Texas and southeastern New Mexico. These services must be provided by a registered Texas Professional Geoscientist (PG) with a minimum of 25 years of experience in both field and desktop based categorization of constituent members of the Rustler Formation (e.g., Culebra Dolomite, Magenta Dolomite, etc.). The professional is also required to have proven experience with the evaluation of geophysical logs to determine the extent of halite cementation within the various Member units of the Rustler Formation. This experience must be demonstrated through scientific publications in peer-reviewed journals.

Item #2 — Subcontracting Opportunity Description Utilized

Services are needed from a professional petrophysicist to oversee the analysis and interpretation of a number of geophysical logs run through the Rustler Formation in west Texas and southeastern New Mexico. The results will include the development of a petrophysical workflow that will guide the calculation of formation parameters within the Rustler Aquifer. The petrophysicist must have at least 25 years of experience in developing algorithms used to correct porosity measurements from neutron logs to formation parameters, a proven track record in the calculation of water resistivity (Rw) from true deep resistivity (Rt) from a variety of geophysical logs, and be able to determine correction factors for the logs by grouping them into geographic regions. The professional will possess in-depth research skills as evidenced by at least two of the following: publishing multiple scientific articles/papers involving log analysis in peer-reviewed journals, serving as editor/co-editor of professional journals focused on log analysis, and conducting well log analysis workshops and training courses for the oil and gas industry.

Item #3 — Subcontracting Opportunity Description Utilized

Services are needed by a company specializing in the acquisition and commercial distribution of geophysical borehole logs. Specifically, the company will have an established database containing geophysical borehole logs that are readily searchable by API numbers, log type, top and bottom logging interval, formation at total depth, and other search criteria. The successful execution of the subject project requires that the company be able to furnish specific geophysical logs in a redacted manner such that they: 1) retain important information related to characterizing the water quality of groundwater resources, 2) can be released to state agencies for public distribution; and 3) can be acquired at a competitive price. The company's database must contain logs located within the footprint of the Rustler Aquifer in western Texas and southeastern New Mexico. In addition, the company must provide at least 300 geophysical logs that are geographically distributed where it has been confirmed that the top logging interval is above the top of the Rustler Formation and the bottom logging interval is below the base of the Rustler Formation.

Item #4 — Subcontracting Opportunity Description Utilized

Services are requested from a technical expert to review hydrogeological data to identify geological constraints that could act as hydraulic barriers to groundwater flow. The respondent will need to have a

Ph.D in the geological sciences and have at least 30 years of experience conducting research regarding groundwater flow, flow and transport, hydrogeophysics, and sedimentary basin hydrogeology. The respondent will need to demonstrate their expertise and capabilities through conference presentations, reports, peer-reviewed journal articles, books, and field guides. Demonstration should include a list of 100 or more peer-review articles in journals, experience as an editor or manuscript reviewer of at least 10 scientific journals, and a reviewer of water research proposals for at least 10 major agencies. The respondent should also be aware of the water resources in Texas and knowledgeable about the Groundwater Availability Program managed by the Texas Water Development Board.

Item #5 — Subcontracting Opportunity Description Utilized

Services are required from a technical expert to assess the feasibility of desalination of brackish groundwater in Texas. The expert must be have a PhD in civil engineering, or a related discipline, be a registered Professional Engineer in Texas, have 15 years of experience in water quality assessments, and have knowledge regarding the potential problems associated with desalination of a blend of brackish groundwater and ocean water. Additional experience requirements include: conducting pilot testing of multiple desalination systems in Texas; a proven track record of applying the four-phase protocol to meet the Texas Commission of Environmental Quality requirements for reverse osmosis membrane systems; and the design of a water treatment system that has successfully removed radium from groundwater.

Section B-4: Subcontracting Selection

a. Item #1 — Subcontracting Opportunity Description Utilized

Services are needed from a professional geoscientist with specialized expertise and experience with geologic interpretation and correlation in the Rustler Formation and other Permian Formations in the Delaware Basin of west Texas and southeastern New Mexico. These services must be provided by a registered Texas Professional Geoscientist (PG) with a minimum of 25 years of experience in both field and desktop based categorization of constituent members of the Rustler Formation (e.g., Culebra Dolomite, Magenta Dolomite, etc.). The professional is also required to have proven experience with the evaluation of geophysical logs to determine the extent of halite cementation within the various Member units of the Rustler Formation. This experience must be demonstrated through scientific publications in peer-reviewed journals.

a. Item #2 — Subcontracting Opportunity Description Utilized

Services are needed from a professional petrophysicist to oversee the analysis and interpretation of a number of geophysical logs run through the Rustler Formation in west Texas and southeastern New Mexico. The results will include the development of a petrophysical workflow that will guide the calculation of formation parameters within the Rustler Aquifer. The petrophysicist must have at least 25 years of experience in developing algorithms used to correct porosity measurements from neutron logs to formation parameters, a proven track record in the calculation of water resistivity (Rw) from true deep resistivity (Rt) from a variety of geophysical logs, and be able to determine correction factors for the logs by grouping them into geographic regions. The professional will possess in-depth research skills as evidenced by at least two of the following: publishing multiple scientific articles/papers involving log analysis in peer-reviewed journals, serving as editor/co-editor of professional journals focused on log analysis, and conducting well log analysis workshops and training courses for the oil and gas industry.

a. Item #3 — Subcontracting Opportunity Description Utilized

Services are needed by a company specializing in the acquisition and commercial distribution of geophysical borehole logs. Specifically, the company will have an established database containing geophysical borehole logs that are readily searchable by API numbers, log type, top and bottom logging interval, formation at total depth, and other search criteria. The successful execution of the subject project requires that the company be able to furnish specific geophysical logs in a redacted manner such that they: 1) retain important information related to characterizing the water quality of groundwater resources, 2) can be released to state agencies for public distribution; and 3) can be acquired at a competitive price. The company's database must contain logs located within the footprint of the Rustler Aquifer in western Texas and southeastern New Mexico. In addition, the company must provide at least 300 geophysical logs that are geographically distributed where it has been confirmed that the top logging interval is above the top of the Rustler Formation and the bottom logging interval is below the base of the Rustler Formation.

a. Item #4 — Subcontracting Opportunity Description Utilized

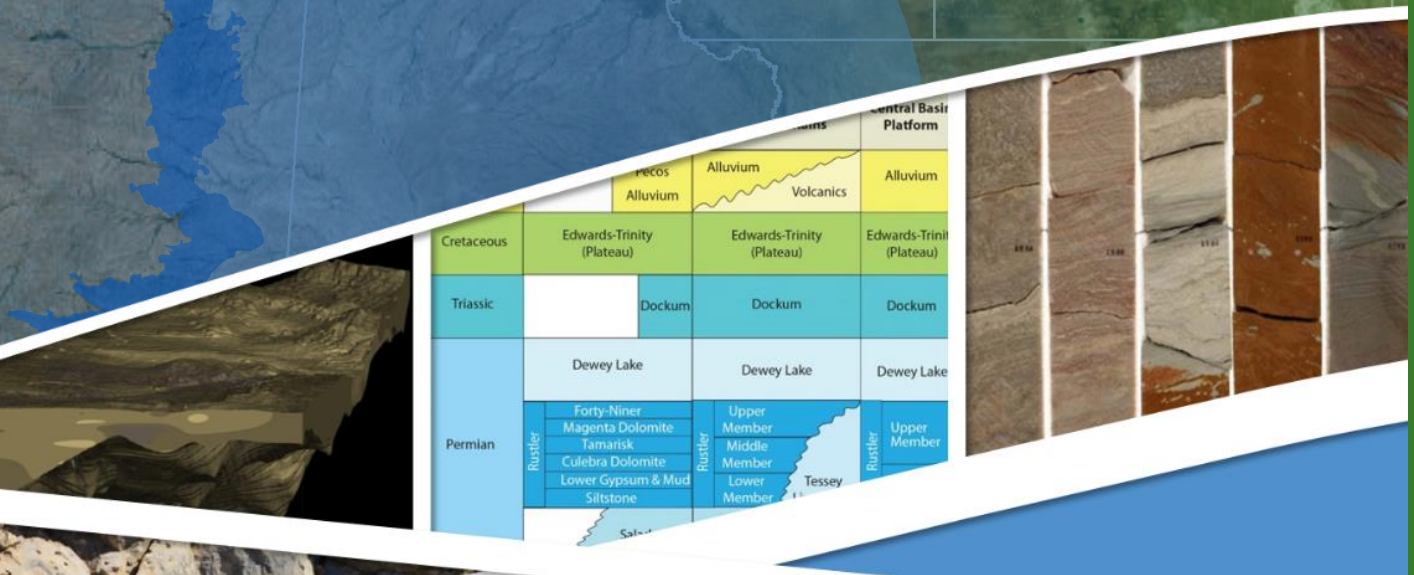
Services are requested from a technical expert to review hydrogeological data to identify geological constraints that could act as hydraulic barriers to groundwater flow. The respondent will need to have a Ph.D in the geological sciences and have at least 30 years of experience conducting research regarding groundwater flow, flow and transport, hydrogeophysics, and sedimentary basin hydrogeology. The

respondent will need to demonstrate their expertise and capabilities through conference presentations, reports, peer-reviewed journal articles, books, and field guides. Demonstration should include a list of 100 or more peer-review articles in journals, experience as an editor or manuscript reviewer of at least 10 scientific journals, and a reviewer of water research proposals for at least 10 major agencies. The respondent should also be aware of the water resources in Texas and knowledgeable about the Groundwater Availability Program managed by the Texas Water Development Board.

a. Item #5 — Subcontracting Opportunity Description Utilized

Services are required from a technical expert to assess the feasibility of desalination of brackish groundwater in Texas. The expert must be have a PhD in civil engineering, or a related discipline, be a registered Professional Engineer in Texas, have 15 years of experience in water quality assessments, and have knowledge regarding the potential problems associated with desalination of a blend of brackish groundwater and ocean water. Additional experience requirements include: conducting pilot testing of multiple desalination systems in Texas; a proven track record of applying the four-phase protocol to meet the Texas Commission of Environmental Quality requirements for reverse osmosis membrane systems; and the design of a water treatment system that has successfully removed radium from groundwater.

OPPORTUNITY #1
HUB and Trade/Development Center Notifications



INTERA
GEOSCIENCE & ENGINEERING SOLUTIONS

HUB Notifications for Opportunity #1

ACI Group, Inc.

INTERA
GEOSCIENCE & ENGINEERING SOLUTIONS

1812 Centre Creek Drive, Suite 300
Austin, Texas 78754
Tel: 512 425 2000
Fax: 512 727 4821

Fax

To:	Ms. Janna Peel Paulson	**From:**	Van Kelley, PG
Company:	ACI Group, LLC		
Fax:	512-306-0974	**Pages:**	3 pages (including Subcontracting Notification Form)
Phone:	512-347-9000	**Date:**	11/12/15
Re:	**Subcontracting Opportunity to Provide Geological Consulting by Developing the Structural Framework of the Rustler Formation and its Constituent Member Units**		

Dear Ms. Paulson:

INTERA Incorporated (INTERA) is responding to a reissued solicitation from the Texas Water Development Board (TWDB) to conduct a study of brackish groundwater production zones in the Rustler Aquifer. The original RFQ (#580-16-RFQ0007) was canceled and reissued as RFQ #580-16-RFQ0008 on November 10, 2015. Per the TWDB's Request for Qualifications, INTERA is soliciting subcontracting services from certified Historically Underutilized Businesses (HUBs) on the Centralized Master Bidders List (CMBL). We are currently developing a subcontracting plan wherein HUB firms are identified that may be selected to work under this contract. This letter has been sent to solicit your interest in performing the identified scope of work (a HUB Subcontracting Opportunity Notification Form is attached) on this project as a subcontractor to INTERA. While we recognize that the scopes and required qualifications are very specific in nature, we view this expertise and experience as critical to winning, and subsequently executing, this project. If there is interest, and you have the capabilities and experience to perform this scope, please fax (512-727-4821) or email (vkelley@intera.com) a written statement to Van Kelley. INTERA will, at its sole discretion, determine which firms are selected for opportunities under this contract. The scope of work and requirements are listed below:

> Services are needed from a professional geoscientist with specialized expertise and experience with geologic interpretation and correlation in the Rustler Formation and other Permian Formations in the Delaware Basin of west Texas and southeastern New Mexico. These services must be provided by a registered Texas Professional Geoscientist (PG) with a minimum of 25 years of experience in both field and desktop based categorization of constituent members of the Rustler Formation (e.g., Culebra Dolomite, Magenta Dolomite, etc.). The professional is also required to have proven experience with the evaluation of geophysical logs to determine the extent of halite cementation within the various Member units of the Rustler Formation. This experience must be demonstrated through scientific publications in peer-reviewed journals.

In order to evaluate and subsequently incorporate subcontractor qualifications/experience into INTERA's Statement of Qualifications to TWDB, please confirm your interest within **seven** working days of receiving this notice **(i.e., no later than 5:00 pm on Monday, November 23, 2015)**. We look forward to your response.

Sincerely,

Van Kelley, PG
Sr. Vice President/Project Manager

Rev 09/15

HUB Subcontracting Opportunity Notification Form

In accordance with Texas Gov't Code, Chapter 2161, each state agency that considers entering into a contract with an expected value of $100,000 or more shall, before the agency solicits bids, proposals, offers, or other applicable expressions of interest, determine whether subcontracting opportunities are probable under the contract. The state agency I have identified below in **Section B** has determined that subcontracting opportunities are probable under the requisition to which my company will be responding.

34 Texas Administrative Code, §20.14 requires all respondents (prime contractors) bidding on the contract to provide notice of each of their subcontracting opportunities to at least three (3) Texas certified HUBs (who work within the respective industry applicable to the subcontracting opportunity), and allow the HUBs at least seven (7) working days to respond to the notice prior to the respondent submitting its bid response to the contracting agency. In addition, at least seven (7) working days prior to submitting its bid response to the contracting agency, the respondent must provide notice of each of its subcontracting opportunities to two (2) or more trade organizations or development centers (in Texas) that serves members of groups (i.e., Asian Pacific American, Black American, Hispanic American, Native American, Woman, Service Disabled Veteran) identified in Texas Administrative Code, §20.11(19)(C).

We respectfully request that vendors interested in bidding on the subcontracting opportunity scope of work identified in **Section C, Item 2**, reply no later than the date and time identified in **Section C, Item 1**. Submit your response to the point-of-contact referenced in **Section A**.

SECTION: A PRIME CONTRACTOR'S INFORMATION

Company Name: INTERA Incorporated
State of Texas VID #: 1743010638900
Point-of-Contact: Mr. Van Kelley, PG
Phone #: 512-425-2047
E-mail Address: vkelley@intera.com
Fax #: 512-727-4821

SECTION: B CONTRACTING STATE AGENCY AND REQUISITION INFORMATION

Agency Name: Texas Water Development Board
Point-of-Contact: Ms. Tina Newstrom
Phone #: 512-463-7825
Requisition #: Request for Qualifications to Conduct a Study of Brackish Groundwater Production Zones in the Rustler Aquifer. RFP #580-16-RFQ0008
Bid Open Date: 11/24/2015 (mm/dd/yyyy)

SECTION: C SUBCONTRACTING OPPORTUNITY RESPONSE DUE DATE, DESCRIPTION, REQUIREMENTS AND RELATED INFORMATION

1. Potential Subcontractor's Bid Response Due Date:

If you would like for our company to consider your company's bid for the subcontracting opportunity identified below in Item 2, we must receive your bid response no later than 5:00 PM (Central Time) on 11/23/2015 (Date (mm/dd/yyyy)).

In accordance with 34 TAC §20.14, each notice of subcontracting opportunity shall be provided to at least three (3) Texas certified HUBs, and allow the HUBs at least seven (7) working days to respond to the notice prior to submitting our bid response to the contracting agency. In addition, at least seven (7) working days prior to us submitting our bid response to the contracting agency, we must provide notice of each of our subcontracting opportunities to two (2) or more trade organizations or development centers (in Texas) that serves members of groups (i.e., Asian Pacific American, Black American, Hispanic American, Native American, Woman, Service Disabled Veteran) identified in Texas Administrative Code, §20.11(19)(C).

(A working day is considered a normal business day of a state agency, not including weekends, federal or state holidays, or days the agency is declared closed by its executive officer. The initial day the subcontracting opportunity notice is sent/provided to the HUBs and to the trade organizations or development centers is considered to be "day zero" and does not count as one of the seven (7) working days.)

2. Subcontracting Opportunity Scope of Work:

INTERA requires technical consulting services from a professional geoscientist with specialized expertise and experience with geologic interpretation and correlation in the Rustler Formation and other Permian Formations in the Delaware Basin of west Texas and southeastern New Mexico.

3. Required Qualifications: ☐ - Not Applicable

These services must be provided by a registered Texas Professional Geoscientist (PG) with a minimum of 25 years of experience in both field and desktop based categorization of constituent members of the Rustler Formation (e.g., Culebra Dolomite, Magenta Dolomite, etc.). The professional is also required to have proven experience with the evaluation of geophysical logs to determine the extent of halite cementation within the various Member units of the Rustler Formation. This experience must be demonstrated through scientific publications in peer-reviewed journals.

4. Bonding/Insurance Requirements: ☐ - Not Applicable

Subcontractor is solely responsible for obtaining sufficient insurance in accordance with the general standards and practices of the industry or governmental entity.

5. Location to review plans/specifications: ☐ - Not Applicable

Request for Qualifications is available on the Texas Water Development Board's website at:
www.twdb.texas.gov/about/contract_admin/request/rfq0008/index.asp or
the Electronic State Business Daily at: esbd.cpa.state.tx.us/bid_show.cfm?bidid=121146

Amanda Derechailo

From: NoReply@MyFax.com
Sent: Thursday, November 12, 2015 4:29 PM
To: Amanda Derechailo
Subject: Successful transmission to 15123060974. Re: Subcontracting Opportunity to Provide Geological Consulting by Developing the Structural Framework of the Rustler Formation and its Constituent Member Units

Dear INTERA,

Re: Subcontracting Opportunity to Provide Geological Consulting by Developing the Structural Framework of the Rustler Formation and its Constituent Member Units

The 3 page fax you sent through MyFax to 15123060974 was successfully transmitted at 2015-11-12 22:29:21 (GMT).

The length of transmission was 178 seconds

The receiving machine's fax ID: 512

If you need assistance, please visit our online help center at www.myfax.com/support.
Thank you for using the MyFax service.

Best Regards,
The MyFax Team

Contact Customer Support

Hours: 24 hours per day, 7 days a week.
Email: support@myfax.com

North America
Toll-Free: (866) 563-9212

UK
Free Phone: 0808 804 0015
International: (613) 260-6325

1

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Horizon Environmental Services, Inc.

INTERA
GEOSCIENCE & ENGINEERING SOLUTIONS
1812 Centre Creek Drive, Suite 300
Austin, Texas 78754
Tel: 512 425 2000
Fax: 512 727 4821

Fax

To:	Ms. JoAnn Wiersema/Ms. Lynda Sherrod	**From:**	Van Kelley, PG
Company:	Horizon Environmental Services, Inc.		
Fax:	512-328-1804	**Pages:**	3 pages (including Subcontracting Notification Form)
Phone:	512-328-2430	**Date:**	11/12/15
Re:	**Subcontracting Opportunity to Provide Geological Consulting by Developing the Structural Framework of the Rustler Formation and its Constituent Member Units**		

Dear Ms. Wiersema and Ms. Sherrod:

INTERA Incorporated (INTERA) is responding to a reissued solicitation from the Texas Water Development Board (TWDB) to conduct a study of brackish groundwater production zones in the Rustler Aquifer. The original RFQ (#580-16-RFQ0007) was canceled and reissued as RFQ #580-16-RFQ0008 on November 10, 2015. Per the TWDB's Request for Qualifications, INTERA is soliciting subcontracting services from certified Historically Underutilized Businesses (HUBs) on the Centralized Master Bidders List (CMBL). We are currently developing a subcontracting plan wherein HUB firms are identified that may be selected to work under this contract. This letter has been sent to solicit your interest in performing the identified scope of work (a separate HUB Subcontracting Opportunity Notification Form is attached) on this project as a subcontractor to INTERA. While we recognize that the scopes and required qualifications are very specific in nature, we view this expertise and experience as critical to winning, and subsequently executing, this project. If there is interest, and you have the capabilities and experience to perform this scope, please fax (512-727-4821) or email (vkelley@intera.com) a written statement to Van Kelley. INTERA will, at its sole discretion, determine which firms are selected for opportunities under this contract. The scope of work and requirements are listed below:

> Services are needed from a professional geoscientist with specialized expertise and experience with geologic interpretation and correlation in the Rustler Formation and other Permian Formations in the Delaware Basin of west Texas and southeastern New Mexico. These services must be provided by a registered Texas Professional Geoscientist (PG) with a minimum of 25 years of experience in both field and desktop based categorization of constituent members of the Rustler Formation (e.g., Culebra Dolomite, Magenta Dolomite, etc.). The professional is also required to have proven experience with the evaluation of geophysical logs to determine the extent of halite cementation within the various Member units of the Rustler Formation. This experience must be demonstrated through scientific publications in peer-reviewed journals.

In order to evaluate and subsequently incorporate subcontractor qualifications/experience into INTERA's Statement of Qualifications to TWDB, please confirm your interest within **seven** working days of receiving this notice **(i.e., no later than 5:00 pm on Monday, November 23, 2015)**. We look forward to your response.

Sincerely,

Van Kelley, PG
Sr. Vice President/Project Manager

Rev 09/15

HUB Subcontracting Opportunity Notification Form

In accordance with Texas Gov't Code, Chapter 2161, each state agency that considers entering into a contract with an expected value of $100,000 or more shall, before the agency solicits bids, proposals, offers, or other applicable expressions of interest, determine whether subcontracting opportunities are probable under the contract. The state agency I have identified below in **Section B** has determined that subcontracting opportunities are probable under the requisition to which my company will be responding.

34 Texas Administrative Code, §20.14 requires all respondents (prime contractors) bidding on the contract to provide notice of each of their subcontracting opportunities to at least three (3) Texas certified HUBs (who work within the respective industry applicable to the subcontracting opportunity), and allow the HUBs at least seven (7) working days to respond to the notice prior to the respondent submitting its bid response to the contracting agency. In addition, at least seven (7) working days prior to submitting its bid response to the contracting agency, the respondent must provide notice of each of its subcontracting opportunities to two (2) or more trade organizations or development centers (in Texas) that serves members of groups (i.e., Asian Pacific American, Black American, Hispanic American, Native American, Woman, Service Disabled Veteran) identified in Texas Administrative Code, §20.11(19)(C).

We respectfully request that vendors interested in bidding on the subcontracting opportunity scope of work identified in **Section C, Item 2**, reply no later than the date and time identified in **Section C, Item 1**. Submit your response to the point-of-contact referenced in **Section A**.

SECTION: A PRIME CONTRACTOR'S INFORMATION

Company Name: INTERA Incorporated
State of Texas VID #: 1743010638900
Point-of-Contact: Mr. Van Kelley, PG
Phone #: 512-425-2047
E-mail Address: vkelley@intera.com
Fax #: 512-727-4821

SECTION: B CONTRACTING STATE AGENCY AND REQUISITION INFORMATION

Agency Name: Texas Water Development Board
Point-of-Contact: Ms. Tina Newstrom
Phone #: 512-463-7825
Requisition #: Request for Qualifications to Conduct a Study of Brackish Groundwater Production Zones in the Rustler Aquifer. RFP #580-16-RFQ0008
Bid Open Date: 11/24/2015 (mm/dd/yyyy)

SECTION: C SUBCONTRACTING OPPORTUNITY RESPONSE DUE DATE, DESCRIPTION, REQUIREMENTS AND RELATED INFORMATION

1. Potential Subcontractor's Bid Response Due Date:

If you would like for our company to consider your company's bid for the subcontracting opportunity identified below in Item 2,

we must receive your bid response no later than **5:00 PM** (Central Time) on **11/23/2015** (Date (mm/dd/yyyy)).

In accordance with 34 TAC §20.14, each notice of subcontracting opportunity shall be provided to at least three (3) Texas certified HUBs, and allow the HUBs at least seven (7) working days to respond to the notice prior to submitting our bid response to the contracting agency. In addition, at least seven (7) working days prior to us submitting our bid response to the contracting agency, we must provide notice of each of our subcontracting opportunities to two (2) or more trade organizations or development centers (in Texas) that serves members of groups (i.e., Asian Pacific American, Black American, Hispanic American, Native American, Woman, Service Disabled Veteran) identified in Texas Administrative Code, §20.11(19)(C).

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2. Subcontracting Opportunity Scope of Work:

INTERA requires technical consulting services from a professional geoscientist with specialized expertise and experience with geologic interpretation and correlation in the Rustler Formation and other Permian Formations in the Delaware Basin of west Texas and southeastern New Mexico.

3. Required Qualifications: ☐ - Not Applicable

These services must be provided by a registered Texas Professional Geoscientist (PG) with a minimum of 25 years of experience in both field and desktop based categorization of constituent members of the Rustler Formation (e.g., Culebra Dolomite, Magenta Dolomite, etc.). The professional is also required to have proven experience with the evaluation of geophysical logs to determine the extent of halite cementation within the various Member units of the Rustler Formation. This experience must be demonstrated through scientific publications in peer-reviewed journals.

4. Bonding/Insurance Requirements: ☐ - Not Applicable

Subcontractor is solely responsible for obtaining sufficient insurance in accordance with the general standards and practices of the industry or governmental entity.

5. Location to review plans/specifications: ☐ - Not Applicable

Request for Qualifications is available on the Texas Water Development Board's website at:
www.twdb.texas.gov/about/contract_admin/request/rfq0008/index.asp or
the Electronic State Business Daily at: esbd.cpa.state.tx.us/bid_show.cfm?bidid=121146

Amanda Derechailo

From: NoReply@MyFax.com
Sent: Thursday, November 12, 2015 4:37 PM
To: Amanda Derechailo
Subject: Successful transmission to 15123281804. Re: Subcontracting Opportunity to Provide Geological Consulting by Developing the Structural Framework of the Rustler Formation and its Constituent Member Units

Dear INTERA,

Re: Subcontracting Opportunity to Provide Geological Consulting by Developing the Structural Framework of the Rustler Formation and its Constituent Member Units

The 3 page fax you sent through MyFax to 15123281804 was successfully transmitted at 2015-11-12 22:37:21 (GMT).

The length of transmission was 203 seconds

The receiving machine's fax ID: 5123281804

If you need assistance, please visit our online help center at www.myfax.com/support.
Thank you for using the MyFax service.

Best Regards,
The MyFax Team

Contact Customer Support

Hours: 24 hours per day, 7 days a week.
Email: support@myfax.com

North America
Toll-Free: (866) 563-9212

UK
Free Phone: 0808 804 0015
International: (613) 260-6325

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Medina Consulting Company, Inc.

INTERA
GEOSCIENCE & ENGINEERING SOLUTIONS
1812 Centre Creek Drive, Suite 300
Austin, Texas 78754
Tel: 512 425 2000
Fax: 512 727 4821

Fax

To:	Ms. Katherine M. Mc Gookey	**From:**	Van Kelley, PG
Company:	Medina Consulting Company, Inc.		
Fax:	210-694-4577	**Pages:**	3 pages (including Subcontracting Notification Form)
Phone:	210-694-4545	**Date:**	11/12/15
Re:	**Subcontracting Opportunity to Provide Geological Consulting by Developing the Structural Framework of the Rustler Formation and its Constituent Member Units**		

Dear Ms. Mc Gookey:

INTERA Incorporated (INTERA) is responding to a reissued solicitation from the Texas Water Development Board (TWDB) to conduct a study of brackish groundwater production zones in the Rustler Aquifer. The original RFQ (#580-16-RFQ0007) was canceled and reissued as RFQ #580-16-RFQ0008 on November 10, 2015. Per the TWDB's Request for Qualifications, INTERA is soliciting subcontracting services from certified Historically Underutilized Businesses (HUBs) on the Centralized Master Bidders List (CMBL). We are currently developing a subcontracting plan wherein HUB firms are identified that may be selected to work under this contract. This letter has been sent to solicit your interest in performing the identified scope of work (a separate HUB Subcontracting Opportunity Notification Form is attached) on this project as a subcontractor to INTERA. While we recognize that the scopes and required qualifications are very specific in nature, we view this expertise and experience as critical to winning, and subsequently executing, this project. If there is interest, and you have the capabilities and experience to perform this scope, please fax (512-727-4821) or email (vkelley@intera.com) a written statement to Van Kelley. INTERA will, at its sole discretion, determine which firms are selected for opportunities under this contract. The scope of work and requirements are listed below:

> Services are needed from a professional geoscientist with specialized expertise and experience with geologic interpretation and correlation in the Rustler Formation and other Permian Formations in the Delaware Basin of west Texas and southeastern New Mexico. These services must be provided by a registered Texas Professional Geoscientist (PG) with a minimum of 25 years of experience in both field and desktop based categorization of constituent members of the Rustler Formation (e.g., Culebra Dolomite, Magenta Dolomite, etc.). The professional is also required to have proven experience with the evaluation of geophysical logs to determine the extent of halite cementation within the various Member units of the Rustler Formation. This experience must be demonstrated through scientific publications in peer-reviewed journals.

In order to evaluate and subsequently incorporate subcontractor qualifications/experience into INTERA's Statement of Qualifications to TWDB, please confirm your interest within **seven** working days of receiving this notice **(i.e., no later than 5:00 pm on Monday, November 23, 2015)**. We look forward to your response.

Sincerely,

Van Kelley, PG
Sr. Vice President/Project Manager

Rev 09/15

HUB Subcontracting Opportunity Notification Form

In accordance with Texas Gov't Code, Chapter 2161, each state agency that considers entering into a contract with an expected value of $100,000 or more shall, before the agency solicits bids, proposals, offers, or other applicable expressions of interest, determine whether subcontracting opportunities are probable under the contract. The state agency I have identified below in **Section B** has determined that subcontracting opportunities are probable under the requisition to which my company will be responding.

34 Texas Administrative Code, §20.14 requires all respondents (prime contractors) bidding on the contract to provide notice of each of their subcontracting opportunities to at least three (3) Texas certified HUBs (who work within the respective industry applicable to the subcontracting opportunity), and allow the HUBs at least seven (7) working days to respond to the notice prior to the respondent submitting its bid response to the contracting agency. In addition, at least seven (7) working days prior to submitting its bid response to the contracting agency, the respondent must provide notice of each of its subcontracting opportunities to two (2) or more trade organizations or development centers (in Texas) that serves members of groups (i.e., Asian Pacific American, Black American, Hispanic American, Native American, Woman, Service Disabled Veteran) identified in Texas Administrative Code, §20.11(19)(C).

We respectfully request that vendors interested in bidding on the subcontracting opportunity scope of work identified in **Section C, Item 2**, reply no later than the date and time identified in **Section C, Item 1**. Submit your response to the point-of-contact referenced in **Section A**.

SECTION: A PRIME CONTRACTOR'S INFORMATION

Company Name: INTERA Incorporated
State of Texas VID #: 1743010638900
Point-of-Contact: Mr. Van Kelley, PG
Phone #: 512-425-2047
E-mail Address: vkelley@intera.com
Fax #: 512-727-4821

SECTION: B CONTRACTING STATE AGENCY AND REQUISITION INFORMATION

Agency Name: Texas Water Development Board
Point-of-Contact: Ms. Tina Newstrom
Phone #: 512-463-7825
Requisition #: Request for Qualifications to Conduct a Study of Brackish Groundwater Production Zones in the Rustler Aquifer. RFP #580-16-RFQ0008
Bid Open Date: 11/24/2015 (mm/dd/yyyy)

SECTION: C SUBCONTRACTING OPPORTUNITY RESPONSE DUE DATE, DESCRIPTION, REQUIREMENTS AND RELATED INFORMATION

1. Potential Subcontractor's Bid Response Due Date:

If you would like for our company to consider your company's bid for the subcontracting opportunity identified below in Item 2, we must receive your bid response no later than 5:00 PM (Central Time) on 11/23/2015 (Date (mm/dd/yyyy)).

In accordance with 34 TAC §20.14, each notice of subcontracting opportunity shall be provided to at least three (3) Texas certified HUBs, and allow the HUBs at least seven (7) working days to respond to the notice prior to submitting our bid response to the contracting agency. In addition, at least seven (7) working days prior to us submitting our bid response to the contracting agency, we must provide notice of each of our subcontracting opportunities to two (2) or more trade organizations or development centers (in Texas) that serves members of groups (i.e., Asian Pacific American, Black American, Hispanic American, Native American, Woman, Service Disabled Veteran) identified in Texas Administrative Code, §20.11(19)(C).

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2. Subcontracting Opportunity Scope of Work:

INTERA requires technical consulting services from a professional geoscientist with specialized expertise and experience with geologic interpretation and correlation in the Rustler Formation and other Permian Formations in the Delaware Basin of west Texas and southeastern New Mexico.

3. Required Qualifications: ☐ - Not Applicable

These services must be provided by a registered Texas Professional Geoscientist (PG) with a minimum of 25 years of experience in both field and desktop based categorization of constituent members of the Rustler Formation (e.g., Culebra Dolomite, Magenta Dolomite, etc.). The professional is also required to have proven experience with the evaluation of geophysical logs to determine the extent of halite cementation within the various Member units of the Rustler Formation. This experience must be demonstrated through scientific publications in peer-reviewed journals.

4. Bonding/Insurance Requirements: ☐ - Not Applicable

Subcontractor is solely responsible for obtaining sufficient insurance in accordance with the general standards and practices of the industry or governmental entity.

5. Location to review plans/specifications: ☐ - Not Applicable

Request for Qualifications is available on the Texas Water Development Board's website at:
www.twdb.texas.gov/about/contract_admin/request/rfq0008/index.asp or
the Electronic State Business Daily at: esbd.cpa.state.tx.us/bid_show.cfm?bidid=121146

Amanda Derechailo

From: NoReply@MyFax.com
Sent: Thursday, November 12, 2015 4:35 PM
To: Amanda Derechailo
Subject: Successful transmission to 12106944577. Re: Subcontracting Opportunity to Provide Geological Consulting by Developing the Structural Framework of the Rustler Formation and its Constituent Member Units

Dear INTERA,

Re: Subcontracting Opportunity to Provide Geological Consulting by Developing the Structural Framework of the Rustler Formation and its Constituent Member Units

The 3 page fax you sent through MyFax to 12106944577 was successfully transmitted at 2015-11-12 22:35:08 (GMT).

The length of transmission was 175 seconds

The receiving machine's fax ID: 210 694 4577

If you need assistance, please visit our online help center at www.myfax.com/support.
Thank you for using the MyFax service.

Best Regards,
The MyFax Team

Contact Customer Support

Hours: 24 hours per day, 7 days a week.
Email: support@myfax.com

North America
Toll-Free: (866) 563-9212

UK
Free Phone: 0808 804 0015
International: (613) 260-6325

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TRADE ORGANIZATIONS AND DEVELOPMENT CENTER NOTIFICATIONS FOR OPPORTUNITY #1

Hispanic Contractors Association de San Antonio

INTERA
GEOSCIENCE & ENGINEERING SOLUTIONS

1812 Centre Creek Drive, Suite 300
Austin, Texas 78754
Tel: 512 425 2000
Fax: 512 727 4821

Fax

To:	Mr. Roy Attwood	**From:**	Van Kelley, PG
Company:	Hispanic Contractors Association de San Antonio		
Fax:	210-444-1101	**Pages:**	3 pages (including Subcontracting Notification Form)
Phone:	210-444-1101	**Date:**	11/12/15
Re:	**Subcontracting Opportunity to Provide Geological Consulting by Developing the Structural Framework of the Rustler Formation and its Constituent Member Units**		

Dear Mr. Attwood:

INTERA Incorporated (INTERA) is responding to a reissued solicitation from the Texas Water Development Board (TWDB) to conduct a study of brackish groundwater production zones in the Rustler Aquifer. The original RFQ (#580-16-RFQ0007) was canceled and reissued as RFQ #580-16-RFQ0008 on November 10, 2015. Per the TWDB's Request for Qualifications, INTERA is soliciting subcontracting services from certified Historically Underutilized Businesses (HUBs) on the Centralized Master Bidders List (CMBL). We are currently developing a subcontracting plan wherein HUB firms are identified that may be selected to work under this contract. This letter has been sent to solicit your interest in performing the identified scope of work (a separate HUB Subcontracting Opportunity Notification Form is attached) on this project as a subcontractor to INTERA. While we recognize that the scopes and required qualifications are very specific in nature, we view this expertise and experience as critical to winning, and subsequently executing, this project. If there is interest, and you have the capabilities and experience to perform this scope, please fax (512-727-4821) or email (vkelley@intera.com) a written statement to Van Kelley. INTERA will, at its sole discretion, determine which firms are selected for opportunities under this contract. The scope of work and requirements are listed below:

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Sincerely,

Van Kelley, PG
Sr. Vice President/Project Manager

Rev 09/15

HUB Subcontracting Opportunity Notification Form

In accordance with Texas Gov't Code, Chapter 2161, each state agency that considers entering into a contract with an expected value of $100,000 or more shall, before the agency solicits bids, proposals, offers, or other applicable expressions of interest, determine whether subcontracting opportunities are probable under the contract. The state agency I have identified below in **Section B** has determined that subcontracting opportunities are probable under the requisition to which my company will be responding.

34 Texas Administrative Code, §20.14 requires all respondents (prime contractors) bidding on the contract to provide notice of each of their subcontracting opportunities to at least three (3) Texas certified HUBs (who work within the respective industry applicable to the subcontracting opportunity), and allow the HUBs at least seven (7) working days to respond to the notice prior to the respondent submitting its bid response to the contracting agency. In addition, at least seven (7) working days prior to submitting its bid response to the contracting agency, the respondent must provide notice of each of its subcontracting opportunities to two (2) or more trade organizations or development centers (in Texas) that serves members of groups (i.e., Asian Pacific American, Black American, Hispanic American, Native American, Woman, Service Disabled Veteran) identified in Texas Administrative Code, §20.11(19)(C).

We respectfully request that vendors interested in bidding on the subcontracting opportunity scope of work identified in **Section C, Item 2**, reply no later than the date and time identified in **Section C, Item 1**. Submit your response to the point-of-contact referenced in **Section A**.

SECTION: A PRIME CONTRACTOR'S INFORMATION

Company Name: INTERA Incorporated
State of Texas VID #: 1743010638900
Point-of-Contact: Mr. Van Kelley, PG
Phone #: 512-425-2047
E-mail Address: vkelley@intera.com
Fax #: 512-727-4821

SECTION: B CONTRACTING STATE AGENCY AND REQUISITION INFORMATION

Agency Name: Texas Water Development Board
Point-of-Contact: Ms. Tina Newstrom
Phone #: 512-463-7825
Requisition #: Request for Qualifications to Conduct a Study of Brackish Groundwater Production Zones in the Rustler Aquifer. RFP #580-16-RFQ0008
Bid Open Date: 11/24/2015 (mm/dd/yyyy)

SECTION: C SUBCONTRACTING OPPORTUNITY RESPONSE DUE DATE, DESCRIPTION, REQUIREMENTS AND RELATED INFORMATION

1. Potential Subcontractor's Bid Response Due Date:

If you would like for our company to consider your company's bid for the subcontracting opportunity identified below in Item 2, we must receive your bid response no later than 5:00 PM Central Time on 11/23/2015 Date (mm/dd/yyyy).

In accordance with 34 TAC §20.14, each notice of subcontracting opportunity shall be provided to at least three (3) Texas certified HUBs, and allow the HUBs at least seven (7) working days to respond to the notice prior to submitting our bid response to the contracting agency. In addition, at least seven (7) working days prior to us submitting our bid response to the contracting agency, we must provide notice of each of our subcontracting opportunities to two (2) or more trade organizations or development centers (in Texas) that serves members of groups (i.e., Asian Pacific American, Black American, Hispanic American, Native American, Woman, Service Disabled Veteran) identified in Texas Administrative Code, §20.11(19)(C).

(A working day is considered a normal business day of a state agency, not including weekends, federal or state holidays, or days the agency is declared closed by its executive officer. The initial day the subcontracting opportunity notice is sent/provided to the HUBs and to the trade organizations or development centers is considered to be "day zero" and does not count as one of the seven (7) working days.)

2. Subcontracting Opportunity Scope of Work:

INTERA requires technical consulting services from a professional geoscientist with specialized expertise and experience with geologic interpretation and correlation in the Rustler Formation and other Permian Formations in the Delaware Basin of west Texas and southeastern New Mexico.

3. Required Qualifications: ☐ - Not Applicable

These services must be provided by a registered Texas Professional Geoscientist (PG) with a minimum of 25 years of experience in both field and desktop based categorization of constituent members of the Rustler Formation (e.g., Culebra Dolomite, Magenta Dolomite, etc.). The professional is also required to have proven experience with the evaluation of geophysical logs to determine the extent of halite cementation within the various Member units of the Rustler Formation. This experience must be demonstrated through scientific publications in peer-reviewed journals.

4. Bonding/Insurance Requirements: ☐ - Not Applicable

Subcontractor is solely responsible for obtaining sufficient insurance in accordance with the general standards and practices of the industry or governmental entity.

5. Location to review plans/specifications: ☐ - Not Applicable

Request for Qualifications is available on the Texas Water Development Board's website at:
www.twdb.texas.gov/about/contract_admin/request/rfq0008/index.asp or
the Electronic State Business Daily at: esbd.cpa.state.tx.us/bid_show.cfm?bidid=121146

Amanda Derechailo

From: NoReply@MyFax.com
Sent: Thursday, November 12, 2015 4:34 PM
To: Amanda Derechailo
Subject: Successful transmission to 12104441101. Re: Subcontracting Opportunity to Provide Geological Consulting by Developing the Structural Framework of the Rustler Formation and its Constituent Member Units

Dear INTERA,

Re: Subcontracting Opportunity to Provide Geological Consulting by Developing the Structural Framework of the Rustler Formation and its Constituent Member Units

The 3 page fax you sent through MyFax to 12104441101 was successfully transmitted at 2015-11-12 22:33:40 (GMT).

The length of transmission was 170 seconds

The receiving machine's fax ID: 2104441101

If you need assistance, please visit our online help center at www.myfax.com/support.
Thank you for using the MyFax service.

Best Regards,
The MyFax Team

Contact Customer Support

Hours: 24 hours per day, 7 days a week
Email: support@myfax.com

North America
Toll-Free: (866) 563-9212

UK
Free Phone: 0808 804 0015
International: (613) 260-6325

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Houston Minority Supplier Development Council

INTERA
GEOSCIENCE & ENGINEERING SOLUTIONS
1812 Centre Creek Drive, Suite 300
Austin, Texas 78754
Tel: 512 425 2000
Fax: 512 727 4821

Fax

To:	Ms. Angela Freeman	**From:**	Van Kelley, PG
Company:	Houston Minority Supplier Development Council		
Fax:	713-271-9770	**Pages:**	3 pages (including Subcontracting Notification Form)
Phone:	713-271-7805	**Date:**	11/12/15
Re:	**Subcontracting Opportunity to Provide Geological Consulting by Developing the Structural Framework of the Rustler Formation and its Constituent Member Units**		

Dear Ms. Freeman:

INTERA Incorporated (INTERA) is responding to a reissued solicitation from the Texas Water Development Board (TWDB) to conduct a study of brackish groundwater production zones in the Rustler Aquifer. The original RFQ (#580-16-RFQ0007) was canceled and reissued as RFQ #580-16-RFQ0008 on November 10, 2015. Per the TWDB's Request for Qualifications, INTERA is soliciting subcontracting services from certified Historically Underutilized Businesses (HUBs) on the Centralized Master Bidders List (CMBL). We are currently developing a subcontracting plan wherein HUB firms are identified that may be selected to work under this contract. This letter has been sent to solicit your interest in performing the identified scope of work (a separate HUB Subcontracting Opportunity Notification Form is attached) on this project as a subcontractor to INTERA. While we recognize that the scopes and required qualifications are very specific in nature, we view this expertise and experience as critical to winning, and subsequently executing, this project. If there is interest, and you have the capabilities and experience to perform this scope, please fax (512-727-4821) or email (vkelley@intera.com) a written statement to Van Kelley. INTERA will, at its sole discretion, determine which firms are selected for opportunities under this contract. The scope of work and requirements are listed below:

> Services are needed from a professional geoscientist with specialized expertise and experience with geologic interpretation and correlation in the Rustler Formation and other Permian Formations in the Delaware Basin of west Texas and southeastern New Mexico. These services must be provided by a registered Texas Professional Geoscientist (PG) with a minimum of 25 years of experience in both field and desktop based categorization of constituent members of the Rustler Formation (e.g., Culebra Dolomite, Magenta Dolomite, etc.). The professional is also required to have proven experience with the evaluation of geophysical logs to determine the extent of halite cementation within the various Member units of the Rustler Formation. This experience must be demonstrated through scientific publications in peer-reviewed journals.

In order to evaluate and subsequently incorporate subcontractor qualifications/experience into INTERA's Statement of Qualifications to TWDB, please confirm your interest within **seven** working days of receiving this notice **(i.e., no later than 5:00 pm on Monday, November 23, 2015)**. We look forward to your response.

Sincerely,

Van Kelley, PG
Sr. Vice President/Project Manager

Rev 09/15

HUB Subcontracting Opportunity Notification Form

In accordance with Texas Gov't Code, Chapter 2161, each state agency that considers entering into a contract with an expected value of $100,000 or more shall, before the agency solicits bids, proposals, offers, or other applicable expressions of interest, determine whether subcontracting opportunities are probable under the contract. The state agency I have identified below in **Section B** has determined that subcontracting opportunities are probable under the requisition to which my company will be responding.

34 Texas Administrative Code, §20.14 requires all respondents (prime contractors) bidding on the contract to provide notice of each of their subcontracting opportunities to at least three (3) Texas certified HUBs (who work within the respective industry applicable to the subcontracting opportunity), and allow the HUBs at least seven (7) working days to respond to the notice prior to the respondent submitting its bid response to the contracting agency. In addition, at least seven (7) working days prior to submitting its bid response to the contracting agency, the respondent must provide notice of each of its subcontracting opportunities to two (2) or more trade organizations or development centers (in Texas) that serves members of groups (i.e., Asian Pacific American, Black American, Hispanic American, Native American, Woman, Service Disabled Veteran) identified in Texas Administrative Code, §20.11(19)(C).

We respectfully request that vendors interested in bidding on the subcontracting opportunity scope of work identified in **Section C, Item 2**, reply no later than the date and time identified in **Section C, Item 1**. Submit your response to the point-of-contact referenced in **Section A**.

SECTION: A PRIME CONTRACTOR'S INFORMATION

Company Name: INTERA Incorporated
State of Texas VID #: 1743010638900
Point-of-Contact: Mr. Van Kelley, PG
Phone #: 512-425-2047
E-mail Address: vkelley@intera.com
Fax #: 512-727-4821

SECTION: B CONTRACTING STATE AGENCY AND REQUISITION INFORMATION

Agency Name: Texas Water Development Board
Point-of-Contact: Ms. Tina Newstrom
Phone #: 512-463-7825
Requisition #: Request for Qualifications to Conduct a Study of Brackish Groundwater Production Zones in the Rustler Aquifer. RFP #580-16-RFQ0008
Bid Open Date: 11/24/2015 (mm/dd/yyyy)

SECTION: C SUBCONTRACTING OPPORTUNITY RESPONSE DUE DATE, DESCRIPTION, REQUIREMENTS AND RELATED INFORMATION

1. Potential Subcontractor's Bid Response Due Date:

If you would like for our company to consider your company's bid for the subcontracting opportunity identified below in Item 2, we must receive your bid response no later than 5:00 PM Central Time on 11/23/2015 Date (mm/dd/yyyy).

In accordance with 34 TAC §20.14, each notice of subcontracting opportunity shall be provided to at least three (3) Texas certified HUBs, and allow the HUBs at least seven (7) working days to respond to the notice prior to submitting our bid response to the contracting agency. In addition, at least seven (7) working days prior to us submitting our bid response to the contracting agency, we must provide notice of each of our subcontracting opportunities to two (2) or more trade organizations or development centers (in Texas) that serves members of groups (i.e., Asian Pacific American, Black American, Hispanic American, Native American, Woman, Service Disabled Veteran) identified in Texas Administrative Code, §20.11(19)(C).

(A working day is considered a normal business day of a state agency, not including weekends, federal or state holidays, or days the agency is declared closed by its executive officer. The initial day the subcontracting opportunity notice is sent/provided to the HUBs and to the trade organizations or development centers is considered to be "day zero" and does not count as one of the seven (7) working days.)

2. Subcontracting Opportunity Scope of Work:

INTERA requires technical consulting services from a professional geoscientist with specialized expertise and experience with geologic interpretation and correlation in the Rustler Formation and other Permian Formations in the Delaware Basin of west Texas and southeastern New Mexico.

3. Required Qualifications: ☐ - Not Applicable

These services must be provided by a registered Texas Professional Geoscientist (PG) with a minimum of 25 years of experience in both field and desktop based categorization of constituent members of the Rustler Formation (e.g., Culebra Dolomite, Magenta Dolomite, etc.). The professional is also required to have proven experience with the evaluation of geophysical logs to determine the extent of halite cementation within the various Member units of the Rustler Formation. This experience must be demonstrated through scientific publications in peer-reviewed journals.

4. Bonding/Insurance Requirements: ☐ - Not Applicable

Subcontractor is solely responsible for obtaining sufficient insurance in accordance with the general standards and practices of the industry or governmental entity.

5. Location to review plans/specifications: ☐ - Not Applicable

Request for Qualifications is available on the Texas Water Development Board's website at:
www.twdb.texas.gov/about/contract_admin/request/rfq0008/index.asp or
the Electronic State Business Daily at: esbd.cpa.state.tx.us/bid_show.cfm?bidid=121146

Amanda Derechailo

From: NoReply@MyFax.com
Sent: Thursday, November 12, 2015 4:38 PM
To: Amanda Derechailo
Subject: Successful transmission to 17132719770. Re: Subcontracting Opportunity to Provide Geological Consulting by Developing the Structural Framework of the Rustler Formation and its Constituent Member Units

Dear INTERA,

Re: Subcontracting Opportunity to Provide Geological Consulting by Developing the Structural Framework of the Rustler Formation and its Constituent Member Units

The 3 page fax you sent through MyFax to 17132719770 was successfully transmitted at 2015-11-12 22:37:37 (GMT).

The length of transmission was 122 seconds

The receiving machine's fax ID: 713 271 9770

If you need assistance, please visit our online help center at www.myfax.com/support.
Thank you for using the MyFax service.

Best Regards,
The MyFax Team

Contact Customer Support

Hours: 24 hours per day, 7 days a week.
Email: support@myfax.com

North America
Toll-Free: (866) 563-9212

UK
Free Phone: 0808 804 0015
International: (613) 260-6325

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Southwest Minority Supplier Development Council

INTERA
GEOSCIENCE & ENGINEERING SOLUTIONS
1812 Centre Creek Drive, Suite 300
Austin, Texas 78754
Tel: 512 425 2000
Fax: 512 727 4821

Fax

To:	Ms. Maggie Trevino	**From:**	Van Kelley, PG
Company:	Southwest Minority Supplier Development Council		
Fax:	512-386-8988	**Pages:**	3 pages (including Subcontracting Notification Form)
Phone:	512-386-8766	**Date:**	11/12/15
Re:	**Subcontracting Opportunity to Provide Geological Consulting by Developing the Structural Framework of the Rustler Formation and its Constituent Member Units**		

Dear Ms. Trevino:

INTERA Incorporated (INTERA) is responding to a reissued solicitation from the Texas Water Development Board (TWDB) to conduct a study of brackish groundwater production zones in the Rustler Aquifer. The original RFQ (#580-16-RFQ0007) was canceled and reissued as RFQ #580-16-RFQ0008 on November 10, 2015. Per the TWDB's Request for Qualifications, INTERA is soliciting subcontracting services from certified Historically Underutilized Businesses (HUBs) on the Centralized Master Bidders List (CMBL). We are currently developing a subcontracting plan wherein HUB firms are identified that may be selected to work under this contract. This letter has been sent to solicit your interest in performing the identified scope of work (a separate HUB Subcontracting Opportunity Notification Form is attached) on this project as a subcontractor to INTERA. While we recognize that the scopes and required qualifications are very specific in nature, we view this expertise and experience as critical to winning, and subsequently executing, this project. If there is interest, and you have the capabilities and experience to perform this scope, please fax (512-727-4821) or email (vkelley@intera.com) a written statement to Van Kelley. INTERA will, at its sole discretion, determine which firms are selected for opportunities under this contract. The scope of work and requirements are listed below:

> Services are needed from a professional geoscientist with specialized expertise and experience with geologic interpretation and correlation in the Rustler Formation and other Permian Formations in the Delaware Basin of west Texas and southeastern New Mexico. These services must be provided by a registered Texas Professional Geoscientist (PG) with a minimum of 25 years of experience in both field and desktop based categorization of constituent members of the Rustler Formation (e.g., Culebra Dolomite, Magenta Dolomite, etc.). The professional is also required to have proven experience with the evaluation of geophysical logs to determine the extent of halite cementation within the various Member units of the Rustler Formation. This experience must be demonstrated through scientific publications in peer-reviewed journals.

In order to evaluate and subsequently incorporate subcontractor qualifications/experience into INTERA's Statement of Qualifications to TWDB, please confirm your interest within **seven** working days of receiving this notice **(i.e., no later than 5:00 pm on Monday, November 23, 2015)**. We look forward to your response.

Sincerely,

Van Kelley, PG
Sr. Vice President/Project Manager

Rev. 09/15

HUB Subcontracting Opportunity Notification Form

In accordance with Texas Gov't Code, Chapter 2161, each state agency that considers entering into a contract with an expected value of $100,000 or more shall, before the agency solicits bids, proposals, offers, or other applicable expressions of interest, determine whether subcontracting opportunities are probable under the contract. The state agency I have identified below in **Section B** has determined that subcontracting opportunities are probable under the requisition to which my company will be responding.

34 Texas Administrative Code, §20.14 requires all respondents (prime contractors) bidding on the contract to provide notice of each of their subcontracting opportunities to at least three (3) Texas certified HUBs (who work within the respective industry applicable to the subcontracting opportunity), and allow the HUBs at least seven (7) working days to respond to the notice prior to the respondent submitting its bid response to the contracting agency. In addition, at least seven (7) working days prior to submitting its bid response to the contracting agency, the respondent must provide notice of each of its subcontracting opportunities to two (2) or more trade organizations or development centers (in Texas) that serves members of groups (i.e., Asian Pacific American, Black American, Hispanic American, Native American, Woman, Service Disabled Veteran) identified in Texas Administrative Code, §20.11(19)(C).

We respectfully request that vendors interested in bidding on the subcontracting opportunity scope of work identified in **Section C, Item 2**, reply no later than the date and time identified in **Section C, Item 1**. Submit your response to the point-of-contact referenced in **Section A**.

SECTION: A PRIME CONTRACTOR'S INFORMATION

Company Name: INTERA Incorporated
State of Texas VID #: 1743010638900
Point-of-Contact: Mr. Van Kelley, PG
Phone #: 512-425-2047
E-mail Address: vkelley@intera.com
Fax #: 512-727-4821

SECTION: B CONTRACTING STATE AGENCY AND REQUISITION INFORMATION

Agency Name: Texas Water Development Board
Point-of-Contact: Ms. Tina Newstrom
Phone #: 512-463-7825
Requisition #: Request for Qualifications to Conduct a Study of Brackish Groundwater Production Zones in the Rustler Aquifer. RFP #580-16-RFQ0008
Bid Open Date: 11/24/2015 (mm/dd/yyyy)

SECTION: C SUBCONTRACTING OPPORTUNITY RESPONSE DUE DATE, DESCRIPTION, REQUIREMENTS AND RELATED INFORMATION

1. Potential Subcontractor's Bid Response Due Date:

If you would like for our company to consider your company's bid for the subcontracting opportunity identified below in Item 2, we must receive your bid response no later than 5:00 PM (Central Time) on 11/23/2015 (Date (mm/dd/yyyy)).

In accordance with 34 TAC §20.14, each notice of subcontracting opportunity shall be provided to at least three (3) Texas certified HUBs, and allow the HUBs at least seven (7) working days to respond to the notice prior to submitting our bid response to the contracting agency. In addition, at least seven (7) working days prior to us submitting our bid response to the contracting agency, we must provide notice of each of our subcontracting opportunities to two (2) or more trade organizations or development centers (in Texas) that serves members of groups (i.e., Asian Pacific American, Black American, Hispanic American, Native American, Woman, Service Disabled Veteran) identified in Texas Administrative Code, §20.11(19)(C).

(A working day is considered a normal business day of a state agency, not including weekends, federal or state holidays, or days the agency is declared closed by its executive officer. The initial day the subcontracting opportunity notice is sent/provided to the HUBs and to the trade organizations or development centers is considered to be "day zero" and does not count as one of the seven (7) working days.)

2. Subcontracting Opportunity Scope of Work:

INTERA requires technical consulting services from a professional geoscientist with specialized expertise and experience with geologic interpretation and correlation in the Rustler Formation and other Permian Formations in the Delaware Basin of west Texas and southeastern New Mexico.

3. Required Qualifications: ☐ - Not Applicable

These services must be provided by a registered Texas Professional Geoscientist (PG) with a minimum of 25 years of experience in both field and desktop based categorization of constituent members of the Rustler Formation (e.g., Culebra Dolomite, Magenta Dolomite, etc.). The professional is also required to have proven experience with the evaluation of geophysical logs to determine the extent of halite cementation within the various Member units of the Rustler Formation. This experience must be demonstrated through scientific publications in peer-reviewed journals.

4. Bonding/Insurance Requirements: ☐ - Not Applicable

Subcontractor is solely responsible for obtaining sufficient insurance in accordance with the general standards and practices of the industry or governmental entity.

5. Location to review plans/specifications: ☐ - Not Applicable

Request for Qualifications is available on the Texas Water Development Board's website at:
www.twdb.texas.gov/about/contract_admin/request/rfq0008/index.asp or
the Electronic State Business Daily at: esbd.cpa.state.tx.us/bid_show.cfm?bidid=121146

Amanda Derechailo

From: NoReply@MyFax.com
Sent: Thursday, November 12, 2015 4:33 PM
To: Amanda Derechailo
Subject: Successful transmission to 15123868988. Re: Subcontracting Opportunity to Provide Geological Consulting by Developing the Structural Framework of the Rustler Formation and its Constituent Member Units

Dear INTERA,

Re: Subcontracting Opportunity to Provide Geological Consulting by Developing the Structural Framework of the Rustler Formation and its Constituent Member Units

The 3 page fax you sent through MyFax to 15123868988 was successfully transmitted at 2015-11-12 22:32:41 (GMT).

The length of transmission was 182 seconds

The receiving machine's fax ID: unknown

If you need assistance, please visit our online help center at www.myfax.com/support.
Thank you for using the MyFax service.

Best Regards,
The MyFax Team

Contact Customer Support

Hours: 24 hours per day, 7 days a week.
Email: support@myfax.com

North America
Toll-Free: (866) 563-9212

UK
Free Phone: 0808 804 0015
International: (613) 260-6325

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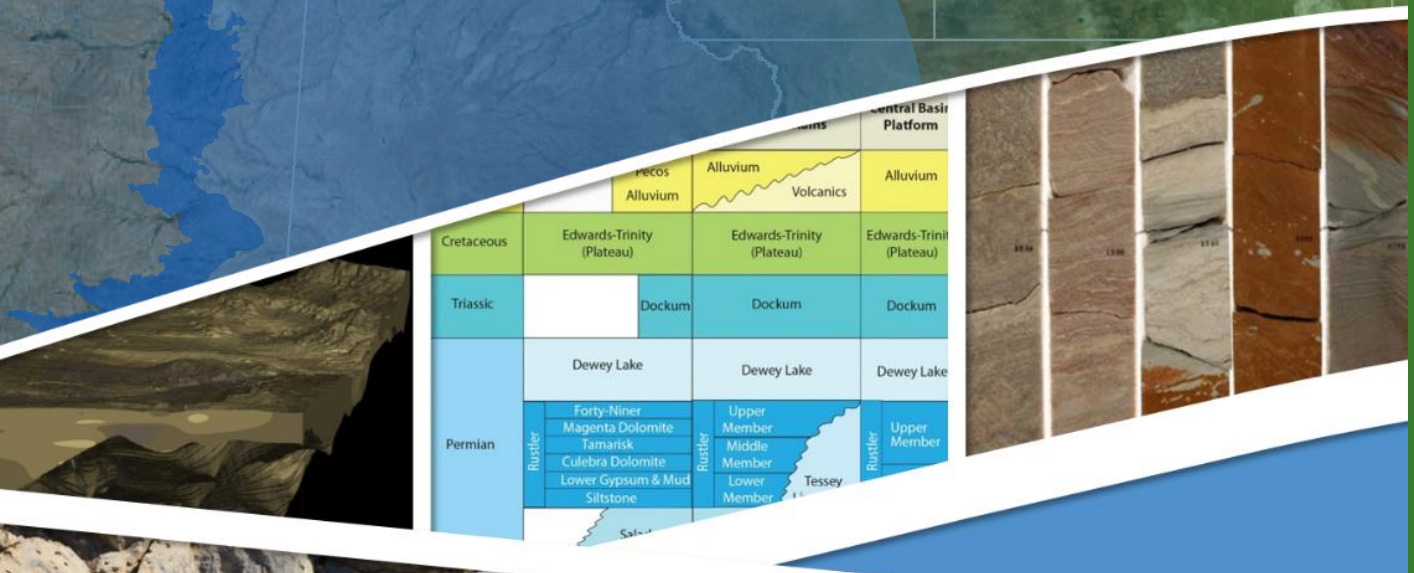
OPPORTUNITY #2
HUB and Trade/Development Center Notifications



INTERA
GEOSCIENCE & ENGINEERING SOLUTIONS

HUB NOTIFICATIONS FOR OPPORTUNITY #2

ACI Group, LLC

INTERA
GEOSCIENCE & ENGINEERING SOLUTIONS

1812 Centre Creek Drive, Suite 300
Austin, Texas 78754
Tel: 512 425 2000
Fax: 512 727 4821

Fax

To:	Ms. Janna Peel Paulson	**From:**	Van Kelley, PG
Company:	ACI Group, LLC		
Fax:	512-306-0974	**Pages:**	3 pages (including Subcontracting Notification Form)
Phone:	512-347-9000	**Date:**	11/12/15
Re:	**Subcontracting Opportunity to Provide Geological Consulting/Study by Developing a Petrophysical Workflow for the Analysis of Water Quality, Lithology and Post Depositional Diagenesis in the Rustler Aquifer of West Texas**		

Dear Ms. Paulson:

INTERA Incorporated (INTERA) is responding to a reissued solicitation from the Texas Water Development Board (TWDB) to conduct a study of brackish groundwater production zones in the Rustler Aquifer. The original RFQ (#580-16-RFQ0007) was canceled and reissued as RFQ #580-16-RFQ0008 on November 10, 2015. Per the TWDB's Request for Qualifications, INTERA is soliciting subcontracting services from certified Historically Underutilized Businesses (HUBs) on the Centralized Master Bidders List (CMBL). We are currently developing a subcontracting plan wherein HUB firms are identified that may be selected to work under this contract. This letter has been sent to solicit your interest in performing the identified scope of work (a separate HUB Subcontracting Opportunity Notification Form is attached) on this project as a subcontractor to INTERA. While we recognize that the scopes and required qualifications are very specific in nature, we view this expertise and experience as critical to winning, and subsequently executing, this project. If there is interest, and you have the capabilities and experience to perform this service, please fax (512-727-4821) or email (vkelley@intera.com) a written statement to Van Kelley. INTERA will, at its sole discretion, determine which firms are selected for opportunities under this contract. The scope of work and requirements are listed below:

> Services are needed from a professional petrophysicist to oversee the analysis and interpretation of a number of geophysical logs run through the Rustler Formation in west Texas and southeastern New Mexico. The results will include the development of a petrophysical workflow that will guide the calculation of formation parameters within the Rustler Aquifer. The petrophysicist must have at least 25 years of experience in developing algorithms used to correct porosity measurements from neutron logs to formation parameters, a proven track record in the calculation of water resistivity (Rw) from true deep resistivity (Rt) from a variety of geophysical logs, and be able to determine correction factors for the logs by grouping them into geographic regions. The professional will possess in-depth research skills as evidenced by at least two of the following: publishing multiple scientific articles/papers involving log analysis in peer-reviewed journals, serving as editor/co-editor of professional journals focused on log analysis, and conducting well log analysis workshops and training courses for the oil and gas industry.

In order to evaluate and subsequently incorporate subcontractor qualifications/experience into INTERA's Statement of Qualifications to TWDB, please confirm your interest within **seven** working days of receiving this notice **(i.e., no later than 5:00 pm on Monday, November 23, 2015)**. We look forward to your response.

Sincerely,

Van Kelley, PG
Sr. Vice President/Project Manager

Rev 09/15

HUB Subcontracting Opportunity Notification Form

In accordance with Texas Gov't Code, Chapter 2161, each state agency that considers entering into a contract with an expected value of $100,000 or more shall, before the agency solicits bids, proposals, offers, or other applicable expressions of interest, determine whether subcontracting opportunities are probable under the contract. The state agency I have identified below in **Section B** has determined that subcontracting opportunities are probable under the requisition to which my company will be responding.

34 Texas Administrative Code, §20.14 requires all respondents (prime contractors) bidding on the contract to provide notice of each of their subcontracting opportunities to at least three (3) Texas certified HUBs (who work within the respective industry applicable to the subcontracting opportunity), and allow the HUBs at least seven (7) working days to respond to the notice prior to the respondent submitting its bid response to the contracting agency. In addition, at least seven (7) working days prior to submitting its bid response to the contracting agency, the respondent must provide notice of each of its subcontracting opportunities to two (2) or more trade organizations or development centers (in Texas) that serves members of groups (i.e., Asian Pacific American, Black American, Hispanic American, Native American, Woman, Service Disabled Veteran) identified in Texas Administrative Code, §20.11(19)(C).

We respectfully request that vendors interested in bidding on the subcontracting opportunity scope of work identified in **Section C, Item 2**, reply no later than the date and time identified in **Section C, Item 1**. Submit your response to the point-of-contact referenced in **Section A**.

SECTION: A PRIME CONTRACTOR'S INFORMATION

Company Name: INTERA Incorporated
State of Texas VID #: 1743010638900
Point-of-Contact: Mr. Van Kelley, PG
Phone #: 512-425-2047
E-mail Address: vkelley@intera.com
Fax #: 512-727-4821

SECTION: B CONTRACTING STATE AGENCY AND REQUISITION INFORMATION

Agency Name: Texas Water Development Board
Point-of-Contact: Ms. Tina Newstrom
Phone #: 512-463-7825
Requisition #: Request for Qualifications to Conduct a Study of Brackish Groundwater Production Zones in the Rustler Aquifer. RFP #580-16-RFQ0008
Bid Open Date: 11/24/2015 (mm/dd/yyyy)

SECTION: C SUBCONTRACTING OPPORTUNITY RESPONSE DUE DATE, DESCRIPTION, REQUIREMENTS AND RELATED INFORMATION

1. Potential Subcontractor's Bid Response Due Date:

If you would like for our company to consider your company's bid for the subcontracting opportunity identified below in Item 2, we must receive your bid response no later than 5:00 PM (Central Time) on 11/23/2015 (Date (mm/dd/yyyy)).

In accordance with 34 TAC §20.14, each notice of subcontracting opportunity shall be provided to at least three (3) Texas certified HUBs, and allow the HUBs at least seven (7) working days to respond to the notice prior to submitting our bid response to the contracting agency. In addition, at least seven (7) working days prior to us submitting our bid response to the contracting agency, we must provide notice of each of our subcontracting opportunities to two (2) or more trade organizations or development centers (in Texas) that serves members of groups (i.e., Asian Pacific American, Black American, Hispanic American, Native American, Woman, Service Disabled Veteran) identified in Texas Administrative Code, §20.11(19)(C).

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2. Subcontracting Opportunity Scope of Work:

INTERA requires technical consulting services from a professional petrophysicist to oversee the analysis and interpretation of a number of geophysical logs run through the Rustler Formation in west Texas and southeastern New Mexico. The results will include the development of a petrophysical workflow that will guide the calculation of formation parameters within the Rustler Aquifer.

3. Required Qualifications: ☐ - Not Applicable

The petrophysicist must have at least 25 years of experience in developing algorithms used to correct porosity measurements from neutron logs to formation parameters, a proven track record in the calculation of water resistivity (Rw) from true deep resistivity (Rt) from a variety of geophysical logs, and be able to determine correction factors for the logs by grouping them into geographic regions. The professional will possess in-depth research skills as evidenced by at least two of the following: publishing multiple scientific articles/papers involving log analysis in peer-reviewed journals, serving as editor/co-editor of professional journals focused on log analysis, and conducting well log analysis workshops and training courses for the oil and gas industry.

4. Bonding/Insurance Requirements: ☐ - Not Applicable

Subcontractor is solely responsible for obtaining sufficient insurance in accordance with the general standards and practices of the industry or governmental entity.

5. Location to review plans/specifications: ☐ - Not Applicable

Request for Qualifications is available on the Texas Water Development Board's website at:
www.twdb.texas.gov/about/contract_admin/request/rfq0008/index.asp or
the Electronic State Business Daily at: esbd.cpa.state.tx.us/bid_show.cfm?bidid=121146

Amanda Derechailo

From: NoReply@MyFax.com
Sent: Thursday, November 12, 2015 4:50 PM
To: Amanda Derechailo
Subject: Successful transmission to 15123060974. Re: Subcontracting Opportunity to Provide Geological Consulting/Study by Developing a Petrophysical Workflow for the Analysis of Water Quality, Lithology and Post Depositional Diagenesis in the Rustler Aquifer of...

Dear INTERA,

Re: Subcontracting Opportunity to Provide Geological Consulting/Study by Developing a Petrophysical Workflow for the Analysis of Water Quality, Lithology and Post Depositional Diagenesis in the Rustler Aquifer of West Texas

The 3 page fax you sent through MyFax to 15123060974 was successfully transmitted at 2015-11-12 22:50:17 (GMT).

The length of transmission was 194 seconds

The receiving machine's fax ID: 512

If you need assistance, please visit our online help center at www.myfax.com/support.
Thank you for using the MyFax service.

Best Regards,
The MyFax Team

Contact Customer Support

Hours: 24 hours per day, 7 days a week.
Email: support@myfax.com

North America
Toll-Free: (866) 563-9212

UK
Free Phone: 0808 804 0015
International: (613) 260-6325

1

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Horizon Environmental Services, Inc.

INTERA
GEOSCIENCE & ENGINEERING SOLUTIONS
1812 Centre Creek Drive, Suite 300
Austin, Texas 78754
Tel: 512 425 2000
Fax: 512 727 4821

Fax

To:	Ms. JoAnn Wiersema/Ms. Lynda Sherrod	**From:**	Van Kelley, PG
Company:	Horizon Environmental Services, Inc.		
Fax:	512-328-1804	**Pages:**	3 pages (including Subcontracting Notification Form)
Phone:	512-328-2430	**Date:**	11/12/15
Re:	**Subcontracting Opportunity to Provide Geological Consulting/Study by Developing a Petrophysical Workflow for the Analysis of Water Quality, Lithology and Post Depositional Diagenesis in the Rustler Aquifer of West Texas**		

Dear Ms. Wiersema and Ms. Sherrod:

INTERA Incorporated (INTERA) is responding to a reissued solicitation from the Texas Water Development Board (TWDB) to conduct a study of brackish groundwater production zones in the Rustler Aquifer. The original RFQ (#580-16-RFQ0007) was canceled and reissued as RFQ #580-16-RFQ0008 on November 10, 2015. Per the TWDB's Request for Qualifications, INTERA is soliciting subcontracting services from certified Historically Underutilized Businesses (HUBs) on the Centralized Master Bidders List (CMBL). We are currently developing a subcontracting plan wherein HUB firms are identified that may be selected to work under this contract. This letter has been sent to solicit your interest in performing the identified scope of work (a separate HUB Subcontracting Opportunity Notification Form is attached) on this project as a subcontractor to INTERA. While we recognize that the scopes and required qualifications are very specific in nature, we view this expertise and experience as critical to winning, and subsequently executing, this project. If there is interest, and you have the capabilities and experience to perform this scope, please fax (512-727-4821) or email (vkelley@intera.com) a written statement to Van Kelley. INTERA will, at its sole discretion, determine which firms are selected for opportunities under this contract. The scope of work and requirements are listed below:

> Services are needed from a professional petrophysicist to oversee the analysis and interpretation of a number of geophysical logs run through the Rustler Formation in west Texas and southeastern New Mexico. The results will include the development of a petrophysical workflow that will guide the calculation of formation parameters within the Rustler Aquifer. The petrophysicist must have at least 25 years of experience in developing algorithms used to correct porosity measurements from neutron logs to formation parameters, a proven track record in the calculation of water resistivity (Rw) from true deep resistivity (Rt) from a variety of geophysical logs, and be able to determine correction factors for the logs by grouping them into geographic regions. The professional will possess in-depth research skills as evidenced by at least two of the following: publishing multiple scientific articles/papers involving log analysis in peer-reviewed journals, serving as editor/co-editor of professional journals focused on log analysis, and conducting well log analysis workshops and training courses for the oil and gas industry.

In order to evaluate and subsequently incorporate subcontractor qualifications/experience into INTERA's Statement of Qualifications to TWDB, please confirm your interest within **seven** working days of receiving this notice **(i.e., no later than 5:00 pm on Monday, November 23, 2015)**. We look forward to your response.

Sincerely,

Van Kelley, PG
Sr. Vice President/Project Manager

Rev 09/15

HUB Subcontracting Opportunity Notification Form

In accordance with Texas Gov't Code, Chapter 2161, each state agency that considers entering into a contract with an expected value of $100,000 or more shall, before the agency solicits bids, proposals, offers, or other applicable expressions of interest, determine whether subcontracting opportunities are probable under the contract. The state agency I have identified below in **Section B** has determined that subcontracting opportunities are probable under the requisition to which my company will be responding.

34 Texas Administrative Code, §20.14 requires all respondents (prime contractors) bidding on the contract to provide notice of each of their subcontracting opportunities to at least three (3) Texas certified HUBs (who work within the respective industry applicable to the subcontracting opportunity), and allow the HUBs at least seven (7) working days to respond to the notice prior to the respondent submitting its bid response to the contracting agency. In addition, at least seven (7) working days prior to submitting its bid response to the contracting agency, the respondent must provide notice of each of its subcontracting opportunities to two (2) or more trade organizations or development centers (in Texas) that serves members of groups (i.e., Asian Pacific American, Black American, Hispanic American, Native American, Woman, Service Disabled Veteran) identified in Texas Administrative Code, §20.11(19)(C).

We respectfully request that vendors interested in bidding on the subcontracting opportunity scope of work identified in **Section C, Item 2**, reply no later than the date and time identified in **Section C, Item 1**. Submit your response to the point-of-contact referenced in **Section A**.

SECTION: A PRIME CONTRACTOR'S INFORMATION

Company Name: INTERA Incorporated
State of Texas VID #: 1743010638900
Point-of-Contact: Mr. Van Kelley, PG
Phone #: 512-425-2047
E-mail Address: vkelley@intera.com
Fax #: 512-727-4821

SECTION: B CONTRACTING STATE AGENCY AND REQUISITION INFORMATION

Agency Name: Texas Water Development Board
Point-of-Contact: Ms. Tina Newstrom
Phone #: 512-463-7825
Requisition #: Request for Qualifications to Conduct a Study of Brackish Groundwater Production Zones in the Rustler Aquifer. RFP #580-16-RFQ0008
Bid Open Date: 11/24/2015 (mm/dd/yyyy)

SECTION: C SUBCONTRACTING OPPORTUNITY RESPONSE DUE DATE, DESCRIPTION, REQUIREMENTS AND RELATED INFORMATION

1. Potential Subcontractor's Bid Response Due Date:

If you would like for our company to consider your company's bid for the subcontracting opportunity identified below in Item 2, we must receive your bid response no later than 5:00 PM (Central Time) on 11/23/2015 (Date (mm/dd/yyyy)).

In accordance with 34 TAC §20.14, each notice of subcontracting opportunity shall be provided to at least three (3) Texas certified HUBs, and allow the HUBs at least seven (7) working days to respond to the notice prior to submitting our bid response to the contracting agency. In addition, at least seven (7) working days prior to us submitting our bid response to the contracting agency, we must provide notice of each of our subcontracting opportunities to two (2) or more trade organizations or development centers (in Texas) that serves members of groups (i.e., Asian Pacific American, Black American, Hispanic American, Native American, Woman, Service Disabled Veteran) identified in Texas Administrative Code, §20.11(19)(C).

(A working day is considered a normal business day of a state agency, not including weekends, federal or state holidays, or days the agency is declared closed by its executive officer. The initial day the subcontracting opportunity notice is sent/provided to the HUBs and to the trade organizations or development centers is considered to be "day zero" and does not count as one of the seven (7) working days.)

2. Subcontracting Opportunity Scope of Work:

INTERA requires technical consulting services from a professional petrophysicist to oversee the analysis and interpretation of a number of geophysical logs run through the Rustler Formation in west Texas and southeastern New Mexico. The results will include the development of a petrophysical workflow that will guide the calculation of formation parameters within the Rustler Aquifer.

3. Required Qualifications: ☐ - Not Applicable

The petrophysicist must have at least 25 years of experience in developing algorithms used to correct porosity measurements from neutron logs to formation parameters, a proven track record in the calculation of water resistivity (Rw) from true deep resistivity (Rt) from a variety of geophysical logs, and be able to determine correction factors for the logs by grouping them into geographic regions. The professional will possess in-depth research skills as evidenced by at least two of the following: publishing multiple scientific articles/papers involving log analysis in peer-reviewed journals, serving as editor/co-editor of professional journals focused on log analysis, and conducting well log analysis workshops and training courses for the oil and gas industry.

4. Bonding/Insurance Requirements: ☐ - Not Applicable

Subcontractor is solely responsible for obtaining sufficient insurance in accordance with the general standards and practices of the industry or governmental entity.

5. Location to review plans/specifications: ☐ - Not Applicable

Request for Qualifications is available on the Texas Water Development Board's website at:
www.twdb.texas.gov/about/contract_admin/request/rfq0008/index.asp or
the Electronic State Business Daily at: esbd.cpa.state.tx.us/bid_show.cfm?bidid=121146

Amanda Derechailo

From: NoReply@MyFax.com
Sent: Thursday, November 12, 2015 4:48 PM
To: Amanda Derechailo
Subject: Successful transmission to 15123281804. Re: Subcontracting Opportunity to Provide Geological Consulting/Study by Developing a Petrophysical Workflow for the Analysis of Water Quality, Lithology and Post Depositional Diagenesis in the Rustler Aquifer of...

Dear INTERA,

Re: Subcontracting Opportunity to Provide Geological Consulting/Study by Developing a Petrophysical Workflow for the Analysis of Water Quality, Lithology and Post Depositional Diagenesis in the Rustler Aquifer of West Texas

The 3 page fax you sent through MyFax to 15123281804 was successfully transmitted at 2015-11-12 22:48:28 (GMT).

The length of transmission was 222 seconds

The receiving machine's fax ID: 5123281804

If you need assistance, please visit our online help center at www.myfax.com/support.
Thank you for using the MyFax service.

Best Regards,
The MyFax Team

Contact Customer Support

Hours: 24 hours per day, 7 days a week.
Email: support@myfax.com

North America
Toll-Free: (866) 563-9212

UK
Free Phone: 0808 804 0015
International: (613) 260-6325

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Round Rock Geophysics, Inc.

INTERA
GEOSCIENCE & ENGINEERING SOLUTIONS
1812 Centre Creek Drive, Suite 300
Austin, Texas 78754
Tel: 512 425 2000
Fax: 512 727 4821

To:	Bereket M. Derie	**From:**	Van Kelley, PG
Company:	Round Rock Geophysics, Inc.		
Fax:	**VIA EMAIL ATTACHMENT**	**Pages:**	2 pages (including Subcontracting Notification Form)
Phone:	512-496-8728	**Date:**	11/12/15
Re:	**Subcontracting Opportunity to Provide Geological Consulting/Study by Developing a Petrophysical Workflow for the Analysis of Water Quality, Lithology and Post Depositional Diagenesis in the Rustler Aquifer of West Texas**		

Dear Bereket M. Derie:

INTERA Incorporated (INTERA) is responding to a reissued solicitation from the Texas Water Development Board (TWDB) to conduct a study of brackish groundwater production zones in the Rustler Aquifer. The original RFQ (#580-16-RFQ0007) was canceled and reissued as RFQ #580-16-RFQ0008 on November 10, 2015. Per the TWDB's Request for Qualifications, INTERA is soliciting subcontracting services from certified Historically Underutilized Businesses (HUBs) on the Centralized Master Bidders List (CMBL). We are currently developing a subcontracting plan wherein HUB firms are identified that may be selected to work under this contract. This letter has been sent to solicit your interest in performing the identified scope of work (a separate HUB Subcontracting Opportunity Notification Form is attached) on this project as a subcontractor to INTERA. While we recognize that the scopes and required qualifications are very specific in nature, we view this expertise and experience as critical to winning, and subsequently executing, this project. If there is interest, and you have the capabilities and experience to perform this service, please fax (512-727-4821) or email (vkelley@intera.com) a written statement to Van Kelley. INTERA will, at its sole discretion, determine which firms are selected for opportunities under this contract. The scope of work and requirements are listed below:

> Services are needed from a professional petrophysicist to oversee the analysis and interpretation of a number of geophysical logs run through the Rustler Formation in west Texas and southeastern New Mexico. The results will include the development of a petrophysical workflow that will guide the calculation of formation parameters within the Rustler Aquifer. The petrophysicist must have at least 25 years of experience in developing algorithms used to correct porosity measurements from neutron logs to formation parameters, a proven track record in the calculation of water resistivity (Rw) from true deep resistivity (Rt) from a variety of geophysical logs, and be able to determine correction factors for the logs by grouping them into geographic regions. The professional will possess in-depth research skills as evidenced by at least two of the following: publishing multiple scientific articles/papers involving log analysis in peer-reviewed journals, serving as editor/co-editor of professional journals focused on log analysis, and conducting well log analysis workshops and training courses for the oil and gas industry.

In order to evaluate and subsequently incorporate subcontractor qualifications/experience into INTERA's Statement of Qualifications to TWDB, please confirm your interest within **seven** working days of receiving this notice **(i.e., no later than 5:00 pm on Monday, November 23, 2015)**. We look forward to your response.

Sincerely,

Van Kelley, PG
Sr. Vice President/Project Manager

Rev. 09/15

HUB Subcontracting Opportunity Notification Form

In accordance with Texas Gov't Code, Chapter 2161, each state agency that considers entering into a contract with an expected value of $100,000 or more shall, before the agency solicits bids, proposals, offers, or other applicable expressions of interest, determine whether subcontracting opportunities are probable under the contract. The state agency I have identified below in **Section B** has determined that subcontracting opportunities are probable under the requisition to which my company will be responding.

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We respectfully request that vendors interested in bidding on the subcontracting opportunity scope of work identified in **Section C, Item 2**, reply no later than the date and time identified in **Section C, Item 1**. Submit your response to the point-of-contact referenced in **Section A**.

SECTION: A PRIME CONTRACTOR'S INFORMATION

Company Name: INTERA Incorporated
State of Texas VID #: 1743010638900
Point-of-Contact: Mr. Van Kelley, PG
Phone #: 512-425-2047
E-mail Address: vkelley@intera.com
Fax #: 512-727-4821

SECTION: B CONTRACTING STATE AGENCY AND REQUISITION INFORMATION

Agency Name: Texas Water Development Board
Point-of-Contact: Ms. Tina Newstrom
Phone #: 512-463-7825
Requisition #: Request for Qualifications to Conduct a Study of Brackish Groundwater Production Zones in the Rustler Aquifer. RFP #580-16-RFQ0008
Bid Open Date: 11/24/2015 (mm/dd/yyyy)

SECTION: C SUBCONTRACTING OPPORTUNITY RESPONSE DUE DATE, DESCRIPTION, REQUIREMENTS AND RELATED INFORMATION

1. Potential Subcontractor's Bid Response Due Date:

If you would like for our company to consider your company's bid for the subcontracting opportunity identified below in Item 2, we must receive your bid response no later than 5:00 PM (Central Time) on 11/23/2015 (Date mm/dd/yyyy).

In accordance with 34 TAC §20.14, each notice of subcontracting opportunity shall be provided to at least three (3) Texas certified HUBs, and allow the HUBs at least seven (7) working days to respond to the notice prior to submitting our bid response to the contracting agency. In addition, at least seven (7) working days prior to us submitting our bid response to the contracting agency, we must provide notice of each of our subcontracting opportunities to two (2) or more trade organizations or development centers (in Texas) that serves members of groups (i.e., Asian Pacific American, Black American, Hispanic American, Native American, Woman, Service Disabled Veteran) identified in Texas Administrative Code, §20.11(19)(C).

(A working day is considered a normal business day of a state agency, not including weekends, federal or state holidays, or days the agency is declared closed by its executive officer. The initial day the subcontracting opportunity notice is sent/provided to the HUBs and to the trade organizations or development centers is considered to be "day zero" and does not count as one of the seven (7) working days.)

2. Subcontracting Opportunity Scope of Work:

INTERA requires technical consulting services from a professional petrophysicist to oversee the analysis and interpretation of a number of geophysical logs run through the Rustler Formation in west Texas and southeastern New Mexico. The results will include the development of a petrophysical workflow that will guide the calculation of formation parameters within the Rustler Aquifer.

3. Required Qualifications: ☐ - Not Applicable

The petrophysicist must have at least 25 years of experience in developing algorithms used to correct porosity measurements from neutron logs to formation parameters, a proven track record in the calculation of water resistivity (Rw) from true deep resistivity (Rt) from a variety of geophysical logs, and be able to determine correction factors for the logs by grouping them into geographic regions. The professional will possess in-depth research skills as evidenced by at least two of the following: publishing multiple scientific articles/papers involving log analysis in peer-reviewed journals, serving as editor/co-editor of professional journals focused on log analysis, and conducting well log analysis workshops and training courses for the oil and gas industry.

4. Bonding/Insurance Requirements: ☐ - Not Applicable

Subcontractor is solely responsible for obtaining sufficient insurance in accordance with the general standards and practices of the industry or governmental entity.

5. Location to review plans/specifications: ☐ - Not Applicable

Request for Qualifications is available on the Texas Water Development Board's website at:
www.twdb.texas.gov/about/contract_admin/request/rfq0008/index.asp or
the Electronic State Business Daily at: esbd.cpa.state.tx.us/bid_show.cfm?bidid=121146

Tanya Townsend

From: Tanya Townsend
Sent: Thursday, November 12, 2015 4:53 PM
To: 'bderie@roundrockgeo.com'
Subject: Subcontracting Opportunity to Provide Geological Consulting/Study by Developing a Petrophysical Workflow for the Analysis of Water Quality, Lithology and Post Depositional Diagenesis in the Rustler Aquifer of West Texas
Attachments: Round Rock Geo Rustler Opp #2.pdf

Dear Bereket M. Derie,

Attached, please find a subcontracting opportunity to provide geological consulting services by developing a petrophysical workflow analysis of water quality, lithology, and post depositional diagenesis in the Rustler Aquifer. If you need additional information about this opportunity, please contact Van Kelley at vkelley@intera.com .

Regards,
Tanya Townsend
INTERA Incorporated
Phone: (512) 425-2019
Fax: (512) 425-2099

INTERA
GEOSCIENCE & ENGINEERING SOLUTIONS

1

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TRADE ORGANIZATIONS AND DEVELOPMENT CENTER NOTIFICATIONS FOR OPPORTUNITY #2

Hispanic Contractors Association de San Antonio

INTERA
GEOSCIENCE & ENGINEERING SOLUTIONS

1812 Centre Creek Drive, Suite 300
Austin, Texas 78754
Tel: 512 425 2000
Fax: 512 727 4821

Fax

To:	Mr. Roy Attwood	**From:**	Van Kelley, PG
Company:	Hispanic Contractors Association de San Antonio		
Fax:	210-444-1101	**Pages:**	3 pages (including Subcontracting Notification Form)
Phone:	210-444-1100	**Date:**	11/12/15
Re:	**Subcontracting Opportunity to Provide Geological Consulting/Study by Developing a Petrophysical Workflow for the Analysis of Water Quality, Lithology and Post Depositional Diagenesis in the Rustler Aquifer of West Texas**		

Dear Mr. Attwood:

INTERA Incorporated (INTERA) is responding to a reissued solicitation from the Texas Water Development Board (TWDB) to conduct a study of brackish groundwater production zones in the Rustler Aquifer. The original RFQ (#580-16-RFQ0007) was canceled and reissued as RFQ #580-16-RFQ0008 on November 10, 2015. Per the TWDB's Request for Qualifications, INTERA is soliciting subcontracting services from certified Historically Underutilized Businesses (HUBs) on the Centralized Master Bidders List (CMBL). We are currently developing a subcontracting plan wherein HUB firms are identified that may be selected to work under this contract. This letter has been sent to solicit your interest in performing the identified scope of work (a separate HUB Subcontracting Opportunity Notification Form is attached) on this project as a subcontractor to INTERA. While we recognize that the scopes and required qualifications are very specific in nature, we view this expertise and experience as critical to winning, and subsequently executing, this project. If there is interest, and you have the capabilities and experience to perform this scope, please fax (512-727-4821) or email (vkelley@intera.com) a written statement to Van Kelley. INTERA will, at its sole discretion, determine which firms are selected for opportunities under this contract. The scope of work and requirements are listed below:

> Services are needed from a professional petrophysicist to oversee the analysis and interpretation of a number of geophysical logs run through the Rustler Formation in west Texas and southeastern New Mexico. The results will include the development of a petrophysical workflow that will guide the calculation of formation parameters within the Rustler Aquifer. The petrophysicist must have at least 25 years of experience in developing algorithms used to correct porosity measurements from neutron logs to formation parameters, a proven track record in the calculation of water resistivity (Rw) from true deep resistivity (Rt) from a variety of geophysical logs, and be able to determine correction factors for the logs by grouping them into geographic regions. The professional will possess in-depth research skills as evidenced by at least two of the following: publishing multiple scientific articles/papers involving log analysis in peer-reviewed journals, serving as editor/co-editor of professional journals focused on log analysis, and conducting well log analysis workshops and training courses for the oil and gas industry.

In order to evaluate and subsequently incorporate subcontractor qualifications/experience into INTERA's Statement of Qualifications to TWDB, please confirm your interest within **seven** working days of receiving this notice **(i.e., no later than 5:00 pm on Monday, November 23, 2015)**. We look forward to your response.

Sincerely,

Van Kelley, PG
Sr. Vice President/Project Manager

Rev 09/15

HUB Subcontracting Opportunity Notification Form

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We respectfully request that vendors interested in bidding on the subcontracting opportunity scope of work identified in **Section C, Item 2**, reply no later than the date and time identified in **Section C, Item 1**. Submit your response to the point-of-contact referenced in **Section A**.

SECTION: A PRIME CONTRACTOR'S INFORMATION

Company Name: INTERA Incorporated
State of Texas VID #: 1743010638900
Point-of-Contact: Mr. Van Kelley, PG
Phone #: 512-425-2047
E-mail Address: vkelley@intera.com
Fax #: 512-727-4821

SECTION: B CONTRACTING STATE AGENCY AND REQUISITION INFORMATION

Agency Name: Texas Water Development Board
Point-of-Contact: Ms. Tina Newstrom
Phone #: 512-463-7825
Requisition #: Request for Qualifications to Conduct a Study of Brackish Groundwater Production Zones in the Rustler Aquifer. RFP #580-16-RFQ0008
Bid Open Date: 11/24/2015 (mm/dd/yyyy)

SECTION: C SUBCONTRACTING OPPORTUNITY RESPONSE DUE DATE, DESCRIPTION, REQUIREMENTS AND RELATED INFORMATION

1. Potential Subcontractor's Bid Response Due Date:

If you would like for our company to consider your company's bid for the subcontracting opportunity identified below in Item 2,

we must receive your bid response no later than **5:00 PM** (Central Time) on **11/23/2015** (Date (mm/dd/yyyy)).

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3. Required Qualifications: ☐ - Not Applicable

The petrophysicist must have at least 25 years of experience in developing algorithms used to correct porosity measurements from neutron logs to formation parameters, a proven track record in the calculation of water resistivity (Rw) from true deep resistivity (Rt) from a variety of geophysical logs, and be able to determine correction factors for the logs by grouping them into geographic regions. The professional will possess in-depth research skills as evidenced by at least two of the following: publishing multiple scientific articles/papers involving log analysis in peer-reviewed journals, serving as editor/co-editor of professional journals focused on log analysis, and conducting well log analysis workshops and training courses for the oil and gas industry.

4. Bonding/Insurance Requirements: ☐ - Not Applicable

Subcontractor is solely responsible for obtaining sufficient insurance in accordance with the general standards and practices of the industry or governmental entity.

5. Location to review plans/specifications: ☐ - Not Applicable

Request for Qualifications is available on the Texas Water Development Board's website at:
www.twdb.texas.gov/about/contract_admin/request/rfq0008/index.asp or
the Electronic State Business Daily at: esbd.cpa.state.tx.us/bid_show.cfm?bidid=121146

Amanda Derechailo

From: NoReply@MyFax.com
Sent: Thursday, November 12, 2015 4:51 PM
To: Amanda Derechailo
Subject: Successful transmission to 12104441101. Re: Subcontracting Opportunity to Provide Geological Consulting/Study by Developing a Petrophysical Workflow for the Analysis of Water Quality, Lithology and Post Depositional Diagenesis in the Rustler Aquifer of...

Dear INTERA,

Re: Subcontracting Opportunity to Provide Geological Consulting/Study by Developing a Petrophysical Workflow for the Analysis of Water Quality, Lithology and Post Depositional Diagenesis in the Rustler Aquifer of West Texas

The 3 page fax you sent through MyFax to 12104441101 was successfully transmitted at 2015-11-12 22:51:22 (GMT).

The length of transmission was 181 seconds

The receiving machine's fax ID: 2104441101

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Best Regards,
The MyFax Team

Contact Customer Support

Hours: 24 hours per day, 7 days a week.
Email: support@myfax.com

North America
Toll-Free: (866) 563-9212

UK
Free Phone: 0808 804 0015
International: (613) 260-6325

1

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Houston Minority Supplier Development Council

INTERA
GEOSCIENCE & ENGINEERING SOLUTIONS
1812 Centre Creek Drive, Suite 300
Austin, Texas 78754
Tel: 512 425 2000
Fax: 512 727 4821

Fax

To:	Ms. Angela Freeman	**From:**	Van Kelley, PG
Company:	Houston Minority Supplier Development Council		
Fax:	713-271-9770	**Pages:**	3 pages (including Subcontracting Notification Form)
Phone:	713-271-7805	**Date:**	11/12/15
Re:	**Subcontracting Opportunity to Provide Geological Consulting/Study by Developing a Petrophysical Workflow for the Analysis of Water Quality, Lithology and Post Depositional Diagenesis in the Rustler Aquifer of West Texas**		

Dear Ms. Freeman:

INTERA Incorporated (INTERA) is responding to a reissued solicitation from the Texas Water Development Board (TWDB) to conduct a study of brackish groundwater production zones in the Rustler Aquifer. The original RFQ (#580-16-RFQ0007) was canceled and reissued as RFQ #580-16-RFQ0008 on November 10, 2015. Per the TWDB's Request for Qualifications, INTERA is soliciting subcontracting services from certified Historically Underutilized Businesses (HUBs) on the Centralized Master Bidders List (CMBL). We are currently developing a subcontracting plan wherein HUB firms are identified that may be selected to work under this contract. This letter has been sent to solicit your interest in performing the identified scope of work (a separate HUB Subcontracting Opportunity Notification Form is attached) on this project as a subcontractor to INTERA. While we recognize that the scopes and required qualifications are very specific in nature, we view this expertise and experience as critical to winning, and subsequently executing, this project. If there is interest, and you have the capabilities and experience to perform this scope, please fax (512-727-4821) or email (vkelley@intera.com) a written statement to Van Kelley. INTERA will, at its sole discretion, determine which firms are selected for opportunities under this contract. The scope of work and requirements are listed below:

> Services are needed from a professional petrophysicist to oversee the analysis and interpretation of a number of geophysical logs run through the Rustler Formation in west Texas and southeastern New Mexico. The results will include the development of a petrophysical workflow that will guide the calculation of formation parameters within the Rustler Aquifer. The petrophysicist must have at least 25 years of experience in developing algorithms used to correct porosity measurements from neutron logs to formation parameters, a proven track record in the calculation of water resistivity (Rw) from true deep resistivity (Rt) from a variety of geophysical logs, and be able to determine correction factors for the logs by grouping them into geographic regions. The professional will possess in-depth research skills as evidenced by at least two of the following: publishing multiple scientific articles/papers involving log analysis in peer-reviewed journals, serving as editor/co-editor of professional journals focused on log analysis, and conducting well log analysis workshops and training courses for the oil and gas industry.

In order to evaluate and subsequently incorporate subcontractor qualifications/experience into INTERA's Statement of Qualifications to TWDB, please confirm your interest within **seven** working days of receiving this notice **(i.e., no later than 5:00 pm on Monday, November 23, 2015)**. We look forward to your response.

Sincerely,

Van Kelley, PG
Sr. Vice President/Project Manager

Rev 09/15

HUB Subcontracting Opportunity Notification Form

In accordance with Texas Gov't Code, Chapter 2161, each state agency that considers entering into a contract with an expected value of $100,000 or more shall, before the agency solicits bids, proposals, offers, or other applicable expressions of interest, determine whether subcontracting opportunities are probable under the contract. The state agency I have identified below in **Section B** has determined that subcontracting opportunities are probable under the requisition to which my company will be responding.

34 Texas Administrative Code, §20.14 requires all respondents (prime contractors) bidding on the contract to provide notice of each of their subcontracting opportunities to at least three (3) Texas certified HUBs (who work within the respective industry applicable to the subcontracting opportunity), and allow the HUBs at least seven (7) working days to respond to the notice prior to the respondent submitting its bid response to the contracting agency. In addition, at least seven (7) working days prior to submitting its bid response to the contracting agency, the respondent must provide notice of each of its subcontracting opportunities to two (2) or more trade organizations or development centers (in Texas) that serves members of groups (i.e., Asian Pacific American, Black American, Hispanic American, Native American, Woman, Service Disabled Veteran) identified in Texas Administrative Code, §20.11(19)(C).

We respectfully request that vendors interested in bidding on the subcontracting opportunity scope of work identified in **Section C, Item 2**, reply no later than the date and time identified in **Section C, Item 1**. Submit your response to the point-of-contact referenced in **Section A**.

SECTION: A PRIME CONTRACTOR'S INFORMATION

Company Name: INTERA Incorporated
State of Texas VID #: 1743010638900
Point-of-Contact: Mr. Van Kelley, PG
Phone #: 512-425-2047
E-mail Address: vkelley@intera.com
Fax #: 512-727-4821

SECTION: B CONTRACTING STATE AGENCY AND REQUISITION INFORMATION

Agency Name: Texas Water Development Board
Point-of-Contact: Ms. Tina Newstrom
Phone #: 512-463-7825
Requisition #: Request for Qualifications to Conduct a Study of Brackish Groundwater Production Zones in the Rustler Aquifer. RFP #580-16-RFQ0008
Bid Open Date: 11/24/2015 (mm/dd/yyyy)

SECTION: C SUBCONTRACTING OPPORTUNITY RESPONSE DUE DATE, DESCRIPTION, REQUIREMENTS AND RELATED INFORMATION

1. Potential Subcontractor's Bid Response Due Date:

If you would like for our company to consider your company's bid for the subcontracting opportunity identified below in Item 2, we must receive your bid response no later than **5:00 PM** (Central Time) on **11/23/2015** (Date (mm/dd/yyyy)).

In accordance with 34 TAC §20.14, each notice of subcontracting opportunity shall be provided to at least three (3) Texas certified HUBs, and allow the HUBs at least seven (7) working days to respond to the notice prior to submitting our bid response to the contracting agency. In addition, at least seven (7) working days prior to us submitting our bid response to the contracting agency, we must provide notice of each of our subcontracting opportunities to two (2) or more trade organizations or development centers (in Texas) that serves members of groups (i.e., Asian Pacific American, Black American, Hispanic American, Native American, Woman, Service Disabled Veteran) identified in Texas Administrative Code, §20.11(19)(C).

(A working day is considered a normal business day of a state agency, not including weekends, federal or state holidays, or days the agency is declared closed by its executive officer. The initial day the subcontracting opportunity notice is sent/provided to the HUBs and to the trade organizations or development centers is considered to be "day zero" and does not count as one of the seven (7) working days.)

2. Subcontracting Opportunity Scope of Work:

INTERA requires technical consulting services from a professional petrophysicist to oversee the analysis and interpretation of a number of geophysical logs run through the Rustler Formation in west Texas and southeastern New Mexico. The results will include the development of a petrophysical workflow that will guide the calculation of formation parameters within the Rustler Aquifer.

3. Required Qualifications: ☐ - Not Applicable

The petrophysicist must have at least 25 years of experience in developing algorithms used to correct porosity measurements from neutron logs to formation parameters, a proven track record in the calculation of water resistivity (Rw) from true deep resistivity (Rt) from a variety of geophysical logs, and be able to determine correction factors for the logs by grouping them into geographic regions. The professional will possess in-depth research skills as evidenced by at least two of the following: publishing multiple scientific articles/papers involving log analysis in peer-reviewed journals, serving as editor/co-editor of professional journals focused on log analysis, and conducting well log analysis workshops and training courses for the oil and gas industry.

4. Bonding/Insurance Requirements: ☐ - Not Applicable

Subcontractor is solely responsible for obtaining sufficient insurance in accordance with the general standards and practices of the industry or governmental entity.

5. Location to review plans/specifications: ☐ - Not Applicable

Request for Qualifications is available on the Texas Water Development Board's website at:
www.twdb.texas.gov/about/contract_admin/request/rfq0008/index.asp or
the Electronic State Business Daily at: esbd.cpa.state.tx.us/bid_show.cfm?bidid=121146

Amanda Derechailo

From: NoReply@MyFax.com
Sent: Thursday, November 12, 2015 4:54 PM
To: Amanda Derechailo
Subject: Successful transmission to 17132719770. Re: Subcontracting Opportunity to Provide Geological Consulting/Study by Developing a Petrophysical Workflow for the Analysis of Water Quality, Lithology and Post Depositional Diagenesis in the Rustler Aquifer of...

Dear INTERA,

Re: Subcontracting Opportunity to Provide Geological Consulting/Study by Developing a Petrophysical Workflow for the Analysis of Water Quality, Lithology and Post Depositional Diagenesis in the Rustler Aquifer of West Texas

The 3 page fax you sent through MyFax to 17132719770 was successfully transmitted at 2015-11-12 22:53:38 (GMT).

The length of transmission was 184 seconds

The receiving machine's fax ID: 713 271 9770

If you need assistance, please visit our online help center at www.myfax.com/support.
Thank you for using the MyFax service.

Best Regards,
The MyFax Team

Contact Customer Support

Hours: 24 hours per day, 7 days a week.
Email: support@myfax.com

North America
Toll-Free: (866) 563-9212

UK
Free Phone: 0808 804 0015
International: (613) 260-6325

1

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Southwest Minority Supplier Development Council

INTERA
GEOSCIENCE & ENGINEERING SOLUTIONS
1812 Centre Creek Drive, Suite 300
Austin, Texas 78754
Tel: 512 425 2000
Fax: 512 727 4821

Fax

To:	Ms. Maggie Trevino	**From:**	Van Kelley, PG
Company:	Southwest Minority Supplier Development Council		
Fax:	512-386-8988	**Pages:**	3 pages (including Subcontracting Notification Form)
Phone:	512-386-8766	**Date:**	11/12/15
Re:	**Subcontracting Opportunity to Provide Geological Consulting/Study by Developing a Petrophysical Workflow for the Analysis of Water Quality, Lithology and Post Depositional Diagenesis in the Rustler Aquifer of West Texas**		

Dear Ms. Trevino:

INTERA Incorporated (INTERA) is responding to a reissued solicitation from the Texas Water Development Board (TWDB) to conduct a study of brackish groundwater production zones in the Rustler Aquifer. The original RFQ (#580-16-RFQ0007) was canceled and reissued as RFQ #580-16-RFQ0008 on November 10, 2015. Per the TWDB's Request for Qualifications, INTERA is soliciting subcontracting services from certified Historically Underutilized Businesses (HUBs) on the Centralized Master Bidders List (CMBL). We are currently developing a subcontracting plan wherein HUB firms are identified that may be selected to work under this contract. This letter has been sent to solicit your interest in performing the identified scope of work (a separate HUB Subcontracting Opportunity Notification Form is attached) on this project as a subcontractor to INTERA. While we recognize that the scopes and required qualifications are very specific in nature, we view this expertise and experience as critical to winning, and subsequently executing, this project. If there is interest, and you have the capabilities and experience to perform this service, please fax (512-727-4821) or email (vkelley@intera.com) a written statement to Van Kelley. INTERA will, at its sole discretion, determine which firms are selected for opportunities under this contract. The scope of work and requirements are listed below:

> Services are needed from a professional petrophysicist to oversee the analysis and interpretation of a number of geophysical logs run through the Rustler Formation in west Texas and southeastern New Mexico. The results will include the development of a petrophysical workflow that will guide the calculation of formation parameters within the Rustler Aquifer. The petrophysicist must have at least 25 years of experience in developing algorithms used to correct porosity measurements from neutron logs to formation parameters, a proven track record in the calculation of water resistivity (Rw) from true deep resistivity (Rt) from a variety of geophysical logs, and be able to determine correction factors for the logs by grouping them into geographic regions. The professional will possess in-depth research skills as evidenced by at least two of the following: publishing multiple scientific articles/papers involving log analysis in peer-reviewed journals, serving as editor/co-editor of professional journals focused on log analysis, and conducting well log analysis workshops and training courses for the oil and gas industry.

In order to evaluate and subsequently incorporate subcontractor qualifications/experience into INTERA's Statement of Qualifications to TWDB, please confirm your interest within **seven** working days of receiving this notice **(i.e., no later than 5:00 pm on Monday, November 23, 2015)**. We look forward to your response.

Sincerely,

Van Kelley, PG
Sr. Vice President/Project Manager

Rev 09/15

HUB Subcontracting Opportunity Notification Form

In accordance with Texas Gov't Code, Chapter 2161, each state agency that considers entering into a contract with an expected value of $100,000 or more shall, before the agency solicits bids, proposals, offers, or other applicable expressions of interest, determine whether subcontracting opportunities are probable under the contract. The state agency I have identified below in **Section B** has determined that subcontracting opportunities are probable under the requisition to which my company will be responding.

34 Texas Administrative Code, §20.14 requires all respondents (prime contractors) bidding on the contract to provide notice of each of their subcontracting opportunities to at least three (3) Texas certified HUBs (who work within the respective industry applicable to the subcontracting opportunity), and allow the HUBs at least seven (7) working days to respond to the notice prior to the respondent submitting its bid response to the contracting agency. In addition, at least seven (7) working days prior to submitting its bid response to the contracting agency, the respondent must provide notice of each of its subcontracting opportunities to two (2) or more trade organizations or development centers (in Texas) that serves members of groups (i.e., Asian Pacific American, Black American, Hispanic American, Native American, Woman, Service Disabled Veteran) identified in Texas Administrative Code, §20.11(19)(C).

We respectfully request that vendors interested in bidding on the subcontracting opportunity scope of work identified in **Section C, Item 2**, reply no later than the date and time identified in **Section C, Item 1**. Submit your response to the point-of-contact referenced in **Section A**.

SECTION: A PRIME CONTRACTOR'S INFORMATION

Company Name: INTERA Incorporated
State of Texas VID #: 1743010638900
Point-of-Contact: Mr. Van Kelley, PG
Phone #: 512-425-2047
E-mail Address: vkelley@intera.com
Fax #: 512-727-4821

SECTION: B CONTRACTING STATE AGENCY AND REQUISITION INFORMATION

Agency Name: Texas Water Development Board
Point-of-Contact: Ms. Tina Newstrom
Phone #: 512-463-7825
Requisition #: Request for Qualifications to Conduct a Study of Brackish Groundwater Production Zones in the Rustler Aquifer. RFP #580-16-RFQ0008
Bid Open Date: 11/24/2015 (mm/dd/yyyy)

SECTION: C SUBCONTRACTING OPPORTUNITY RESPONSE DUE DATE, DESCRIPTION, REQUIREMENTS AND RELATED INFORMATION

1. Potential Subcontractor's Bid Response Due Date:

If you would like for our company to consider your company's bid for the subcontracting opportunity identified below in Item 2, we must receive your bid response no later than **5:00 PM** (Central Time) on **11/23/2015** (Date (mm/dd/yyyy)).

In accordance with 34 TAC §20.14, each notice of subcontracting opportunity shall be provided to at least three (3) Texas certified HUBs, and allow the HUBs at least seven (7) working days to respond to the notice prior to submitting our bid response to the contracting agency. In addition, at least seven (7) working days prior to us submitting our bid response to the contracting agency, we must provide notice of each of our subcontracting opportunities to two (2) or more trade organizations or development centers (in Texas) that serves members of groups (i.e., Asian Pacific American, Black American, Hispanic American, Native American, Woman, Service Disabled Veteran) identified in Texas Administrative Code, §20.11(19)(C).

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2. Subcontracting Opportunity Scope of Work:

INTERA requires technical consulting services from a professional petrophysicist to oversee the analysis and interpretation of a number of geophysical logs run through the Rustler Formation in west Texas and southeastern New Mexico. The results will include the development of a petrophysical workflow that will guide the calculation of formation parameters within the Rustler Aquifer.

3. Required Qualifications: ☐ - Not Applicable

The petrophysicist must have at least 25 years of experience in developing algorithms used to correct porosity measurements from neutron logs to formation parameters, a proven track record in the calculation of water resistivity (Rw) from true deep resistivity (Rt) from a variety of geophysical logs, and be able to determine correction factors for the logs by grouping them into geographic regions. The professional will possess in-depth research skills as evidenced by at least two of the following: publishing multiple scientific articles/papers involving log analysis in peer-reviewed journals, serving as editor/co-editor of professional journals focused on log analysis, and conducting well log analysis workshops and training courses for the oil and gas industry.

4. Bonding/Insurance Requirements: ☐ - Not Applicable

Subcontractor is solely responsible for obtaining sufficient insurance in accordance with the general standards and practices of the industry or governmental entity.

5. Location to review plans/specifications: ☐ - Not Applicable

Request for Qualifications is available on the Texas Water Development Board's website at:
www.twdb.texas.gov/about/contract_admin/request/rfq0008/index.asp or
the Electronic State Business Daily at: esbd.cpa.state.tx.us/bid_show.cfm?bidid=121146

Amanda Derechailo

From: NoReply@MyFax.com
Sent: Thursday, November 12, 2015 4:53 PM
To: Amanda Derechailo
Subject: Successful transmission to 15123868988. Re: Subcontracting Opportunity to Provide Geological Consulting/Study by Developing a Petrophysical Workflow for the Analysis of Water Quality, Lithology and Post Depositional Diagenesis in the Rustler Aquifer of...

Dear INTERA,

Re: Subcontracting Opportunity to Provide Geological Consulting/Study by Developing a Petrophysical Workflow for the Analysis of Water Quality, Lithology and Post Depositional Diagenesis in the Rustler Aquifer of West Texas

The 3 page fax you sent through MyFax to 15123868988 was successfully transmitted at 2015-11-12 22:52:28 (GMT).

The length of transmission was 187 seconds

The receiving machine's fax ID: unknown

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Thank you for using the MyFax service.

Best Regards,
The MyFax Team

Contact Customer Support

Hours: 24 hours per day, 7 days a week.
Email: support@myfax.com

North America
Toll-Free: (866) 563-9212

UK
Free Phone: 0808 804 0015
International: (613) 260-6325

1

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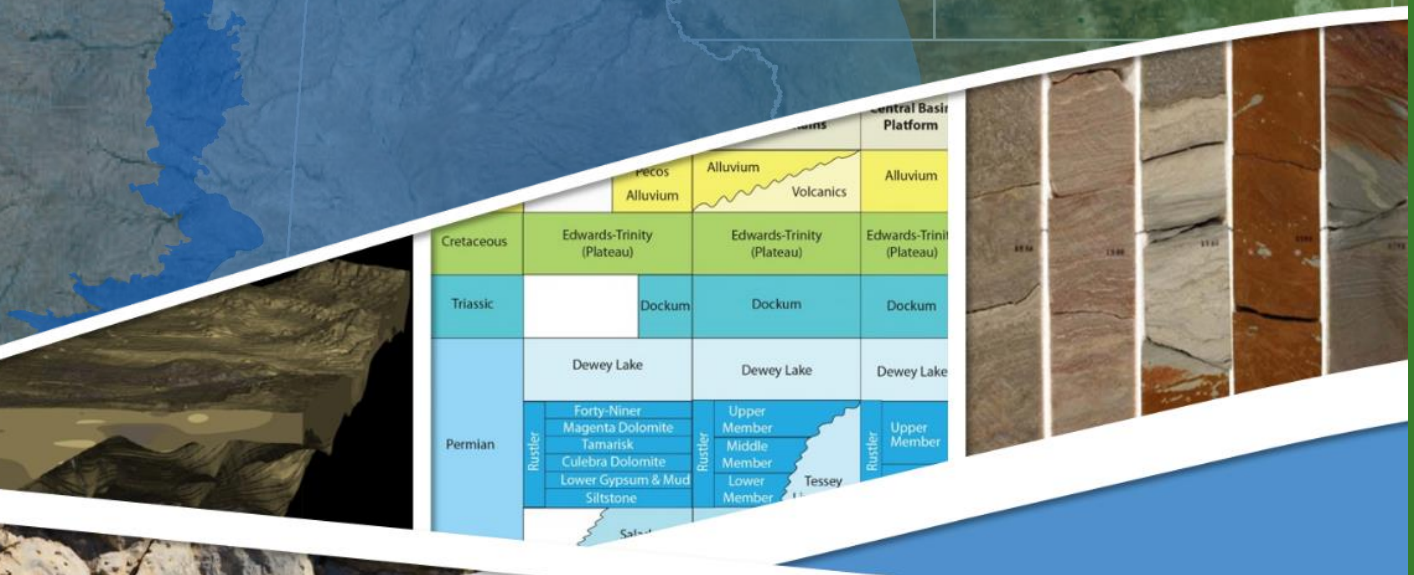
OPPORTUNITY #3
HUB and Trade/Development Center Notifications



INTERA
GEOSCIENCE & ENGINEERING SOLUTIONS

HUB Notifications for Opportunity #3

Geosearch, LP

INTERA
GEOSCIENCE & ENGINEERING SOLUTIONS

1812 Centre Creek Drive, Suite 300
Austin, Texas 78754
Tel: 512 425 2000
Fax: 512 727 4821

Fax

To:	Mr. Scott Davis	**From:**	Van Kelley, PG
Company:	Geosearch, LP		
Fax:	512-472-9967	**Pages:**	3 pages (including Subcontracting Notification Form)
Phone:	512-472-9966	**Date:**	11/12/15
Re:	**Subcontracting Opportunity to Provide Geological Consulting/Study by Providing Redacted Geophysical Logs for Release to Texas State Agencies**		

Dear Mr. Davis:

INTERA Incorporated (INTERA) is responding to a reissued solicitation from the Texas Water Development Board (TWDB) to conduct a study of brackish groundwater production zones in the Rustler Aquifer. The original RFQ (#580-16-RFQ0007) was canceled and reissued as RFQ #580-16-RFQ0008 on November 10, 2015. Per the TWDB's Request for Qualifications, INTERA is soliciting subcontracting services from certified Historically Underutilized Businesses (HUBs) on the Centralized Master Bidders List (CMBL). We are currently developing a subcontracting plan wherein HUB firms are identified that may be selected to work under this contract. This letter has been sent to solicit your interest in performing the identified scope of work (a separate HUB Subcontracting Opportunity Notification Form is attached) on this project as a subcontractor to INTERA. While we recognize that the scopes and required qualifications are very specific in nature, we view this expertise and experience as critical to winning, and subsequently executing, this project. If there is interest, and you have the capabilities and experience to perform this scope, please fax (512-727-4821) or email (vkelley@intera.com) a written statement to Van Kelley. INTERA will, at its sole discretion, determine which firms are selected for opportunities under this contract. The scope of work and requirements are listed below:

> Services are needed by a company specializing in the acquisition and commercial distribution of geophysical borehole logs. Specifically, the company will have an established database containing geophysical borehole logs that are readily searchable by API numbers, log type, top and bottom logging interval, formation at total depth, and other search criteria. The successful execution of the subject project requires that the company be able to furnish specific geophysical logs in a redacted manner such that they: 1) retain important information related to characterizing the water quality of groundwater resources, 2) can be released to state agencies for public distribution; and 3) can be acquired at a competitive price. The company's database must contain logs located within the footprint of the Rustler Aquifer in western Texas and southeastern New Mexico. In addition, the company must provide at least 300 geophysical logs that are geographically distributed where it has been confirmed that the top logging interval is above the top of the Rustler Formation and the bottom logging interval is below the base of the Rustler Formation.

In order to evaluate and subsequently incorporate subcontractor qualifications/experience into INTERA's Statement of Qualifications to TWDB, please confirm your interest within **seven** working days of receiving this notice **(i.e., no later than 5:00 pm on Monday, November 23, 2015)**. We look forward to your response.

Sincerely,

Van Kelley, PG
Sr. Vice President/Project Manager

Rev 09/15

HUB Subcontracting Opportunity Notification Form

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34 Texas Administrative Code, §20.14 requires all respondents (prime contractors) bidding on the contract to provide notice of each of their subcontracting opportunities to at least three (3) Texas certified HUBs (who work within the respective industry applicable to the subcontracting opportunity), and allow the HUBs at least seven (7) working days to respond to the notice prior to the respondent submitting its bid response to the contracting agency. In addition, at least seven (7) working days prior to submitting its bid response to the contracting agency, the respondent must provide notice of each of its subcontracting opportunities to two (2) or more trade organizations or development centers (in Texas) that serves members of groups (i.e., Asian Pacific American, Black American, Hispanic American, Native American, Woman, Service Disabled Veteran) identified in Texas Administrative Code, §20.11(19)(C).

We respectfully request that vendors interested in bidding on the subcontracting opportunity scope of work identified in **Section C, Item 2**, reply no later than the date and time identified in **Section C, Item 1**. Submit your response to the point-of-contact referenced in **Section A**.

SECTION: A PRIME CONTRACTOR'S INFORMATION

Company Name: INTERA Incorporated
State of Texas VID #: 1743010638900
Point-of-Contact: Mr. Van Kelley, PG
Phone #: 512-425-2047
E-mail Address: vkelley@intera.com
Fax #: 512-727-4821

SECTION: B CONTRACTING STATE AGENCY AND REQUISITION INFORMATION

Agency Name: Texas Water Development Board
Point-of-Contact: Ms. Tina Newstrom
Phone #: 512-463-7825
Requisition #: Request for Qualifications to Conduct a Study of Brackish Groundwater Production Zones in the Rustler Aquifer. RFQ #580-16-RFQ0008
Bid Open Date: 11/24/2015 (mm/dd/yyyy)

SECTION: C SUBCONTRACTING OPPORTUNITY RESPONSE DUE DATE, DESCRIPTION, REQUIREMENTS AND RELATED INFORMATION

1. Potential Subcontractor's Bid Response Due Date:

If you would like for our company to consider your company's bid for the subcontracting opportunity identified below in Item 2, we must receive your bid response no later than 5:00 PM (Central Time) on 11/23/2015 (Date mm/dd/yyyy).

In accordance with 34 TAC §20.14, each notice of subcontracting opportunity shall be provided to at least three (3) Texas certified HUBs, and allow the HUBs at least seven (7) working days to respond to the notice prior to submitting our bid response to the contracting agency. In addition, at least seven (7) working days prior to us submitting our bid response to the contracting agency, we must provide notice of each of our subcontracting opportunities to two (2) or more trade organizations or development centers (in Texas) that serves members of groups (i.e., Asian Pacific American, Black American, Hispanic American, Native American, Woman, Service Disabled Veteran) identified in Texas Administrative Code, §20.11(19)(C).

(A working day is considered a normal business day of a state agency, not including weekends, federal or state holidays, or days the agency is declared closed by its executive officer. The initial day the subcontracting opportunity notice is sent/provided to the HUBs and to the trade organizations or development centers is considered to be "day zero" and does not count as one of the seven (7) working days.)

2. Subcontracting Opportunity Scope of Work:

INTERA requires the services of a company specializing in the acquisition and commercial distribution of geophysical borehole logs. Specifically, the company will have an established database containing geophysical borehole logs that are readily searchable by API numbers, log type, top and bottom logging interval, formation at total depth, and other search criteria.

3. Required Qualifications: ☐ - Not Applicable

The successful execution of the subject project requires that the company be able to furnish specific geophysical logs in a redacted manner such that they: 1) retain important information related to characterizing the water quality of groundwater resources, 2) can be released to state agencies for public distribution; and 3) can be acquired at a competitive price. The company's database must contain logs located within the footprint of the Rustler Aquifer in western Texas and southeastern New Mexico. In addition, the company must provide at least 300 geophysical logs that are geographically distributed where it has been confirmed that the top logging interval is above the top of the Rustler Formation and the bottom logging interval is below the base of the Rustler Formation.

4. Bonding/Insurance Requirements: ☐ - Not Applicable

Subcontractor is solely responsible for obtaining sufficient insurance in accordance with the general standards and practices of the industry or governmental entity.

5. Location to review plans/specifications: ☐ - Not Applicable

Request for Qualifications is available on the Texas Water Development Board's website at:
www.twdb.texas.gov/about/contract_admin/request/rfq0008/index.asp or
the Electronic State Business Daily at: esbd.cpa.state.tx.us/bid_show.cfm?bidid=121146

Amanda Derechailo

From: NoReply@MyFax.com
Sent: Thursday, November 12, 2015 5:11 PM
To: Amanda Derechailo
Subject: Successful transmission to 15124729967. Re: Subcontracting Opportunity to Provide Geological Consulting/Study by Providing Redacted Geophysical Logs for Release to Texas State Agencies

Dear INTERA,

Re: Subcontracting Opportunity to Provide Geological Consulting/Study by Providing Redacted Geophysical Logs for Release to Texas State Agencies

The 3 page fax you sent through MyFax to 15124729967 was successfully transmitted at 2015-11-12 23:11:03 (GMT).

The length of transmission was 181 seconds

The receiving machine's fax ID: 512 472 9967

If you need assistance, please visit our online help center at www.myfax.com/support.
Thank you for using the MyFax service.

Best Regards,
The MyFax Team

Contact Customer Support

Hours: 24 hours per day, 7 days a week.
Email: support@myfax.com

North America
Toll-Free: (866) 563-9212

UK
Free Phone: 0808 804 0015
International: (613) 260-6325

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Round Rock Geophysics, LLC

INTERA
GEOSCIENCE & ENGINEERING SOLUTIONS
1812 Centre Creek Drive, Suite 300
Austin, Texas 78754
Tel: 512 425 2000
Fax: 512 727 4821

To:	Bereket M. Derie	**From:**	Van Kelley, PG
Company:	Round Rock Geophysics		
Fax:	**VIA EMAIL**	**Pages:**	2 pages (including Subcontracting Notification Form)
Phone:	512-496-8728	**Date:**	11/23/15
Re:	**Subcontracting Opportunity to Provide Geological Consulting/Study by Providing Redacted Geophysical Logs for Release to Texas State Agencies**		

Dear Bereket M. Derie:

INTERA Incorporated (INTERA) is responding to a reissued solicitation from the Texas Water Development Board (TWDB) to conduct a study of brackish groundwater production zones in the Rustler Aquifer. The original RFQ (#580-16-RFQ0007) was canceled and reissued as RFQ #580-16-RFQ0008 on November 10, 2015. Per the TWDB's Request for Qualifications, INTERA is soliciting subcontracting services from certified Historically Underutilized Businesses (HUBs) on the Centralized Master Bidders List (CMBL). We are currently developing a subcontracting plan wherein HUB firms are identified that may be selected to work under this contract. This letter has been sent to solicit your interest in performing the identified scope of work (a separate HUB Subcontracting Opportunity Notification Form is attached) on this project as a subcontractor to INTERA. While we recognize that the scopes and required qualifications are very specific in nature, we view this expertise and experience as critical to winning, and subsequently executing, this project. If there is interest, and you have the capabilities and experience to perform this scope, please fax (512-727-4821) or email (vkelley@intera.com) a written statement to Van Kelley. INTERA will, at its sole discretion, determine which firms are selected for opportunities under this contract. The scope of work and requirements are listed below:

> Services are needed by a company specializing in the acquisition and commercial distribution of geophysical borehole logs. Specifically, the company will have an established database containing geophysical borehole logs that are readily searchable by API numbers, log type, top and bottom logging interval, formation at total depth, and other search criteria. The successful execution of the subject project requires that the company be able to furnish specific geophysical logs in a redacted manner such that they: 1) retain important information related to characterizing the water quality of groundwater resources, 2) can be released to state agencies for public distribution; and 3) can be acquired at a competitive price. The company's database must contain logs located within the footprint of the Rustler Aquifer in western Texas and southeastern New Mexico. In addition, the company must provide at least 300 geophysical logs that are geographically distributed where it has been confirmed that the top logging interval is above the top of the Rustler Formation and the bottom logging interval is below the base of the Rustler Formation.

In order to evaluate and subsequently incorporate subcontractor qualifications/experience into INTERA's Statement of Qualifications to TWDB, please confirm your interest within **seven** working days of receiving this notice **(i.e., no later than 5:00 pm on Monday, November 23, 2015)**. We look forward to your response.

Sincerely,

Van Kelley, PG
Sr. Vice President/Project Manager

Rev 09/15

HUB Subcontracting Opportunity Notification Form

In accordance with Texas Gov't Code, Chapter 2161, each state agency that considers entering into a contract with an expected value of $100,000 or more shall, before the agency solicits bids, proposals, offers, or other applicable expressions of interest, determine whether subcontracting opportunities are probable under the contract. The state agency I have identified below in **Section B** has determined that subcontracting opportunities are probable under the requisition to which my company will be responding.

34 Texas Administrative Code, §20.14 requires all respondents (prime contractors) bidding on the contract to provide notice of each of their subcontracting opportunities to at least three (3) Texas certified HUBs (who work within the respective industry applicable to the subcontracting opportunity), and allow the HUBs at least seven (7) working days to respond to the notice prior to the respondent submitting its bid response to the contracting agency. In addition, at least seven (7) working days prior to submitting its bid response to the contracting agency, the respondent must provide notice of each of its subcontracting opportunities to two (2) or more trade organizations or development centers (in Texas) that serves members of groups (i.e., Asian Pacific American, Black American, Hispanic American, Native American, Woman, Service Disabled Veteran) identified in Texas Administrative Code, §20.11(19)(C).

We respectfully request that vendors interested in bidding on the subcontracting opportunity scope of work identified in **Section C, Item 2**, reply no later than the date and time identified in **Section C, Item 1**. Submit your response to the point-of-contact referenced in **Section A**.

SECTION: A PRIME CONTRACTOR'S INFORMATION

Company Name: INTERA Incorporated
State of Texas VID #: 1743010638900
Point-of-Contact: Mr. Van Kelley, PG
Phone #: 512-425-2047
E-mail Address: vkelley@intera.com
Fax #: 512-727-4821

SECTION: B CONTRACTING STATE AGENCY AND REQUISITION INFORMATION

Agency Name: Texas Water Development Board
Point-of-Contact: Ms. Tina Newstrom
Phone #: 512-463-7825
Requisition #: Request for Qualifications to Conduct a Study of Brackish Groundwater Production Zones in the Rustler Aquifer. RFQ #580-16-RFQ0008
Bid Open Date: 11/24/2015 (mm/dd/yyyy)

SECTION: C SUBCONTRACTING OPPORTUNITY RESPONSE DUE DATE, DESCRIPTION, REQUIREMENTS AND RELATED INFORMATION

1. Potential Subcontractor's Bid Response Due Date:

If you would like for our company to consider your company's bid for the subcontracting opportunity identified below in Item 2, we must receive your bid response no later than **5:00 PM** (Central Time) on **11/23/2015** (Date (mm/dd/yyyy)).

In accordance with 34 TAC §20.14, each notice of subcontracting opportunity shall be provided to at least three (3) Texas certified HUBs, and allow the HUBs at least seven (7) working days to respond to the notice prior to submitting our bid response to the contracting agency. In addition, at least seven (7) working days prior to us submitting our bid response to the contracting agency, we must provide notice of each of our subcontracting opportunities to two (2) or more trade organizations or development centers (in Texas) that serves members of groups (i.e., Asian Pacific American, Black American, Hispanic American, Native American, Woman, Service Disabled Veteran) identified in Texas Administrative Code, §20.11(19)(C).

(A working day is considered a normal business day of a state agency, not including weekends, federal or state holidays, or days the agency is declared closed by its executive officer. The initial day the subcontracting opportunity notice is sent/provided to the HUBs and to the trade organizations or development centers is considered to be "day zero" and does not count as one of the seven (7) working days.)

2. Subcontracting Opportunity Scope of Work:

INTERA requires the services of a company specializing in the acquisition and commercial distribution of geophysical borehole logs. Specifically, the company will have an established database containing geophysical borehole logs that are readily searchable by API numbers, log type, top and bottom logging interval, formation at total depth, and other search criteria.

3. Required Qualifications: ☐ - Not Applicable

The successful execution of the subject project requires that the company be able to furnish specific geophysical logs in a redacted manner such that they: 1) retain important information related to characterizing the water quality of groundwater resources, 2) can be released to state agencies for public distribution; and 3) can be acquired at a competitive price. The company's database must contain logs located within the footprint of the Rustler Aquifer in western Texas and southeastern New Mexico. In addition, the company must provide at least 300 geophysical logs that are geographically distributed where it has been confirmed that the top logging interval is above the top of the Rustler Formation and the bottom logging interval is below the base of the Rustler Formation.

4. Bonding/Insurance Requirements: ☐ - Not Applicable

Subcontractor is solely responsible for obtaining sufficient insurance in accordance with the general standards and practices of the industry or governmental entity.

5. Location to review plans/specifications: ☐ - Not Applicable

Request for Qualifications is available on the Texas Water Development Board's website at:
www.twdb.texas.gov/about/contract_admin/request/rfq0008/index.asp or
the Electronic State Business Daily at: esbd.cpa.state.tx.us/bid_show.cfm?bidid=121146

Tanya Townsend

From: Tanya Townsend
Sent: Thursday, November 12, 2015 4:51 PM
To: 'bderie@roundrockgeo.com'
Subject: Subcontracting Opportunity to Provide Redacted Geophysical Logs for Release to Texas State Agencies
Attachments: Round Rock Geo Rustler Opp #3.pdf

Dear Bereket M. Derie,

Attached, please find a subcontracting opportunity to provide geological consulting services. If you need additional information about this opportunity, please contact Van Kelley at vkelley@intera.com .

Regards,
Tanya Townsend
INTERA Incorporated
Phone: (512) 425-2019
Fax: (512) 425-2099

INTERA
GEOSCIENCE & ENGINEERING SOLUTIONS

1

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Tessellations Incorporated

INTERA
GEOSCIENCE & ENGINEERING SOLUTIONS
1812 Centre Creek Drive, Suite 300
Austin, Texas 78754
Tel: 512 425 2000
Fax: 512 727 4821

Fax

To:	Sangita Patel	**From:**	Van Kelley, PG
Company:	Tessellations Incorporated		
Fax:	281-667-3253	**Pages:**	3 pages (including Subcontracting Notification Form)
Phone:	936-321-1998	**Date:**	11/12/15
Re:	**Subcontracting Opportunity to Provide Geological Consulting/Study by Providing Redacted Geophysical Logs for Release to Texas State Agencies**		

Dear Sangita Patel:

INTERA Incorporated (INTERA) is responding to a reissued solicitation from the Texas Water Development Board (TWDB) to conduct a study of brackish groundwater production zones in the Rustler Aquifer. The original RFQ (#580-16-RFQ0007) was canceled and reissued as RFQ #580-16-RFQ0008 on November 10, 2015. Per the TWDB's Request for Qualifications, INTERA is soliciting subcontracting services from certified Historically Underutilized Businesses (HUBs) on the Centralized Master Bidders List (CMBL). We are currently developing a subcontracting plan wherein HUB firms are identified that may be selected to work under this contract. This letter has been sent to solicit your interest in performing the identified scope of work (a separate HUB Subcontracting Opportunity Notification Form is attached) on this project as a subcontractor to INTERA. While we recognize that the scopes and required qualifications are very specific in nature, we view this expertise and experience as critical to winning, and subsequently executing, this project. If there is interest, and you have the capabilities and experience to perform this scope, please fax (512-727-4821) or email (vkelley@intera.com) a written statement to Van Kelley. INTERA will, at its sole discretion, determine which firms are selected for opportunities under this contract. The scope of work and requirements are listed below:

> Services are needed by a company specializing in the acquisition and commercial distribution of geophysical borehole logs. Specifically, the company will have an established database containing geophysical borehole logs that are readily searchable by API numbers, log type, top and bottom logging interval, formation at total depth, and other search criteria. The successful execution of the subject project requires that the company be able to furnish specific geophysical logs in a redacted manner such that they: 1) retain important information related to characterizing the water quality of groundwater resources, 2) can be released to state agencies for public distribution; and 3) can be acquired at a competitive price. The company's database must contain logs located within the footprint of the Rustler Aquifer in western Texas and southeastern New Mexico. In addition, the company must provide at least 300 geophysical logs that are geographically distributed where it has been confirmed that the top logging interval is above the top of the Rustler Formation and the bottom logging interval is below the base of the Rustler Formation.

In order to evaluate and subsequently incorporate subcontractor qualifications/experience into INTERA's Statement of Qualifications to TWDB, please confirm your interest within **seven** working days of receiving this notice **(i.e., no later than 5:00 pm on Monday, November 23, 2015)**. We look forward to your response.

Sincerely,

Van Kelley, PG
Sr. Vice President/Project Manager

Rev 09/15

HUB Subcontracting Opportunity Notification Form

In accordance with Texas Gov't Code, Chapter 2161, each state agency that considers entering into a contract with an expected value of $100,000 or more shall, before the agency solicits bids, proposals, offers, or other applicable expressions of interest, determine whether subcontracting opportunities are probable under the contract. The state agency I have identified below in **Section B** has determined that subcontracting opportunities are probable under the requisition to which my company will be responding.

34 Texas Administrative Code, §20.14 requires all respondents (prime contractors) bidding on the contract to provide notice of each of their subcontracting opportunities to at least three (3) Texas certified HUBs (who work within the respective industry applicable to the subcontracting opportunity), and allow the HUBs at least seven (7) working days to respond to the notice prior to the respondent submitting its bid response to the contracting agency. In addition, at least seven (7) working days prior to submitting its bid response to the contracting agency, the respondent must provide notice of each of its subcontracting opportunities to two (2) or more trade organizations or development centers (in Texas) that serves members of groups (i.e., Asian Pacific American, Black American, Hispanic American, Native American, Woman, Service Disabled Veteran) identified in Texas Administrative Code, §20.11(19)(C).

We respectfully request that vendors interested in bidding on the subcontracting opportunity scope of work identified in **Section C, Item 2**, reply no later than the date and time identified in **Section C, Item 1**. Submit your response to the point-of-contact referenced in **Section A**.

SECTION: A PRIME CONTRACTOR'S INFORMATION

Company Name: INTERA Incorporated
State of Texas VID #: 1743010638900
Point-of-Contact: Mr. Van Kelley, PG
Phone #: 512-425-2047
E-mail Address: vkelley@intera.com
Fax #: 512-727-4821

SECTION: B CONTRACTING STATE AGENCY AND REQUISITION INFORMATION

Agency Name: Texas Water Development Board
Point-of-Contact: Ms. Tina Newstrom
Phone #: 512-463-7825
Requisition #: Request for Qualifications to Conduct a Study of Brackish Groundwater Production Zones in the Rustler Aquifer. RFQ #580-16-RFQ0008
Bid Open Date: 11/24/2015 (mm/dd/yyyy)

SECTION: C SUBCONTRACTING OPPORTUNITY RESPONSE DUE DATE, DESCRIPTION, REQUIREMENTS AND RELATED INFORMATION

1. Potential Subcontractor's Bid Response Due Date:

If you would like for our company to consider your company's bid for the subcontracting opportunity identified below in Item 2, we must receive your bid response no later than 5:00 PM (Central Time) on 11/23/2015 (Date (mm/dd/yyyy)).

In accordance with 34 TAC §20.14, each notice of subcontracting opportunity shall be provided to at least three (3) Texas certified HUBs, and allow the HUBs at least seven (7) working days to respond to the notice prior to submitting our bid response to the contracting agency. In addition, at least seven (7) working days prior to us submitting our bid response to the contracting agency, we must provide notice of each of our subcontracting opportunities to two (2) or more trade organizations or development centers (in Texas) that serves members of groups (i.e., Asian Pacific American, Black American, Hispanic American, Native American, Woman, Service Disabled Veteran) identified in Texas Administrative Code, §20.11(19)(C).

(A working day is considered a normal business day of a state agency, not including weekends, federal or state holidays, or days the agency is declared closed by its executive officer. The initial day the subcontracting opportunity notice is sent/provided to the HUBs and to the trade organizations or development centers is considered to be "day zero" and does not count as one of the seven (7) working days.)

2. Subcontracting Opportunity Scope of Work:

INTERA requires the services of a company specializing in the acquisition and commercial distribution of geophysical borehole logs. Specifically, the company will have an established database containing geophysical borehole logs that are readily searchable by API numbers, log type, top and bottom logging interval, formation at total depth, and other search criteria.

3. Required Qualifications: ☐ - Not Applicable

The successful execution of the subject project requires that the company be able to furnish specific geophysical logs in a redacted manner such that they: 1) retain important information related to characterizing the water quality of groundwater resources, 2) can be released to state agencies for public distribution; and 3) can be acquired at a competitive price. The company's database must contain logs located within the footprint of the Rustler Aquifer in western Texas and southeastern New Mexico. In addition, the company must provide at least 300 geophysical logs that are geographically distributed where it has been confirmed that the top logging interval is above the top of the Rustler Formation and the bottom logging interval is below the base of the Rustler Formation.

4. Bonding/Insurance Requirements: ☐ - Not Applicable

Subcontractor is solely responsible for obtaining sufficient insurance in accordance with the general standards and practices of the industry or governmental entity.

5. Location to review plans/specifications: ☐ - Not Applicable

Request for Qualifications is available on the Texas Water Development Board's website at:
www.twdb.texas.gov/about/contract_admin/request/rfq0008/index.asp or
the Electronic State Business Daily at: esbd.cpa.state.tx.us/bid_show.cfm?bidid=121146

Amanda Derechailo

From: NoReply@MyFax.com
Sent: Thursday, November 12, 2015 5:06 PM
To: Amanda Derechailo
Subject: Successful transmission to 12816673253. Re: Subcontracting Opportunity to Provide Geological Consulting/Study by Providing Redacted Geophysical Logs for Release to Texas State Agencies

Dear INTERA,

Re: Subcontracting Opportunity to Provide Geological Consulting/Study by Providing Redacted Geophysical Logs for Release to Texas State Agencies

The 3 page fax you sent through MyFax to 12816673253 was successfully transmitted at 2015-11-12 23:05:50 (GMT).

The length of transmission was 180 seconds

The receiving machine's fax ID: 12816673253

If you need assistance, please visit our online help center at www.myfax.com/support.
Thank you for using the MyFax service.

Best Regards,
The MyFax Team

Contact Customer Support

Hours: 24 hours per day, 7 days a week.
Email: support@myfax.com

North America
Toll-Free: (866) 563-9212

UK
Free Phone: 0808 804 0015
International: (613) 260-6325

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TRADE ORGANIZATIONS AND DEVELOPMENT CENTER NOTIFICATIONS FOR OPPORTUNITY #3

Hispanic Contractors Association de San Antonio

INTERA
GEOSCIENCE & ENGINEERING SOLUTIONS

Fax

1812 Centre Creek Drive, Suite 300
Austin, Texas 78754
Tel: 512 425 2000
Fax: 512 727 4821

To:	Mr. Roy Attwood	**From:**	Van Kelley, PG
Company:	Hispanic Contractors Association de San Antonio		
Fax:	210-444-1101	**Pages:**	3 pages (including Subcontracting Notification Form)
Phone:	210-444-1100	**Date:**	11/12/15
Re:	**Subcontracting Opportunity to Provide Geological Consulting/Study by Providing Redacted Geophysical Logs for Release to Texas State Agencies**		

Dear Mr. Attwood:

INTERA Incorporated (INTERA) is responding to a reissued solicitation from the Texas Water Development Board (TWDB) to conduct a study of brackish groundwater production zones in the Rustler Aquifer. The original RFQ (#580-16-RFQ0007) was canceled and reissued as RFQ #580-16-RFQ0008 on November 10, 2015. Per the TWDB's Request for Qualifications, INTERA is soliciting subcontracting services from certified Historically Underutilized Businesses (HUBs) on the Centralized Master Bidders List (CMBL). We are currently developing a subcontracting plan wherein HUB firms are identified that may be selected to work under this contract. This letter has been sent to solicit your interest in performing the identified scope of work (a separate HUB Subcontracting Opportunity Notification Form is attached) on this project as a subcontractor to INTERA. While we recognize that the scopes and required qualifications are very specific in nature, we view this expertise and experience as critical to winning, and subsequently executing, this project. If there is interest, and you have the capabilities and experience to perform this scope, please fax (512-727-4821) or email (vkelley@intera.com) a written statement to Van Kelley. INTERA will, at its sole discretion, determine which firms are selected for opportunities under this contract. The scope of work and requirements are listed below:

> Services are needed by a company specializing in the acquisition and commercial distribution of geophysical borehole logs. Specifically, the company will have an established database containing geophysical borehole logs that are readily searchable by API numbers, log type, top and bottom logging interval, formation at total depth, and other search criteria. The successful execution of the subject project requires that the company be able to furnish specific geophysical logs in a redacted manner such that they: 1) retain important information related to characterizing the water quality of groundwater resources, 2) can be released to state agencies for public distribution; and 3) can be acquired at a competitive price. The company's database must contain logs located within the footprint of the Rustler Aquifer in western Texas and southeastern New Mexico. In addition, the company must provide at least 300 geophysical logs that are geographically distributed where it has been confirmed that the top logging interval is above the top of the Rustler Formation and the bottom logging interval is below the base of the Rustler Formation.

In order to evaluate and subsequently incorporate subcontractor qualifications/experience into INTERA's Statement of Qualifications to TWDB, please confirm your interest within **seven** working days of receiving this notice **(i.e., no later than 5:00 pm on Monday, November 23, 2015)**. We look forward to your response.

Sincerely,

Van Kelley, PG
Sr. Vice President/Project Manager

Rev 09/15

HUB Subcontracting Opportunity Notification Form

In accordance with Texas Gov't Code, Chapter 2161, each state agency that considers entering into a contract with an expected value of $100,000 or more shall, before the agency solicits bids, proposals, offers, or other applicable expressions of interest, determine whether subcontracting opportunities are probable under the contract. The state agency I have identified below in **Section B** has determined that subcontracting opportunities are probable under the requisition to which my company will be responding.

34 Texas Administrative Code, §20.14 requires all respondents (prime contractors) bidding on the contract to provide notice of each of their subcontracting opportunities to at least three (3) Texas certified HUBs (who work within the respective industry applicable to the subcontracting opportunity), and allow the HUBs at least seven (7) working days to respond to the notice prior to the respondent submitting its bid response to the contracting agency. In addition, at least seven (7) working days prior to submitting its bid response to the contracting agency, the respondent must provide notice of each of its subcontracting opportunities to two (2) or more trade organizations or development centers (in Texas) that serves members of groups (i.e., Asian Pacific American, Black American, Hispanic American, Native American, Woman, Service Disabled Veteran) identified in Texas Administrative Code, §20.11(19)(C).

We respectfully request that vendors interested in bidding on the subcontracting opportunity scope of work identified in **Section C, Item 2**, reply no later than the date and time identified in **Section C, Item 1**. Submit your response to the point-of-contact referenced in **Section A**.

SECTION: A PRIME CONTRACTOR'S INFORMATION

Company Name: INTERA Incorporated
State of Texas VID #: 1743010638900
Point-of-Contact: Mr. Van Kelley, PG
Phone #: 512-425-2047
E-mail Address: vkelley@intera.com
Fax #: 512-727-4821

SECTION: B CONTRACTING STATE AGENCY AND REQUISITION INFORMATION

Agency Name: Texas Water Development Board
Point-of-Contact: Ms. Tina Newstrom
Phone #: 512-463-7825
Requisition #: Request for Qualifications to Conduct a Study of Brackish Groundwater Production Zones in the Rustler Aquifer. RFQ #580-16-RFQ0008
Bid Open Date: 11/24/2015 (mm/dd/yyyy)

SECTION: C SUBCONTRACTING OPPORTUNITY RESPONSE DUE DATE, DESCRIPTION, REQUIREMENTS AND RELATED INFORMATION

1. Potential Subcontractor's Bid Response Due Date:

If you would like for our company to consider your company's bid for the subcontracting opportunity identified below in Item 2, we must receive your bid response no later than 5:00 PM (Central Time) on 11/23/2015 (Date (mm/dd/yyyy)).

In accordance with 34 TAC §20.14, each notice of subcontracting opportunity shall be provided to at least three (3) Texas certified HUBs, and allow the HUBs at least seven (7) working days to respond to the notice prior to submitting our bid response to the contracting agency. In addition, at least seven (7) working days prior to us submitting our bid response to the contracting agency, we must provide notice of each of our subcontracting opportunities to two (2) or more trade organizations or development centers (in Texas) that serves members of groups (i.e., Asian Pacific American, Black American, Hispanic American, Native American, Woman, Service Disabled Veteran) identified in Texas Administrative Code, §20.11(19)(C).

(A working day is considered a normal business day of a state agency, not including weekends, federal or state holidays, or days the agency is declared closed by its executive officer. The initial day the subcontracting opportunity notice is sent/provided to the HUBs and to the trade organizations or development centers is considered to be "day zero" and does not count as one of the seven (7) working days.)

2. Subcontracting Opportunity Scope of Work:

INTERA requires the services of a company specializing in the acquisition and commercial distribution of geophysical borehole logs. Specifically, the company will have an established database containing geophysical borehole logs that are readily searchable by API numbers, log type, top and bottom logging interval, formation at total depth, and other search criteria.

3. Required Qualifications: ☐ - Not Applicable

The successful execution of the subject project requires that the company be able to furnish specific geophysical logs in a redacted manner such that they: 1) retain important information related to characterizing the water quality of groundwater resources, 2) can be released to state agencies for public distribution; and 3) can be acquired at a competitive price. The company's database must contain logs located within the footprint of the Rustler Aquifer in western Texas and southeastern New Mexico. In addition, the company must provide at least 300 geophysical logs that are geographically distributed where it has been confirmed that the top logging interval is above the top of the Rustler Formation and the bottom logging interval is below the base of the Rustler Formation.

4. Bonding/Insurance Requirements: ☐ - Not Applicable

Subcontractor is solely responsible for obtaining sufficient insurance in accordance with the general standards and practices of the industry or governmental entity.

5. Location to review plans/specifications: ☐ - Not Applicable

Request for Qualifications is available on the Texas Water Development Board's website at:
www.twdb.texas.gov/about/contract_admin/request/rfq0008/index.asp or
the Electronic State Business Daily at: esbd.cpa.state.tx.us/bid_show.cfm?bidid=121146

Amanda Derechailo

From: NoReply@MyFax.com
Sent: Thursday, November 12, 2015 5:05 PM
To: Amanda Derechailo
Subject: Successful transmission to 12104441101. Re: Subcontracting Opportunity to Provide Geological Consulting/Study by Providing Redacted Geophysical Logs for Release to Texas State Agencies

Dear INTERA,

Re: Subcontracting Opportunity to Provide Geological Consulting/Study by Providing Redacted Geophysical Logs for Release to Texas State Agencies

The 3 page fax you sent through MyFax to 12104441101 was successfully transmitted at 2015-11-12 23:04:43 (GMT).

The length of transmission was 182 seconds

The receiving machine's fax ID: 2104441101

If you need assistance, please visit our online help center at www.myfax.com/support.
Thank you for using the MyFax service.

Best Regards,
The MyFax Team

Contact Customer Support

Hours: 24 hours per day, 7 days a week.
Email: support@myfax.com

North America
Toll-Free: (866) 563-9212

UK
Free Phone: 0808 804 0015
International: (613) 260-6325

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Houston Minority Supplier Development Council

INTERA
GEOSCIENCE & ENGINEERING SOLUTIONS

1812 Centre Creek Drive, Suite 300
Austin, Texas 78754
Tel: 512 425 2000
Fax: 512 727 4821

Fax

To:	Ms. Angela Freeman	**From:**	Van Kelley, PG
Company:	Houston Minority Supplier Development Council		
Fax:	713-271-9770	**Pages:**	3 pages (including Subcontracting Notification Form)
Phone:	713-271-9770	**Date:**	11/12/15
Re:	**Subcontracting Opportunity to Provide Geological Consulting/Study by Providing Redacted Geophysical Logs for Release to Texas State Agencies**		

Dear Ms. Freeman:

INTERA Incorporated (INTERA) is responding to a reissued solicitation from the Texas Water Development Board (TWDB) to conduct a study of brackish groundwater production zones in the Rustler Aquifer. The original RFQ (#580-16-RFQ0007) was canceled and reissued as RFQ #580-16-RFQ0008 on November 10, 2015. Per the TWDB's Request for Qualifications, INTERA is soliciting subcontracting services from certified Historically Underutilized Businesses (HUBs) on the Centralized Master Bidders List (CMBL). We are currently developing a subcontracting plan wherein HUB firms are identified that may be selected to work under this contract. This letter has been sent to solicit your interest in performing the identified scope of work (a separate HUB Subcontracting Opportunity Notification Form is attached) on this project as a subcontractor to INTERA. While we recognize that the scopes and required qualifications are very specific in nature, we view this expertise and experience as critical to winning, and subsequently executing, this project. If there is interest, and you have the capabilities and experience to perform this scope, please fax (512-727-4821) or email (vkelley@intera.com) a written statement to Van Kelley. INTERA will, at its sole discretion, determine which firms are selected for opportunities under this contract. The scope of work and requirements are listed below:

> Services are needed by a company specializing in the acquisition and commercial distribution of geophysical borehole logs. Specifically, the company will have an established database containing geophysical borehole logs that are readily searchable by API numbers, log type, top and bottom logging interval, formation at total depth, and other search criteria. The successful execution of the subject project requires that the company be able to furnish specific geophysical logs in a redacted manner such that they: 1) retain important information related to characterizing the water quality of groundwater resources, 2) can be released to state agencies for public distribution; and 3) can be acquired at a competitive price. The company's database must contain logs located within the footprint of the Rustler Aquifer in western Texas and southeastern New Mexico. In addition, the company must provide at least 300 geophysical logs that are geographically distributed where it has been confirmed that the top logging interval is above the top of the Rustler Formation and the bottom logging interval is below the base of the Rustler Formation.

In order to evaluate and subsequently incorporate subcontractor qualifications/experience into INTERA's Statement of Qualifications to TWDB, please confirm your interest within **seven** working days of receiving this notice **(i.e., no later than 5:00 pm on Monday, November 23, 2015)**. We look forward to your response.

Sincerely,

Van Kelley, PG
Sr. Vice President/Project Manager

Rev 09/15

HUB Subcontracting Opportunity Notification Form

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We respectfully request that vendors interested in bidding on the subcontracting opportunity scope of work identified in **Section C, Item 2**, reply no later than the date and time identified in **Section C, Item 1**. Submit your response to the point-of-contact referenced in **Section A**.

SECTION: A PRIME CONTRACTOR'S INFORMATION

Company Name: INTERA Incorporated
State of Texas VID #: 1743010638900
Point-of-Contact: Mr. Van Kelley, PG
Phone #: 512-425-2047
E-mail Address: vkelley@intera.com
Fax #: 512-727-4821

SECTION: B CONTRACTING STATE AGENCY AND REQUISITION INFORMATION

Agency Name: Texas Water Development Board
Point-of-Contact: Ms. Tina Newstrom
Phone #: 512-463-7825
Requisition #: Request for Qualifications to Conduct a Study of Brackish Groundwater Production Zones in the Rustler Aquifer. RFQ #580-16-RFQ0008
Bid Open Date: 11/24/2015 (mm/dd/yyyy)

SECTION: C SUBCONTRACTING OPPORTUNITY RESPONSE DUE DATE, DESCRIPTION, REQUIREMENTS AND RELATED INFORMATION

1. Potential Subcontractor's Bid Response Due Date:

If you would like for our company to consider your company's bid for the subcontracting opportunity identified below in Item 2, we must receive your bid response no later than 5:00 PM (Central Time) on 11/23/2015 (Date (mm/dd/yyyy)).

In accordance with 34 TAC §20.14, each notice of subcontracting opportunity shall be provided to at least three (3) Texas certified HUBs, and allow the HUBs at least seven (7) working days to respond to the notice prior to submitting our bid response to the contracting agency. In addition, at least seven (7) working days prior to us submitting our bid response to the contracting agency, we must provide notice of each of our subcontracting opportunities to two (2) or more trade organizations or development centers (in Texas) that serves members of groups (i.e., Asian Pacific American, Black American, Hispanic American, Native American, Woman, Service Disabled Veteran) identified in Texas Administrative Code, §20.11(19)(C).

(A working day is considered a normal business day of a state agency, not including weekends, federal or state holidays, or days the agency is declared closed by its executive officer. The initial day the subcontracting opportunity notice is sent/provided to the HUBs and to the trade organizations or development centers is considered to be "day zero" and does not count as one of the seven (7) working days.)

2. Subcontracting Opportunity Scope of Work:

INTERA requires the services of a company specializing in the acquisition and commercial distribution of geophysical borehole logs. Specifically, the company will have an established database containing geophysical borehole logs that are readily searchable by API numbers, log type, top and bottom logging interval, formation at total depth, and other search criteria.

3. Required Qualifications: ☐ - Not Applicable

The successful execution of the subject project requires that the company be able to furnish specific geophysical logs in a redacted manner such that they: 1) retain important information related to characterizing the water quality of groundwater resources, 2) can be released to state agencies for public distribution; and 3) can be acquired at a competitive price. The company's database must contain logs located within the footprint of the Rustler Aquifer in western Texas and southeastern New Mexico. In addition, the company must provide at least 300 geophysical logs that are geographically distributed where it has been confirmed that the top logging interval is above the top of the Rustler Formation and the bottom logging interval is below the base of the Rustler Formation.

4. Bonding/Insurance Requirements: ☐ - Not Applicable

Subcontractor is solely responsible for obtaining sufficient insurance in accordance with the general standards and practices of the industry or governmental entity.

5. Location to review plans/specifications: ☐ - Not Applicable

Request for Qualifications is available on the Texas Water Development Board's website at:
www.twdb.texas.gov/about/contract_admin/request/rfq0008/index.asp or
the Electronic State Business Daily at: esbd.cpa.state.tx.us/bid_show.cfm?bidid=121146

Amanda Derechailo

From: NoReply@MyFax.com
Sent: Thursday, November 12, 2015 5:10 PM
To: Amanda Derechailo
Subject: Successful transmission to 17132719770. Re: Subcontracting Opportunity to Provide Geological Consulting/Study by Providing Redacted Geophysical Logs for Release to Texas State Agencies

Dear INTERA,

Re: Subcontracting Opportunity to Provide Geological Consulting/Study by Providing Redacted Geophysical Logs for Release to Texas State Agencies

The 3 page fax you sent through MyFax to 17132719770 was successfully transmitted at 2015-11-12 23:09:52 (GMT).

The length of transmission was 181 seconds

The receiving machine's fax ID: 713 271 9770

If you need assistance, please visit our online help center at www.myfax.com/support.
Thank you for using the MyFax service.

Best Regards,
The MyFax Team

Contact Customer Support

Hours: 24 hours per day, 7 days a week
Email: support@myfax.com

North America
Toll-Free: (866) 563-9212

UK
Free Phone: 0808 804 0015
International: (613) 260-6325

1

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Southwest Minority Supplier Development Council

INTERA
GEOSCIENCE & ENGINEERING SOLUTIONS
1812 Centre Creek Drive, Suite 300
Austin, Texas 78754
Tel: 512 425 2000
Fax: 512 727 4821

Fax

To:	Ms. Maggie Trevino	**From:**	Van Kelley, PG
Company:	Southwest Minority Supplier Development Council		
Fax:	512-386-8988	**Pages:**	3 pages (including Subcontracting Notification Form)
Phone:	512-386-8766	**Date:**	11/12/15
Re:	**Subcontracting Opportunity to Provide Geological Consulting/Study by Providing Redacted Geophysical Logs for Release to Texas State Agencies**		

Dear Ms. Trevino:

INTERA Incorporated (INTERA) is responding to a reissued solicitation from the Texas Water Development Board (TWDB) to conduct a study of brackish groundwater production zones in the Rustler Aquifer. The original RFQ (#580-16-RFQ0007) was canceled and reissued as RFQ #580-16-RFQ0008 on November 10, 2015. Per the TWDB's Request for Qualifications, INTERA is soliciting subcontracting services from certified Historically Underutilized Businesses (HUBs) on the Centralized Master Bidders List (CMBL). We are currently developing a subcontracting plan wherein HUB firms are identified that may be selected to work under this contract. This letter has been sent to solicit your interest in performing the identified scope of work (a separate HUB Subcontracting Opportunity Notification Form is attached) on this project as a subcontractor to INTERA. While we recognize that the scopes and required qualifications are very specific in nature, we view this expertise and experience as critical to winning, and subsequently executing, this project. If there is interest, and you have the capabilities and experience to perform this scope, please fax (512-727-4821) or email (vkelley@intera.com) a written statement to Van Kelley. INTERA will, at its sole discretion, determine which firms are selected for opportunities under this contract. The scope of work and requirements are listed below:

> Services are needed by a company specializing in the acquisition and commercial distribution of geophysical borehole logs. Specifically, the company will have an established database containing geophysical borehole logs that are readily searchable by API numbers, log type, top and bottom logging interval, formation at total depth, and other search criteria. The successful execution of the subject project requires that the company be able to furnish specific geophysical logs in a redacted manner such that they: 1) retain important information related to characterizing the water quality of groundwater resources, 2) can be released to state agencies for public distribution; and 3) can be acquired at a competitive price. The company's database must contain logs located within the footprint of the Rustler Aquifer in western Texas and southeastern New Mexico. In addition, the company must provide at least 300 geophysical logs that are geographically distributed where it has been confirmed that the top logging interval is above the top of the Rustler Formation and the bottom logging interval is below the base of the Rustler Formation.

In order to evaluate and subsequently incorporate subcontractor qualifications/experience into INTERA's Statement of Qualifications to TWDB, please confirm your interest within **seven** working days of receiving this notice **(i.e., no later than 5:00 pm on Monday, November 23, 2015)**. We look forward to your response.

Sincerely,

Van Kelley, PG
Sr. Vice President/Project Manager

Rev. 09/15

HUB Subcontracting Opportunity Notification Form

In accordance with Texas Gov't Code, Chapter 2161, each state agency that considers entering into a contract with an expected value of $100,000 or more shall, before the agency solicits bids, proposals, offers, or other applicable expressions of interest, determine whether subcontracting opportunities are probable under the contract. The state agency I have identified below in **Section B** has determined that subcontracting opportunities are probable under the requisition to which my company will be responding.

34 Texas Administrative Code, §20.14 requires all respondents (prime contractors) bidding on the contract to provide notice of each of their subcontracting opportunities to at least three (3) Texas certified HUBs (who work within the respective industry applicable to the subcontracting opportunity), and allow the HUBs at least seven (7) working days to respond to the notice prior to the respondent submitting its bid response to the contracting agency. In addition, at least seven (7) working days prior to submitting its bid response to the contracting agency, the respondent must provide notice of each of its subcontracting opportunities to two (2) or more trade organizations or development centers (in Texas) that serves members of groups (i.e., Asian Pacific American, Black American, Hispanic American, Native American, Woman, Service Disabled Veteran) identified in Texas Administrative Code, §20.11(19)(C).

We respectfully request that vendors interested in bidding on the subcontracting opportunity scope of work identified in **Section C, Item 2**, reply no later than the date and time identified in **Section C, Item 1**. Submit your response to the point-of-contact referenced in **Section A**.

SECTION: A PRIME CONTRACTOR'S INFORMATION

Company Name: INTERA Incorporated
State of Texas VID #: 1743010638900
Point-of-Contact: Mr. Van Kelley, PG
Phone #: 512-425-2047
E-mail Address: vkelley@intera.com
Fax #: 512-727-4821

SECTION: B CONTRACTING STATE AGENCY AND REQUISITION INFORMATION

Agency Name: Texas Water Development Board
Point-of-Contact: Ms. Tina Newstrom
Phone #: 512-463-7825
Requisition #: Request for Qualifications to Conduct a Study of Brackish Groundwater Production Zones in the Rustler Aquifer. RFQ #580-16-RFQ0008
Bid Open Date: 11/24/2015 (mm/dd/yyyy)

SECTION: C SUBCONTRACTING OPPORTUNITY RESPONSE DUE DATE, DESCRIPTION, REQUIREMENTS AND RELATED INFORMATION

1. Potential Subcontractor's Bid Response Due Date:

If you would like for our company to consider your company's bid for the subcontracting opportunity identified below in Item 2, we must receive your bid response no later than **5:00 PM** Central Time on **11/23/2015** Date (mm/dd/yyyy).

In accordance with 34 TAC §20.14, each notice of subcontracting opportunity shall be provided to at least three (3) Texas certified HUBs, and allow the HUBs at least seven (7) working days to respond to the notice prior to submitting our bid response to the contracting agency. In addition, at least seven (7) working days prior to us submitting our bid response to the contracting agency, we must provide notice of each of our subcontracting opportunities to two (2) or more trade organizations or development centers (in Texas) that serves members of groups (i.e., Asian Pacific American, Black American, Hispanic American, Native American, Woman, Service Disabled Veteran) identified in Texas Administrative Code, §20.11(19)(C).

(A working day is considered a normal business day of a state agency, not including weekends, federal or state holidays, or days the agency is declared closed by its executive officer. The initial day the subcontracting opportunity notice is sent/provided to the HUBs and to the trade organizations or development centers is considered to be "day zero" and does not count as one of the seven (7) working days.)

2. Subcontracting Opportunity Scope of Work:

INTERA requires the services of a company specializing in the acquisition and commercial distribution of geophysical borehole logs. Specifically, the company will have an established database containing geophysical borehole logs that are readily searchable by API numbers, log type, top and bottom logging interval, formation at total depth, and other search criteria.

3. Required Qualifications: ☐ - Not Applicable

The successful execution of the subject project requires that the company be able to furnish specific geophysical logs in a redacted manner such that they: 1) retain important information related to characterizing the water quality of groundwater resources, 2) can be released to state agencies for public distribution; and 3) can be acquired at a competitive price. The company's database must contain logs located within the footprint of the Rustler Aquifer in western Texas and southeastern New Mexico. In addition, the company must provide at least 300 geophysical logs that are geographically distributed where it has been confirmed that the top logging interval is above the top of the Rustler Formation and the bottom logging interval is below the base of the Rustler Formation.

4. Bonding/Insurance Requirements: ☐ - Not Applicable

Subcontractor is solely responsible for obtaining sufficient insurance in accordance with the general standards and practices of the industry or governmental entity.

5. Location to review plans/specifications: ☐ - Not Applicable

Request for Qualifications is available on the Texas Water Development Board's website at:
www.twdb.texas.gov/about/contract_admin/request/rfq0008/index.asp or
the Electronic State Business Daily at: esbd.cpa.state.tx.us/bid_show.cfm?bidid=121146

Amanda Derechailo

From: NoReply@MyFax.com
Sent: Thursday, November 12, 2015 5:08 PM
To: Amanda Derechailo
Subject: Successful transmission to 15123868988. Re: Subcontracting Opportunity to Provide Geological Consulting/Study by Providing Redacted Geophysical Logs for Release to Texas State Agencies

Dear INTERA,

Re: Subcontracting Opportunity to Provide Geological Consulting/Study by Providing Redacted Geophysical Logs for Release to Texas State Agencies

The 3 page fax you sent through MyFax to 15123868988 was successfully transmitted at 2015-11-12 23:08:29 (GMT).

The length of transmission was 187 seconds

The receiving machine's fax ID: unknown

If you need assistance, please visit our online help center at www.myfax.com/support.
Thank you for using the MyFax service.

Best Regards,
The MyFax Team

Contact Customer Support

Hours: 24 hours per day, 7 days a week.
Email: support@myfax.com

North America
Toll-Free: (866) 563-9212

UK
Free Phone: 0808 804 0015
International: (613) 260-6325

1

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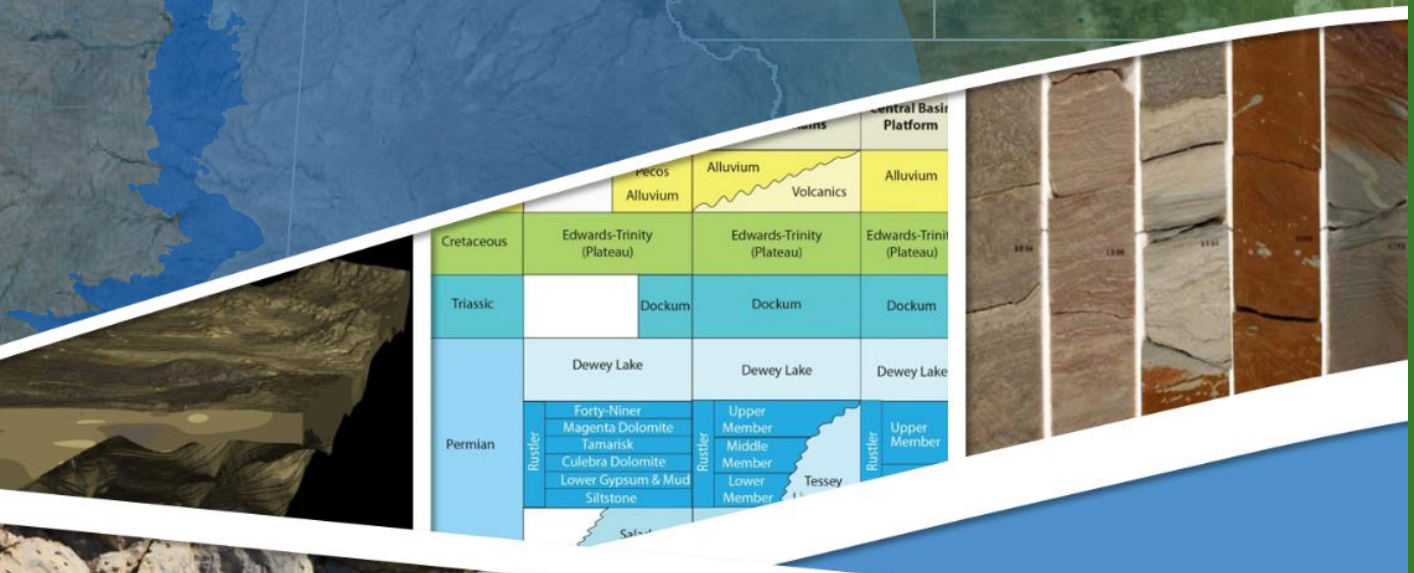
OPPORTUNITY #4
HUB and Trade/Development Center Notifications



INTERA
GEOSCIENCE & ENGINEERING SOLUTIONS

HUB NOTIFICATIONS FOR OPPORTUNITY #4

ACI Group, LCC

INTERA
GEOSCIENCE & ENGINEERING SOLUTIONS

1812 Centre Creek Drive, Suite 300
Austin, Texas 78754
Tel: 512 425 2000
Fax: 512 727 4821

Fax

To:	Ms. Janna Peel Paulson	**From:**	Van Kelley, PG
Company:	ACI Group, LLC		
Fax:	512-306-0974	**Pages:**	3 pages (including Subcontracting Notification Form)
Phone:	512-347-9000	**Date:**	11/12/15
Re:	**Subcontracting Opportunity to Provide Geological Consulting Services to Review Hydrogeological Data to Identify Geological Constraints that Could Act as Hydraulic Barriers to Groundwater Flow**		

Dear Ms. Paulson:

INTERA Incorporated (INTERA) is responding to a reissued solicitation from the Texas Water Development Board (TWDB) to conduct a study of brackish groundwater production zones in the Rustler Aquifer. The original RFQ (#580-16-RFQ0007) was canceled and reissued as RFQ #580-16-RFQ0008 on November 10, 2015. Per the TWDB's Request for Qualifications, INTERA is soliciting subcontracting services from certified Historically Underutilized Businesses (HUBs) on the Centralized Master Bidders List (CMBL). We are currently developing a subcontracting plan wherein HUB firms are identified that may be selected to work under this contract. This letter has been sent to solicit your interest in performing the identified scope of work (a separate HUB Subcontracting Opportunity Notification Form is attached) on this project as a subcontractor to INTERA. While we recognize that the scopes and required qualifications are very specific in nature, we view this expertise and experience as critical to winning, and subsequently executing, this project. If there is interest, and you have the capabilities and experience to perform this scope, please fax (512-727-4821) or email (vkelley@intera.com) a written statement to Van Kelley. INTERA will, at its sole discretion, determine which firms are selected for opportunities under this contract. The scope of work and requirements are listed below:

> Services are requested from a technical expert to review hydrogeological data to identify geological constraints that could act as hydraulic barriers to groundwater flow. The respondent will need to have a Ph.D in the geological sciences and have at least 30 years of experience conducting research regarding groundwater flow, flow and transport, hydrogeophysics, and sedimentary basin hydrogeology. The respondent will need to demonstrate their expertise and capabilities through conference presentations, reports, peer-reviewed journal articles, books, and field guides. Demonstration should include a list of 100 or more peer-review articles in journals, experience as an editor or manuscript reviewer of at least 10 scientific journals, and a reviewer of water research proposals for at least 10 major agencies. The respondent should also be aware of the water resources in Texas and knowledgeable about the Groundwater Availability Program managed by the Texas Water Development Board.

In order to evaluate and subsequently incorporate subcontractor qualifications/experience into INTERA's Statement of Qualifications to TWDB, please confirm your interest within **seven** working days of receiving this notice **(i.e., no later than 5:00 pm on Monday, November 23, 2015)**. We look forward to your response.

Sincerely,

Van Kelley, PG
Sr. Vice President/Project Manager

Rev 09/15

HUB Subcontracting Opportunity Notification Form

In accordance with Texas Gov't Code, Chapter 2161, each state agency that considers entering into a contract with an expected value of $100,000 or more shall, before the agency solicits bids, proposals, offers, or other applicable expressions of interest, determine whether subcontracting opportunities are probable under the contract. The state agency I have identified below in **Section B** has determined that subcontracting opportunities are probable under the requisition to which my company will be responding.

34 Texas Administrative Code, §20.14 requires all respondents (prime contractors) bidding on the contract to provide notice of each of their subcontracting opportunities to at least three (3) Texas certified HUBs (who work within the respective industry applicable to the subcontracting opportunity), and allow the HUBs at least seven (7) working days to respond to the notice prior to the respondent submitting its bid response to the contracting agency. In addition, at least seven (7) working days prior to submitting its bid response to the contracting agency, the respondent must provide notice of each of its subcontracting opportunities to two (2) or more trade organizations or development centers (in Texas) that serves members of groups (i.e., Asian Pacific American, Black American, Hispanic American, Native American, Woman, Service Disabled Veteran) identified in Texas Administrative Code, §20.11(19)(C).

We respectfully request that vendors interested in bidding on the subcontracting opportunity scope of work identified in **Section C, Item 2**, reply no later than the date and time identified in **Section C, Item 1**. Submit your response to the point-of-contact referenced in **Section A**.

SECTION: A PRIME CONTRACTOR'S INFORMATION

Company Name: INTERA Incorporated
State of Texas VID #: 1743010638900
Point-of-Contact: Mr. Van Kelley, PG
Phone #: 512-425-2047
E-mail Address: vkelley@intera.com
Fax #: 512-727-4821

SECTION: B CONTRACTING STATE AGENCY AND REQUISITION INFORMATION

Agency Name: Texas Water Development Board
Point-of-Contact: Ms. Tina Newstrom
Phone #: 512-463-7825
Requisition #: Request for Qualifications to Conduct a Study of Brackish Groundwater Production Zones in the Rustler Aquifer. RFQ #580-16-RFQ0008
Bid Open Date: 11/24/2015 (mm/dd/yyyy)

SECTION: C SUBCONTRACTING OPPORTUNITY RESPONSE DUE DATE, DESCRIPTION, REQUIREMENTS AND RELATED INFORMATION

1. Potential Subcontractor's Bid Response Due Date:

If you would like for our company to consider your company's bid for the subcontracting opportunity identified below in Item 2, we must receive your bid response no later than **5:00 PM** (Central Time) on **11/23/2015** (Date (mm/dd/yyyy)).

In accordance with 34 TAC §20.14, each notice of subcontracting opportunity shall be provided to at least three (3) Texas certified HUBs, and allow the HUBs at least seven (7) working days to respond to the notice prior to submitting our bid response to the contracting agency. In addition, at least seven (7) working days prior to us submitting our bid response to the contracting agency, we must provide notice of each of our subcontracting opportunities to two (2) or more trade organizations or development centers (in Texas) that serves members of groups (i.e., Asian Pacific American, Black American, Hispanic American, Native American, Woman, Service Disabled Veteran) identified in Texas Administrative Code, §20.11(19)(C).

(A working day is considered a normal business day of a state agency, not including weekends, federal or state holidays, or days the agency is declared closed by its executive officer. The initial day the subcontracting opportunity notice is sent/provided to the HUBs and to the trade organizations or development centers is considered to be "day zero" and does not count as one of the seven (7) working days.)

2. Subcontracting Opportunity Scope of Work:

Services are requested from a technical expert to review hydrogeological data to identify geological constraints that could act as hydraulic barriers to groundwater flow.

3. Required Qualifications: ☐ - Not Applicable

The respondent will need to have a Ph.D in the geological sciences and have at least 30 years of experience conducting research regarding groundwater flow, flow and transport, hydrogeophysics, and sedimentary basin hydrogeology. The respondent will need to demonstrate their expertise and capabilities through conference presentations, reports, peer-reviewed journal articles, books, and field guides. Demonstration should include a list of 100 or more peer-review articles in journals, experience as an editor or manuscript reviewer of at least 10 scientific journals, and a reviewer of water research proposals for at least 10 major agencies. The respondent should also be aware of the water resources in Texas and knowledgeable about the Groundwater Availability Program managed by the Texas Water Development Board.

4. Bonding/Insurance Requirements: ☐ - Not Applicable

Subcontractor is solely responsible for obtaining sufficient insurance in accordance with the general standards and practices of the industry or governmental entity.

5. Location to review plans/specifications: ☐ - Not Applicable

Request for Qualifications is available on the Texas Water Development Board's website at:
www.twdb.texas.gov/about/contract_admin/request/rfq0008/index.asp or
the Electronic State Business Daily at: esbd.cpa.state.tx.us/bid_show.cfm?bidid=121146

Amanda Derechailo

From: NoReply@MyFax.com
Sent: Thursday, November 12, 2015 5:34 PM
To: Amanda Derechailo
Subject: Successful transmission to 15123060974. Re: Subcontracting Opportunity to Provide Geological Consulting Services to Review Hydrogeological Data to Identify Geological Constraints that Could Act as Hydraulic Barriers to Groundwater Flow

Dear INTERA,

Re: Subcontracting Opportunity to Provide Geological Consulting Services to Review Hydrogeological Data to Identify Geological Constraints that Could Act as Hydraulic Barriers to Groundwater Flow

The 3 page fax you sent through MyFax to 15123060974 was successfully transmitted at 2015-11-12 23:33:51 (GMT).

The length of transmission was 132 seconds

The receiving machine's fax ID: 512

If you need assistance, please visit our online help center at www.myfax.com/support.
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Best Regards,
The MyFax Team

Contact Customer Support

Hours: 24 hours per day, 7 days a week
Email: support@myfax.com

North America
Toll-Free: (866) 563-9212

UK
Free Phone: 0808 804 0015
International: (613) 260-6325

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Horizon Environmental Services, Inc.

INTERA
GEOSCIENCE & ENGINEERING SOLUTIONS
1812 Centre Creek Drive, Suite 300
Austin, Texas 78754
Tel: 512 425 2000
Fax: 512 727 4821

Fax

To:	Ms. JoAnn Wiersema/Ms. Lynda Sherrod	**From:**	Van Kelley, PG
Company:	Horizon Environmental Services, Inc.		
Fax:	512-328-1804	**Pages:**	3 pages (including Subcontracting Notification Form)
Phone:	512-328-2430	**Date:**	11/12/15
Re:	**Subcontracting Opportunity to Provide Geological Consulting Services to Review Hydrogeological Data to Identify Geological Constraints that Could Act as Hydraulic Barriers to Groundwater Flow**		

Dear Ms. Wiersema/Ms. Sherrod:

INTERA Incorporated (INTERA) is responding to a reissued solicitation from the Texas Water Development Board (TWDB) to conduct a study of brackish groundwater production zones in the Rustler Aquifer. The original RFQ (#580-16-RFQ0007) was canceled and reissued as RFQ #580-16-RFQ0008 on November 10, 2015. Per the TWDB's Request for Qualifications, INTERA is soliciting subcontracting services from certified Historically Underutilized Businesses (HUBs) on the Centralized Master Bidders List (CMBL). We are currently developing a subcontracting plan wherein HUB firms are identified that may be selected to work under this contract. This letter has been sent to solicit your interest in performing the identified scope of work (a separate HUB Subcontracting Opportunity Notification Form is attached) on this project as a subcontractor to INTERA. While we recognize that the scopes and required qualifications are very specific in nature, we view this expertise and experience as critical to winning, and subsequently executing, this project. If there is interest, and you have the capabilities and experience to perform this scope, please fax (512-727-4821) or email (vkelley@intera.com) a written statement to Van Kelley. INTERA will, at its sole discretion, determine which firms are selected for opportunities under this contract. The scope of work and requirements are listed below:

> Services are requested from a technical expert to review hydrogeological data to identify geological constraints that could act as hydraulic barriers to groundwater flow. The respondent will need to have a Ph.D in the geological sciences and have at least 30 years of experience conducting research regarding groundwater flow, flow and transport, hydrogeophysics, and sedimentary basin hydrogeology. The respondent will need to demonstrate their expertise and capabilities through conference presentations, reports, peer-reviewed journal articles, books, and field guides. Demonstration should include a list of 100 or more peer-review articles in journals, experience as an editor or manuscript reviewer of at least 10 scientific journals, and a reviewer of water research proposals for at least 10 major agencies. The respondent should also be aware of the water resources in Texas and knowledgeable about the Groundwater Availability Program managed by the Texas Water Development Board.

In order to evaluate and subsequently incorporate subcontractor qualifications/experience into INTERA's Statement of Qualifications to TWDB, please confirm your interest within **seven** working days of receiving this notice **(i.e., no later than 5:00 pm on Monday, November 23, 2015)**. We look forward to your response.

Sincerely,

Van Kelley, PG
Sr. Vice President/Project Manager

Rev 09/15

HUB Subcontracting Opportunity Notification Form

In accordance with Texas Gov't Code, Chapter 2161, each state agency that considers entering into a contract with an expected value of $100,000 or more shall, before the agency solicits bids, proposals, offers, or other applicable expressions of interest, determine whether subcontracting opportunities are probable under the contract. The state agency I have identified below in **Section B** has determined that subcontracting opportunities are probable under the requisition to which my company will be responding.

34 Texas Administrative Code, §20.14 requires all respondents (prime contractors) bidding on the contract to provide notice of each of their subcontracting opportunities to at least three (3) Texas certified HUBs (who work within the respective industry applicable to the subcontracting opportunity), and allow the HUBs at least seven (7) working days to respond to the notice prior to the respondent submitting its bid response to the contracting agency. In addition, at least seven (7) working days prior to submitting its bid response to the contracting agency, the respondent must provide notice of each of its subcontracting opportunities to two (2) or more trade organizations or development centers (in Texas) that serves members of groups (i.e., Asian Pacific American, Black American, Hispanic American, Native American, Woman, Service Disabled Veteran) identified in Texas Administrative Code, §20.11(19)(C).

We respectfully request that vendors interested in bidding on the subcontracting opportunity scope of work identified in **Section C, Item 2**, reply no later than the date and time identified in **Section C, Item 1**. Submit your response to the point-of-contact referenced in **Section A**.

SECTION: A PRIME CONTRACTOR'S INFORMATION

Company Name: INTERA Incorporated
State of Texas VID #: 1743010638900
Point-of-Contact: Mr. Van Kelley, PG
Phone #: 512-425-2047
E-mail Address: vkelley@intera.com
Fax #: 512-727-4821

SECTION: B CONTRACTING STATE AGENCY AND REQUISITION INFORMATION

Agency Name: Texas Water Development Board
Point-of-Contact: Ms. Tina Newstrom
Phone #: 512-463-7825
Requisition #: Request for Qualifications to Conduct a Study of Brackish Groundwater Production Zones in the Rustler Aquifer. RFQ #580-16-RFQ0008
Bid Open Date: 11/24/2015 (mm/dd/yyyy)

SECTION: C SUBCONTRACTING OPPORTUNITY RESPONSE DUE DATE, DESCRIPTION, REQUIREMENTS AND RELATED INFORMATION

1. Potential Subcontractor's Bid Response Due Date:

If you would like for our company to consider your company's bid for the subcontracting opportunity identified below in Item 2, we must receive your bid response no later than 5:00 PM Central Time on 11/23/2015 Date (mm/dd/yyyy).

In accordance with 34 TAC §20.14, each notice of subcontracting opportunity shall be provided to at least three (3) Texas certified HUBs, and allow the HUBs at least seven (7) working days to respond to the notice prior to submitting our bid response to the contracting agency. In addition, at least seven (7) working days prior to us submitting our bid response to the contracting agency, we must provide notice of each of our subcontracting opportunities to two (2) or more trade organizations or development centers (in Texas) that serves members of groups (i.e., Asian Pacific American, Black American, Hispanic American, Native American, Woman, Service Disabled Veteran) identified in Texas Administrative Code, §20.11(19)(C).

(A working day is considered a normal business day of a state agency, not including weekends, federal or state holidays, or days the agency is declared closed by its executive officer. The initial day the subcontracting opportunity notice is sent/provided to the HUBs and to the trade organizations or development centers is considered to be "day zero" and does not count as one of the seven (7) working days.)

2. Subcontracting Opportunity Scope of Work:

Services are requested from a technical expert to review hydrogeological data to identify geological constraints that could act as hydraulic barriers to groundwater flow.

3. Required Qualifications: ☐ - Not Applicable

The respondent will need to have a Ph.D in the geological sciences and have at least 30 years of experience conducting research regarding groundwater flow, flow and transport, hydrogeophysics, and sedimentary basin hydrogeology. The respondent will need to demonstrate their expertise and capabilities through conference presentations, reports, peer-reviewed journal articles, books, and field guides. Demonstration should include a list of 100 or more peer-review articles in journals, experience as an editor or manuscript reviewer of at least 10 scientific journals, and a reviewer of water research proposals for at least 10 major agencies. The respondent should also be aware of the water resources in Texas and knowledgeable about the Groundwater Availability Program managed by the Texas Water Development Board.

4. Bonding/Insurance Requirements: ☐ - Not Applicable

Subcontractor is solely responsible for obtaining sufficient insurance in accordance with the general standards and practices of the industry or governmental entity.

5. Location to review plans/specifications: ☐ - Not Applicable

Request for Qualifications is available on the Texas Water Development Board's website at:
www.twdb.texas.gov/about/contract_admin/request/rfq0008/index.asp or
the Electronic State Business Daily at: esbd.cpa.state.tx.us/bid_show.cfm?bidid=121146

Amanda Derechailo

From: NoReply@MyFax.com
Sent: Thursday, November 12, 2015 5:25 PM
To: Amanda Derechailo
Subject: Successful transmission to 15123281804. Re: Subcontracting Opportunity to Provide Geological Consulting Services to Review Hydrogeological Data to Identify Geological Constraints that Could Act as Hydraulic Barriers to Groundwater Flow

Dear INTERA,

Re: Subcontracting Opportunity to Provide Geological Consulting Services to Review Hydrogeological Data to Identify Geological Constraints that Could Act as Hydraulic Barriers to Groundwater Flow

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The MyFax Team

Contact Customer Support

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Email: support@myfax.com

North America
Toll-Free: (866) 563-9212

UK
Free Phone: 0808 804 0015
International: (613) 260-6325

1

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Medina Consulting Company, Inc.

INTERA
GEOSCIENCE & ENGINEERING SOLUTIONS
1812 Centre Creek Drive, Suite 300
Austin, Texas 78754
Tel: 512 425 2000
Fax: 512 727 4821

Fax

To:	Ms. Katherine Mc Gookey	**From:**	Van Kelley, PG
Company:	Medina Consulting Company, Inc.		
Fax:	210-694-4577	**Pages:**	3 pages (including Subcontracting Notification Form)
Phone:	210-694-4545	**Date:**	11/12/15
Re:	**Subcontracting Opportunity to Provide Geological Consulting Services to Review Hydrogeological Data to Identify Geological Constraints that Could Act as Hydraulic Barriers to Groundwater Flow**		

Dear Ms. Mc Gookey:

INTERA Incorporated (INTERA) is responding to a reissued solicitation from the Texas Water Development Board (TWDB) to conduct a study of brackish groundwater production zones in the Rustler Aquifer. The original RFQ (#580-16-RFQ0007) was canceled and reissued as RFQ #580-16-RFQ0008 on November 10, 2015. Per the TWDB's Request for Qualifications, INTERA is soliciting subcontracting services from certified Historically Underutilized Businesses (HUBs) on the Centralized Master Bidders List (CMBL). We are currently developing a subcontracting plan wherein HUB firms are identified that may be selected to work under this contract. This letter has been sent to solicit your interest in performing the identified scope of work (a separate HUB Subcontracting Opportunity Notification Form is attached) on this project as a subcontractor to INTERA. While we recognize that the scopes and required qualifications are very specific in nature, we view this expertise and experience as critical to winning, and subsequently executing, this project. If there is interest, and you have the capabilities and experience to perform this scope, please fax (512-727-4821) or email (vkelley@intera.com) a written statement to Van Kelley. INTERA will, at its sole discretion, determine which firms are selected for opportunities under this contract. The scope of work and requirements are listed below:

> Services are requested from a technical expert to review hydrogeological data to identify geological constraints that could act as hydraulic barriers to groundwater flow. The respondent will need to have a Ph.D in the geological sciences and have at least 30 years of experience conducting research regarding groundwater flow, flow and transport, hydrogeophysics, and sedimentary basin hydrogeology. The respondent will need to demonstrate their expertise and capabilities through conference presentations, reports, peer-reviewed journal articles, books, and field guides. Demonstration should include a list of 100 or more peer-review articles in journals, experience as an editor or manuscript reviewer of at least 10 scientific journals, and a reviewer of water research proposals for at least 10 major agencies. The respondent should also be aware of the water resources in Texas and knowledgeable about the Groundwater Availability Program managed by the Texas Water Development Board.

In order to evaluate and subsequently incorporate subcontractor qualifications/experience into INTERA's Statement of Qualifications to TWDB, please confirm your interest within **seven** working days of receiving this notice **(i.e., no later than 5:00 pm on Monday, November 23, 2015)**. We look forward to your response.

Sincerely,

Van Kelley, PG
Sr. Vice President/Project Manager

Rev 09/15

HUB Subcontracting Opportunity Notification Form

In accordance with Texas Gov't Code, Chapter 2161, each state agency that considers entering into a contract with an expected value of $100,000 or more shall, before the agency solicits bids, proposals, offers, or other applicable expressions of interest, determine whether subcontracting opportunities are probable under the contract. The state agency I have identified below in **Section B** has determined that subcontracting opportunities are probable under the requisition to which my company will be responding.

34 Texas Administrative Code, §20.14 requires all respondents (prime contractors) bidding on the contract to provide notice of each of their subcontracting opportunities to at least three (3) Texas certified HUBs (who work within the respective industry applicable to the subcontracting opportunity), and allow the HUBs at least seven (7) working days to respond to the notice prior to the respondent submitting its bid response to the contracting agency. In addition, at least seven (7) working days prior to submitting its bid response to the contracting agency, the respondent must provide notice of each of its subcontracting opportunities to two (2) or more trade organizations or development centers (in Texas) that serves members of groups (i.e., Asian Pacific American, Black American, Hispanic American, Native American, Woman, Service Disabled Veteran) identified in Texas Administrative Code, §20.11(19)(C).

We respectfully request that vendors interested in bidding on the subcontracting opportunity scope of work identified in **Section C, Item 2**, reply no later than the date and time identified in **Section C, Item 1**. Submit your response to the point-of-contact referenced in **Section A**.

SECTION: A PRIME CONTRACTOR'S INFORMATION

Company Name: INTERA Incorporated
State of Texas VID #: 1743010638900
Point-of-Contact: Mr. Van Kelley, PG
Phone #: 512-425-2047
E-mail Address: vkelley@intera.com
Fax #: 512-727-4821

SECTION: B CONTRACTING STATE AGENCY AND REQUISITION INFORMATION

Agency Name: Texas Water Development Board
Point-of-Contact: Ms. Tina Newstrom
Phone #: 512-463-7825
Requisition #: Request for Qualifications to Conduct a Study of Brackish Groundwater Production Zones in the Rustler Aquifer. RFQ #580-16-RFQ0008
Bid Open Date: 11/24/2015 (mm/dd/yyyy)

SECTION: C SUBCONTRACTING OPPORTUNITY RESPONSE DUE DATE, DESCRIPTION, REQUIREMENTS AND RELATED INFORMATION

1. Potential Subcontractor's Bid Response Due Date:

If you would like for our company to consider your company's bid for the subcontracting opportunity identified below in Item 2,

we must receive your bid response no later than **5:00 PM** (Central Time) on **11/23/2015** (Date (mm/dd/yyyy)).

In accordance with 34 TAC §20.14, each notice of subcontracting opportunity shall be provided to at least three (3) Texas certified HUBs, and allow the HUBs at least seven (7) working days to respond to the notice prior to submitting our bid response to the contracting agency. In addition, at least seven (7) working days prior to us submitting our bid response to the contracting agency, we must provide notice of each of our subcontracting opportunities to two (2) or more trade organizations or development centers (in Texas) that serves members of groups (i.e., Asian Pacific American, Black American, Hispanic American, Native American, Woman, Service Disabled Veteran) identified in Texas Administrative Code, §20.11(19)(C).

(A working day is considered a normal business day of a state agency, not including weekends, federal or state holidays, or days the agency is declared closed by its executive officer. The initial day the subcontracting opportunity notice is sent/provided to the HUBs and to the trade organizations or development centers is considered to be "day zero" and does not count as one of the seven (7) working days.)

2. Subcontracting Opportunity Scope of Work:

Services are requested from a technical expert to review hydrogeological data to identify geological constraints that could act as hydraulic barriers to groundwater flow.

3. Required Qualifications: ☐ - Not Applicable

The respondent will need to have a Ph.D in the geological sciences and have at least 30 years of experience conducting research regarding groundwater flow, flow and transport, hydrogeophysics, and sedimentary basin hydrogeology. The respondent will need to demonstrate their expertise and capabilities through conference presentations, reports, peer-reviewed journal articles, books, and field guides. Demonstration should include a list of 100 or more peer-review articles in journals, experience as an editor or manuscript reviewer of at least 10 scientific journals, and a reviewer of water research proposals for at least 10 major agencies. The respondent should also be aware of the water resources in Texas and knowledgeable about the Groundwater Availability Program managed by the Texas Water Development Board.

4. Bonding/Insurance Requirements: ☐ - Not Applicable

Subcontractor is solely responsible for obtaining sufficient insurance in accordance with the general standards and practices of the industry or governmental entity.

5. Location to review plans/specifications: ☐ - Not Applicable

Request for Qualifications is available on the Texas Water Development Board's website at:
www.twdb.texas.gov/about/contract_admin/request/rfq0008/index.asp or
the Electronic State Business Daily at: esbd.cpa.state.tx.us/bid_show.cfm?bidid=121146

Amanda Derechailo

From: NoReply@MyFax.com
Sent: Thursday, November 12, 2015 5:31 PM
To: Amanda Derechailo
Subject: Successful transmission to 12106944577. Re: Subcontracting Opportunity to Provide Geological Consulting Services to Review Hydrogeological Data to Identify Geological Constraints that Could Act as Hydraulic Barriers to Groundwater Flow

Dear INTERA,

Re: Subcontracting Opportunity to Provide Geological Consulting Services to Review Hydrogeological Data to Identify Geological Constraints that Could Act as Hydraulic Barriers to Groundwater Flow

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Best Regards,
The MyFax Team

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Email: support@myfax.com

North America
Toll-Free: (866) 563-9212

UK
Free Phone: 0808 804 0015
International: (613) 260-6325

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TRADE ORGANIZATIONS AND DEVELOPMENT CENTER NOTIFICATIONS FOR OPPORTUNITY #4

Hispanic Contractors Association de San Antonio

INTERA
GEOSCIENCE & ENGINEERING SOLUTIONS

1812 Centre Creek Drive, Suite 300
Austin, Texas 78754
Tel: 512 425 2000
Fax: 512 727 4821

Fax

To:	Mr. Roy Attwood	**From:**	Van Kelley, PG
Company:	Hispanic Contractors Association de San Antonio		
Fax:	210-444-1101	**Pages:**	3 pages (including Subcontracting Notification Form)
Phone:	210-444-1100	**Date:**	11/12/15
Re:	**Subcontracting Opportunity to Provide Geological Consulting Services to Review Hydrogeological Data to Identify Geological Constraints that Could Act as Hydraulic Barriers to Groundwater Flow**		

Dear Mr. Attwood:

INTERA Incorporated (INTERA) is responding to a reissued solicitation from the Texas Water Development Board (TWDB) to conduct a study of brackish groundwater production zones in the Rustler Aquifer. The original RFQ (#580-16-RFQ0007) was canceled and reissued as RFQ #580-16-RFQ0008 on November 10, 2015. Per the TWDB's Request for Qualifications, INTERA is soliciting subcontracting services from certified Historically Underutilized Businesses (HUBs) on the Centralized Master Bidders List (CMBL). We are currently developing a subcontracting plan wherein HUB firms are identified that may be selected to work under this contract. This letter has been sent to solicit your interest in performing the identified scope of work (a separate HUB Subcontracting Opportunity Notification Form is attached) on this project as a subcontractor to INTERA. While we recognize that the scopes and required qualifications are very specific in nature, we view this expertise and experience as critical to winning, and subsequently executing, this project. If there is interest, and you have the capabilities and experience to perform this scope, please fax (512-727-4821) or email (vkelley@intera.com) a written statement to Van Kelley. INTERA will, at its sole discretion, determine which firms are selected for opportunities under this contract. The scope of work and requirements are listed below:

> Services are requested from a technical expert to review hydrogeological data to identify geological constraints that could act as hydraulic barriers to groundwater flow. The respondent will need to have a Ph.D in the geological sciences and have at least 30 years of experience conducting research regarding groundwater flow, flow and transport, hydrogeophysics, and sedimentary basin hydrogeology. The respondent will need to demonstrate their expertise and capabilities through conference presentations, reports, peer-reviewed journal articles, books, and field guides. Demonstration should include a list of 100 or more peer-review articles in journals, experience as an editor or manuscript reviewer of at least 10 scientific journals, and a reviewer of water research proposals for at least 10 major agencies. The respondent should also be aware of the water resources in Texas and knowledgeable about the Groundwater Availability Program managed by the Texas Water Development Board.

In order to evaluate and subsequently incorporate subcontractor qualifications/experience into INTERA's Statement of Qualifications to TWDB, please confirm your interest within **seven** working days of receiving this notice **(i.e., no later than 5:00 pm on Monday, November 23, 2015)**. We look forward to your response.

Sincerely,

Van Kelley, PG
Sr. Vice President/Project Manager

Rev. 09/15

HUB Subcontracting Opportunity Notification Form

In accordance with Texas Gov't Code, Chapter 2161, each state agency that considers entering into a contract with an expected value of $100,000 or more shall, before the agency solicits bids, proposals, offers, or other applicable expressions of interest, determine whether subcontracting opportunities are probable under the contract. The state agency I have identified below in **Section B** has determined that subcontracting opportunities are probable under the requisition to which my company will be responding.

34 Texas Administrative Code, §20.14 requires all respondents (prime contractors) bidding on the contract to provide notice of each of their subcontracting opportunities to at least three (3) Texas certified HUBs (who work within the respective industry applicable to the subcontracting opportunity), and allow the HUBs at least seven (7) working days to respond to the notice prior to the respondent submitting its bid response to the contracting agency. In addition, at least seven (7) working days prior to submitting its bid response to the contracting agency, the respondent must provide notice of each of its subcontracting opportunities to two (2) or more trade organizations or development centers (in Texas) that serves members of groups (i.e., Asian Pacific American, Black American, Hispanic American, Native American, Woman, Service Disabled Veteran) identified in Texas Administrative Code, §20.11(19)(C).

We respectfully request that vendors interested in bidding on the subcontracting opportunity scope of work identified in **Section C, Item 2**, reply no later than the date and time identified in **Section C, Item 1**. Submit your response to the point-of-contact referenced in **Section A**.

SECTION: A PRIME CONTRACTOR'S INFORMATION

Company Name: INTERA Incorporated
State of Texas VID #: 1743010638900
Point-of-Contact: Mr. Van Kelley, PG
Phone #: 512-425-2047
E-mail Address: vkelley@intera.com
Fax #: 512-727-4821

SECTION: B CONTRACTING STATE AGENCY AND REQUISITION INFORMATION

Agency Name: Texas Water Development Board
Point-of-Contact: Ms. Tina Newstrom
Phone #: 512-463-7825
Requisition #: Request for Qualifications to Conduct a Study of Brackish Groundwater Production Zones in the Rustler Aquifer. RFQ #580-16-RFQ0008
Bid Open Date: 11/24/2015 (mm/dd/yyyy)

SECTION: C SUBCONTRACTING OPPORTUNITY RESPONSE DUE DATE, DESCRIPTION, REQUIREMENTS AND RELATED INFORMATION

1. Potential Subcontractor's Bid Response Due Date:

If you would like for our company to consider your company's bid for the subcontracting opportunity identified below in Item 2, we must receive your bid response no later than **5:00 PM** (Central Time) on **11/23/2015** (Date (mm/dd/yyyy)).

In accordance with 34 TAC §20.14, each notice of subcontracting opportunity shall be provided to at least three (3) Texas certified HUBs, and allow the HUBs at least seven (7) working days to respond to the notice prior to submitting our bid response to the contracting agency. In addition, at least seven (7) working days prior to us submitting our bid response to the contracting agency, we must provide notice of each of our subcontracting opportunities to two (2) or more trade organizations or development centers (in Texas) that serves members of groups (i.e., Asian Pacific American, Black American, Hispanic American, Native American, Woman, Service Disabled Veteran) identified in Texas Administrative Code, §20.11(19)(C).

(A working day is considered a normal business day of a state agency, not including weekends, federal or state holidays, or days the agency is declared closed by its executive officer. The initial day the subcontracting opportunity notice is sent/provided to the HUBs and to the trade organizations or development centers is considered to be "day zero" and does not count as one of the seven (7) working days.)

2. Subcontracting Opportunity Scope of Work:

Services are requested from a technical expert to review hydrogeological data to identify geological constraints that could act as hydraulic barriers to groundwater flow.

3. Required Qualifications: ☐ - Not Applicable

The respondent will need to have a Ph.D in the geological sciences and have at least 30 years of experience conducting research regarding groundwater flow, flow and transport, hydrogeophysics, and sedimentary basin hydrogeology. The respondent will need to demonstrate their expertise and capabilities through conference presentations, reports, peer-reviewed journal articles, books, and field guides. Demonstration should include a list of 100 or more peer-review articles in journals, experience as an editor or manuscript reviewer of at least 10 scientific journals, and a reviewer of water research proposals for at least 10 major agencies. The respondent should also be aware of the water resources in Texas and knowledgeable about the Groundwater Availability Program managed by the Texas Water Development Board.

4. Bonding/Insurance Requirements: ☐ - Not Applicable

Subcontractor is solely responsible for obtaining sufficient insurance in accordance with the general standards and practices of the industry or governmental entity.

5. Location to review plans/specifications: ☐ - Not Applicable

Request for Qualifications is available on the Texas Water Development Board's website at:
www.twdb.texas.gov/about/contract_admin/request/rfq0008/index.asp or
the Electronic State Business Daily at: esbd.cpa.state.tx.us/bid_show.cfm?bidid=121146

Amanda Derechailo

From: NoReply@MyFax.com
Sent: Thursday, November 12, 2015 5:28 PM
To: Amanda Derechailo
Subject: Successful transmission to 12104441101. Re: Subcontracting Opportunity to Provide Geological Consulting Services to Review Hydrogeological Data to Identify Geological Constraints that Could Act as Hydraulic Barriers to Groundwater Flow

Dear INTERA,

Re: Subcontracting Opportunity to Provide Geological Consulting Services to Review Hydrogeological Data to Identify Geological Constraints that Could Act as Hydraulic Barriers to Groundwater Flow

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Best Regards,
The MyFax Team

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Email: support@myfax.com

North America
Toll-Free: (866) 563-9212

UK
Free Phone: 0808 804 0015
International: (613) 260-6325

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Houston Minority Supplier Development Council

INTERA
GEOSCIENCE & ENGINEERING SOLUTIONS
1812 Centre Creek Drive, Suite 300
Austin, Texas 78754
Tel: 512 425 2000
Fax: 512 727 4821

Fax

To:	Ms. Angela Freeman	**From:**	Van Kelley, PG
Company:	Houston Minority Supplier Development Council		
Fax:	713-271-9770	**Pages:**	3 pages (including Subcontracting Notification Form)
Phone:	713-271-7805	**Date:**	11/12/15
Re:	**Subcontracting Opportunity to Provide Geological Consulting Services to Review Hydrogeological Data to Identify Geological Constraints that Could Act as Hydraulic Barriers to Groundwater Flow**		

Dear Ms. Freeman:

INTERA Incorporated (INTERA) is responding to a reissued solicitation from the Texas Water Development Board (TWDB) to conduct a study of brackish groundwater production zones in the Rustler Aquifer. The original RFQ (#580-16-RFQ0007) was canceled and reissued as RFQ #580-16-RFQ0008 on November 10, 2015. Per the TWDB's Request for Qualifications, INTERA is soliciting subcontracting services from certified Historically Underutilized Businesses (HUBs) on the Centralized Master Bidders List (CMBL). We are currently developing a subcontracting plan wherein HUB firms are identified that may be selected to work under this contract. This letter has been sent to solicit your interest in performing the identified scope of work (a separate HUB Subcontracting Opportunity Notification Form is attached) on this project as a subcontractor to INTERA. While we recognize that the scopes and required qualifications are very specific in nature, we view this expertise and experience as critical to winning, and subsequently executing, this project. If there is interest, and you have the capabilities and experience to perform this scope, please fax (512-727-4821) or email (vkelley@intera.com) a written statement to Van Kelley. INTERA will, at its sole discretion, determine which firms are selected for opportunities under this contract. The scope of work and requirements are listed below:

> Services are requested from a technical expert to review hydrogeological data to identify geological constraints that could act as hydraulic barriers to groundwater flow. The respondent will need to have a Ph.D in the geological sciences and have at least 30 years of experience conducting research regarding groundwater flow, flow and transport, hydrogeophysics, and sedimentary basin hydrogeology. The respondent will need to demonstrate their expertise and capabilities through conference presentations, reports, peer-reviewed journal articles, books, and field guides. Demonstration should include a list of 100 or more peer-review articles in journals, experience as an editor or manuscript reviewer of at least 10 scientific journals, and a reviewer of water research proposals for at least 10 major agencies. The respondent should also be aware of the water resources in Texas and knowledgeable about the Groundwater Availability Program managed by the Texas Water Development Board.

In order to evaluate and subsequently incorporate subcontractor qualifications/experience into INTERA's Statement of Qualifications to TWDB, please confirm your interest within **seven** working days of receiving this notice **(i.e., no later than 5:00 pm on Monday, November 23, 2015)**. We look forward to your response.

Sincerely,

Van Kelley, PG
Sr. Vice President/Project Manager

Rev 09/15

HUB Subcontracting Opportunity Notification Form

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We respectfully request that vendors interested in bidding on the subcontracting opportunity scope of work identified in **Section C, Item 2**, reply no later than the date and time identified in **Section C, Item 1**. Submit your response to the point-of-contact referenced in **Section A**.

SECTION: A PRIME CONTRACTOR'S INFORMATION

Company Name: INTERA Incorporated
State of Texas VID #: 1743010638900
Point-of-Contact: Mr. Van Kelley, PG
Phone #: 512-425-2047
E-mail Address: vkelley@intera.com
Fax #: 512-727-4821

SECTION: B CONTRACTING STATE AGENCY AND REQUISITION INFORMATION

Agency Name: Texas Water Development Board
Point-of-Contact: Ms. Tina Newstrom
Phone #: 512-463-7825
Requisition #: Request for Qualifications to Conduct a Study of Brackish Groundwater Production Zones in the Rustler Aquifer. RFQ #580-16-RFQ0008
Bid Open Date: 11/24/2015 (mm/dd/yyyy)

SECTION: C SUBCONTRACTING OPPORTUNITY RESPONSE DUE DATE, DESCRIPTION, REQUIREMENTS AND RELATED INFORMATION

1. Potential Subcontractor's Bid Response Due Date:

If you would like for our company to consider your company's bid for the subcontracting opportunity identified below in Item 2, we must receive your bid response no later than **5:00 PM** (Central Time) on **11/23/2015** (Date (mm/dd/yyyy)).

In accordance with 34 TAC §20.14, each notice of subcontracting opportunity shall be provided to at least three (3) Texas certified HUBs, and allow the HUBs at least seven (7) working days to respond to the notice prior to submitting our bid response to the contracting agency. In addition, at least seven (7) working days prior to us submitting our bid response to the contracting agency, we must provide notice of each of our subcontracting opportunities to two (2) or more trade organizations or development centers (in Texas) that serves members of groups (i.e., Asian Pacific American, Black American, Hispanic American, Native American, Woman, Service Disabled Veteran) identified in Texas Administrative Code, §20.11(19)(C).

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2. Subcontracting Opportunity Scope of Work:

Services are requested from a technical expert to review hydrogeological data to identify geological constraints that could act as hydraulic barriers to groundwater flow.

3. Required Qualifications: ☐ - Not Applicable

The respondent will need to have a Ph.D in the geological sciences and have at least 30 years of experience conducting research regarding groundwater flow, flow and transport, hydrogeophysics, and sedimentary basin hydrogeology. The respondent will need to demonstrate their expertise and capabilities through conference presentations, reports, peer-reviewed journal articles, books, and field guides. Demonstration should include a list of 100 or more peer-review articles in journals, experience as an editor or manuscript reviewer of at least 10 scientific journals, and a reviewer of water research proposals for at least 10 major agencies. The respondent should also be aware of the water resources in Texas and knowledgeable about the Groundwater Availability Program managed by the Texas Water Development Board.

4. Bonding/Insurance Requirements: ☐ - Not Applicable

Subcontractor is solely responsible for obtaining sufficient insurance in accordance with the general standards and practices of the industry or governmental entity.

5. Location to review plans/specifications: ☐ - Not Applicable

Request for Qualifications is available on the Texas Water Development Board's website at:
www.twdb.texas.gov/about/contract_admin/request/rfq0008/index.asp or
the Electronic State Business Daily at: esbd.cpa.state.tx.us/bid_show.cfm?bidid=121146

Amanda Derechailo

From: NoReply@MyFax.com
Sent: Thursday, November 12, 2015 5:32 PM
To: Amanda Derechailo
Subject: Successful transmission to 17132719770. Re: Subcontracting Opportunity to Provide Geological Consulting Services to Review Hydrogeological Data to Identify Geological Constraints that Could Act as Hydraulic Barriers to Groundwater Flow

Dear INTERA,

Re: Subcontracting Opportunity to Provide Geological Consulting Services to Review Hydrogeological Data to Identify Geological Constraints that Could Act as Hydraulic Barriers to Groundwater Flow

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Best Regards,
The MyFax Team

Contact Customer Support

Hours: 24 hours per day, 7 days a week.
Email: support@myfax.com

North America
Toll-Free: (866) 563-9212

UK
Free Phone: 0808 804 0015
International: (613) 260-6325

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Southwest Minority Supplier Development Council

INTERA
GEOSCIENCE & ENGINEERING SOLUTIONS
1812 Centre Creek Drive, Suite 300
Austin, Texas 78754
Tel: 512 425 2000
Fax: 512 727 4821

Fax

To:	Ms. Maggie Trevino	**From:**	Van Kelley, PG
Company:	Southwest Minority Supplier Development Council		
Fax:	512-386-8988	**Pages:**	3 pages (including Subcontracting Notification Form)
Phone:	512-386-8766	**Date:**	11/12/15
Re:	**Subcontracting Opportunity to Provide Geological Consulting Services to Review Hydrogeological Data to Identify Geological Constraints that Could Act as Hydraulic Barriers to Groundwater Flow**		

Dear Ms. Trevino:

INTERA Incorporated (INTERA) is responding to a reissued solicitation from the Texas Water Development Board (TWDB) to conduct a study of brackish groundwater production zones in the Rustler Aquifer. The original RFQ (#580-16-RFQ0007) was canceled and reissued as RFQ #580-16-RFQ0008 on November 10, 2015. Per the TWDB's Request for Qualifications, INTERA is soliciting subcontracting services from certified Historically Underutilized Businesses (HUBs) on the Centralized Master Bidders List (CMBL). We are currently developing a subcontracting plan wherein HUB firms are identified that may be selected to work under this contract. This letter has been sent to solicit your interest in performing the identified scope of work (a separate HUB Subcontracting Opportunity Notification Form is attached) on this project as a subcontractor to INTERA. While we recognize that the scopes and required qualifications are very specific in nature, we view this expertise and experience as critical to winning, and subsequently executing, this project. If there is interest, and you have the capabilities and experience to perform this scope, please fax (512-727-4821) or email (vkelley@intera.com) a written statement to Van Kelley. INTERA will, at its sole discretion, determine which firms are selected for opportunities under this contract. The scope of work and requirements are listed below:

> Services are requested from a technical expert to review hydrogeological data to identify geological constraints that could act as hydraulic barriers to groundwater flow. The respondent will need to have a Ph.D in the geological sciences and have at least 30 years of experience conducting research regarding groundwater flow, flow and transport, hydrogeophysics, and sedimentary basin hydrogeology. The respondent will need to demonstrate their expertise and capabilities through conference presentations, reports, peer-reviewed journal articles, books, and field guides. Demonstration should include a list of 100 or more peer-review articles in journals, experience as an editor or manuscript reviewer of at least 10 scientific journals, and a reviewer of water research proposals for at least 10 major agencies. The respondent should also be aware of the water resources in Texas and knowledgeable about the Groundwater Availability Program managed by the Texas Water Development Board.

In order to evaluate and subsequently incorporate subcontractor qualifications/experience into INTERA's Statement of Qualifications to TWDB, please confirm your interest within **seven** working days of receiving this notice **(i.e., no later than 5:00 pm on Monday, November 23, 2015)**. We look forward to your response.

Sincerely,

Van Kelley, PG
Sr. Vice President/Project Manager

Rev 09/15

HUB Subcontracting Opportunity Notification Form

In accordance with Texas Gov't Code, Chapter 2161, each state agency that considers entering into a contract with an expected value of $100,000 or more shall, before the agency solicits bids, proposals, offers, or other applicable expressions of interest, determine whether subcontracting opportunities are probable under the contract. The state agency I have identified below in **Section B** has determined that subcontracting opportunities are probable under the requisition to which my company will be responding.

34 Texas Administrative Code, §20.14 requires all respondents (prime contractors) bidding on the contract to provide notice of each of their subcontracting opportunities to at least three (3) Texas certified HUBs (who work within the respective industry applicable to the subcontracting opportunity), and allow the HUBs at least seven (7) working days to respond to the notice prior to the respondent submitting its bid response to the contracting agency. In addition, at least seven (7) working days prior to submitting its bid response to the contracting agency, the respondent must provide notice of each of its subcontracting opportunities to two (2) or more trade organizations or development centers (in Texas) that serves members of groups (i.e., Asian Pacific American, Black American, Hispanic American, Native American, Woman, Service Disabled Veteran) identified in Texas Administrative Code, §20.11(19)(C).

We respectfully request that vendors interested in bidding on the subcontracting opportunity scope of work identified in **Section C, Item 2**, reply no later than the date and time identified in **Section C, Item 1**. Submit your response to the point-of-contact referenced in **Section A**.

SECTION: A PRIME CONTRACTOR'S INFORMATION

Company Name: INTERA Incorporated
State of Texas VID #: 1743010638900
Point-of-Contact: Mr. Van Kelley, PG
Phone #: 512-425-2047
E-mail Address: vkelley@intera.com
Fax #: 512-727-4821

SECTION: B CONTRACTING STATE AGENCY AND REQUISITION INFORMATION

Agency Name: Texas Water Development Board
Point-of-Contact: Ms. Tina Newstrom
Phone #: 512-463-7825
Requisition #: Request for Qualifications to Conduct a Study of Brackish Groundwater Production Zones in the Rustler Aquifer. RFQ #580-16-RFQ0008
Bid Open Date: 11/24/2015 (mm/dd/yyyy)

SECTION: C SUBCONTRACTING OPPORTUNITY RESPONSE DUE DATE, DESCRIPTION, REQUIREMENTS AND RELATED INFORMATION

1. Potential Subcontractor's Bid Response Due Date:

If you would like for our company to consider your company's bid for the subcontracting opportunity identified below in Item 2, we must receive your bid response no later than **5:00 PM** (Central Time) on **11/23/2015** (Date (mm/dd/yyyy)).

In accordance with 34 TAC §20.14, each notice of subcontracting opportunity shall be provided to at least three (3) Texas certified HUBs, and allow the HUBs at least seven (7) working days to respond to the notice prior to submitting our bid response to the contracting agency. In addition, at least seven (7) working days prior to us submitting our bid response to the contracting agency, we must provide notice of each of our subcontracting opportunities to two (2) or more trade organizations or development centers (in Texas) that serves members of groups (i.e., Asian Pacific American, Black American, Hispanic American, Native American, Woman, Service Disabled Veteran) identified in Texas Administrative Code, §20.11(19)(C).

(A working day is considered a normal business day of a state agency, not including weekends, federal or state holidays, or days the agency is declared closed by its executive officer. The initial day the subcontracting opportunity notice is sent/provided to the HUBs and to the trade organizations or development centers is considered to be "day zero" and does not count as one of the seven (7) working days.)

2. Subcontracting Opportunity Scope of Work:

Services are requested from a technical expert to review hydrogeological data to identify geological constraints that could act as hydraulic barriers to groundwater flow.

3. Required Qualifications: ☐ - Not Applicable

The respondent will need to have a Ph.D in the geological sciences and have at least 30 years of experience conducting research regarding groundwater flow, flow and transport, hydrogeophysics, and sedimentary basin hydrogeology. The respondent will need to demonstrate their expertise and capabilities through conference presentations, reports, peer-reviewed journal articles, books, and field guides. Demonstration should include a list of 100 or more peer-review articles in journals, experience as an editor or manuscript reviewer of at least 10 scientific journals, and a reviewer of water research proposals for at least 10 major agencies. The respondent should also be aware of the water resources in Texas and knowledgeable about the Groundwater Availability Program managed by the Texas Water Development Board.

4. Bonding/Insurance Requirements: ☐ - Not Applicable

Subcontractor is solely responsible for obtaining sufficient insurance in accordance with the general standards and practices of the industry or governmental entity.

5. Location to review plans/specifications: ☐ - Not Applicable

Request for Qualifications is available on the Texas Water Development Board's website at:
www.twdb.texas.gov/about/contract_admin/request/rfq0008/index.asp or
the Electronic State Business Daily at: esbd.cpa.state.tx.us/bid_show.cfm?bidid=121146

Amanda Derechailo

From: NoReply@MyFax.com
Sent: Thursday, November 12, 2015 5:27 PM
To: Amanda Derechailo
Subject: Successful transmission to 15123868988. Re: Subcontracting Opportunity to Provide Geological Consulting Services to Review Hydrogeological Data to Identify Geological Constraints that Could Act as Hydraulic Barriers to Groundwater Flow

Dear INTERA,

Re: Subcontracting Opportunity to Provide Geological Consulting Services to Review Hydrogeological Data to Identify Geological Constraints that Could Act as Hydraulic Barriers to Groundwater Flow

The 3 page fax you sent through MyFax to 15123868988 was successfully transmitted at 2015-11-12 23:27:21 (GMT).

The length of transmission was 190 seconds

The receiving machine's fax ID: unknown

If you need assistance, please visit our online help center at www.myfax.com/support.
Thank you for using the MyFax service.

Best Regards,
The MyFax Team

Contact Customer Support

Hours: 24 hours per day, 7 days a week.
Email: support@myfax.com

North America
Toll-Free: (866) 563-9212

UK
Free Phone: 0808 804 0015
International: (613) 260-6325

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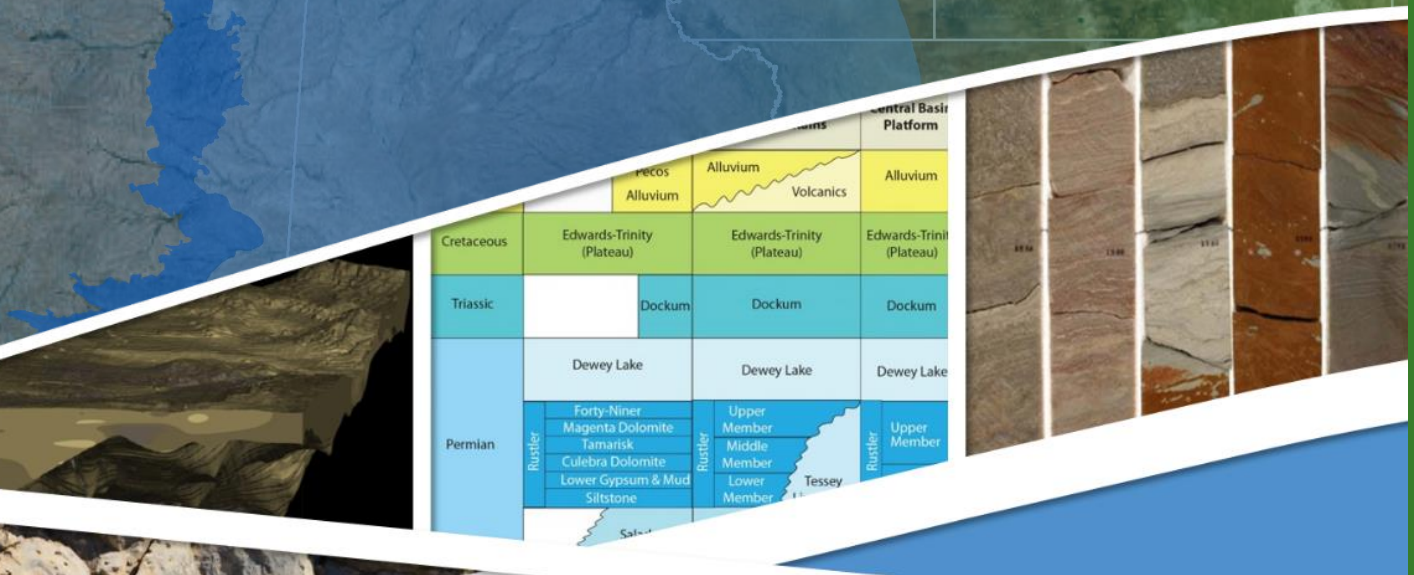
OPPORTUNITY #5
HUB and Trade/Development Center Notifications



INTERA
GEOSCIENCE & ENGINEERING SOLUTIONS

HUB NOTIFICATIONS FOR OPPORTUNITY #5

Ash & Associates, LLC

INTERA
GEOSCIENCE & ENGINEERING SOLUTIONS

1812 Centre Creek Drive, Suite 300
Austin, Texas 78754
Tel: 512 425 2000
Fax: 512 727 4821

Fax

To:	Shawn Ash	**From:**	Van Kelley, PG
Company:	Ash & Associates		
Fax:	512-392-1719	**Pages:**	3 pages (including Subcontracting Notification Form)
Phone:	512-392-1928	**Date:**	11/12/15
Re:	**Subcontracting Opportunity to Provide Water Supply, Treatment, and Distribution/Engineering Services for the Rustler Aquifer**		

Dear Mr. Ash:

INTERA Incorporated (INTERA) is responding to a reissued solicitation from the Texas Water Development Board (TWDB) to conduct a study of brackish groundwater production zones in the Rustler Aquifer. The original RFQ (#580-16-RFQ0007) was canceled and reissued as RFQ #580-16-RFQ0008 on November 10, 2015. Per the TWDB's Request for Qualifications, INTERA is soliciting subcontracting services from certified Historically Underutilized Businesses (HUBs) on the Centralized Master Bidders List (CMBL). We are currently developing a subcontracting plan wherein HUB firms are identified that may be selected to work under this contract. This letter has been sent to solicit your interest in performing the identified scope of work (a separate HUB Subcontracting Opportunity Notification Form is attached) on this project as a subcontractor to INTERA. While we recognize that the scopes and required qualifications are very specific in nature, we view this expertise and experience as critical to winning, and subsequently executing, this project. If there is interest, and you have the capabilities and experience to perform this service, please fax (512-727-4821) or email (vkelley@intera.com) a written statement to Van Kelley. INTERA will, at its sole discretion, determine which firms are selected for opportunities under this contract. The scope of work and requirements are listed below:

> Services are required from a technical expert to assess the feasibility of desalination of brackish groundwater in Texas. The expert must be have a PhD in civil engineering, or a related discipline, be a registered Professional Engineer in Texas, have 15 years of experience in water quality assessments, and have knowledge regarding the potential problems associated with desalination of a blend of brackish groundwater and ocean water. Additional experience requirements include: conducting pilot testing of multiple desalination systems in Texas; a proven track record of applying the four-phase protocol to meet the Texas Commission of Environmental Quality requirements for reverse osmosis membrane systems; and the design of a water treatment system that has successfully removed radium from groundwater.

In order to evaluate and subsequently incorporate subcontractor qualifications/experience into INTERA's Statement of Qualifications to TWDB, please confirm your interest within **seven** working days of receiving this notice **(i.e., no later than 5:00 pm on Monday, November 23, 2015)**. We look forward to your response.

Sincerely,

Van Kelley, PG
Sr. Vice President/Project Manager

Rev 09/15

HUB Subcontracting Opportunity Notification Form

In accordance with Texas Gov't Code, Chapter 2161, each state agency that considers entering into a contract with an expected value of $100,000 or more shall, before the agency solicits bids, proposals, offers, or other applicable expressions of interest, determine whether subcontracting opportunities are probable under the contract. The state agency I have identified below in **Section B** has determined that subcontracting opportunities are probable under the requisition to which my company will be responding.

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We respectfully request that vendors interested in bidding on the subcontracting opportunity scope of work identified in **Section C, Item 2**, reply no later than the date and time identified in **Section C, Item 1**. Submit your response to the point-of-contact referenced in **Section A**.

SECTION: A PRIME CONTRACTOR'S INFORMATION

Company Name: INTERA Incorporated
State of Texas VID #: 1743010638900
Point-of-Contact: Mr. Van Kelley, PG
Phone #: 512-425-2047
E-mail Address: vkelley@intera.com
Fax #: 512-727-4821

SECTION: B CONTRACTING STATE AGENCY AND REQUISITION INFORMATION

Agency Name: Texas Water Development Board
Point-of-Contact: Ms. Tina Newstrom
Phone #: 512-463-7825
Requisition #: Request for Qualifications to Conduct a Study of Brackish Groundwater Production Zones in the Rustler Aquifer. RFQ #580-16-RFQ0008
Bid Open Date: 11/24/2015 (mm/dd/yyyy)

SECTION: C SUBCONTRACTING OPPORTUNITY RESPONSE DUE DATE, DESCRIPTION, REQUIREMENTS AND RELATED INFORMATION

1. Potential Subcontractor's Bid Response Due Date:

If you would like for our company to consider your company's bid for the subcontracting opportunity identified below in Item 2, we must receive your bid response no later than 5:00 PM (Central Time) on 11/23/2015 (Date (mm/dd/yyyy)).

In accordance with 34 TAC §20.14, each notice of subcontracting opportunity shall be provided to at least three (3) Texas certified HUBs, and allow the HUBs at least seven (7) working days to respond to the notice prior to submitting our bid response to the contracting agency. In addition, at least seven (7) working days prior to us submitting our bid response to the contracting agency, we must provide notice of each of our subcontracting opportunities to two (2) or more trade organizations or development centers (in Texas) that serves members of groups (i.e., Asian Pacific American, Black American, Hispanic American, Native American, Woman, Service Disabled Veteran) identified in Texas Administrative Code, §20.11(19)(C).

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2. Subcontracting Opportunity Scope of Work:

Services are required from a technical expert to assess the feasibility of desalination of brackish groundwater in Texas.

3. Required Qualifications: ☐ - Not Applicable

The expert must be have a PhD in civil engineering, or a related discipline, be a registered Professional Engineer in Texas, have 15 years of experience in water quality assessments, and have knowledge regarding the potential problems associated with desalination of a blend of brackish groundwater and ocean water. Additional experience requirements include: conducting pilot testing of multiple desalination systems in Texas; a proven track record of applying the four-phase protocol to meet the Texas Commission of Environmental Quality requirements for reverse osmosis membrane systems; and the design of a water treatment system that has successfully removed radium from groundwater.

4. Bonding/Insurance Requirements: ☐ - Not Applicable

Subcontractor is solely responsible for obtaining sufficient insurance in accordance with the general standards and practices of the industry or governmental entity.

5. Location to review plans/specifications: ☐ - Not Applicable

Request for Qualifications is available on the Texas Water Development Board's website at:
www.twdb.texas.gov/about/contract_admin/request/rfq0008/index.asp or
the Electronic State Business Daily at: esbd.cpa.state.tx.us/bid_show.cfm?bidid=121146

Amanda Derechailo

From: NoReply@MyFax.com
Sent: Thursday, November 12, 2015 6:03 PM
To: Amanda Derechailo
Subject: Successful transmission to 15123921928. Re: Subcontracting Opportunity to Provide Water Supply, Treatment, and Distribution/Engineering Services for the Rustler Aquifer

Dear INTERA,

Re: Subcontracting Opportunity to Provide Water Supply, Treatment, and Distribution/Engineering Services for the Rustler Aquifer

The 3 page fax you sent through MyFax to 15123921928 was successfully transmitted at 2015-11-13 00:03:08 (GMT).

The length of transmission was 173 seconds

The receiving machine's fax ID: 210-393-1928

If you need assistance, please visit our online help center at www.myfax.com/support.
Thank you for using the MyFax service.

Best Regards,
The MyFax Team

Contact Customer Support

Hours: 24 hours per day, 7 days a week.
Email: support@myfax.com

North America
Toll-Free: (866) 563-9212

UK
Free Phone: 0808 804 0015
International: (613) 260-6325

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MBCO Engineering, LLC

INTERA
GEOSCIENCE & ENGINEERING SOLUTIONS
1812 Centre Creek Drive, Suite 300
Austin, Texas 78754
Tel: 512 425 2000
Fax: 512 727 4821

EMAIL

To:	Brock Crenek	**From:**	Van Kelley, PG
Company:	MBCO Engineering, LLC		
EMAIL:	brock.crenek@mbcoengineering.com	**Pages:**	2 pages (including Subcontracting Notification Form)
Phone:	281-760-1656	**Date:**	11/12/15
Re:	**Subcontracting Opportunity to Provide Water Supply, Treatment, and Distribution/Engineering Services for the Rustler Aquifer**		

Dear Mr. Crenek:

INTERA Incorporated (INTERA) is responding to a reissued solicitation from the Texas Water Development Board (TWDB) to conduct a study of brackish groundwater production zones in the Rustler Aquifer. The original RFQ (#580-16-RFQ0007) was canceled and reissued as RFQ #580-16-RFQ0008 on November 10, 2015. Per the TWDB's Request for Qualifications, INTERA is soliciting subcontracting services from certified Historically Underutilized Businesses (HUBs) on the Centralized Master Bidders List (CMBL). We are currently developing a subcontracting plan wherein HUB firms are identified that may be selected to work under this contract. This letter has been sent to solicit your interest in performing the identified scope of work (a separate HUB Subcontracting Opportunity Notification Form is attached) on this project as a subcontractor to INTERA. While we recognize that the scopes and required qualifications are very specific in nature, we view this expertise and experience as critical to winning, and subsequently executing, this project. If there is interest, and you have the capabilities and experience to perform this scope, please fax (512-727-4821) or email (vkelley@intera.com) a written statement to Van Kelley. INTERA will, at its sole discretion, determine which firms are selected for opportunities under this contract. The scope of work and requirements are listed below:

> Services are required from a technical expert to assess the feasibility of desalination of brackish groundwater in Texas. The expert must be have a PhD in civil engineering, or a related discipline, be a registered Professional Engineer in Texas, have 15 years of experience in water quality assessments, and have knowledge regarding the potential problems associated with desalination of a blend of brackish groundwater and ocean water. Additional experience requirements include: conducting pilot testing of multiple desalination systems in Texas; a proven track record of applying the four-phase protocol to meet the Texas Commission of Environmental Quality requirements for reverse osmosis membrane systems; and the design of a water treatment system that has successfully removed radium from groundwater.

In order to evaluate and subsequently incorporate subcontractor qualifications/experience into INTERA's Statement of Qualifications to TWDB, please confirm your interest within **seven** working days of receiving this notice **(i.e., no later than 5:00 pm on Monday, November 23, 2015)**. We look forward to your response.

Sincerely,

Van Kelley, PG
Sr. Vice President/Project Manager

Rev 09/15

HUB Subcontracting Opportunity Notification Form

In accordance with Texas Gov't Code, Chapter 2161, each state agency that considers entering into a contract with an expected value of $100,000 or more shall, before the agency solicits bids, proposals, offers, or other applicable expressions of interest, determine whether subcontracting opportunities are probable under the contract. The state agency I have identified below in **Section B** has determined that subcontracting opportunities are probable under the requisition to which my company will be responding.

34 Texas Administrative Code, §20.14 requires all respondents (prime contractors) bidding on the contract to provide notice of each of their subcontracting opportunities to at least three (3) Texas certified HUBs (who work within the respective industry applicable to the subcontracting opportunity), and allow the HUBs at least seven (7) working days to respond to the notice prior to the respondent submitting its bid response to the contracting agency. In addition, at least seven (7) working days prior to submitting its bid response to the contracting agency, the respondent must provide notice of each of its subcontracting opportunities to two (2) or more trade organizations or development centers (in Texas) that serves members of groups (i.e., Asian Pacific American, Black American, Hispanic American, Native American, Woman, Service Disabled Veteran) identified in Texas Administrative Code, §20.11(19)(C).

We respectfully request that vendors interested in bidding on the subcontracting opportunity scope of work identified in **Section C, Item 2**, reply no later than the date and time identified in **Section C, Item 1**. Submit your response to the point-of-contact referenced in **Section A**.

SECTION: A PRIME CONTRACTOR'S INFORMATION

Company Name: INTERA Incorporated
State of Texas VID #: 1743010638900
Point-of-Contact: Mr. Van Kelley, PG
Phone #: 512-425-2047
E-mail Address: vkelley@intera.com
Fax #: 512-727-4821

SECTION: B CONTRACTING STATE AGENCY AND REQUISITION INFORMATION

Agency Name: Texas Water Development Board
Point-of-Contact: Ms. Tina Newstrom
Phone #: 512-463-7825
Requisition #: Request for Qualifications to Conduct a Study of Brackish Groundwater Production Zones in the Rustler Aquifer. RFQ #580-16-RFQ0008
Bid Open Date: 11/24/2015 (mm/dd/yyyy)

SECTION: C SUBCONTRACTING OPPORTUNITY RESPONSE DUE DATE, DESCRIPTION, REQUIREMENTS AND RELATED INFORMATION

1. Potential Subcontractor's Bid Response Due Date:

If you would like for our company to consider your company's bid for the subcontracting opportunity identified below in Item 2,

we must receive your bid response no later than **5:00 PM** (Central Time) on **11/23/2015** (Date (mm/dd/yyyy)).

In accordance with 34 TAC §20.14, each notice of subcontracting opportunity shall be provided to at least three (3) Texas certified HUBs, and allow the HUBs at least seven (7) working days to respond to the notice prior to submitting our bid response to the contracting agency. In addition, at least seven (7) working days prior to us submitting our bid response to the contracting agency, we must provide notice of each of our subcontracting opportunities to two (2) or more trade organizations or development centers (in Texas) that serves members of groups (i.e., Asian Pacific American, Black American, Hispanic American, Native American, Woman, Service Disabled Veteran) identified in Texas Administrative Code, §20.11(19)(C).

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2. Subcontracting Opportunity Scope of Work:

Services are required from a technical expert to assess the feasibility of desalination of brackish groundwater in Texas.

3. Required Qualifications: ☐ - Not Applicable

The expert must be have a PhD in civil engineering, or a related discipline, be a registered Professional Engineer in Texas, have 15 years of experience in water quality assessments, and have knowledge regarding the potential problems associated with desalination of a blend of brackish groundwater and ocean water. Additional experience requirements include: conducting pilot testing of multiple desalination systems in Texas; a proven track record of applying the four-phase protocol to meet the Texas Commission of Environmental Quality requirements for reverse osmosis membrane systems; and the design of a water treatment system that has successfully removed radium from groundwater.

4. Bonding/Insurance Requirements: ☐ - Not Applicable

Subcontractor is solely responsible for obtaining sufficient insurance in accordance with the general standards and practices of the industry or governmental entity.

5. Location to review plans/specifications: ☐ - Not Applicable

Request for Qualifications is available on the Texas Water Development Board's website at:
www.twdb.texas.gov/about/contract_admin/request/rfq0008/index.asp or
the Electronic State Business Daily at: esbd.cpa.state.tx.us/bid_show.cfm?bidid=121146

Tanya Townsend

From: Tanya Townsend
Sent: Thursday, November 12, 2015 5:30 PM
To: 'brock.crenek@mbcoengineering.com'
Subject: Subcontracting Opportunity to Provide Water Supply Treatment, and Distribution/Engineering Services for the Rustler Aquifer
Attachments: MBCO Rustler Opp #5.pdf

Dear Mr. Crenek,

Attached, please find a subcontracting opportunity to provide water supply, treatment, and distribution/engineering services for the Rustler Aquifer. If you need additional information about this opportunity, please contact Van Kelley at vkelley@intera.com or at 512-425-2000.

Regards,
Tanya Townsend
INTERA Incorporated
Phone: (512) 425-2019
Fax: (512) 425-2099

INTERA
GEOSCIENCE & ENGINEERING SOLUTIONS

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Porras Nance Engineering
INTERA
GEOSCIENCE & ENGINEERING SOLUTIONS
1812 Centre Creek Drive, Suite 300
Austin, Texas 78754
Tel: 512 425 2000
Fax: 512 727 4821

Fax

To:	Thelma Nance	**From:**	Van Kelley, PG
Company:	Porras Nance Engineering		
Fax:	956-724-9208	**Pages:**	3 pages (including Subcontracting Notification Form)
Phone:	956-724-3097	**Date:**	11/12/15
Re:	**Subcontracting Opportunity to Provide Water Supply, Treatment, and Distribution/Engineering Services for the Rustler Aquifer**		

Dear Ms. Nance:

INTERA Incorporated (INTERA) is responding to a reissued solicitation from the Texas Water Development Board (TWDB) to conduct a study of brackish groundwater production zones in the Rustler Aquifer. The original RFQ (#580-16-RFQ0007) was canceled and reissued as RFQ #580-16-RFQ0008 on November 10, 2015. Per the TWDB's Request for Qualifications, INTERA is soliciting subcontracting services from certified Historically Underutilized Businesses (HUBs) on the Centralized Master Bidders List (CMBL). We are currently developing a subcontracting plan wherein HUB firms are identified that may be selected to work under this contract. This letter has been sent to solicit your interest in performing the identified scope of work (a separate HUB Subcontracting Opportunity Notification Form is attached) on this project as a subcontractor to INTERA. While we recognize that the scopes and required qualifications are very specific in nature, we view this expertise and experience as critical to winning, and subsequently executing, this project. If there is interest, and you have the capabilities and experience to perform this scope, please fax (512-727-4821) or email (vkelley@intera.com) a written statement to Van Kelley. INTERA will, at its sole discretion, determine which firms are selected for opportunities under this contract. The scope of work and requirements are listed below:

> Services are required from a technical expert to assess the feasibility of desalination of brackish groundwater in Texas. The expert must be have a PhD in civil engineering, or a related discipline, be a registered Professional Engineer in Texas, have 15 years of experience in water quality assessments, and have knowledge regarding the potential problems associated with desalination of a blend of brackish groundwater and ocean water. Additional experience requirements include: conducting pilot testing of multiple desalination systems in Texas; a proven track record of applying the four-phase protocol to meet the Texas Commission of Environmental Quality requirements for reverse osmosis membrane systems; and the design of a water treatment system that has successfully removed radium from groundwater.

In order to evaluate and subsequently incorporate subcontractor qualifications/experience into INTERA's Statement of Qualifications to TWDB, please confirm your interest within **seven** working days of receiving this notice **(i.e., no later than 5:00 pm on Monday, November 23, 2015)**. We look forward to your response.

Sincerely,

Van Kelley, PG
Sr. Vice President/Project Manager

Rev 09/15

HUB Subcontracting Opportunity Notification Form

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We respectfully request that vendors interested in bidding on the subcontracting opportunity scope of work identified in **Section C, Item 2**, reply no later than the date and time identified in **Section C, Item 1**. Submit your response to the point-of-contact referenced in **Section A**.

SECTION: A PRIME CONTRACTOR'S INFORMATION

Company Name: INTERA Incorporated
State of Texas VID #: 1743010638900
Point-of-Contact: Mr. Van Kelley, PG
Phone #: 512-425-2047
E-mail Address: vkelley@intera.com
Fax #: 512-727-4821

SECTION: B CONTRACTING STATE AGENCY AND REQUISITION INFORMATION

Agency Name: Texas Water Development Board
Point-of-Contact: Ms. Tina Newstrom
Phone #: 512-463-7825
Requisition #: Request for Qualifications to Conduct a Study of Brackish Groundwater Production Zones in the Rustler Aquifer. RFQ #580-16-RFQ0008
Bid Open Date: 11/24/2015 (mm/dd/yyyy)

SECTION: C SUBCONTRACTING OPPORTUNITY RESPONSE DUE DATE, DESCRIPTION, REQUIREMENTS AND RELATED INFORMATION

1. Potential Subcontractor's Bid Response Due Date:

If you would like for our company to consider your company's bid for the subcontracting opportunity identified below in Item 2, we must receive your bid response no later than 5:00 PM (Central Time) on 11/23/2015 (Date (mm/dd/yyyy)).

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2. Subcontracting Opportunity Scope of Work:

Services are required from a technical expert to assess the feasibility of desalination of brackish groundwater in Texas.

3. Required Qualifications: ☐ - Not Applicable

The expert must be have a PhD in civil engineering, or a related discipline, be a registered Professional Engineer in Texas, have 15 years of experience in water quality assessments, and have knowledge regarding the potential problems associated with desalination of a blend of brackish groundwater and ocean water. Additional experience requirements include: conducting pilot testing of multiple desalination systems in Texas; a proven track record of applying the four-phase protocol to meet the Texas Commission of Environmental Quality requirements for reverse osmosis membrane systems; and the design of a water treatment system that has successfully removed radium from groundwater.

4. Bonding/Insurance Requirements: ☐ - Not Applicable

Subcontractor is solely responsible for obtaining sufficient insurance in accordance with the general standards and practices of the industry or governmental entity.

5. Location to review plans/specifications: ☐ - Not Applicable

Request for Qualifications is available on the Texas Water Development Board's website at:
www.twdb.texas.gov/about/contract_admin/request/rfq0008/index.asp or
the Electronic State Business Daily at: esbd.cpa.state.tx.us/bid_show.cfm?bidid=121146

Amanda Derechailo

From: NoReply@MyFax.com
Sent: Thursday, November 12, 2015 5:50 PM
To: Amanda Derechailo
Subject: Successful transmission to 19567249208. Re: Subcontracting Opportunity to Provide Water Supply, Treatment, and Distribution/Engineering Services for the Rustler Aquifer

Dear INTERA,

Re: Subcontracting Opportunity to Provide Water Supply, Treatment, and Distribution/Engineering Services for the Rustler Aquifer

The 3 page fax you sent through MyFax to 19567249208 was successfully transmitted at 2015-11-12 23:49:39 (GMT).

The length of transmission was 197 seconds

The receiving machine's fax ID: 9567249208

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Thank you for using the MyFax service.

Best Regards,
The MyFax Team

Contact Customer Support

Hours: 24 hours per day, 7 days a week.
Email: support@myfax.com

North America
Toll-Free: (866) 563-9212

UK
Free Phone: 0808 804 0015
International: (613) 260-6325

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TRADE ORGANIZATIONS AND DEVELOPMENT CENTER NOTIFICATIONS FOR OPPORTUNITY #5

Hispanic Contractors Association de San Antonio

INTERA
GEOSCIENCE & ENGINEERING SOLUTIONS

1812 Centre Creek Drive, Suite 300
Austin, Texas 78754
Tel: 512 425 2000
Fax: 512 727 4821

Fax

To:	Mr. Roy Attwood	**From:**	Van Kelley, PG
Company:	Hispanic Contractors Association de San Antonio		
Fax:	210-444-1101	**Pages:**	3 pages (including Subcontracting Notification Form)
Phone:	210-444-1100	**Date:**	11/12/15
Re:	**Subcontracting Opportunity to Provide Water Supply, Treatment, and Distribution/Engineering Services for the Rustler Aquifer**		

Dear Mr. Attwood:

INTERA Incorporated (INTERA) is responding to a reissued solicitation from the Texas Water Development Board (TWDB) to conduct a study of brackish groundwater production zones in the Rustler Aquifer. The original RFQ (#580-16-RFQ0007) was canceled and reissued as RFQ #580-16-RFQ0008 on November 10, 2015. Per the TWDB's Request for Qualifications, INTERA is soliciting subcontracting services from certified Historically Underutilized Businesses (HUBs) on the Centralized Master Bidders List (CMBL). We are currently developing a subcontracting plan wherein HUB firms are identified that may be selected to work under this contract. This letter has been sent to solicit your interest in performing the identified scope of work (a separate HUB Subcontracting Opportunity Notification Form is attached) on this project as a subcontractor to INTERA. While we recognize that the scopes and required qualifications are very specific in nature, we view this expertise and experience as critical to winning, and subsequently executing, this project. If there is interest, and you have the capabilities and experience to perform this scope, please fax (512-727-4821) or email (vkelley@intera.com) a written statement to Van Kelley. INTERA will, at its sole discretion, determine which firms are selected for opportunities under this contract. The scope of work and requirements are listed below:

> Services are required from a technical expert to assess the feasibility of desalination of brackish groundwater in Texas. The expert must be have a PhD in civil engineering, or a related discipline, be a registered Professional Engineer in Texas, have 15 years of experience in water quality assessments, and have knowledge regarding the potential problems associated with desalination of a blend of brackish groundwater and ocean water. Additional experience requirements include: conducting pilot testing of multiple desalination systems in Texas; a proven track record of applying the four-phase protocol to meet the Texas Commission of Environmental Quality requirements for reverse osmosis membrane systems; and the design of a water treatment system that has successfully removed radium from groundwater.

In order to evaluate and subsequently incorporate subcontractor qualifications/experience into INTERA's Statement of Qualifications to TWDB, please confirm your interest within **seven** working days of receiving this notice **(i.e., no later than 5:00 pm on Monday, November 23, 2015)**. We look forward to your response.

Sincerely,

Van Kelley, PG
Sr. Vice President/Project Manager

Rev 09/15

HUB Subcontracting Opportunity Notification Form

In accordance with Texas Gov't Code, Chapter 2161, each state agency that considers entering into a contract with an expected value of $100,000 or more shall, before the agency solicits bids, proposals, offers, or other applicable expressions of interest, determine whether subcontracting opportunities are probable under the contract. The state agency I have identified below in **Section B** has determined that subcontracting opportunities are probable under the requisition to which my company will be responding.

34 Texas Administrative Code, §20.14 requires all respondents (prime contractors) bidding on the contract to provide notice of each of their subcontracting opportunities to at least three (3) Texas certified HUBs (who work within the respective industry applicable to the subcontracting opportunity), and allow the HUBs at least seven (7) working days to respond to the notice prior to the respondent submitting its bid response to the contracting agency. In addition, at least seven (7) working days prior to submitting its bid response to the contracting agency, the respondent must provide notice of each of its subcontracting opportunities to two (2) or more trade organizations or development centers (in Texas) that serves members of groups (i.e., Asian Pacific American, Black American, Hispanic American, Native American, Woman, Service Disabled Veteran) identified in Texas Administrative Code, §20.11(19)(C).

We respectfully request that vendors interested in bidding on the subcontracting opportunity scope of work identified in **Section C, Item 2**, reply no later than the date and time identified in **Section C, Item 1**. Submit your response to the point-of-contact referenced in **Section A**.

SECTION: A PRIME CONTRACTOR'S INFORMATION

Company Name: INTERA Incorporated
State of Texas VID #: 1743010638900
Point-of-Contact: Mr. Van Kelley, PG
Phone #: 512-425-2047
E-mail Address: vkelley@intera.com
Fax #: 512-727-4821

SECTION: B CONTRACTING STATE AGENCY AND REQUISITION INFORMATION

Agency Name: Texas Water Development Board
Point-of-Contact: Ms. Tina Newstrom
Phone #: 512-463-7825
Requisition #: Request for Qualifications to Conduct a Study of Brackish Groundwater Production Zones in the Rustler Aquifer. RFQ #580-16-RFQ0008
Bid Open Date: 11/24/2015 (mm/dd/yyyy)

SECTION: C SUBCONTRACTING OPPORTUNITY RESPONSE DUE DATE, DESCRIPTION, REQUIREMENTS AND RELATED INFORMATION

1. Potential Subcontractor's Bid Response Due Date:

If you would like for our company to consider your company's bid for the subcontracting opportunity identified below in Item 2,

we must receive your bid response no later than 5:00 PM (Central Time) on 11/23/2015 (Date (mm/dd/yyyy)).

In accordance with 34 TAC §20.14, each notice of subcontracting opportunity shall be provided to at least three (3) Texas certified HUBs, and allow the HUBs at least seven (7) working days to respond to the notice prior to submitting our bid response to the contracting agency. In addition, at least seven (7) working days prior to us submitting our bid response to the contracting agency, we must provide notice of each of our subcontracting opportunities to two (2) or more trade organizations or development centers (in Texas) that serves members of groups (i.e., Asian Pacific American, Black American, Hispanic American, Native American, Woman, Service Disabled Veteran) identified in Texas Administrative Code, §20.11(19)(C).

(A working day is considered a normal business day of a state agency, not including weekends, federal or state holidays, or days the agency is declared closed by its executive officer. The initial day the subcontracting opportunity notice is sent/provided to the HUBs and to the trade organizations or development centers is considered to be "day zero" and does not count as one of the seven (7) working days.)

2. Subcontracting Opportunity Scope of Work:

Services are required from a technical expert to assess the feasibility of desalination of brackish groundwater in Texas.

3. Required Qualifications: ☐ - Not Applicable

The expert must be have a PhD in civil engineering, or a related discipline, be a registered Professional Engineer in Texas, have 15 years of experience in water quality assessments, and have knowledge regarding the potential problems associated with desalination of a blend of brackish groundwater and ocean water. Additional experience requirements include: conducting pilot testing of multiple desalination systems in Texas; a proven track record of applying the four-phase protocol to meet the Texas Commission of Environmental Quality requirements for reverse osmosis membrane systems; and the design of a water treatment system that has successfully removed radium from groundwater.

4. Bonding/Insurance Requirements: ☐ - Not Applicable

Subcontractor is solely responsible for obtaining sufficient insurance in accordance with the general standards and practices of the industry or governmental entity.

5. Location to review plans/specifications: ☐ - Not Applicable

Request for Qualifications is available on the Texas Water Development Board's website at:
www.twdb.texas.gov/about/contract_admin/request/rfq0008/index.asp or
the Electronic State Business Daily at: esbd.cpa.state.tx.us/bid_show.cfm?bidid=121146

Amanda Derechailo

From: NoReply@MyFax.com
Sent: Thursday, November 12, 2015 5:46 PM
To: Amanda Derechailo
Subject: Successful transmission to 12104441101. Re: Subcontracting Opportunity to Provide Water Supply, Treatment, and Distribution/Engineering Services for the Rustler Aquifer

Dear INTERA,

Re: Subcontracting Opportunity to Provide Water Supply, Treatment, and Distribution/Engineering Services for the Rustler Aquifer

The 3 page fax you sent through MyFax to 12104441101 was successfully transmitted at 2015-11-12 23:45:36 (GMT).

The length of transmission was 169 seconds

The receiving machine's fax ID: 2104441101

If you need assistance, please visit our online help center at www.myfax.com/support.
Thank you for using the MyFax service.

Best Regards,
The MyFax Team

Contact Customer Support

Hours: 24 hours per day, 7 days a week.
Email: support@myfax.com

North America
Toll-Free: (866) 563-9212

UK
Free Phone: 0808 804 0015
International: (613) 260-6325

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Houston Minority Supplier Development Council

INTERA
GEOSCIENCE & ENGINEERING SOLUTIONS
1812 Centre Creek Drive, Suite 300
Austin, Texas 78754
Tel: 512 425 2000
Fax: 512 727 4821

Fax

To:	Ms. Angela Freeman	**From:**	Van Kelley, PG
Company:	Houston Minority Supplier Development Council		
Fax:	713-271-9770	**Pages:**	3 pages (including Subcontracting Notification Form)
Phone:	713-271-7805	**Date:**	11/12/15
Re:	**Subcontracting Opportunity to Provide Water Supply, Treatment, and Distribution/Engineering Services for the Rustler Aquifer**		

Dear Ms. Freeman:

INTERA Incorporated (INTERA) is responding to a reissued solicitation from the Texas Water Development Board (TWDB) to conduct a study of brackish groundwater production zones in the Rustler Aquifer. The original RFQ (#580-16-RFQ0007) was canceled and reissued as RFQ #580-16-RFQ0008 on November 10, 2015. Per the TWDB's Request for Qualifications, INTERA is soliciting subcontracting services from certified Historically Underutilized Businesses (HUBs) on the Centralized Master Bidders List (CMBL). We are currently developing a subcontracting plan wherein HUB firms are identified that may be selected to work under this contract. This letter has been sent to solicit your interest in performing the identified scope of work (a separate HUB Subcontracting Opportunity Notification Form is attached) on this project as a subcontractor to INTERA. While we recognize that the scopes and required qualifications are very specific in nature, we view this expertise and experience as critical to winning, and subsequently executing, this project. If there is interest, and you have the capabilities and experience to perform this scope, please fax (512-727-4821) or email (vkelley@intera.com) a written statement to Van Kelley. INTERA will, at its sole discretion, determine which firms are selected for opportunities under this contract. The scope of work and requirements are listed below:

> Services are required from a technical expert to assess the feasibility of desalination of brackish groundwater in Texas. The expert must be have a PhD in civil engineering, or a related discipline, be a registered Professional Engineer in Texas, have 15 years of experience in water quality assessments, and have knowledge regarding the potential problems associated with desalination of a blend of brackish groundwater and ocean water. Additional experience requirements include: conducting pilot testing of multiple desalination systems in Texas; a proven track record of applying the four-phase protocol to meet the Texas Commission of Environmental Quality requirements for reverse osmosis membrane systems; and the design of a water treatment system that has successfully removed radium from groundwater.

In order to evaluate and subsequently incorporate subcontractor qualifications/experience into INTERA's Statement of Qualifications to TWDB, please confirm your interest within **seven** working days of receiving this notice **(i.e., no later than 5:00 pm on Monday, November 23, 2015)**. We look forward to your response.

Sincerely,

Van Kelley, PG
Sr. Vice President/Project Manager

Rev 09/15

HUB Subcontracting Opportunity Notification Form

In accordance with Texas Gov't Code, Chapter 2161, each state agency that considers entering into a contract with an expected value of $100,000 or more shall, before the agency solicits bids, proposals, offers, or other applicable expressions of interest, determine whether subcontracting opportunities are probable under the contract. The state agency I have identified below in **Section B** has determined that subcontracting opportunities are probable under the requisition to which my company will be responding.

34 Texas Administrative Code, §20.14 requires all respondents (prime contractors) bidding on the contract to provide notice of each of their subcontracting opportunities to at least three (3) Texas certified HUBs (who work within the respective industry applicable to the subcontracting opportunity), and allow the HUBs at least seven (7) working days to respond to the notice prior to the respondent submitting its bid response to the contracting agency. In addition, at least seven (7) working days prior to submitting its bid response to the contracting agency, the respondent must provide notice of each of its subcontracting opportunities to two (2) or more trade organizations or development centers (in Texas) that serves members of groups (i.e., Asian Pacific American, Black American, Hispanic American, Native American, Woman, Service Disabled Veteran) identified in Texas Administrative Code, §20.11(19)(C).

We respectfully request that vendors interested in bidding on the subcontracting opportunity scope of work identified in **Section C, Item 2**, reply no later than the date and time identified in **Section C, Item 1**. Submit your response to the point-of-contact referenced in **Section A**.

SECTION: A PRIME CONTRACTOR'S INFORMATION

Company Name: INTERA Incorporated
State of Texas VID #: 1743010638900
Point-of-Contact: Mr. Van Kelley, PG
Phone #: 512-425-2047
E-mail Address: vkelley@intera.com
Fax #: 512-727-4821

SECTION: B CONTRACTING STATE AGENCY AND REQUISITION INFORMATION

Agency Name: Texas Water Development Board
Point-of-Contact: Ms. Tina Newstrom
Phone #: 512-463-7825
Requisition #: Request for Qualifications to Conduct a Study of Brackish Groundwater Production Zones in the Rustler Aquifer. RFQ #580-16-RFQ0008
Bid Open Date: 11/24/2015 (mm/dd/yyyy)

SECTION: C SUBCONTRACTING OPPORTUNITY RESPONSE DUE DATE, DESCRIPTION, REQUIREMENTS AND RELATED INFORMATION

1. Potential Subcontractor's Bid Response Due Date:

If you would like for our company to consider your company's bid for the subcontracting opportunity identified below in Item 2,

we must receive your bid response no later than **5:00 PM** (Central Time) on **11/23/2015** (Date (mm/dd/yyyy)).

In accordance with 34 TAC §20.14, each notice of subcontracting opportunity shall be provided to at least three (3) Texas certified HUBs, and allow the HUBs at least seven (7) working days to respond to the notice prior to submitting our bid response to the contracting agency. In addition, at least seven (7) working days prior to us submitting our bid response to the contracting agency, we must provide notice of each of our subcontracting opportunities to two (2) or more trade organizations or development centers (in Texas) that serves members of groups (i.e., Asian Pacific American, Black American, Hispanic American, Native American, Woman, Service Disabled Veteran) identified in Texas Administrative Code, §20.11(19)(C).

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2. Subcontracting Opportunity Scope of Work:

Services are required from a technical expert to assess the feasibility of desalination of brackish groundwater in Texas.

3. Required Qualifications: ☐ - Not Applicable

The expert must be have a PhD in civil engineering, or a related discipline, be a registered Professional Engineer in Texas, have 15 years of experience in water quality assessments, and have knowledge regarding the potential problems associated with desalination of a blend of brackish groundwater and ocean water. Additional experience requirements include: conducting pilot testing of multiple desalination systems in Texas; a proven track record of applying the four-phase protocol to meet the Texas Commission of Environmental Quality requirements for reverse osmosis membrane systems; and the design of a water treatment system that has successfully removed radium from groundwater.

4. Bonding/Insurance Requirements: ☐ - Not Applicable

Subcontractor is solely responsible for obtaining sufficient insurance in accordance with the general standards and practices of the industry or governmental entity.

5. Location to review plans/specifications: ☐ - Not Applicable

Request for Qualifications is available on the Texas Water Development Board's website at:
www.twdb.texas.gov/about/contract_admin/request/rfq0008/index.asp or
the Electronic State Business Daily at: esbd.cpa.state.tx.us/bid_show.cfm?bidid=121146

Amanda Derechailo

From: NoReply@MyFax.com
Sent: Thursday, November 12, 2015 5:47 PM
To: Amanda Derechailo
Subject: Successful transmission to 17132719770. Re: Subcontracting Opportunity to Provide Water Supply, Treatment, and Distribution/Engineering Services for the Rustler Aquifer

Dear INTERA,

Re: Subcontracting Opportunity to Provide Water Supply, Treatment, and Distribution/Engineering Services for the Rustler Aquifer

The 3 page fax you sent through MyFax to 17132719770 was successfully transmitted at 2015-11-12 23:46:56 (GMT).

The length of transmission was 172 seconds

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Thank you for using the MyFax service.

Best Regards,
The MyFax Team

Contact Customer Support

Hours: 24 hours per day, 7 days a week.
Email: support@myfax.com

North America
Toll-Free: (866) 563-9212

UK
Free Phone: 0808 804 0015
International: (613) 260-6325

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Southwest Minority Supplier Development Council

INTERA
GEOSCIENCE & ENGINEERING SOLUTIONS
1812 Centre Creek Drive, Suite 300
Austin, Texas 78754
Tel: 512 425 2000
Fax: 512 727 4821

Fax

To:	Ms. Maggie Trevino	**From:**	Van Kelley, PG
Company:	Southwest Minority Supplier Development Council		
Fax:	512-386-8988	**Pages:**	3 pages (including Subcontracting Notification Form)
Phone:	512-386-8766	**Date:**	11/12/15
Re:	**Subcontracting Opportunity to Provide Water Supply, Treatment, and Distribution/Engineering Services for the Rustler Aquifer**		

Dear Ms. Trevino:

INTERA Incorporated (INTERA) is responding to a reissued solicitation from the Texas Water Development Board (TWDB) to conduct a study of brackish groundwater production zones in the Rustler Aquifer. The original RFQ (#580-16-RFQ0007) was canceled and reissued as RFQ #580-16-RFQ0008 on November 10, 2015. Per the TWDB's Request for Qualifications, INTERA is soliciting subcontracting services from certified Historically Underutilized Businesses (HUBs) on the Centralized Master Bidders List (CMBL). We are currently developing a subcontracting plan wherein HUB firms are identified that may be selected to work under this contract. This letter has been sent to solicit your interest in performing the identified scope of work (a separate HUB Subcontracting Opportunity Notification Form is attached) on this project as a subcontractor to INTERA. While we recognize that the scopes and required qualifications are very specific in nature, we view this expertise and experience as critical to winning, and subsequently executing, this project. If there is interest, and you have the capabilities and experience to perform this scope, please fax (512-727-4821) or email (vkelley@intera.com) a written statement to Van Kelley. INTERA will, at its sole discretion, determine which firms are selected for opportunities under this contract. The scope of work and requirements are listed below:

> Services are required from a technical expert to assess the feasibility of desalination of brackish groundwater in Texas. The expert must be have a PhD in civil engineering, or a related discipline, be a registered Professional Engineer in Texas, have 15 years of experience in water quality assessments, and have knowledge regarding the potential problems associated with desalination of a blend of brackish groundwater and ocean water. Additional experience requirements include: conducting pilot testing of multiple desalination systems in Texas; a proven track record of applying the four-phase protocol to meet the Texas Commission of Environmental Quality requirements for reverse osmosis membrane systems; and the design of a water treatment system that has successfully removed radium from groundwater.

In order to evaluate and subsequently incorporate subcontractor qualifications/experience into INTERA's Statement of Qualifications to TWDB, please confirm your interest within **seven** working days of receiving this notice **(i.e., no later than 5:00 pm on Monday, November 23, 2015)**. We look forward to your response.

Sincerely,

Van Kelley, PG
Sr. Vice President/Project Manager

Rev 09/15

HUB Subcontracting Opportunity Notification Form

In accordance with Texas Gov't Code, Chapter 2161, each state agency that considers entering into a contract with an expected value of $100,000 or more shall, before the agency solicits bids, proposals, offers, or other applicable expressions of interest, determine whether subcontracting opportunities are probable under the contract. The state agency I have identified below in **Section B** has determined that subcontracting opportunities are probable under the requisition to which my company will be responding.

34 Texas Administrative Code, §20.14 requires all respondents (prime contractors) bidding on the contract to provide notice of each of their subcontracting opportunities to at least three (3) Texas certified HUBs (who work within the respective industry applicable to the subcontracting opportunity), and allow the HUBs at least seven (7) working days to respond to the notice prior to the respondent submitting its bid response to the contracting agency. In addition, at least seven (7) working days prior to submitting its bid response to the contracting agency, the respondent must provide notice of each of its subcontracting opportunities to two (2) or more trade organizations or development centers (in Texas) that serves members of groups (i.e., Asian Pacific American, Black American, Hispanic American, Native American, Woman, Service Disabled Veteran) identified in Texas Administrative Code, §20.11(19)(C).

We respectfully request that vendors interested in bidding on the subcontracting opportunity scope of work identified in **Section C, Item 2**, reply no later than the date and time identified in **Section C, Item 1**. Submit your response to the point-of-contact referenced in **Section A**.

SECTION: A PRIME CONTRACTOR'S INFORMATION

Company Name: INTERA Incorporated
State of Texas VID #: 1743010638900
Point-of-Contact: Mr. Van Kelley, PG
Phone #: 512-425-2047
E-mail Address: vkelley@intera.com
Fax #: 512-727-4821

SECTION: B CONTRACTING STATE AGENCY AND REQUISITION INFORMATION

Agency Name: Texas Water Development Board
Point-of-Contact: Ms. Tina Newstrom
Phone #: 512-463-7825
Requisition #: Request for Qualifications to Conduct a Study of Brackish Groundwater Production Zones in the Rustler Aquifer. RFQ #580-16-RFQ0008
Bid Open Date: 11/24/2015 (mm/dd/yyyy)

SECTION: C SUBCONTRACTING OPPORTUNITY RESPONSE DUE DATE, DESCRIPTION, REQUIREMENTS AND RELATED INFORMATION

1. Potential Subcontractor's Bid Response Due Date:

If you would like for our company to consider your company's bid for the subcontracting opportunity identified below in Item 2,

we must receive your bid response no later than 5:00 PM (Central Time) on 11/23/2015 (Date (mm/dd/yyyy)).

In accordance with 34 TAC §20.14, each notice of subcontracting opportunity shall be provided to at least three (3) Texas certified HUBs, and allow the HUBs at least seven (7) working days to respond to the notice prior to submitting our bid response to the contracting agency. In addition, at least seven (7) working days prior to us submitting our bid response to the contracting agency, we must provide notice of each of our subcontracting opportunities to two (2) or more trade organizations or development centers (in Texas) that serves members of groups (i.e., Asian Pacific American, Black American, Hispanic American, Native American, Woman, Service Disabled Veteran) identified in Texas Administrative Code, §20.11(19)(C).

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2. Subcontracting Opportunity Scope of Work:

Services are required from a technical expert to assess the feasibility of desalination of brackish groundwater in Texas.

3. Required Qualifications: ☐ - Not Applicable

The expert must be have a PhD in civil engineering, or a related discipline, be a registered Professional Engineer in Texas, have 15 years of experience in water quality assessments, and have knowledge regarding the potential problems associated with desalination of a blend of brackish groundwater and ocean water. Additional experience requirements include: conducting pilot testing of multiple desalination systems in Texas; a proven track record of applying the four-phase protocol to meet the Texas Commission of Environmental Quality requirements for reverse osmosis membrane systems; and the design of a water treatment system that has successfully removed radium from groundwater.

4. Bonding/Insurance Requirements: ☐ - Not Applicable

Subcontractor is solely responsible for obtaining sufficient insurance in accordance with the general standards and practices of the industry or governmental entity.

5. Location to review plans/specifications: ☐ - Not Applicable

Request for Qualifications is available on the Texas Water Development Board's website at:
www.twdb.texas.gov/about/contract_admin/request/rfq0008/index.asp or
the Electronic State Business Daily at: esbd.cpa.state.tx.us/bid_show.cfm?bidid=121146

Amanda Derechailo

From: NoReply@MyFax.com
Sent: Thursday, November 12, 2015 5:48 PM
To: Amanda Derechailo
Subject: Successful transmission to 15123868988. Re: Subcontracting Opportunity to Provide Water Supply, Treatment, and Distribution/Engineering Services for the Rustler Aquifer

Dear INTERA,

Re: Subcontracting Opportunity to Provide Water Supply, Treatment, and Distribution/Engineering Services for the Rustler Aquifer

The 3 page fax you sent through MyFax to 15123868988 was successfully transmitted at 2015-11-12 23:48:05 (GMT).

The length of transmission was 183 seconds

The receiving machine's fax ID: unknown

If you need assistance, please visit our online help center at www.myfax.com/support.
Thank you for using the MyFax service.

Best Regards,
The MyFax Team

Contact Customer Support

Hours: 24 hours per day, 7 days a week.
Email: support@myfax.com

North America
Toll-Free: (866) 563-9212

UK
Free Phone: 0808 804 0015
International: (613) 260-6325

1

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SECTION 6: Company Ownership

INTERA
GEOSCIENCE & ENGINEERING SOLUTIONS

SECTION 6: OWNERSHIP OF INTERA

While INTERA is an employee-owned company, our ownership is broad-based. No single employee has a 25 percent ownership in the company.

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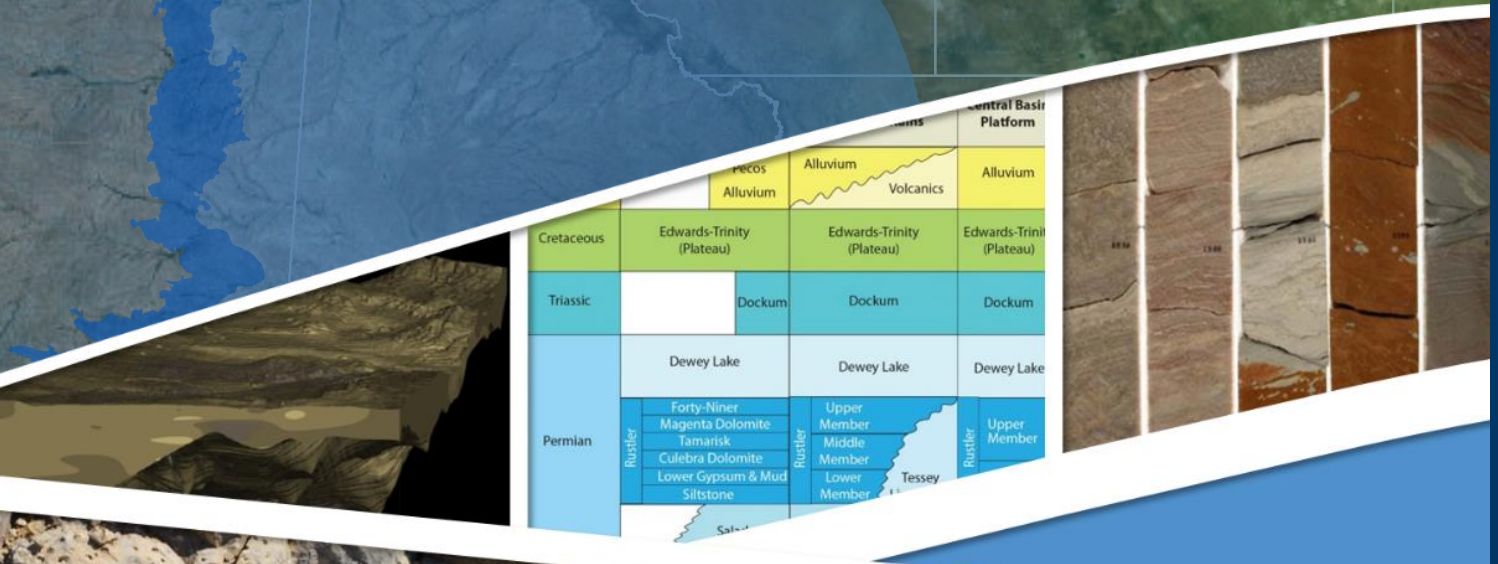
SECTION 7:
Detailed Scope of Work



INTERA
GEOSCIENCE & ENGINEERING SOLUTIONS

SECTION 7:
Detailed Scope of Work

SECTION 7: SCOPE OF WORK

The INTERA Team's technical approach for conducting an evaluation of brackish groundwater in the Rustler Aquifer will result in a high quality product for the TWDB that is completed on schedule and within the allotted budget. This section describes our approach to the scope of work tasks, the organizational and management approach we will use to complete the tasks, and the reports and other documentation that we will deliver to the TWDB over the course of the project.

Our technical approach to the scope of work tasks is based on more than 30 years of experience, both in west Texas and in southeast New Mexico, on projects involving characterization and modeling of the Rustler Formation. As part of developing the Rustler GAM, INTERA worked closely with the BRACS division staff to co-develop the Rustler structural contacts in the Delaware Basin. We have also recently completed several detailed hydrostratigraphic and groundwater resource evaluations in the Rustler Formation. The Rustler is a complex aquifer system with lithologic variability, fracturing (secondary porosity), dissolution collapse residuum, and structural features that include fault throws large enough to offset the entire Rustler sequence by more than 600 feet. Based on our experience in the Delaware and other basins, we believe that standard log-based water quality analysis techniques will be insufficient to adequately delineate water quality in the Rustler Aquifer. In light of this, we will augment standard techniques with more sophisticated technologies developed for the oil and gas industry. The INTERA Team's overall approach to completing the tasks necessary to delineate and quantify brackish groundwater in the Rustler incorporates the following key features.

- **Access to Additional Geophysical Logs.** In order help obtain important geophysical logs for the project, we have established formal agreements with two commercial providers of well logs. Both firms—Drillinginfo and The Subsurface Library—have agreed to provide, at a minimum, the portions of the logs that include the Rustler Formation to the TWDB for public use.
- **Construction of a Log Database.** In conjunction with publicly-available logs, the additional logs acquired from Drillinginfo and The Subsurface Library will provide us with the geographically-distributed information needed to better define aquifer lithology, structure, and water quality across the Rustler footprint. We will design and construct a log database using a subset of the BRACS database schema to facilitate subsequent integration.
- **Rustler Stratigraphy and Lithology.** As applicable, the INTERA Team will use the logs to make picks in the Rustler Aquifer footprint for the Vaca Triste Sandstone Member of the Salado Formation and all member units of the Rustler Formation. The presence and thickness of the Vaca Triste Sandstone correlates with Salado dissolution and concomitant collapse and development of secondary fracture and/or vuggy porosity in the overlying Magenta and Culebra Dolomites (Powers et al., 2003).
- **Delineation of Salinity Zones.** The identification of fresh, brackish, and saline groundwater will be based on the classification developed by the U.S. Geological Survey (USGS) (Winslow and Kister, 1956).
- **Calculation of Volumes.** We will develop and apply a methodology to calculate brackish volumes that is based on TWDB's approach to calculating Total Estimated Recoverable Storage. This methodology will incorporate the lithology, primary or secondary porosity controls, water bearing zones, and TDS profiles obtained from the analyses of geophysical logs and validated using a resistivity sensitivity analysis.

- **Identification of Transmissive Brackish Zones.** Potential Production Areas (PPAs) will be evaluated using a combination of geophysical log interpretation (mainly presence/absence of definable member units) and, where available, water well production information.
- **Identification of Hydrogeological Barriers.** As part of our work developing the Rustler GAM (Ewing and others, 2012), we mapped major faults in the Rustler and characterized their throw. The conductance of faults was estimated through conceptualization and calibration. Building on this knowledge, we will review lithologic boundaries to define features that may serve as hydrologic barriers between brackish and other types of groundwater that may potentially hinder production.
- **Assessment of Available Volumes.** The INTERA Team will develop and apply groundwater flow models to determine the volume of brackish groundwater that can be produced over 30- and 50-year time periods without causing significant impacts to fresh groundwater or areas with existing brackish groundwater use. Multiple model runs will be performed to evaluate the sensitivity of the predicted pumping impacts to modeling assumptions and aquifer parameters. Sensitivity to fault conductance will also be evaluated.

7.1 Feasibility of Approach

In developing our approach to performing the brackish groundwater evaluation for the Rustler Aquifer, we considered three key criteria—all of which are indicative of the feasibility of the approach. As described below, these criteria are: scientific soundness, time efficiency, and cost effectiveness.

- **Scientific Soundness.** First and foremost, our approach has to be scientifically-sound and produce results that are technically-defensible. Using geophysical well logs to determine water quality in areas that lack sampled water quality, like the Rustler Aquifer, is a scientifically proven and technically defensible method used regularly in water resource evaluations. Furthermore, because of the limited geographic coverage of available logs that include the Rustler, the INTERA Team has enlisted the support of Dr. Carlos Torres-Verdin, an expert in geophysical log analyses, to perform sensitivity analysis on the available geophysical logs and to provide further validation that the water quality interpretations we make are consistent with current, state-of-the-science petrophysical methods.
- **Time Efficiency.** Our approach has to be time efficient and implementable within the required timeframe for the study (completed by August 31, 2016). One of the more time consuming activities associated with the study is locating geophysical logs that are suitable for use in evaluating the Rustler Aquifer (i.e., logs with data that includes the Rustler interval). This is particularly true when only using public log databases. We have established formal agreements with two private log libraries/providers that not only provide us with access to vast quantities of catalogued geophysical logs, but that will allow the Rustler portions of acquired logs to be made available for ultimate public dissemination. This will enable us to focus more of our time on log interpretation which is critical to producing a high quality study that is accomplished in accordance with the TWDB's schedule requirements.
- **Cost-Effectiveness.** Our approach has to be cost-effective in terms of meeting the TWDB's estimate for completing the Rustler Aquifer study ($200,000). Accordingly, our approach defines a level of activities that is consistent with meeting the TWDB's cost expectations. INTERA's 15+ year track record of delivering work products to the TWDB at the agreed-upon cost provides added assurance that the budgetary constraints for this study will be met.

As the following detailed discussion of the scope of work tasks will confirm, the INTERA Team's approach is not only technically feasible, but will result in a high quality evaluation of brackish groundwater in the Rustler Aquifer that is completed on-time and on-budget. We are fully committed to delivering the information needed to support the TWDB's report to the legislature on brackish resources in the Rustler and three other aquifers by December 1, 2016.

7.2 Detailed Approach to Scope of Work Tasks

We have divided the brackish groundwater evaluation of the Rustler Aquifer into seven tasks. Discussions of the activities associated with each task, and our approaches to executing the tasks, are provided below.

Task 1 – Project Management

An expedited study of brackish groundwater in the Rustler requires expertise in several facets of hydrogeology and well log interpretation. Imperative to the success of the study is a project manager that is intimately familiar with hydrogeologic data, models, the geology of the Rustler, and the TWDB groundwater program. To meet these requirements, Van Kelley, PG will serve as our Project Manager. Mr. Kelley has previously managed six TWDB contracts covering development and calibration or recalibration of seven GAMs including the model of the Rustler Aquifer. In his role as Project Manager, Mr. Kelley will serve as the single point of contact for the TWDB and stakeholders. We understand that given the importance, complexity, and accelerated schedule for completing the project, regular coordination and communication with the BRACS division staff will be critical to project success. Mr. Kelley's project management responsibilities will include providing prompt and comprehensive information to TWDB and stakeholders regarding the project's schedule, budget, and technical considerations. Specific project management activities include submitting monthly progress reports, attending review meetings with the TWDB, and providing senior technical review of the INTERA Team's project deliverables. Additional details on our project organization and management approach are provided in Section 7.2.

The project management task also includes three meetings. Mr. Kelley will schedule and attend the project initiation meeting with the TWDB immediately after contract award and the project completion meeting upon submittal of the final technical report summarizing the study. He will also coordinate with the TWDB to establish the date, time, and location of a meeting with stakeholders at the end of the project in a central location in the Rustler region, such as Ft. Stockton. This meeting will provide information on the results of the project and solicit input on the identified PPAs. The INTERA Team will attend and present data and interpretations at the meeting. Prior to this meeting, we will discuss an approach with the TWDB for presenting data and discussing technical issues. No later than four working days before the meeting, we will provide a draft presentation to TWDB for review and comment.

Task 2 – Delineate Vertical and Horizontal Extent of Fresh, Brackish, and Saline Groundwater

Typical approaches to the delineation of groundwater quality (defining TDS in milligrams/liter) involve sampling of water wells, calculations of TDS from electric logs, or more commonly in brackish formations that overlie oil and gas basins, some combination of these approaches. The distribution of water wells with water quality data in the Rustler Aquifer from the TWDB's Groundwater Database, the USGS National Water Information System, and in various studies that incorporated groundwater quality (SPWLA (1982), Texas Water Commission (1989), Small and Ozuna (1993), Boghici (1997), Brown (1998), Boghici and Van Broekhoven (2001), TWDB (2015)) is shown in **Figure 7-1**. Ewing and others (2012) provided a dataset for all available water quality samples for the Rustler Formation in and

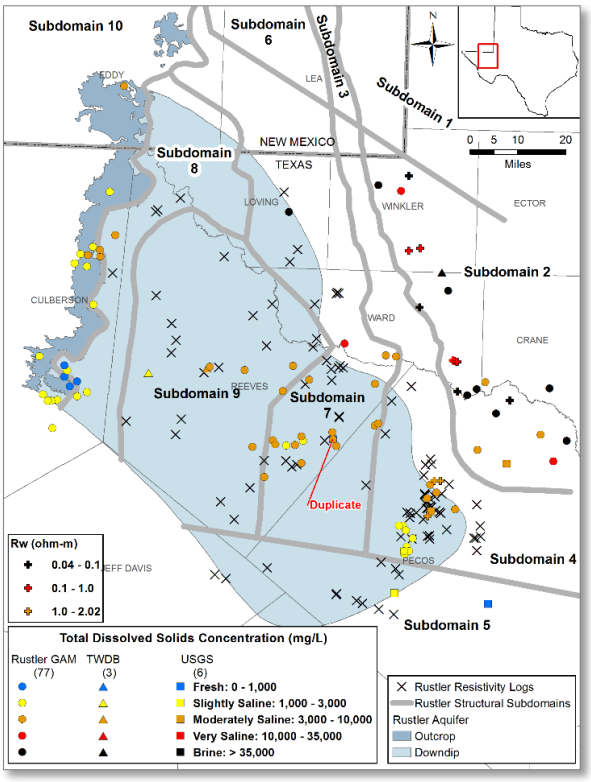


Figure 7-1. Rustler study area base map showing water quality samples, resistivity logs and structural subdomains

surrounding the Rustler Aquifer footprint (Figure 7-1 shown here and Figure 4.8.2 in Ewing and others, 2012). The Ewing data is from the TWDB's historical records that were available in November 2012, published reports, and the USGS in New Mexico (Ewing and others, 2012).

In addition to the records Ewing and others (2012) compiled to develop the Rustler GAM, the INTERA Team has acquired three additional water quality samples from the TWDB records, six from the USGS records, and 15 water resistivity samples from a SPWLA publication (from 1982). After querying the TWDB GWDB and USGS databases for water quality values in the study area, one of the resulting points appears to be a duplicate between the two datasets. However, the sampled water quality is in different ranges (Figure 7-1). Because the SPWLA samples include a R_w value, they provide both calculated water quality and additional data to estimate the resistivity of the water from the resistivity recorded on the geophysical logs (R_w from R_t). This concept is discussed in more detail in later sections.

Even with this additional data, the distribution of water quality samples within the Rustler Aquifer is still sparse. To help improve data coverage, the INTERA Team will contact GCDs that overlie the Rustler Aquifer in an effort to obtain additional water quality samples and well completion information. With the advent of hydraulic fracturing, more oil and gas companies are using Rustler water for their operations. Our experience has shown that these companies commonly share well completion and water quality information with the GCDs. INTERA will use stakeholder meetings to make requests to non-GCD entities or persons for additional water quality data in the Rustler.

Given the sparse vertical and horizontal distribution of water quality samples from the Rustler Aquifer, additional water quality estimates would be of considerable value in delineating the brackish groundwater zones. Because calculated water quality, as opposed to sampled water quality, can provide a reasonable proxy for trends in the distribution of TDS in a groundwater basin, INTERA proposes to use electric logs to augment the data shown in Figure 7-1. In the Delaware Basin, oil and gas wells are typically drilled to the base of useable quality water, surface casing is installed, and the well is then drilled to the base of the Castile Formation, generally using a saturated saltwater mud to prevent dissolution of the Castile and Salado evaporites. A second string of casing is then normally installed. This often negates the possibility of an open-hole log being run through the aquifer(s) that overlie the evaporites. Although electric logs are not commonly run through the Rustler Aquifer, they do exist, and it is merely a matter of locating them, assessing their quality, establishing a means to provide them to the TWDB for public dissemination, and interpreting them. While all of these tasks are a challenge for the Rustler Aquifer, we have developed a strategy for acquiring useful well logs that can be made available to the public. The following subtask discusses this strategy.

Task 2.1 – Acquire and Digitize Geophysical Well Logs. The ability to efficiently access public and private well log databases to supplement currently available information is critical to the success of this project. For the public databases, we first queried TWDB's BRACS database. Shown in **Figure 7-2**, there are 682 wells within a 10-mile buffer around the Rustler Aquifer footprint with picks for either the Rustler or Salado and that have at least one raster log. In addition, there are 671 wells that do not have a geophysical log but have a pick for the Rustler or Salado. Geophysical logs and associated metadata in the BRACS database that fit the criteria for this evaluation will be integrated into a Petra-based project database. Petra is an integrated software application with a common database and interface for project and data management, well log analysis, mapping, cross-sections and seismic data integration. As INTERA demonstrated during the development of the High Plains Aquifer System GAM (Deeds and others, 2015), using Petra facilitates the process of formatting data for ultimate entry into the BRACS database.

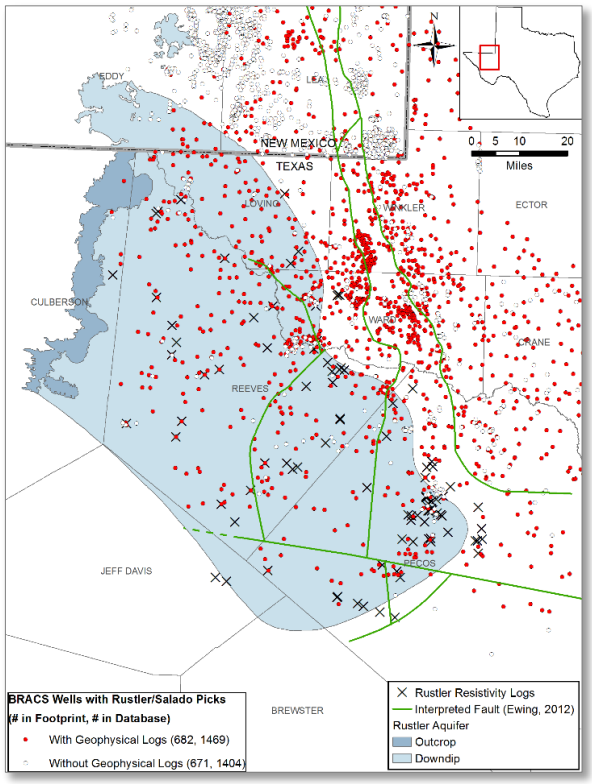


Figure 7-2. Rustler study area base map showing BRACS well log and pick availability along with inferred faults (from Ewing and others, 2012)

Other public databases in Texas that offer some potential to provide geophysical logs run through the Rustler Aquifer, but do not have the necessary metadata to readily query, are the databases at the Railroad Commission, the Bureau of Economic Geology and the University Lands. In New Mexico the Oil Conservation Division (OCD) retains the majority of all logs run in the state of New Mexico. The key issue with these log databases is that they lack the ability to query and subsequently access the logs in an efficient and timely manner on the scale required to support the evaluation of brackish groundwater in the Rustler. It is important to have a database that catalogues the top and bottom logging interval of every curve on the geophysical log for the well. With the exception of the BRACS database which will be used over the entire Rustler aquifer extent, all of the aforementioned public databases will be used to infill small areas where there are data gaps as opposed to being primary data sources.

While public log databases are ideal when evaluating a small number of wells in a geographically small area, for larger areas and time-critical applications, more time can be spent on the actual analysis of the geophysical logs when the majority of the front end work has been completed by specialized commercial log database companies. The INTERA Team has developed a strategy that allows leveraging the efficiency and comprehensiveness of commercial log databases while allowing the logs to be made public as required for the proposed work.

To better evaluate the availability of resistivity logs, INTERA used our IHS subscription to determine the distribution of these logs in and around the Rustler Aquifer footprint. IHS has the world's largest log database for the Permian Basin. All wells that overlie the Rustler Aquifer footprint within a 5-mile buffer were queried, resulting in approximately 7,000 wells. For these wells, there were over 120,000 geophysical logs. A majority (>95%) of the logs had a top logging interval well below the base of the Rustler Formation, essentially making them unusable for this analysis. We then queried wells having a

resistivity/induction or any other type of electric log run through the Rustler Aquifer with a buffer of 200 feet below the top of the Rustler and 200 feet above the base of the Rustler. The 200 foot buffer was applied in an attempt to not throw out logs that have the majority but not all of the Rustler Formation logged. This query resulted in a total of 329 wells with all of the logs having a gamma curve and 97 of them having some type of a resistivity (Figure 7-1).

Given the stipulation in the RFQ that "Geophysical well log data obtained for the project must be non-confidential and submitted in a Tagged Image Format (TIFF) and, if available, Log ASCII Standard (LAS) format", we cannot use the logs from the IHS database since IHS is unwilling to provide the geophysical well logs for public dissemination. However, recognizing the contribution that the private log databases can provide to the project, INTERA has received a written commitment (provided in **Attachment A**) from Drillinginfo, an Austin based private log library with a log database comparable to the IHS Permian Basin database, to release to the TWDB for ultimate public dissemination the Rustler Aquifer portion of any logs purchased specifically for this project. Accordingly, INTERA will acquire logs from Drillinginfo, and these logs will be redacted below the Castile Formation/ top of the Delaware Mountain Group. Acquiring these logs means that less of the project budget will be spent on searching for publicly available logs and integrating them into our Petra database. Conversely, more time can be spent to ensure the accurate evaluation of the logs. In addition, since Drillinginfo will be working with INTERA to query out these logs, the end result will be a much larger number of higher quality logs that will ultimately be integrated into the BRACS database and provided to the public.

Drillinginfo, working with INTERA, has queried their database in the project area for logs with a curve in addition to natural gamma. The resulting dataset contained 548 wells with geophysical logs, in addition to gamma, that are run through the Rustler Formation with a buffer of 200 feet below the top and 200 feet above the base of the Rustler Formation. Drillinginfo will physically examine each one of these geophysical logs and determine/catalog the type of logs that are run through the Rustler Formation. We anticipate that the Drillinginfo database will include a large percentage of the resistivity logs we identified in the IHS database as well as additional logs not identified by IHS. For the resistivity logs that are not in the Drillinginfo database and for geographic areas that do not have any data in the database, we will use The Subsurface Library to search for logs (in addition to natural gamma) in the specific areas where additional data is needed. The Subsurface Library has also committed to allowing the Rustler portion of any acquired logs to be made publically available (see letter in **Attachment A**).

In addition to resistivity/induction logs, the INTERA Team will search the databases for neutron porosity logs to support the analysis of structure, stratigraphy, and lithology for all of the member units of the Rustler Formation. **Figure 7-3** shows the units that comprise the Rustler Formation. Logs from the BRACS database will be the first to be integrated. Based on our past experience in assembling and analyzing logs, we believe it is likely that the majority of the logs for the 548 wells in the Drillinginfo database will have a neutron porosity

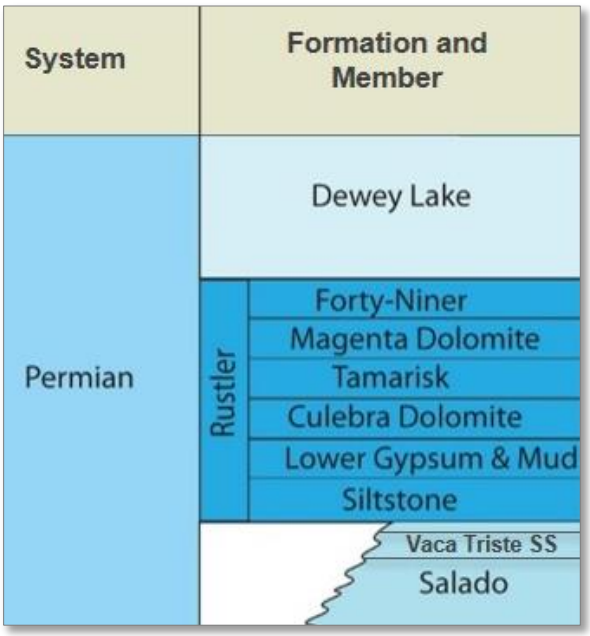


Figure 7-3. Stratigraphic column of the Permian units of interest (adapted from Ewing and others, 2012)

log run through casing. While a neutron log run through casing is not ideal, Dr. Dennis Powers, a member of the INTERA Team, has considerable experience in evaluating these logs. In combination with the natural gamma signature, the neutron porosity log can be used to delineate the member units of the Rustler Formation and provide insights into the lithologic patterns and distribution of cementation, in addition to identifying areas of Salado Formation collapse. We are confident that an adequate distribution of logs can be assembled to refine the structure and lithology of the Rustler Formation and its member units.

Task 2.2 – Draft Techniques and Approaches Report and Meeting. Once the best possible population of resistivity and neutron porosity/natural gamma logs has been identified, we will document the findings and draft a technical approach report for submission to the TWDB. The specific approach for geophysical well log interpretation of aquifer TDS concentration will be dependent on the availability and type of geophysical logs that are available. The report will include information on the types of geophysical well logs available in the Rustler Aquifer area, how the interpreted TDS concentration from well log analysis relates to existing aquifer water chemistry as determined by direct measurements, how the log correction factors are determined, and how the interpretation techniques will be applied across the entire salinity range within the aquifer. We will then meet with staff at the TWDB to discuss the techniques and establish consensus on the overall approach.

After receiving TWDB approval of our approach, INTERA will digitize relevant logs and catalog all of the available header parameters. The digitized logs will serve two purposes. First, they will be used to facilitate the development of a series of structural cross sections through the area of interest. Second, the digitized logs are essential for making calculations and correcting log signatures based on borehole conditions and formation thicknesses/parameters. For example, with water quality calculations from resistivity logs, areas of mud filtrate invasion must be identified before calculations of water quality can be made. If the log is digitized and the resistivity of the mud filtrate is documented in the log header, algorithms can be used to identify areas where the resistivity is reflective of the borehole mud filtrate as opposed to the formation water resistivity.

Task 2.3 – Evaluate Structure and Lithology. The first step in this task will be a thorough literature review encompassing publications relevant to the stratigraphy, structure, lithology, and water chemistry of the Rustler Formation. A significant repository of relevant Rustler publications was amassed by the INTERA Team as part of developing the Rustler GAM (Ewing and others, 2012) and by the BRACS group as part of the study on the Structure and Brackish Groundwater in the Pecos Valley Alluvial Aquifer (Meyer and others, 2012). Historical publications of significance include Hiss' 1975 PhD dissertation on the Stratigraphy and Ground-Water Hydrology of the Capitan Aquifer (Hiss, 1975) in addition to the structural map that he created for the Rustler Formation (Hiss, 1976). Dr. Dennis Powers used these and other publications as references for developing the structure of the Rustler Formation as part of the Rustler Aquifer GAM that was submitted to the TWDB (Ewing and others, 2012). Since the completion of the Rustler GAM and the Pecos Valley Alluvial Aquifer study , the USGS has published a series of reports related to the hydrogeology and hydrogeochemistry of the Edwards-Trinity and related aquifers in the Pecos County Region (Pearson and others, 2012, Bumgarner and others, 2012 and Clark and others, 2014). While these reports are mainly focused on the Edwards-Trinity system, data acquisition, analysis, and modeling efforts included the Rustler Formation and these reports will be used as a reference when considering the hydrogeology and hydrogeochemistry of the Rustler Aquifer. Finally, the TWDB commissioned an evaluation of the hydrochemical and isotopic data in GMA 3 and GMA 7 (Kreitler and others, 2013). Data and conclusions from this report will be evaluated and used appropriately when considering the water quality in the Rustler aquifer.

The INTERA team will maximize the use of available data by using the gamma and neutron porosity logs, along with any other supplementary logs, to make picks on the member units of the Rustler Formation along with a refined distribution of halite cementation and Salado collapse in the Rustler Aquifer footprint. A portion of the structure of the Rustler was jointly developed by INTERA and the BRACS Group as part of developing the Rustler GAM (Ewing and others, 2012 and Meyer, 2011). The structure of the Rustler is complex and a hydrostructural conceptual model was developed in Ewing and others (2012). The BRACS structure and the hydrostructural conceptual model will provide a foundation for this work. We will further evaluate halite presence, and dissolution and secondary cementation to help develop a model of lithology that will be central to log interpretation and ultimately quantification of groundwater volumes.

Halite in the Rustler commonly indicates where porosity is occluded, permeability is extremely low, and the salinity of any water is close to saturation with respect to halite (e.g., Powers et al., 2003, 2006). Specific log characteristics have been used to map halite cementation margins for Rustler members in parts of the Delaware Basin (Powers et al., 2003). These log characteristics were determined from shaft mapping (Holt and Powers, 1984, 1986, 1990) as well as core analysis and geophysical log interpretations (Holt and Powers, 1988, 2010; Powers, 2008; Ewing and others, 2012). The main source of data for developing the distribution of halite cementation are geophysical logs. The most thorough analysis can be made for boreholes with a more complete suite of logs (natural gamma, caliper, and density or sonic) (Powers and Holt, 2000). While drillholes with this suite of logs are variably distributed, they do provide good benchmarks. Through his more than 40 years of experience working in the Rustler Formation, Dr. Powers has acquired a series of these benchmarking logs. The stratigraphy of the Rustler is dominantly determined on the basis of natural gamma (Holt and Powers, 1988; Powers and Holt, 2000). Members and informal units are widespread and facies changes are most common in the halitic units. Interval thickness and changes in the log character can be reasonably determined through gamma and neutron logs, again with corroborating evidence from a more complete suite, as available.

Another important contributor to Rustler hydraulic properties is dissolution of salt from the upper Salado. An evaluation of the distribution of hydraulic heads shows that the Tessey Limestone and the Rustler Aquifer outcrops in the Rustler Hills are the most likely locations for recharge to the Rustler Formation (Ewing and others, 2012). In these areas preferential flow paths are developed where recharged groundwater dissolves the halite cemented porosity in the Culebra and Magenta dolomites or recharging groundwater is initiating Salado dissolution and subsequent Rustler collapse. This serves to create a feedback loop where the transmissivities increase as the Rustler Formation Culebra and Magenta Dolomites continue to fracture following Salado collapse.

A metric for identifying upper Salado dissolution developed in the Delaware Basin uses the thickness of the interval between the Culebra Dolomite Member of the Rustler and the Vaca Triste Sandstone Member of the Salado Formation. Both units are widespread. Regional trends in depositional thickness (Powers et al., 2003) are disrupted at dissolution margins that are relatively sharp (Powers et al., 2003; Holt and Powers, 2010). Across large areas the upper Salado also displays natural gamma as well as other log characters (including neutron) that are related to regionally extensive marker beds and other units. For more detail, local log cross-sections can be correlated to reveal truncation of upper Salado beds (Powers, unpublished presentation to WIPP Peer Review Panel). The natural gamma character of the basal Rustler (Los Medaños Member, comprising siliciclastics, halitic mudstones, muddy halite, and sulfates (mainly anhydrite)) can reveal the amalgamation of upper Salado residues. Identifying these areas will contribute to discretization of areas of Salado collapse. Where Salado collapse has occurred, it

is anticipated that the Rustler Formation Dolomites will exhibit a more cavernous (secondary) porosity and this will be factored into the delineation of PPAs.

Work products for this task will include:

- At least 4 cross sections (two along strike and two along dip) showing the overburden, Rustler Formation, member units of the Rustler Formation, top of the Salado Formation and top and base of the Vaca Triste Sandstone Member of the Salado Formation. These cross sections will be used to highlight regional structure and log signatures for different lithologic regimes within the Rustler.
  - In areas where the individual member units of the Rustler Formation are indistinguishable, picks will be made for the Lower, Middle and Upper Members of the Rustler Formation
  - It is anticipated that areas will exist where the discretization of the Rustler Formation into its component Member Units will not be possible. There areas will likely be the result of solution collapse and they will be identified in a plan view map of the study area.
- An adequate distribution of geophysical logs with picks, where discernable, for the tops of the Rustler Formation/Forty-Niner Member, Magenta Dolomite, Tamarisk, Culebra Dolomite, Los Medaños Member, top of the Salado Formation and top and base of the Vaca Triste Sandstone Member of the Salado Formation.

Task 2.4 – Generate Surfaces Defining Member Units of Rustler. Component member units of the Rustler Formation (Figure 7-3) that were interpreted as part of Task 2.2 will be interpolated across the Rustler aquifer extent using an interpolation algorithm in ESRI's ArcGIS v10.2 Spatial Analyst package. Surfaces for the top of the Vaca Triste Sandstone Member of the Salado Formation and top of the Salado Formation along with the tops of the Los Medaños, Culebra Dolomite, Tamarisk, Magenta Dolomite, and Forty-Niner members of the Rustler Formation will be interpolated to the extent possible. In areas where the formation tops are not identifiable, a best approximation for the top and base of the Rustler Formation will be made and these areas will be identified. In addition, domains reflecting like formational characteristics, mainly porosity (primary or secondary based on ability to identify member units), will be delineated and used to guide a formation parameter sensitivity analysis and to calculate volumes of available fresh, brackish, and saline groundwater in the Rustler Aquifer.

To assist in this process, all TWDB groundwater database wells and digitized submitted drillers reports with recorded production rates and screen information will be documented. For these wells, the top and bottom of the Rustler Formation will be established and all wells that fall within the Rustler Aquifer and have production values will be posted along with the areas of Salado Formation collapse. The distribution of the production rates will be evaluated in combination with the areas of Salado collapse to determine the existence of trends. Work products from this task will include:

- Structural surfaces for the top and base of the Rustler Formation along with the tops of the Los Medaños, Culebra Dolomite, Tamarisk, Magenta Dolomite and Forty-Niner Members of the Rustler Formation. Where no further discretization of the Rustler into its member units is possible, a best approximation for the top and base of the Rustler Formation will be made.
- A plan view map including shapefiles displaying areas where the Rustler Formation is still intact and likely a primary porosity flow system and areas where Rustler collapse has occurred and is likely a secondary porosity flow system. This map will be based on analysis from geophysical logs and production rates from wells screened to the Rustler Formation.

Task 2.5 – Formation Parameter Sensitivity Analysis. The calculation of water quality (calculated TDS) from resistivity is a standard technique to supplement areas where sampled water quality (sampled

TDS) measurements are sparse. Examples of this include Alger (1966), Ayers and Lewis (1985), Fogg (1980), Fogg and Kreitler (1982), Fogg and Blanchard (1986), Hamlin (1988), Estepp (1998), and Meyer (2012). The majority of these applications were performed in the unconsolidated sediments of the Gulf of Mexico Basin where data availability and geographic distribution of electric logs is far greater than it is for the Rustler Formation within the Rustler Aquifer footprint. One possible exception is Collier's (1993a,b) evaluation of various consolidated formations (e.g., Cretaceous Edwards Formation, Trinity Group, Paleozoic limestones, etc.). In addition to the sparse distribution of resistivity logs, no detailed publications have been found that adequately discuss the calculation of water quality from resistivity or spontaneous potential measurements specifically in the Rustler Formation. Given the lithologic complexity of the units that make up the Rustler, standard techniques for water quality calculations can vary over many orders of magnitude if specific properties such as layer thickness, log type, porosity, cementation exponent, geothermal gradient, and permeability are not constrained.

Where resistivity logs exist (Figure 7-1), it is paramount that the sensitivities to potential variables be quantified. To that end, the INTERA Team includes Dr. Carlos Torres-Verdin, a professor in the University of Texas at Austin's Petroleum and Geosystems Engineering Department. Dr. Torres-Verdin will work closely with Dr. Powers and INTERA to evaluate the distribution of geophysical logs and determine, based on data density and availability, the best approach to characterizing water quality using resistivity logs.

Before water quality can be assessed from well logs, it is necessary that all borehole variables included in them be quantified. Depending on the specific conditions, some of the petrophysical affects can be greater than the impact of water quality. Well logs acquired in water-bearing rocks can be substantially affected not only by water quality (i.e., ion concentration, ion types, etc.) but also by rock properties such as porosity, permeability, irreducible water saturation, mud-filtrate invasion, borehole size, and layer thickness, in addition to the properties of the specific tools used to acquire them, especially considering the age of most of the logs run through the Rustler Formation. Most of the latter effects included in well logs are not typically accounted for by logging companies when providing well logs such as gamma ray, SP, resistivity, density porosity, and neutron porosity. Modern methods used in the interpretation of well logs invokes some degree of numerical simulation to quantify the relative impact of borehole and layer environmental effects in the interpretation of layer petrophysical properties and saturating fluids.

The numerical simulation of well logs is performed by first defining all pertinent, available, geometrical properties such as borehole size, mud type (i.e., types of ions in solution and their concentrations), temperature, layer thicknesses, etc. Next, layer properties such as porosity, volume of shale, permeability, total water saturation, irreducible water saturation, and water quality are used to calculate effective layer properties such as electrical resistivity, natural radioactivity, compressional and shear wave velocities, and nuclear properties. The calculated layer physical properties, together with the definition of layer thicknesses and specific tool properties are then used to numerically simulate all well logs (e.g., gamma, SP, resistivity, etc.). Comparison of numerically simulated well logs against measured well logs provides quantitative verification of the relative impact of relevant formation properties on the well logs, including water quality.

A central contribution of the numerical simulation of well logs is the generation of expected well-log signatures for a wide variety of petrophysical, fluid, and water quality conditions, for comparison against existing well logs. When all petrophysical and geometrical conditions are accounted for in the numerical simulation of well logs, the matching of available well logs and their numerical simulations can explicitly yield quantitative estimates of water quality without invoking ad-hoc and/or empirical

correlations. The method can equally be used for interpretation of evaporitic, clastic, or carbonate formations, all of which exist in the Rustler Formation.

The work products generated as part of this task are:

- An analysis in the form of figures and text showing the relative sensitivity of the resistivity logs to geometrical and petrophysical conditions. This sensitivity analysis will guide the analysis of the resistivity logs for calculation of water quality.
- A value for the resistivity of the formation water (Rw) factoring in the sensitivity of the resistivity signature to the aforementioned geometrical and petrophysical conditions.

Task 2.6 – Interpret Water Quality Based on Distribution of Resistivity. Resistivity (ohm-m^2/m or ohm-m) can be defined as the degree to which a substance resists the flow of an electrical current. In general, resistivity is inversely related to conductivity (milliSiemens per meter or mS/m) and generally inversely related to Total Dissolved Solids (mg/L). That is, the higher the resistivity, the fresher the water and the lower the resistivity, the more brackish the water. Resistivity is measured in a borehole by lowering a logging tool down the borehole and using a multiple-electrode array to apply a constant current into the formation and measure the voltage drop. The resulting True Resistivity (R_t) is recorded on a geophysical log and represents the varying resistivity values within and amongst the formations contacted in the borehole. Assuming that the units contacted by the borehole had no electronic, as opposed to electrolytic, conductivity, then the rocks are electrical insulators and would exhibit an infinite resistivity. However, since rocks have a least some small amount of interconnected porosity, and that porosity is filled with a conducting fluid (oil, gas or water), the rock will have a measureable resistivity. Where the formation is 100 percent saturated with water (S_w = 100%) as opposed to some combination of water, oil or gas (S_w < 100%), as it is in the Rustler Aquifer, then the True Resistivity (R_t) is equal to the Resistivity of the rock filled with formation water (R_o). The Resistivity of the Water (R_w) is related to the Resistivity of the water filled formation (R_o) through the Archie Equation (Archie, 1942):

$$R_w = \frac{1}{\emptyset^m} * \mathrm{R}_o$$

Where:

R_w = the resistivity of the water within the formation
$\emptyset$ = porosity (provided from geophysical log interpretations and sensitivity analysis)
m = the cementation exponent (varied based on permeability of the Dolomite Members)
R_o = the resistivity of a 100 percent water saturated formation

The value of *m* reflects the tortuosity of current flow through the maze of rock pores (Dewan, 1983). Uncertainty in both the porosity and cementation exponent can result in a wide range of R_w calculations if not properly constrained. Fortunately, through numerical simulation using existing geophysical logs such as gamma, neutron porosity, resistivity, etc. in combination with known characteristics of the Rustler Aquifer, the porosity and cementation exponent can be appropriately constrained, resulting in a constrained calculation of R_w from R_t.

Once the resistivity of the formation water (R_w) has been parsed out of the true resistivity (R_t), the calculation of water quality (calculated TDS in mg/L) is relatively straightforward using the Archie Equation as an approximate guide:

First, the R_w at formation temperature must be corrected to R_w at 75°F based on formation temperature. Then, the formation water resistivity at 75°F (R_{w75}) will be converted to Specific Conductance at 75°F:

$$C_{w75} = \frac{10{,}000}{R_{w75}}$$

Where:

C_{w75} = Specific Conductance at 75°F
R_{w75} = Formation water resistivity at 75°F

This is followed by the calculation of sodium chloride equivalent TDS:

$$TDS_{NaCl} = ct * C_{w75}$$

Where:

TDS_{NaCl} = Sodium chloride equivalent Total Dissolved Solids in milligrams per liter (mg/L)
ct = C_{w75} - TDS conversion factor (derived using water quality samples from water wells producing from the formation of interest which would be the Rustler in this case)
C_{w75} = Specific Conductance at 75°F

This conversion of R_w to TDS diverts from Estepp's R_{wa} Minimum TDS method (2010) in that we do not apply a correction factor based on ionic makeup of the water, but instead assume that the calculation is for a sodium chloride equivalent TDS. Based on analysis performed by Ewing and others (2012), the Rustler Formation water makeup is high calcium, high sulfate, and low carbonate.

The extra step in this calculation requires a conversion from sampled TDS at the well to TDS_{NaCl} using the Schlumberger Chart Gen-4 (formerly Gen-8) shown in **Figure 7-4**. The chart is used to approximate the parts-per-million (ppm) concentration of a sodium chloride solution for which the total solids concentration of the solution is known (Schlumberger, 2009). Individual values for the ionic makeup of the Rustler Aquifer will be used to calculate an equivalent TDS_{NaCl} from the formation water samples and a ratio of the TDS_{NaCl} to calculated TDS will be developed. There are roughly 85 locations that have the necessary water quality data needed to calculate this ratio. This ratio will be used as the last step to convert from TDS_{NaCl} to calculated TDS using the following equation:

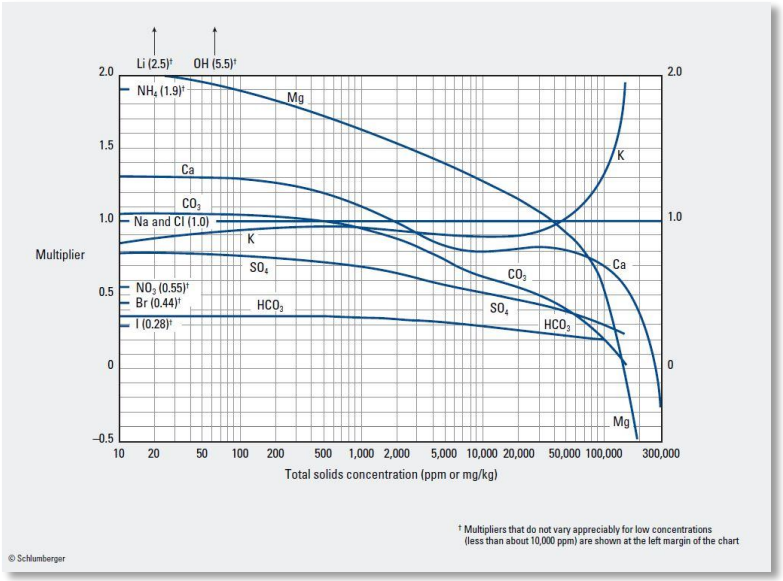


Figure 7-4. Schlumberger Chart Gen-4 for converting sampled TDS at the well to TDS_{NaCl}

$$TDS = TDS_{NaCl} * cf_{Rustler}$$

TDS = Calculated Total Dissolved Solids in milligrams per liter (mg/L)
TDS_{NaCl} = Equivalent sodium chloride TDS calculated from R_w
$cf_{Rustler}$ = Correction factor specifically derived for the Rustler Aquifer from existing water quality samples (Figure 1) and Schlumberger Chart Gen-4 (Figure 4)

While there are other methods for calculating TDS from resistivity logs, primarily the Mean R_o Method (Estepp, 2010), we do not anticipate that the data will be available to use this method. In addition to the

Mean R_o Method, the spontaneous potential curve can be used to calculate TDS. However, given the high salt content of the drilling mud, our experience has shown that the margin of error from calculations using the SP log is too large. Regardless, this method will be investigated in combination with the sensitivity simulations generated in Task 2.4.

Geophysical logs with resistivity curves will be digitized. The resistivity signatures over the dolomite members of the Rustler Formation, as defined in Task 2.2 and 2.3, will be compared to the resistivity logs generated as part of the sensitivity analysis performed in Task 2.4. Resulting comparisons will guide the parsing of R_w from R_t on a log-by-log basis. In addition, R_w values derived from SPWLA (1982) will be used as a general guide for the parsing of R_w from R_t.

Corrected resistivity values on a per-foot basis over the Culebra and Magenta dolomites will be used to calculate TDS. These calculated TDS values will then be averaged over each of the dolomite members of the Rustler Formation, where they are identifiable in Task 2.2. Where the two dolomite members are not identifiable, and it is suspected that collapse has occurred, resistivity measurements will be evaluated over the entire Rustler Formation thickness. In these areas, an effort will be made to find and justify resistivity values that appear to make sense and that are not in stark contrast to surrounding water quality calculations or measurements. Resistivity logs in suspected collapse areas will be treated with caution. Where applicable, calculated TDS values will be compared to sampled water quality from water wells. If values are significantly different, results from the sensitivity analysis will be used to guide modifications to the approach in order to reduce this mismatch. The result will be a calculated TDS for the Culebra and Magenta dolomites where they are able to be distinguished and calculated TDS over the entire Rustler Formation in areas where the dolomite members are not distinguishable.

Averaged water quality calculations, conversions of R_w to calculated TDS, and water quality samples will be tabulated. In areas where the calculation is being made from resistivity logs and the Culebra and Magenta dolomites are distinguishable, there will be one calculation for the Culebra and one for the Magenta. If the two values are reasonably close, they will be averaged for consistency. In areas where there is a water quality sample or a conversion from R_w to calculated TDS, the TDS measurement will be applied to both of the units. Where the Rustler Formation is suspected to be collapsed, the water quality sample, measurement, or conversion will be applied over the entire Rustler Formation thickness. These point location values, along with the shapefile for porosity zonation generated in Task 2.3, will be brought into ArcGIS and interpolated to delineate cutoffs for fresh, brackish, and saline groundwater.

Task 3 – Quantify Volume of Fresh, Brackish, and Saline Groundwater

The INTERA Team will develop a GIS-based application to calculate volumes of fresh, brackish, and saline groundwater by aquifer (Rustler), member (Culebra and Magenta dolomites), county, GCD, and groundwater management area for the Rustler Aquifer. The application will consist of scripts that automate the workflow in ArcMap (and the Spatial Analyst extension) and enable volumes to be calculated. This guarantees both reproducible results and the ability to quickly assess sensitivity of volume calculations to uncertain parameters, such as storage properties.

Notable features of the scripted workflow include:

- Enabled calculations to be made on a consistent raster-based geometry, with a common origin, extent, and resolution (e.g., 0.5 mile square cells)
- Incorporates surface rasters developed by the INTERA Team as part of this analysis for the top and base of the Culebra and Magenta dolomite members of the Rustler Formation and top and base of the Rustler Formation. A shapefile developed as part of Task 2.3 will be used to distinguish between

areas of primary and secondary porosity. In areas that are identified as having primary porosity, volumetric calculations will be confined to the Culebra or Magenta dolomite or the combination of the two units. Porosities in these areas will be interpolated from porosities derived from neutron porosity logs. In areas identified as having secondary porosity, the volumetric calculations will be calculated over the entire Rustler Formation thickness and the porosity values will be reflective of a secondary porosity system.

- Provides options for different assumptions and approaches to calculate volume either based on porosity, as derived from a geophysical logs, or a drainage volume such as specific yield (Sy), as derived from the Rustler GAM (Ewing and others, 2012);
- Allows the user to calculate groundwater volumes for any polygon-defined area (i.e., allows subdivision of larger salinity zones into the PPAs for volume calculations)

The scripted workflow will be implemented in the following 6-step sequence.

Step 1. ***Load the BRACS database into the GIS project.*** The database will contain the porosity values, identification of porosity type (primary or secondary), thicknesses of the Culebra and Magenta Dolomites, and water quality estimates from the geophysical logs and water quality samples from water wells.

Step 2. ***Load Additional Control Points.*** To guide calculation of groundwater volumes in regions where the geophysical data is sparse or complex, the INTERA Team will develop a set of control points for porosities, specific yield, unit thicknesses (Rustler or Dolomite units) and TDS concentrations that are based on an interpretation and extrapolation of geophysical data, measured water TDS concentrations at groundwater wells, R_w based water quality calculations, and published literature.

Step 3. ***Load Extents for Salinity Classes.*** The delineated areas for each salinity class will be defined by polygon shapefiles.

Step 4. ***Generate Unit Thickness and Average Porosity (or Specific Yield) by Formation for Each Raster Cell.*** The application will include scripts to generate rasters of unit thickness and average porosity. The interpolation of the data in the BRACS database and Control Points will use one of the several options supported by ArcMap. The scripts will include raster calculations that ensure that inversions in thickness or porosities outside of physical ranges do not occur.

Step 5. ***Generate Unit Thickness for each Water Quality Type.*** The application will provide scripts to calculate the thickness associated with each defined water quality category (fresh, slightly saline, moderately saline, or saline) by unit.

Step 6. ***Calculate Groundwater Volumes.*** The area of interest will be specified by using an existing shape file or a list of grid cells and assumptions regarding drainage porosity and the unit(s) of interest. The GIS application will create an ASCII file containing the tabulated results and will create shape files that show the spatial distribution of fresh, brackish, and saline groundwater volumes.

Prior to developing the GIS application to calculate groundwater volumes for the study, we will meet with the TWDB to explain the data available for the application, the options available for interpolating the data, and the options for calculating water volumes. The GIS application deliverable to the TWDB will include the top and bottom raster surfaces, thickness maps of the Culebra and Magenta dolomites in areas with suspected primary porosity, thickness maps of the Rustler Formation in areas of suspected secondary porosity, thickness maps of the Rustler over the entire TWDB-defined Rustler Aquifer boundary, salinity classification zone top and bottom raster surfaces, PPA top and bottom raster

surfaces, well control point files, and project raster snap grid. All raster surfaces will share the same map projection and snap grid attributes.

Task 4 – Delineate Potential Production Areas

The INTERA Team will identify the vertical and lateral extent of brackish and saline groundwater in the Rustler in Task 3. This will generally define PPAs for brackish groundwater in the Rustler. In Task 4, we will identify the areas where long-term pumping of a brackish zone will not significantly impact fresh groundwater or a brackish groundwater source currently serving as a significant water supply. To accomplish this task, we will extend our hydrostructural and transmissivity model developed in Ewing and others (2012), map potential hydrogeological barriers, and identify specific areas to be protected.

Task 4.1 Refine Hydrostructural Model and Transmissivity Estimates. The most refined regional structural analysis, and the only regional assessment of transmissivity of the Rustler, was performed as part of developing the Rustler GAM (Ewing and others, 2012). The structure of the Rustler is very complex (see Figure 7-2 showing major faults). Likewise, the hydrogeologic nature of the Rustler is a product of depositional environment, lithology, diagenesis, and post-depositional alteration of the Rustler and the underlying Salado Formation. As previously discussed, these factors are a proxy for interpreting transmissivity of the Rustler. In such a complex aquifer with a general lack of aquifer test data, we will rely on a conceptual understanding of the factors described above to estimate transmissivity on a regional basis. Ewing and others (2012) developed a conceptualization for the Rustler, termed a hydrostructural model, that was used to help define flow systems within the aquifer and to develop a model for transmissivity and storativity of the aquifer. We will use this framework as a foundation for our analysis. Any new results from the current study will be used to modify or refine the regional understanding documented in Ewing and others (2012).

Task 4.2 Map Hydrogeologic Barriers. The primary objective of mapping hydrogeological barriers is to provide geologic constraints on the location and deliverability of brackish groundwater in the Rustler. Specifically, it is important to identify anhydrite or polyhalite sequences within the aquifer that act as regional aquitards/aquicludes or major structural features (faults) that separate sections of the aquifer. Ewing and others (2012) initiated the process of defining, through a hydrostructural conceptual model, lithology and diagenesis or post-depositional alteration that likely play a role in aquifer transmissivity. All major faults were mapped, fault throws were examined, and the regions where the Rustler remains in contact across the faults or the degree of separation that occurs, were defined. Using this structural data and through model calibration, fault conductances were calculated and their sensitivity to model calibration was investigated. The new research from this study will be used to augment the framework developed in Ewing and others (2012). Because cross-formational flow can be important to portions of the Rustler flow field and the concepts of isolation, we will use stratigraphic contacts as well as modeled vertical conductance to review vertical isolation. This will include contacts across faults. In general, consideration of isolation below the Rustler is not warranted.

Task 4.3. Identify Protected Areas. As described in the RFQ, PPAs cannot include an aquifer with an average TDS concentration of more than 1,000 mg/L and that is serving as a significant source of water supply for municipal, domestic, or agricultural purposes. To identify these areas, we will review a current listing of groundwater registrations and permits from the GCDs in the aquifer boundaries, a current listing of public water supply (PWS) wells from the TCEQ, and the large-diameter wells listed in the TWBD's database on submitted driller's reports. In addition, we will coordinate with the TWDB to locate any other databases that can help identify a significant water source of interest. Prior to identifying these water supplies, we will meet with the TWDB to clarify the meaning and/or intent of

"significant source." The RFQ also states that a PPA cannot include a part of a geologic stratum that is designated or used for wastewater injection through the injection or disposal wells. To identify these areas, we will review the TCEQ and Railroad Commission of Texas databases that contain records of permitted injection and disposal wells.

Task 4.4. Identify Potential Production Areas. Based on the findings from Tasks 4.1 through 4.3, the INTERA Team will identify PPAs. The areas must be brackish/saline, potentially productive, and hydrogeologically isolated from the protected areas. As part of identifying PPAs, Dr. Justin Sutherland of Carollo will assist in determining the feasibility for treatment of any specific groundwater constituents that can impede desalination of brackish groundwater. These feasibility evaluations will be used as one of the evaluation criteria for prioritizing PPAs. Each of the PPAs will be assigned a unique identification number, and maps showing the locations of the PPAs will be created prior to meeting with TWDB staff to discuss and prioritize the PPAs.

Task 4.5. Potential Production Area Meeting with TWDB. The INTERA Team will meet with TWDB staff to discuss the viability of the identified PPAs. Criteria for prioritizing the PPAs will be presented and specific areas for further analysis will be identified. The TWDB will provide the final criteria for prioritizing the PPAs. At the end of the meeting, or soon thereafter, a list of priority PPAs will be developed.

Task 5 – Determine Availability of Brackish Groundwater in Potential Production Areas

During the PPA meeting with the TWDB, the INTERA Team will discuss an approach for using a groundwater model to determine brackish groundwater availability in the identified PPAs. For priority PPAs, the modeled availability will be calculated for 30-year and 50-year production periods, while demonstrating no significant impact to water quality and quantity in regions meeting the protected criteria, as described above in Task 4.3.

Based on the complexity of the Rustler and the limited time frame and budget available for model development activities, we will use the Rustler GAM as the basis of our calculations to the extent practicable. Because brackish PPAs may have relatively small footprints and near-field hydraulics may be important to vertical connections, the model grid (currently on a 1/4-mile grid scale) may need to be refined. This can be accomplished with the MODFLOW-NWT (Niswonger and others, 2011) code used for the GAM or by using MODFLOW-USG (Panday and others, 2013). If the current GAM is determined to be inadequate for simulating the required hydraulics, we will adapt a semi-analytic approach. This approach will be discussed in detail with the TWDB before it is applied.

The number of PPAs to be modeled will be determined in consultation with the TWDB. Once the modeling approach and formulations are approved, the next step will be to assign aquifer properties. While the current Rustler GAM is calibrated, as discussed in Ewing and others (2012), properties including transmissivity, storativity, and vertical and fracture/fault conductances are not well constrained. In addition, as part of this study we will be defining the individual members of the Rustler that may be contributing flow as well as the importance of secondary versus primary porosity on productivity. As a result, based on the GAM estimates and the characteristics of the brackish PPA groundwater bearing members, we will assign a best estimate (likely from the GAM unless inconsistent with current study interpretation), an upper value, and a lower value for each aquifer hydraulic property.

For the top prioritized brackish PPAs, a steady-state predevelopment scenario will be used as the initial condition for the 30-year and 50-year pumping scenarios. For the pumping scenarios, we will perform a series of Monte Carlo-type runs based on three to six different values of pumping and seven to 15

different sets of assumed aquifer parameters. The boundary condition and fault conductances can be evaluated using the GAM as well as the base case simulation. To look at uncertainty in hydraulic diffusivity of the Rustler due to reduced pore volume, secondary porosity, or general lack of data, we will post-process the base case results. Because the process being modeled is confined groundwater flow, it will be linear with the possible exception of some areas near boundaries (which can be tested using the GAM). The ensemble of simulated hydraulic heads for each model run will be processed using scripts to calculate pumping impacts. Examples of pumping impacts that can be quantified include average drawdown across a region, drawdown values at a boundary, drawdown at existing wells, or changes to Desired Future Conditions.

Task 6 – Final Report, Documentation, and Technology Transfer

The INTERA Team will submit a technical report to the TWDB that summarizes the project data, methods, results, and conclusions. We will also make a formal presentation of the results to the TWDB. In conjunction with the final report, the project deliverables defined in the RFQ (Section III, 3.1, pages 7 and 8) will be submitted. INTERA will also provide training for TWDB staff, as needed or requested, on how volumes of brackish groundwater in the Rustler Aquifer were estimated and the techniques we used to determine the extents of salinity zones. Additional details on reports and deliverables are provided in Section 7.3.

7.3 Organization and Management

Through our completion of groundwater resource evaluations and modeling contracts for a variety of commercial and governmental clients, the INTERA Team offers TWDB a proven approach to successful project management. We are providing a highly qualified and experienced team of technical and management personnel committed to the project. Our Project Manager, Van Kelley, has over 30 years of experience in conducting groundwater studies, developing and applying groundwater flow models, and project management. The INTERA Team's proposed project organization is shown in **Figure 7-5**.

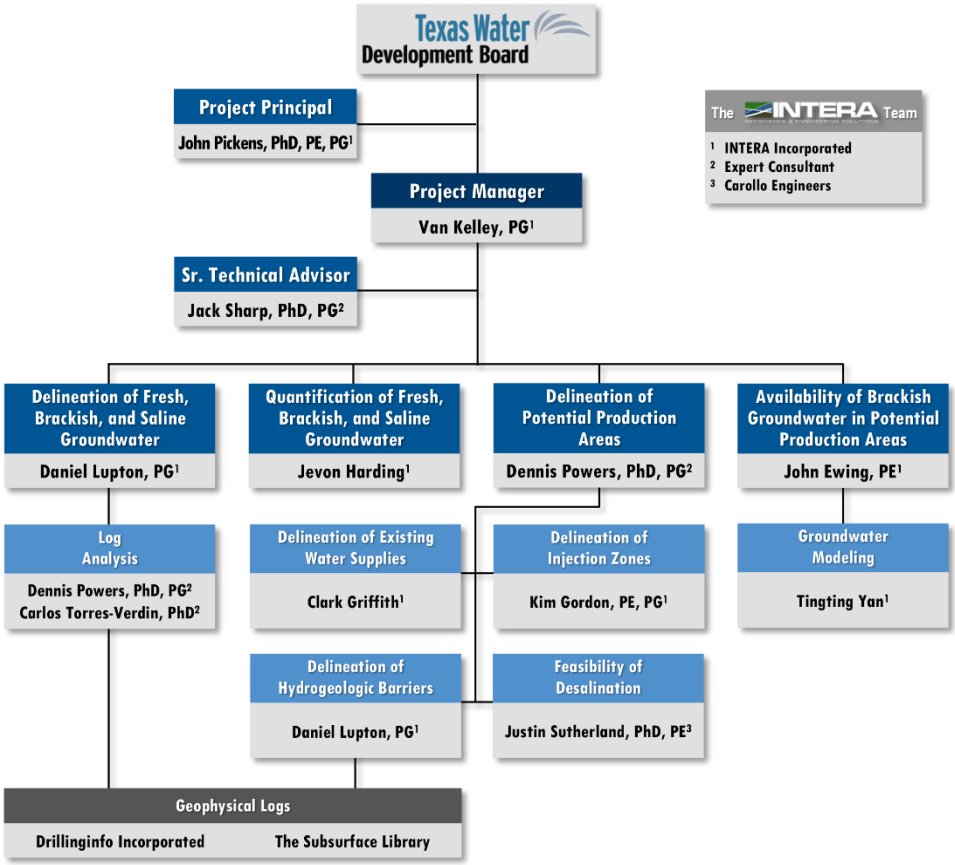


Figure 7-5. Project organizational structure

Our organization and management approach is

designed to satisfy the following objectives: provide timely and effective administration of the contract; be highly responsive to TWDB; ensure efficient access to and optimal use of our personnel as required by each specific technical task; provide complete, on-schedule, on-budget, quality-assured performance on all tasks; and provide effective communication among team members and the TWDB and other stakeholders. **Figure 7-6** shows the primary roles and responsibilities of our management positions.

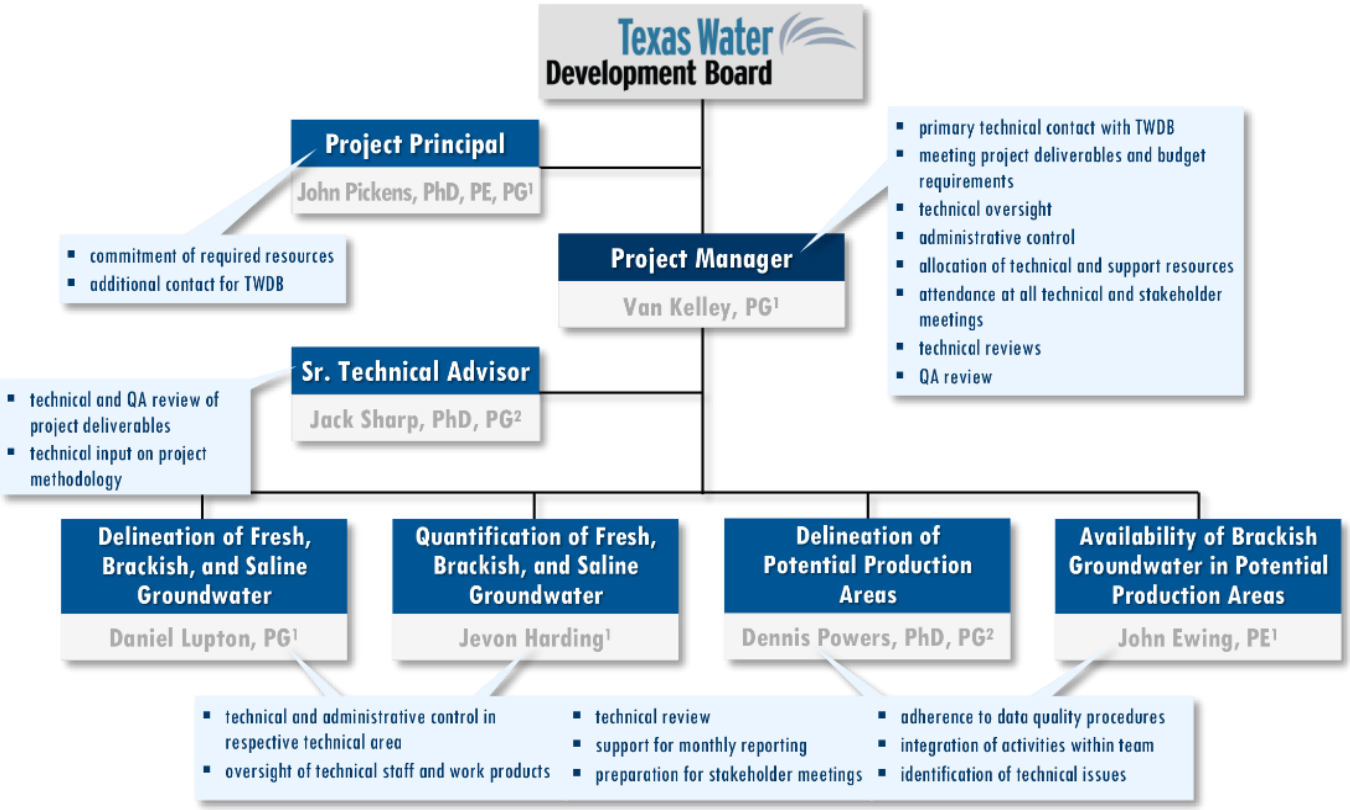


Figure 7-6. Roles and responsibilities of key management staff

The INTERA Team will monitor project progress using the same procedures that have enabled us to meet scheduled deliverables on other TWDB projects. Monthly status reports, including technical information regarding progress on the study of brackish groundwater in the Rustler Aquifer in the preceding month, will be provided to TWDB. The monthly report will also summarize project progress relative to the schedule. Cost summaries, by task and subconsultant will be provided to the TWDB with our monthly invoices. These cost summaries will show costs relative to budget. Monthly project reports will be used as a means of documenting issues, either technical or programmatic, which require consultation with the TWDB. Coordination with TWDB staff will be critical throughout the project. The SOW specifies meetings with the TWDB at various phases of the project. Important project points where these meetings will be held include project initiation, after our methodology for determining water quality based on geophysical well logs has been finalized, after we have identified PPAs, and at project completion. In addition, we anticipate regular communications with the TWDB's Project Manager and other TWDB staff during the project. These additional meetings will be held either in person, through a webinar, or teleconference. INTERA's Austin office, located approximately five miles from the TWDB office, will facilitate communication throughout the project.

At INTERA, project management and control functions are carried out in accordance with a well-established system. Our Project Managers use Axiom's Ajera Complete, a computer-based project control system that integrates time keeping, accounting, and accounts receivable. The Project Manager can monitor project hours and charges in real time since the system updates with every hour added on a time sheet (time is entered on a daily basis). This system provides for detailed tracking of resources and schedules and allows early identification of problem areas so that any required corrective measures can be applied in a timely manner. A key component to our management and control plan is the development of a detailed task plan. As discussed in section 7.1 of our SOQ, we have divided the Rustler Aquifer study scope of work into seven primary tasks. These tasks are divided into subtasks that further break out the work scope. Our Project Manager will establish the budget for each task, and assign each element of work an appropriate task code designation. The Project Manager will monitor the performance of each work element and will prepare monthly progress reports. These reports will provide various levels of information for each task, as well as for the entire project. This includes personnel hours and direct costs charged to date, current estimates to complete the project, and a comparison of the current estimated total with the previously established budget.

The INTERA Team's proposed project schedule for completing the study of brackish groundwater in the Rustler Aquifer is shown in **Figure 7-7** on the next page. As the schedule shows, the model will be completed over the course of seven months from contract award. For purposes of developing our schedule and timeline, we are assuming a start date of February 1, 2016. In accordance with the schedule requirements defined in the RFP, the project end date is August 31, 2016. **Table 7-1** provides a breakdown of the percent of effort to be expended for each task along with a labor hour breakdown for each of the INTERA Team companies and consultants.

7.4 Reports and Deliverables

Table 7-1. Estimate of Labor Hours by Task and Team Member

PROJECT TASK	% of Effort by Task	Labor Hours by INTERA Team Member						
		INTERA	Jack Sharp	Dennis Powers	Carlos Torres-Verdin	Carollo Engineers	Drilling info	The Subsurface Library
1.0 Project Management (includes Project Initiation, Project Completion, and Stakeholder Meetings)	9%	133	–	–	–	–	–	–
2.0 Delineate Vertical and Horizontal Extent of Fresh, Brackish, and Saline Groundwater	50%	192	7	152	192	–	115	38
3.0 Quantify Volume of Fresh, Brackish, and Saline Groundwater	7%	100	–	–	–	–	–	–
4.0 Delineate Potential Production Areas	9%	115	–	–	–	20	–	–
5.0 Determine Availability of Brackish Groundwater in Potential Production Areas	15%	231	–	–	–	–	–	–
6.0 Final Report, Documentation, and Technology Transfer	10%	133	16	–	–	–	–	–
TOTAL	100%	904	23	152	192	20	115	38

Because the study of brackish groundwater in the Rustler Aquifer will support planners and decision makers in better formulating water management strategies for the resource, the thorough documentation of the study data, the methods used to generate the data, and the data analyses results is critical to ensuring it is scientifically-defensible. All documentation for the study will be prepared in a manner consistent with the format and content specified by TWDB in Section III – Deliverables of the RFQ (pages 7-8). Reports will include a draft report documenting the techniques and approaches used for geophysical well log interpretation of aquifer TDS concentration, and a final technical report summarizing the results of the study. Deliverables will include updated data for the BRACS Database containing all new well records used in the project, three-dimensional GIS datasets that delineate groundwater salinity zones, and three-dimensional GIS datasets that delineate PPAs and the estimated volumes of brackish groundwater production in 30- and 50-year timeframes. All geophysical well logs

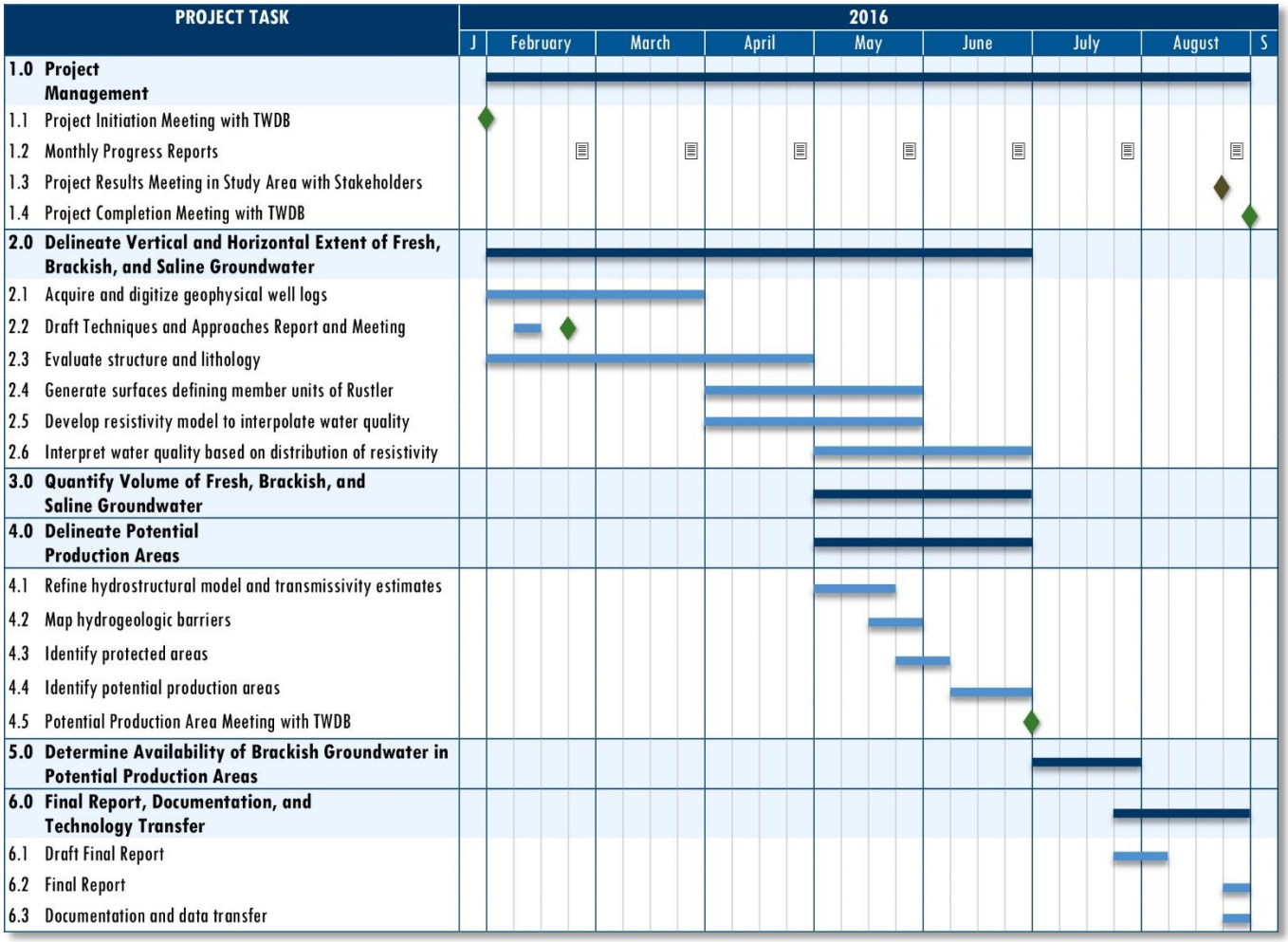


Figure 7-7. Schedule for completing the study of brackish groundwater in the Rustler

interpreted for TDS and all interpretation data values will be documented in table(s) with links to attributes in a Microsoft Access database format that can be linked to existing BRACS Database tables. Having produced dozens of draft and final reports associated with our work on other hydrogeological studies and GAM projects for the TWDB, INTERA is intimately familiar with the BRACS and other program contract data requirements, including GIS data and map projection standards, BRACS database standards, and well report and geophysical well log file naming and organization standards. Reports will be delivered in both Microsoft Word and PDF formats.

ATTACHMENT A: Commitment Letters

INTERA
GEOSCIENCE & ENGINEERING SOLUTIONS

ATTACHMENT A:
Commitment Letters

ATTACHMENT A –

Commitment Letters

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October 29, 2015

Erika Mancha
Team Lead, Innovative Water Technologies
Texas Water Development Board
P.O. Box 13231, 1700 N. Congress Ave.
Austin, TX 78711-3231

RE: Commitment to Provide Geophysical Logs for Studies of Brackish Aquifers in Texas

Dear Ms. Mancha,

In reference to the Texas Water Development Board's (TWDB) Request for Qualifications (RFQ) to Study Brackish Aquifers in Texas, and specifically the Gulf Coast, Rustler, and Trinity Aquifers, Drillinginfo, Inc. (Drillinginfo) is participating as a member of the INTERA Incorporated (INTERA) team that is submitting a proposal to complete the studies of these aquifers. As you may know, Drillinginfo possesses one of the largest private geophysical log libraries in Texas and New Mexico, and we commercially distribute these logs primarily to the oil and gas industry. Should the INTERA team be selected, Drillinginfo will support the study in a consulting role by locating, assembling, and supplying specific logs that will prove useful in delineating water quality throughout these aquifers.

After being acquired as part of the study, at our standard cost of $20 per log raster file plus applicable research fees, we have agreed to release the logs to the TWDB upon completion of the project. This will enable compliance with the requirement, as identified under the Project Deliverable section of the RFP, that "Geophysical well log data obtained for the project must be non-confidential and submitted in a Tagged Image Format (TIFF) and, if available, Log ASCII Standard (LAS) format."

Drillinginfo recognizes the importance of developing and managing groundwater resources in an informed manner. We believe that offering these logs, or portions of the logs that include the aquifers of interest, from our private database is an excellent way for us to contribute towards gaining a better understanding of the groundwater resources in Texas. Should you have any questions, please do not hesitate to contact me at (512) 477-9200 or by email at agilmer@drillinginfo.com.

Sincerely,

Allen Gilmer, CEO

Drillinginfo, Inc.

THE SUBSURFACE LIBRARY

MIDLAND AUSTIN

November 2, 2015

Erika Mancha
Team Lead, Innovative Water Technologies
Texas Water Development Board
P.O. Box 13231, 1700 N. Congress Ave.
Austin, TX 78711-3231

RE: Commitment to Provide Geophysical Logs for Studies of Brackish Aquifers in Texas

Dear Ms. Mancha,

In reference to the Texas Water Development Board's (TWDB) Request for Qualifications (RFQ) to Study Brackish Aquifers in Texas, and specifically the Gulf Coast, Rustler, and Trinity Aquifers, Subsurface Library is participating as a member of the INTERA Incorporated (INTERA) team that is submitting proposals to complete the studies of these aquifers.

The Subsurface Library has offices in Austin and Midland Texas and has recently celebrated its 50th anniversary. The Subsurface Library has access to over 1 million well logs and has reciprocity with eleven other log libraries in Texas and Oklahoma. Should the INTERA team be selected, the Subsurface Library will support the study in a consulting role by locating, assembling, and supplying specific logs that will prove useful in delineating water quality and hydrogeological barriers throughout these aquifers. The logs used for this project will be redacted by cutting the log information off at the base of the groundwater aquifer of interest. The redacted logs that the Subsurface Library provides to the project will be released to the TWDB and the general public upon the completion of the project.

The Subsurface Library recognizes the importance of developing and managing our natural resources with appropriate information and science and look forward to assisting Texas to improve the characterization of its brackish groundwater. Should you have any questions, please do not hesitate to contact me at (512)-773-5053 or by email at austin@subsurface.info.

Sincerely,

Ann Leist

The Subsurface Library

CC:/ Steven Young, INTERA

600 WEST OHIO AVE. MIDLAND, TX 79701 (432) 683-5588 FAX (432) 683-4718
MAILING ADDRESS: P.O. BOX 2538 MIDLAND, TX 79702-2538
AUSTIN, TX OFFICE (512) 773-5063 FAX (512) 471-7227

ATTACHMENT B: Cited References

INTERA
GEOSCIENCE & ENGINEERING SOLUTIONS

ATTACHMENT B: Cited References

ATTACHMENT B –

Cited Literature References

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Texas Water Development Board

REQUEST FOR QUALIFICATIONS NO. 580-16-RFQ0008

FOR

SERVICES ASSOCIATED TO STUDY BRACKISH AQUIFERS IN TEXAS

Class-Item Code(s): 918/55, 926/52

RESPONSES DUE:

NOVEMBER 24, 2015 12:00 PM

PLEASE NOTE:

This Request for Qualifications No. 580-16-RFQ0008 is revised and supersedes Request for Qualification No. 580-16-RFQ0007 and any other documents.

Texas Water Development Board
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SECTION I - OVERVIEW

1.1 OVERVIEW

The Texas Water Development Board (TWDB) request responses to this Request for Qualifications (RFQ) for the award of Services Contract(s) to conduct studies on six (6) Brackish Aquifers in Texas (hereafter referred to as "Project"). This RFQ is part of a requirement of House Bill 30, 84th Texas Legislative Session, for the TWDB to identify and designate brackish groundwater production zones in the aquifers of the state.

NOTE: Separate Statement of Qualifications (SOQ) is required to be submitted for each of the six (6) Projects as identified in Section II.

1.2 CONTRACT TERM

Service for each Project shall begin upon execution of the Contract. The completion date for three (3) of the Projects shall be August 31, 2016; and the remaining three (3) Projects shall be completed by August 31, 2017. Contract extensions for the studies will NOT be granted. The completion dates are identified in each Project.

NOTE: TWDB reserves the right to award each Project separately.

1.3 COMPENSATION

To be negotiated once the TWDB selects respondent(s) based on qualifications. Failure to arrive at mutually agreeable terms of a contract with the most qualified respondent shall constitute a rejection of the TWDB's offer and may result in subsequent negotiations with the next most qualified respondent. The TWDB reserves the right to reject any or all responses.

1.4 BACKGROUND

Planners and decision makers need reliable estimates of available fresh, brackish, and saline groundwater to better formulate water management strategies. Currently, the basis for determining the amount of brackish groundwater in Texas is decades-old data generated during a 2003 TWDB-funded study (LBG-Guyton, 2003, contract number 2001483395). The study helped lay the foundation for estimating brackish groundwater volumes in the state and documented that brackish groundwater is a tremendous asset in the state's water portfolio. However, the study was by design regional in scope, limited in areal extent, and narrow in its assessment of groundwater quality.

In 2009, the 81st Texas Legislature approved funding to establish the Brackish Resources Aquifer Characterization System (BRACS) program. The goal of the program is to map and characterize the brackish portions of the aquifers in Texas in sufficient detail to provide useful information and data to regional water planning groups and other entities interested in using brackish groundwater for desalination supplies. Since 2009, TWDB has completed three studies: the Pecos Valley Aquifer in West Texas (TWDB Report 382), Gulf Coast Aquifer in a four-county area in the Lower Rio Grande Valley (TWDB Report 383), and the Queen City and Sparta aquifers in part of a two-county area in south-central Texas (TWDB Technical Note 14-1). The TWDB also has two ongoing studies: the Carrizo-Wilcox Aquifer in a nine-county area in south-

central Texas scheduled for completion in spring 2016 and the Lipan Aquifer in a six-county area in West Texas scheduled for completion in summer 2016.

In 2015, the 84th Texas Legislature passed House Bill 30, directing the TWDB to conduct studies on and report to the legislature on a) four aquifers by December 1, 2016 and b) remaining aquifers in the state by December 1, 2022. This RFQ is for the Projects that require the TWDB to submit a report to the Texas Legislature by December 1, 2016, as well as additional studies. The Projects will also support implementation of House Bill 1232, (84th Texas Legislative Session), which requires mapping of confined and unconfined aquifers in the state by the TWDB.

SECTION II – STATEMENT OF WORK

2.1 DESCRIPTION OF SERVICES

The selected Contractor(s) will provide services, which shall include, but are not limited to, the requirements contained in this RFQ. Services set forth that contain the words "must" or "shall" are mandatory and must be provided as specified with no alterations, modifications or exceptions. Services set forth that contain the words "may" or "can" allow Respondents to offer alternatives to the manner in which the Services are provided. The selected Contractor(s) will provide assistance to the TWDB for activities described below for one or more of the Projects stated within this RFQ.

2.2 SCOPE OF WORK

General Requirements and Resource(s) for all six (6) Projects

To fulfill part of the requirements of House Bill 30, 84th Texas Legislature, 2015, the TWDB is requesting the Contractor to perform the following:

A. Delineate fresh, brackish, and saline groundwater both vertically and horizontally in the aquifers of the Project areas listed under The Projects.

B. Use the groundwater salinity classification developed by the U.S. Geological Survey (Winslow and Kister, 1956) to categorize the water delineated. The classification is based on the concentration of total dissolved solids (milligrams per liter) in water and includes the following: fresh (0 to 1,000); slightly saline (1,000 to 3,000); moderately saline (3,000 to 10,000); and very saline (10,000 to 35,000).

C. Quantify the volume of available fresh, brackish, and saline groundwater.

D. Delineate potential production areas that are separated by hydrogeologic barriers sufficient to prevent significant impacts to water availability or water quality in any part of the same or other fresh water aquifers. These potential production areas cannot include (a) an aquifer with an average total dissolved solids concentration of more than 1,000 milligrams per liter and which is serving as a significant source of water supply for municipal, domestic, or agricultural purposes, (b) a part of a geologic stratum that is designated or used for wastewater injection through the use of injection or disposal wells permitted under Texas Water Code Chapter 27, and/or (c) areas within the Harris-Galveston Subsidence District and the Fort Bend Subsidence District.

E. Meet with TWDB staff to discuss Contractor recommendations of potential production areas and develop a prioritized list of these areas for item 2.2G.

F. Meet with stakeholders to (1) explain TWDB's approach in implementing House Bill 30, (2) solicit feedback on what constitutes "significant impact", and (3) receive general comments concerning implementation of the legislation. *NOTE: Contractor(s) will not be making recommendations to the TWDB to designate brackish groundwater production zones; only the TWDB Executive Administrator will make these recommendations.*

G. Determine the volume of brackish groundwater that the potential production areas are capable of producing over a 30-year and a 50-year period without causing significant impact to water quality and quantity as described in item 2.2D.

H. **Resources**: The BRACS Database was developed to store and analyze well data for the completed BRACS studies. TWDB Open-File Report 12-02, Second Edition is a data dictionary for the BRACS Database. It describes the data objects or items in the database for the benefit of the user. In addition, previous and ongoing studies of the Groundwater Availability Modeling program have direct applicability to BRACS studies.

I. **Project Monitoring:** *At a minimum*, TWDB expects to meet with the Project Team (Contractor Meeting) four (4) times during the Project and conduct at least two (2) stakeholder meetings.

J. **Contractor Meetings shall include but not limited to:**
   1) Project initiation; the beginning of the Project.
   2) Discussion and approval of Project methodology; date to be determined by the Contractor.
   3) Discussion of potential production areas and prioritization for production calculations; date to be determined by the Contractor.
   4) Project completion; the end of the Project.

K. Additional technical meetings may be scheduled either in person, through a webinar, or teleconference venue to discuss Project progress and issues. TWDB staff may periodically visit the Contractor's work premises to assess progress on the Project.

L. Detailed monthly progress reports must be submitted to the TWDB outlining progress of the Project and include the original or adjusted schedule and detail how the Project is progressing relative to this yardstick. Project invoices cannot be processed without detailed descriptions of the progress made by tasks. Each of the Project tasks must be described in detail consistent with the budget description. The TWDB expects issues to be reported to the TWDB Project Manager immediately as they appear. Maintaining close coordination with TWDB throughout the Project will be critical.

M. A draft report documenting the technique(s) and approaches selected by the Contractor for geophysical well log interpretation of aquifer total dissolved solids concentration shall

be given to TWDB for review at a date determined by the Contractor. The report shall include information on the types of geophysical well logs available in the Project area, how the interpreted total dissolved solids concentration from geophysical well log analysis relates to existing aquifer water chemistry as determined by direct measurements (including specific examples), how the log correction factors are determined, and how the interpretation techniques will be applied across the entire salinity range within the aquifer. TWDB will have up to 10 business days to review the draft report, and the Contractor will schedule a meeting to discuss the techniques.

N. A meeting to discuss the potential production areas, at a date determined by the Contractor, shall be made prior to the end of the Project. Potential production areas will be prioritized for 30-year and 50-year pumping estimate task with input from stakeholders.

O. A formal presentation on the results of the Project shall be made to TWDB at the end of each Project.

P. **Stakeholder Meetings include but not limited to the following:**
1) For each Project, formal stakeholder meetings shall be scheduled and held.
2) The first general meeting was held October 26, 2015 from 10:00 am – 12:00pm in room 170 of the Stephen F. Austin Building in Austin, Texas. The general meeting was to explain TWDB's approach in implementing House Bill 30; solicit feedback on what constitutes "significant impact", and; receive general comments concerning implementation of the legislation.
3) The second meeting will be held at the end of the Project in the study area to provide information on the results of the Project and to solicit input on the potential production areas.

Q. TWDB will organize the meetings and invite stakeholders including at a minimum all the groundwater conservation districts within the Project area. The contractor will attend and make a presentation at the second stakeholder meeting.

R. Any meetings and/or conference calls will be held on regular business days (M - F) during regular business hours (8:00 am – 5:00 pm CT) upon agreed dates and times.

2.3 BRACKISH AQUIFERS

Project No. 1
Project Name: Gulf Coast Aquifer
Project Area: Gulf Coast Aquifer and adjacent strata (Catahoula Formation) that extend from the Texas-Louisiana border to the southern county lines of Brooks, Jim Hogg, and Kenedy counties and from the outcrop areas of these aquifers to the Gulf of Mexico.
Project Timeline: This Project must be completed no later than August 31, 2016. Contract extensions will not be granted.
Additional resources:

"Hydrogeochemical evaluation of the Texas Gulf Coast Aquifer system and implications for developing groundwater availability models" (Young and others, 2014, TWDB contract 1148301233),
"Updating the hydrogeologic framework for the northern portion of the Gulf Coast Aquifer" (Young and others, 2012, TWDB contract 1004831113),
"Hydrostratigraphy of the Gulf Coast Aquifer from the Brazos River to the Rio Grande" (Young and others, 2010 TWDB contract 0804830795),
"Groundwater resource evaluation and availability model of the Gulf Coast Aquifer in the Lower Rio Grande Valley of Texas" (Chowdhury and Mace, 2007, TWDB Report 368),
"Groundwater availability model of the central Gulf Coast Aquifer system: numerical simulations through 1999" (Chowdhury and others, 2004),
"Hydrogeology and simulation of groundwater flow and land-surface subsidence in the northern part of the Gulf Coast Aquifer system, Texas, 1891-2009" (Kasmarek, 2013, U.S. Geological Survey Scientific Investigations Report 2012-5154),
An alternative model "Groundwater management area 16 groundwater flow model" (Hutchison and others, 2011) was prepared for the Gulf Coast Aquifer.

TWDB is working on a groundwater model for the Gulf Coast Aquifer in groundwater management areas 15 and 16 scheduled for completion in December 2016.

Project No. 2
Project Name: Blaine Aquifer
Project Area: Blaine Aquifer, extent defined by the TWDB
Project Timeline: This Project must be completed no later than August 31, 2016. Contract extensions will not be granted.
Additional resources: "Groundwater availability model for the Seymour Aquifer" (Ewing and others, 2004, TWDB contract) that includes Permian formations in layer 2.

Project No. 3
Project Name: Rustler Aquifer
Project Area: Rustler Aquifer, extent defined by the TWDB
Project Timeline: This Project must be completed no later than August 31, 2016. Contract extensions will not be granted.
Additional resources: "Groundwater availability model report for the Rustler Aquifer" (Ewing and others, 2012 TWDB contract 0904831000)

Project No. 4
Project Name: Trinity Aquifer
Project Area: The northern and southern extent of Trinity Aquifer defined by the TWDB downdip until the total dissolved solids concentration in the aquifer transitions to at least 10,000 milligrams per liter.
Project Timeline: This Project must be completed no later than August 31, 2017. Contract extensions will not be granted.
Additional Resources:
"Updated groundwater availability model of the northern Trinity and Woodbine Aquifers" (Kelley and others, 2014),

"Groundwater availability model for the Hill Country portion of the Trinity Aquifer System, Texas" (Jones and others, 2009), and
"Northern Trinity/Woodbine aquifer groundwater availability model" (R.W. Harden and Associates and others, 2004, TWDB contract 2003483483)

Project No. 5
Project Name: Blossom Aquifer
Project Area: Blossom Aquifer extent defined by the TWDB downdip until the groundwater total dissolved solids concentration transitions to at least 10,000 milligrams per liter.
Project Timeline: This Project must be completed no later than August 31, 2017. Contract extensions will not be granted.
Additional Resources: TWDB Report 307

Project No. 6
Project Name: Nacatoch Aquifer
Project Area: Nacatoch Aquifer extent defined by the TWDB downdip until the groundwater total dissolved solids concentration transitions to at least 10,000 milligrams per liter.
Project Timeline: This Project must be completed no later than August 31, 2017. Contract extensions will not be granted.
Additional Resources: "Nacatoch Aquifer groundwater availability model" (Beach and others, 2009, TWDB contract 0604830588).

2.4 RESPONSE REQUIREMENTS FOP EVALUATION

Respondents to this RFQ are required to indicate in Section 4.1.B(7)(d) of their response their abilities in the areas listed below (A-L). Please include years of experience, educational degrees and any professional certifications.

A. General hydrogeology;
B. Hydrogeology of the Project aquifer;
C. Interpreting and using geophysical well logs, as applicable to the Project;
D. Using data from TWDB Groundwater Availability Modeling Projects and other TWDB-contracted studies in the Project area;
E. Groundwater modeling in order to evaluate potential production areas;
F. Geographic Information System (GIS) files, use, and metadata documentation;
G. Communicating with the public;
H. Technology transfer;
I. Producing high-quality technical reports;
J. Using the TWDB BRACS and Groundwater databases;
K. Contract management including the ability to meet short and strict deadlines within budget; and
L. Demonstrate their ability to meet Project completion deadlines since there will be no contract extensions.

SECTION III – DELIVERABLES

3.1 CONTRACT DELIVERABLES

The Contractor shall deliver the following items to the TWDB on the date determined by each Project:

A. Updated data for the BRACS Database containing all new well records used in the Project.

B. Copies of water well reports, water quality reports, and geophysical well logs used in the study (unless those reports and logs already exist in the TWDB Groundwater or BRACS databases).

C. Three-dimensional GIS datasets that delineate groundwater salinity zones using ranges of concentrations of total dissolved solids of 0 to 1,000 milligrams per liter (fresh), 1,000 to 3,000 milligrams per liter (slightly saline), 3,000 to 10,000 milligrams per liter (moderately saline), and 10,000 to 35,000 milligrams per liter (very saline).

D. Three-dimensional GIS datasets that delineate potential production areas and the estimated volumes of brackish groundwater production in 30- and 50-year timeframes.

E. A technical report summarizing the study.

F. All geophysical well logs interpreted for total dissolved solids will be submitted to TWDB and all interpretation data values (input and output) will be documented in table(s) with links to well numbers, log numbers, depths, and names of geological formations in a Microsoft Access database format that can be linked to existing BRACS Database tables. Geophysical well log data obtained for the Project must be non-confidential and submitted in a Tagged Image Format (TIFF) and, if available, Log ASCII Standard (LAS) format. New well control will be added to the BRACS Database with complete attributes. Water quality data will be compatible with the Groundwater Database table design and should include the source of the data.

G. To develop new and updated maps of the water resources, the Project should use current information from a variety of non-proprietary databases and geophysical log repositories that are publicly available.

H. The tools and techniques used for determining the extent and volumes of the required ranges of total dissolved solids in the groundwater shall be thorough, use defensible scientific means and approaches, and shall be documented in the technical report. The technique(s) used to determine if a potential production area is hydrogeologically separated from fresh water aquifers shall be thoroughly documented in the technical report. Each potential production area will be assigned a unique ID, and all production area attributes (ID, volume of brackish groundwater subdivided by salinity classification zones, 30-year and 50-year production calculation estimates) will be recorded in a

Microsoft Access database table, in supporting GIS files (top, bottom, and lateral extent), and in groundwater modeling files.

I. The calculated volumes of groundwater within each aquifer and each TWDB-prioritized potential production area will be organized by salinity classification zone, county, groundwater conservation district, and groundwater management area. All GIS data shall be thoroughly documented with metadata including source, field descriptions, and units (as applicable) and use BRACS program-naming conventions and map Projection parameters. Geologic formation top and bottom raster surfaces, net sand raster maps, salinity classification zone top and bottom raster surfaces, proposed production area top and bottom raster surfaces, well control point files, and Project raster snap grid will be submitted to TWDB. All raster surfaces will share the same map Projection and snap grid attributes. TWDB must be able to replicate the volumes estimated and techniques used to determine the extents of each of the salinity classification zones. All potential production area modeling files will be submitted to TWDB.

J. Training for TWDB staff shall be provided, as needed or requested. Training may include, but not limited to how the volumes were estimated and the techniques used to determine the extents of salinity zones.

K. All draft and final reports shall be delivered in Microsoft Word and PDF formats. Draft deliverables will be submitted for review and comment by TWDB. These comments must be addressed in the Final Report and a copy of the comments must be incorporated into the final deliverables. Acceptance of the Final Report indicates the successful completion of the Project.

L. The BRACS program contract data requirements are available on the TWDB website at http://www.twdb.texas.gov/innovativewater/bracs/projects.asp and include information on GIS data and map Projection standards, BRACS Database standards, well report and geophysical well log file naming and organization standards, and other useful information.

SECTION IV – GENERAL INFORMATION

4.1 SOQ REQUIREMENTS

A. **SUBMISSIONS**: The Respondent shall submit one (1) original and six (6) double-sided, single-spaced copies of their SOQ on and one electronic copy for *each Project*; please indicate the Project No. on each response as listed in Section 2.3. You can submit a response for all or one of the Projects. However, a separate response is required for each Project and MUST indicate the Project No.:

1) ORIGINAL: One (1) complete ORIGINAL response (marked Original) which shall include a copy of the RFQ solicitation document along with the SOQ contents listed in paragraph B, below for each Project. The SOQ pages should be numbered and contain an organized, paginated table of contents corresponding to the section and pages of the response.

2) ELECTRONIC: One Portable Document Format files of the submission on a CD/DVD or USB drive.
3) Response may be tab indexed.
4) Responses must be delivered to the address noted in the RFQ.
5) Responses must be clearly marked **RESPONSE TO RFQ 580-16-RFQ0008**.
6) Responses must be complete and comprehensive.

B. **CONTENTS**: The Respondent shall submit all information listed below, in the order given, separated by labeled and tabbed sheets, as the response to this RFQ. The SOQ will only be considered if all items are submitted as required. Incomplete/late responses to this RFQ will not be considered. NOTE: Since there are six (6) Projects, a separate response for each Project is required and the Project No. MUST be indicated. ***You may make copies of any attachments and/or forms in the RFQ for submission purpose ONLY.***

1) Section 1: Signed/dated Execution of Response to the Request for Qualifications (SECTION 1)
2) Section 2: Company Profile Summary and History, two (2) pages maximum. Response should include the following:
   a. Legal company name, address, phone number, and legal status (corporation, partnership, joint venture, sole proprietorship)
   b. Legal name of each participant/potential user(s), their possible involvement with the Project, their phone number, and email address. Also include the contact person(s) information should questions come up regarding the response.
   c. Name, title, phone number and email address of person submitting the response with the authority to bind the company.
   d. Describe the general nature of previous work, the number of years in business, size and scope of operation.
3) Section 3: Company References - Provide references from a minimum of three (3) customers to whom the Respondent has provided services in the past 36 months similar to the scope of work described in this specification.
4) Section 4: Resumes of Individuals - Submit qualifications and experience of Project staff that will be directly involved, at any level, with this Project. ***PLEASE NOTE: Resumes do not count towards the two page maximum listed in Section 2.***
5) Section 5: Historically Underutilized Businesses Subcontracting Plan and applicable forms.
6) Section 6: Name(s) and Social Security Number(s) of Each Person with at least 25 Percent Ownership of the Business Entity submitting the RFQ (if applicable).
7) Section 7: Scope of Work - A detailed Scope of Work (SOW) describing the following:
   a. Each task, a percent of effort per each task, a proposed time schedule for each task, and the amount of time each team member will spend on the Project. This SOW shall not exceed 20 pages, using Times New Roman 12 font.

b. A description of project-monitoring procedures; In addition, the contractor should demonstrate they are able to meet project completion deadlines since there will be no contract extensions.
c. A description of the project deliverables (reports, plans, or other products that the Board will receive;
d. Indicate abilities as listed in Section 2.4(A-L).

4.2 RESPONSE COSTS

Respondents are responsible for all costs in the preparation and delivery of their response to this RFQ to TWDB.

4.3 TRAVEL EXPENSES

This contract may include travel throughout the State of Texas to perform the tasks therein. Any and all travel expenses shall be in accordance with the state travel and per diem allowances detailed at https://fmx.cpa.state.tx.us/fmx/travel/index.php.

4.4 MEETINGS

Any meetings and/or conference calls will be held on regular business days (M - F) during regular business hours (8:00 am – 5:00 pm CT) upon agreed dates and times.

4.5 SCHEDULE OF EVENTS:

The solicitation process for this RFQ will proceed according to the following schedule:

EVENT	DATE (Central Time)
Issue Request for Qualifications	Tuesday, November 10, 2015
Deadline for Submission of SOW	Tuesday, November 24, 2015 12:00 pm
Expected Date of Award of Contract	January, 2016
Expected Contract Start Date	January, 2016

4.6 REVISIONS TO SCHEDULE

TWDB reserves the right to change the dates in the Schedule of Events above upon written notification to prospective Respondent(s) as an addendum posted on the Electronic State Business Daily.

4.7 INQUIRIES

A. All inquiries shall be submitted in writing to the attention of TWDB Contract Administration Staff via e-mail to contracts@twdb.texas.gov.

B. Except as otherwise provided in this Section, upon issuance of this RFQ, other employees and representatives of TWDB will not answer questions or otherwise discuss the contents of this RFQ with any potential Respondent or its representatives. Failure to observe this restriction may result in disqualification of any subsequent RFQ. This restriction does not preclude discussions unrelated to this RFQ.

4.8 RESPONSE SUBMISSION

A. All responses must be received and date stamped by TWDB by the deadline listed in the Schedule of Events above. TWDB will NOT accept late submittals.

B. Responses should be placed in a separate envelope or package and correctly identified with the RFQ number and submittal deadline/RFQ opening date and time. It is Respondent's responsibility to appropriately mark and deliver this response to TWDB by the specified date.

C. Telephone, facsimile or emailed responses will not be accepted.

D. Receipt of all addenda, if applicable, to this response should be acknowledged by returning a signed copy of each addendum with the submitted response**.**

NOTE: Failure to return the required items with the response will result in rejection of your Response. TWDB will not be responsible for locating or securing information that is not included in your Response.

4.9 DELIVERY OF SUBMISSION

Responses may be submitted to TWDB by one of the following methods:

U.S. Postal Service
Texas Water Development Board
Contracting & Purchasing
P.O. Box 13231
Austin, TX 78711-3231

Overnight/Express Mail or Hand Delivery
Texas Water Development Board
1700 North Congress Avenue, 6th Floor
Austin, TX 78701
Hours: 8:00 am to 5:00 pm (CT)

4.10 OPENING

Responses will be opened at 1700 North Congress Avenue, 6th Floor, Austin, TX, at the submittal deadline. Only Respondent's names will be read.

All submitted response's become the property of TWDB after the submittal deadline/opening date. Responses submitted shall constitute an offer for a period of ninety (90) days or until selection is made by TWDB, whichever occurs first.

4.11 EVALUATION AND AWARD

A. TWDB shall award a Contract to the vendor whose response is most qualified to perform the Statement of Work for the State of Texas.

B. A committee will be established by TWDB (including TWDB employees) to evaluate the responses.

C. The evaluation applies to ***each*** Project, which will be evaluated separately. ***TWDB reserves the right to award each Project separately***.

The evaluation committee will determine best value by applying the following criteria:

Points Available	Evaluation Criteria
0 – 70	Qualifications and Experience
0 – 90	Technical Approach
0 – 40	Project Organization and Management
0 – 30	Reports and Deliverables
0 – 20	Feasible Approach
250	**Total Points Possible**

D. TWDB may, at its discretion, elect to have Respondents provide oral presentations and respond to inquiries from the evaluation committee related to their SOQ.

E. Past Performance: A Respondent's past performance will be measured based upon pass/fail criteria, in compliance with applicable provisions of §2155.074, 2155.075, 2156.007, 2157.003, and 2157.125, Gov't Code. Respondents may fail this selection criterion for any of the following conditions:

1) A score of less than 90% in the Vendor Performance System;
2) Currently under a Corrective Action Plan through the CPA;
3) Having repeated negative Vendor Performance Reports for the same reason; or
4) Having purchase orders that have been cancelled in the previous 12 months for non-performance (i.e. late delivery, etc.).

Contractor performance information is located on the CPA web site at: http://comptroller.texas.gov/procurement/prog/vendor_performance/

SECTION V – GENERAL TERMS AND CONDITIONS

5.1 GENERAL TERMS

Any Contract awarded as a result of this RFQ will contain the general terms and conditions provided in this document. Subcontractors must also comply. In addition, any Contract awarded as a result of this RFQ shall be governed, construed, and interpreted under the laws of the State of Texas. The factors listed in Texas Government Code, Title 10, Subtitle D, Section 2155.074, 2155.144, 2156.007, and 2157.003 shall also be considered in making an award when specified. Any legal actions must be filed in Travis County, Texas.

5.2 PATENTS OR COPYRIGHTS

The Contractor agrees to protect the State and TWDB from claims involving infringement of patents or copyrights. TWDB will not consider any RFQ that bears a copyright. RFQ will be subject to the Texas Public Information Act, Texas Government Code, Chapter 552, and may be disclosed to the public upon request. Subject to the Act, Respondents may protect trade and confidential information from public release. Trade secrets or other confidential information,

submitted as part of a RFQ, shall be clearly marked at each page it appears. Such marking shall be in **boldface type at least 14 point font.**

5.3 CONTRACTOR ASSIGNMENTS

Respondent hereby assigns to TWDB any and all claims for overcharges associated with this Contract arising under the antitrust laws of the United States 15 U.S.C.A. Section 1, et seq. (1973), and the antitrust laws of the State of Texas, TEX. Bus. & Comm. Code Ann. Sec. 15.01, et seq. (1967).

5.4 HISTORICALLY UNDERUTILIZED BUSINESSES SUBCONTRACTING PLAN

It is the policy of TWDB to make a good faith effort to achieve the annual program goals by contracting directly with Historically Underutilized Businesses (HUBs) or indirectly through subcontracting opportunities in accordance with the Texas Government Code, Chapter 2161, Subchapter F, and HUB Rules promulgated by the Comptroller of Public Accounts (CPA), 34 TAC, Chapter 20.

HUBs are strongly urged to respond to this RFQ. Under Texas law, state agencies are required to make a good faith effort to assist HUBs in receiving certain percentages of the total value of contract awards. Vendors who meet the qualifications are strongly encouraged to apply for certification as HUBs.

TWDB has determined that subcontracting is probable under any Contract awarded as a result of this RFQ. ALL VENDORS RESPONDING TO THIS RFQ, INCLUDING THOSE THAT ARE HUB CERTIFIED OR THOSE WHO DO NOT PLAN TO SUBCONTRACT, MUST COMPLETE A HUB SUBCONTRACTING PLAN (HSP) IN ACCORDANCE WITH THE STATE'S POLICY ON UTILIZATION OF HUBs. THE HSP MUST BE INCLUDED AS PART OF THE RFQ TO THIS RFQ. FAILURE TO COMPLETE THE HSP AS INSTRUCTED MAY RESULT IN DISQUALIFICATION OF THE RFQ FROM CONSIDERATION. Please review the HSP forms carefully and allow sufficient time to identify and contact HUBs and allow them to respond. Note that Vendors must demonstrate a good faith effort to contract with new HUBs if currently proposed HUBs have performed as subcontractors to the Vendor for more than five (5) years. If the Vendor does not plan to subcontract, Vendor must state that fact in their plan. An original, signed paper copy of the HSP must be submitted in an envelope that is separate from the rest of the RFQ. The completed plan shall become a part of the contract that may be awarded as a result of this RFQ.

5.5 HUB CONTINUING PERFORMANCE

Any Contract(s) awarded as a result of this RFQ shall include reporting responsibilities related to HUB subcontracting. Awarded Vendors may not change any subcontractor without submitting a revised HUB Subcontracting Plan (HSP) to TWDB. Any change to a subcontractor and revised HSP must be approved in writing by TWDB prior to implementation.

5.6 HUB RESOURCES AVAILABLE

A list of certified HUBs is available on the Texas Comptroller of Public Accounts (CPA) Web site at: http://www.window.state.tx.us/procurement/cmbl/hubonly.html. For additional information, contact the CPA's HUB program office at Texas4hubs@cpa.state.tx.us. If Vendors

know of any businesses that may qualify for certification as a HUB, they should encourage those businesses to contact the CPA HUB program office.

5.7 RESPONDENT'S AFFIRMATION

Signing this response (SECTION 1 - Execution of Response to the Request for Qualifications) with a false statement is a material breach of Contract and shall void the submitted response or any resulting Contract(s), and the Respondent shall be removed from all bid lists. By signature hereon affixed on SECTION 1, the Respondent hereby certifies that:

A. The Respondent has not given, offered to give, nor intends to give at any time hereafter any economic opportunity, future employment, gift, loan, gratuity, special discount, trip, favor, or service to a public servant in connection with the submitted bid;

B. Neither the Respondent nor the firm, corporation, partnership, or institution represented by the Respondent, or anyone acting for such firm, corporation or institution has violated the antitrust laws of this State or the Federal Antitrust Laws, nor communicated directly or indirectly this RFQ made to any competitor or any other person engaged in such line of business;

C. The Respondent is not a member of the TWDB, a TWDB staff member or a member of their immediate family;

D. Pursuant to Section 2155.004, Government Code, the Respondent has not received compensation for participation in the preparation of the specifications for this RFQ;

E. Pursuant to Section 231.006 (d), Family Code, re: child support, the Respondent certifies that the individual or business entity named in this bid is not ineligible to receive the specified payment and acknowledges that this contract may be terminated and payment may be withheld if this certification is inaccurate;

F. Under Section 2155.004 Government Code, the Respondent certifies that the individual or business entity named in this RFQ or Contract is not ineligible to receive the specified Contract and acknowledges that this Contract may be terminated and payment withheld if this certification is inaccurate;

G. The Respondent shall defend, indemnify, and hold harmless the State of Texas, all of its officers, agents and employees from and against all claims, actions, suits, demands, proceedings, costs, damages, and liabilities, arising out of, connected with, or resulting from any acts or omissions of Contractor or any agent, employee, subcontractor, or supplier of Respondent in the execution or performance of this contract;

H. Respondent agrees that any payments due under this contract will be applied towards any debt, including but not limited to delinquent taxes and child support that is owed to the State of Texas;

I. Respondent certifies that they are in compliance with Section 669.003 of the Government Code, relating to contracting with executive head of a State agency. If Section 669.003 applies, the Respondent will complete the following information in order for the bid to be evaluated:

Name of Former Executive: _____
Name of State Agency: _____
Date of Separation from State Agency: _____
Position with Respondent: _____
Date of Employment with Respondent: _____

J. Respondent agrees to comply with Government Code Section 2155.4441, pertaining to service contract use of products produced in the State of Texas; and

K. Respondent understands that acceptance of funds under this contract acts as acceptance of the authority of the State Auditor's Office, or any successor agency, to conduct an audit or investigation in connection with those funds. Respondent further agrees to cooperate fully with the State Auditor's Office or its successor in the conducting of the audit or investigation, including providing all records requested. Respondent will ensure that this clause concerning the authority to audit funds received indirectly by subcontractors through Respondent and the requirement to cooperate is included in any subcontract it awards.

5.8 EXECUTIVE ORDER 13224

The TWDB is federally mandated to adhere to the directions provided in the President's Executive Order (EO) 13224, Executive Order on Terrorist Financing – Blocking Property and Prohibiting Transactions with Persons Who Commit, Threaten to Commit, or Support Terrorism, effective 9/24/2001 and any subsequent changes made to it via cross-referencing Respondents/Contractors with the Federal General Services Administration's Excluded Parties List System (EPLS, http://www.sam.gov), which is inclusive of the United States Treasury's Office of Foreign Assets Control (OFAC) Specially Designated National (SDN) list.

5.9 FAMILY CODE REQUIREMENTS

Pursuant to Section 231.006 (c), Family Code, bid must include Names and Social Security Numbers of each person with at least 25% ownership of the business entity submitting the bid. Enter Name & Social Security Numbers for each person.

5.10 ADDITIONAL TERMS

Any terms and conditions attached to this RFQ will not be considered unless specifically referred to on this RFQ and may result in disqualification of this RFQ.

5.11 DISPUTE RESOLUTION

The dispute resolution process provided for in Chapter 2260 of the Texas Government Code must be used by the TWDB and the Respondent to attempt to resolve all disputes arising under this Contract.

5.12 NON-APPROPRIATION OF FUNDS

The State's funds are contingent on the availability of lawful appropriations by the Texas Legislature. If the Texas Legislature fails to continue funding for the payments due under an order referencing this Contract, the order will terminate as of the date that the funding expires, and TWDB will have no further obligation to make any payments.

5.13 PUBLIC INFORMATION ACT

Information, documentation, and other material in connection with this solicitation or any resulting Contract may be subject to public disclosure pursuant to Chapter 552 of the Texas Government Code (the "Public Information Act"). Any part of the RFQ that is of a confidential or proprietary nature must be clearly and prominently marked as such by the Respondent.

5.14 TECHNOLOGY ACCESS CLAUSE

The Respondent expressly acknowledges that State funds may not be expended in connection with the purchase of an automated information system unless that system meets certain statutory requirements relating to accessibility by persons with visual impairments. Accordingly, the Respondent represents and warrants to the qualified ordering entity that the technology provided to the qualified ordering entity for purchase is capable, either by virtue of features included within the technology or because it is readily adaptable by use with other technology, of:

A. Providing equivalent access for effective use by both visual and non-visual means;
B. Presenting information, including prompts used for interactive communications, in formats intended for both visual and non-visual use; and
C. Being integrated into networks for obtaining, retrieving, and disseminating information used by individuals who are not blind or visually impaired.

For purposes of this clause, the phrase "equivalent access" means a substantially similar ability to communicate with or make use of the technology, either directly by features incorporated within the technology or by other reasonable means such as assistive devices or services that would constitute reasonable accommodations under the Federal Americans with Disabilities Act or similar state or federal laws. Examples of methods by which equivalent access may be provided include, but are not limited to, keyboard alternatives to mouse commands and other means of navigating graphical displays and customizable display appearance.

5.15 ETHICS

Under Section 2155.003, Government Code, an individual who interacts with public purchasers in any capacity is required to adhere to the guidelines established in Section 1.2 of the State of Texas Procurement Manual, which outlines the ethical standards required of public purchasers, employees, and bidders who interact with public purchasers in the conduct of state business, and with any opinions of or rules adopted by the Texas Ethics Commission. Entities who are interested in seeking business opportunities with the State must be mindful of these restrictions when interacting with public purchasers of TWDB or purchasers of other state agencies. Specifically, a TWDB employee may not have an interest in, or in any manner be connected with a contract or bid for a purchase of goods or services by an agency of the state; or in any manner, including by rebate or gift, accept or receive from a person to whom a contract may be awarded, directly or indirectly, anything of value or a promise, obligation, or Contract for future reward or compensation. Entities who are interested in seeking business opportunities with the State must be mindful of these restrictions when interacting with public purchasers of TWDB or purchasers of other State agencies.

5.16 FRAUD STATEMENT

Respondents understand that the TWDB does not tolerate any type of fraud. The TWDB's policy is to promote consistent, legal, and ethical organizational behavior by assigning responsibilities and providing guidelines to enforce controls. Any violations of law, agency policies, or standards of ethical conduct will be investigated, and appropriate actions will be taken. Providers are expected to report any possible fraudulent or dishonest acts, waste, or abuse to the agency's Internal Audit division at 512-463-7978 or Nicole.Campbell@twdb.texas.gov.

5.17 CONFLICT OF INTERESTS

A RFQ will not be selected if it has a conflict of interest that will or may arise during the performance of its obligations under the Contract. For this reason, the submission in response to this RFQ must disclose all business interest and all relationships that could reasonably be considered to pose possible conflicts of interest in the offer's performance of contract obligations. In addition, Offers must represent and warrant in its response to this RFQ and in the contract that in the performance of services under the contract, (1) Respondent does not have and will not have any actual or potential conflict of interest, and (2) Respondent will take whatever reasonable actions may be necessary and prudent to avoid even the appearance of impropriety.

5.18 CONTRACT ADMINISTRATION

The TWDB shall designate a Project Manager for this Contract. The Project Manager will serve as the point of contact between the TWDB and the selected Contractor. The TWDB's Project Manager shall supervise the TWDB's review of contractor's technical work, deliverables, draft reports, the final report, payment requests, schedules, financial and budget administration, and similar matters. The Project Manager does not have any express or implied authority to vary the terms of the Contract, amend the Contract in any way or waive strict performance of the terms or conditions of the Contract.

5.19 CONTRACT REVISIONS

The contract may only be revised through a contract amendment process.

5.20 VENDOR PERFORMANCE

State agencies shall report a vendor's performance on any purchase of $25,000 or more from contracts administered by the commission or any other purchase made through an agency's delegated authority or a purchase made pursuant to the authority in Government Code, Title 10, Subtitle D or a purchase exemption from CPA/TPASS procurement rules and procedures.

5.21 DEFAULT

If Contractor is found to be in default under any provision of this Contract, TWDB may cancel the Contract without notice and either re-solicit or award the contract to the next best responsive and responsible Respondent. In the event of abandonment or default, Contractor will be responsible for paying damages to TWDB including but not limited to re-procurement costs, and any consequential damages to the State of Texas or TWDB resulting from Contractor's non-performance. The defaulting Contractor will not be considered in the re-solicitation and may not be considered in future solicitations for the same type of work, unless the specification or scope of work is significantly changed.

5.22 FORCE MAJEURE

Neither Contractor nor TWDB shall be liable to the other for any delay in, or failure of performance, of any requirement included in any PO resulting from this RFP caused by force majeure. The existence of such causes of delay or failure shall extend the period of performance until after the causes of delay or failure have been removed provided the non-performing party exercises all reasonable due diligence to perform. Force majeure is defined as acts of God, war, fires, explosions, hurricanes, floods, failure of transportation, or other causes that are beyond the

reasonable control of either party and that by exercise of due foresight such party could not reasonably have been expected to avoid, and which, by the exercise of all reasonable due diligence, such party is unable to overcome. Each party must inform the other in writing, with proof of receipt, within three (3) business days of the existence of such force majeure, or otherwise waive this right as a defense.

5.23 OWNERSHIP/INTELLECTUAL PROPERTY, INCLUDING RIGHTS TO DATA, DOCUMENTS AND COMPUTER SOFTWARE

For the purposes of this Contract, the term "Work" is defined as all reports, statistical analyses, work papers, work products, materials, approaches, designs, specifications, systems, documentation, methodologies, concepts, research, materials, intellectual property or other property developed, produced, or generated in connection with this Contract. All work performed pursuant to this Contract is made the exclusive property of TWDB. All right, title and interest in and to said property shall vest in TWDB upon creation and shall be deemed to be a work for hire and made in the course of the services rendered pursuant to this Contract. To the extent that title to any such work may not, by operation of law, vest in TWDB, or such work may not be considered a work made for hire, all rights, title and interest therein are hereby irrevocably assigned to TWDB. TWDB shall have the right to obtain and to hold in its name any and all patents, copyrights, registrations or such other protection as may be appropriate to the subject matter, and any extensions and renewals thereof. Contractor must give TWDB and/or the State of Texas, as well as any person designated by TWDB and/or the State of Texas, all assistance required to perfect the rights defined herein without any charge or expense beyond those amounts payable to Contractor for the services rendered under this Contract.

Contractor shall maintain and retain supporting fiscal and any other documents relevant to showing that any payments under this Contract funds were expended in accordance with the laws and regulations of the State of Texas, including but not limited to, requirements of the Comptroller of the State of Texas and the State Auditor. Contractor shall maintain all such documents and other records relating to this Contract and the State's property for a period of four (4) years after the date of submission of the final invoices or until a resolution of all billing questions, whichever is later. Contractor shall make available at reasonable times and upon reasonable notice, and for reasonable periods, all documents and other information related to the "Work" as defined in paragraph 11.30 of this Contract. Contractor and the subcontractors shall provide the State Auditor with any information that the State Auditor deems relevant to any investigation or audit. Contractor must retain all work and other supporting documents pertaining to this Contract, for purposes of inspecting, monitoring, auditing, or evaluating by TWDB and any authorized agency of the State of Texas, including an investigation or audit by the State Auditor.

Contractor shall cooperate with any authorized agents of the State of Texas and shall provide them with prompt access to all of such State's work as requested. Contractor's failure to comply with this Section shall constitute a material breach of this Contract and shall authorize the TWDB and the State of Texas to immediately assess appropriate damages for such failure. Pursuant to Government Code, §2262.003 the acceptance of funds by Contractor or any other entity or person directly under this Contract, or indirectly through a subcontract under this Contract, shall constitute acceptance of the authority of the State Auditor to conduct an audit or

investigation in connection with those funds. Contractor acknowledges and understands that the acceptance of funds under this Contract shall constitute consent to an audit by the State Auditor, Comptroller or other agency of the State of Texas. Contractor shall ensure that this paragraph concerning the State's authority to audit funds received indirectly by subcontractors through Contractor and the requirement to cooperate is included in any subcontract it awards. Furthermore, under the direction of the legislative audit committee, an entity that is the subject of an audit or investigation by the State Auditor must provide the State Auditor with access to any information the State Auditor considers relevant to the investigation or audit.

5.24 DRUG FREE WORKPLACE POLICY

The contractor shall comply with the applicable provisions of the Drug-Free Work Place Act of 1988 (Public Law 100-690, Title V, Subtitle D; 41 U.S.C. 701 ET SEQ.) and maintain a drug-free work environment; and the final rule, government-wide requirements for drug-free work place (grants), issued by the Office of Management and Budget and the Department of Defense (32 CFR Part 280, Subpart F) to implement the provisions of the Drug-Free Work Place Act of 1988 is incorporated by reference and the contractor shall comply with the relevant provisions thereof, including any amendments to the final rule that may hereafter be issued.

5.25 INSURANCE

Contractor represents and warrants that it will, within five (5) business days of executing this agreement, provide TWDB with current certificates of insurance or other proof acceptable to TWDB of the following insurance coverage: Standard Workers Compensation Insurance covering all personnel who will provide services under this Contract;

Commercial General Liability Insurance, personal injury and advertising injury with, at a minimum, the following limits: $500,000 minimum each occurrence; $1,000,000 per general aggregate. Contractor represents and warrants that all of the above coverage is with companies licensed in the state of Texas, with "A" rating from Best, and authorized to provide the corresponding coverage. Contractor also represents and warrants that all policies contain endorsements prohibiting cancellation except upon at least thirty (30) days prior written notice to TWDB. Contractor represents and warrants that it shall maintain the above insurance coverage during the term of this Contract, and shall provide TWDB with an executed copy of the policies immediately upon request.

5.26 ORDER PRECEDENCE

In the event of conflicts or inconsistencies between this contract and its exhibits or attachments, such conflicts or inconsistencies shall be resolved by reference to the documents in the following order of priority: Signed Contract (or Notice of Award), Attachments to the Contract (or Notice of Award), Request for Proposals, and Respondent's Response to Request for Proposals.

5.27 PROPRIETY INFORMATION

The TWDB is a government agency subject to the Texas Public Information Act (PIA), Chapter 552, Gov't Code. The Proposal and other information submitted to the TWDB by the Respondent are subject to release as public information. The Proposal and other submitted information shall be presumed to be subject to disclosure unless a specific exception to disclosure under the PIA applies. If it is necessary for the Respondent to include proprietary or otherwise confidential

information in its Proposal or other submitted information, the Respondent must clearly label that proprietary or confidential information and identify the specific exception to disclosure in the PIA. Merely making a blanket claim that the entire Proposal is protected from disclosure because it contains some proprietary information is not acceptable, and shall make the entire Proposal subject to release under the PIA. In order to trigger the process of seeking an Attorney General opinion on the release of proprietary or confidential information, the specific provisions of the Proposal that are considered by the Respondent to be proprietary or confidential must be clearly labeled as described above. Any information which is not clearly identified as proprietary or confidential shall be deemed to be subject to disclosure pursuant to the PIA.

All contracts shall include the following language**:** "**Contractor is required to make any information created or exchanged with the state pursuant to this contract, and not otherwise excepted from disclosure under the Texas Public Information Act, available in a format that is accessible by the public at no additional charge to the state**." In addition to this recommended language, the Comptroller also advises that in order to ***comply with the new statutory requirements***, each state governmental entity should supplement this provision with the additional terms agreed upon by the parties regarding the specific format by which the vendor is required to make the information accessible by the public.

5.28 PUBLIC DISCLOSURE

No public disclosures or news releases pertaining to this contract shall be made without prior written approval of TWDB.

5.29 SUBSTITUTIONS

Substitutions are not permitted without written approval of TWDB.

5.30 TAXES

Contractor represents and warrants that it shall pay all taxes or similar amounts resulting from this Contract, including, but not limited to, any federal, State, or local income, sales or excise taxes of Contractor or its employees. TWDB shall not be liable for any taxes resulting from this Contract.

5.31 ACTS OR OMISSIONS

Vendor shall indemnify and hold harmless the State of Texas and Customers, AND/OR THEIR OFFICERS, AGENTS, EMPLOYEES, REPRESENTATIVES, CONTRACTORS, ASSIGNEES, AND/OR DESIGNEES FROM ANY AND ALL LIABILITY, ACTIONS, CLAIMS, DEMANDS, OR SUITS, AND ALL RELATED COSTS, ATTORNEY FEES, AND EXPENSES arising out of, or resulting from any acts or omissions of the Vendor or its agents, employees, subcontractors, Order Fulfillers, or suppliers of subcontractors in the execution or performance of the Contract and any Purchase Orders issued under the Contract. THE DEFENSE SHALL BE COORDINATED BY VENDOR WITH THE OFFICE OF THE ATTORNEY GENERAL WHEN TEXAS STATE AGENCIES ARE NAMED DEFENDANTS IN ANY LAWSUIT AND VENDOR MAY NOT AGREE TO ANY SETTLEMENT WITHOUT FIRST OBTAINING THE CONCURRENCE FROM THE OFFICE OF THE ATTORNEY GENERAL. VENDOR AND THE CUSTOMER AGREE TO FURNISH TIMELY WRITTEN NOTICE TO EACH OTHER OF ANY SUCH CLAIM.

5.32 INFRINGEMENTS

a) Vendor shall indemnify and hold harmless the State of Texas and Customers, AND/OR THEIR EMPLOYEES, AGENTS, REPRESENTATIVES, CONTRACTORS, ASSIGNEES, AND/OR DESIGNEES from any and all third party claims involving infringement of United States patents, copyrights, trade and service marks, and any other intellectual or intangible property rights in connection with the PERFORMANCES OR ACTIONS OF VENDOR PURSUANT TO THIS CONTRACT. VENDOR AND THE CUSTOMER AGREE TO FURNISH TIMELY WRITTEN NOTICE TO EACH OTHER OF ANY SUCH CLAIM. VENDOR SHALL BE LIABLE TO PAY ALL COSTS OF DEFENSE INCLUDING ATTORNEYS' FEES. THE DEFENSE SHALL BE COORDINATED BY VENDOR WITH THE OFFICE OF THE ATTORNEY GENERAL WHEN TEXAS STATE AGENCIES ARE NAMED DEFENDANTS IN ANY LAWSUIT AND VENDOR MAY NOT AGREE TO ANY SETTLEMENT WITHOUT FIRST OBTAINING THE CONCURRENCE FROM THE OFFICE OF THE ATTORNEY GENERAL.

b) Vendor shall have no liability under this section if the alleged infringement is caused in whole or in part by: (i) use of the product or service for a purpose or in a manner for which the product or service was not designed, (ii) any modification made to the product without Vendor's written approval, (iii) any modifications made to the product by the Vendor pursuant to Customer's specific instructions, (iv) any intellectual property right owned by or licensed to Customer, or (v) any use of the product or service by Customer that is not in conformity with the terms of any applicable license agreement.

c) If Vendor becomes aware of an actual or potential claim, or Customer provides Vendor with notice of an actual or potential claim, Vendor may (or in the case of an injunction against Customer, shall), at Vendor's sole option and expense; (i) procure for the Customer the right to continue to use the affected portion of the product or service, or
(ii) modify or replace the affected portion of the product or service with functionally equivalent or superior product or service so that Customer's use is non-infringing.

5.33 TAXES/WORKERS' COMPENSATION/UNEMPLOYMENT INSURANCE – INCLUDING INDEMNITY

1) VENDOR AGREES AND ACKNOWLEDGES THAT DURING THE EXISTENCE OF THIS CONTRACT, VENDOR SHALL BE ENTIRELY RESPONSIBLE FOR THE LIABILITY AND PAYMENT OF VENDOR'S AND VENDOR'S EMPLOYEES' TAXES OF WHATEVER KIND, ARISING OUT OF THE PERFORMANCES IN THIS CONTRACT. VENDOR AGREES TO COMPLY WITH ALL STATE AND FEDERAL LAWS APPLICABLE TO ANY SUCH PERSONS, INCLUDING LAWS REGARDING WAGES, TAXES, INSURANCE, AND WORKERS' COMPENSATION. THE CUSTOMER AND/OR THE STATE SHALL NOT BE LIABLE TO THE VENDOR, ITS EMPLOYEES, AGENTS, OR OTHERS FOR THE PAYMENT OF TAXES OR THE PROVISION OF UNEMPLOYMENT INSURANCE AND/OR WORKERS' COMPENSATION OR ANY BENEFIT AVAILABLE TO A STATE EMPLOYEE OR EMPLOYEE OF ANOTHER GOVERNMENTAL ENTITY CUSTOMER.

2) VENDOR AGREES TO INDEMNIFY AND HOLD HARMLESS CUSTOMERS, THE STATE OF TEXAS AND/OR THEIR EMPLOYEES, AGENTS, REPRESENTATIVES, CONTRACTORS, AND/OR ASSIGNEES FROM ANY AND ALL LIABILITY, ACTIONS, CLAIMS, DEMANDS, OR SUITS, AND ALL RELATED COSTS, ATTORNEYS' FEES, AND EXPENSES, RELATING TO TAX LIABILITY, UNEMPLOYMENT INSURANCE AND/OR WORKERS'
COMPENSATION IN ITS PERFORMANCE UNDER THIS CONTRACT. VENDOR SHALL BE LIABLE TO PAY ALL COSTS OF DEFENSE INCLUDING ATTORNEYS' FEES. THE DEFENSE SHALL BE COORDINATED BY VENDOR WITH THE OFFICE OF THE ATTORNEY GENERAL WHEN TEXAS STATE AGENCIES ARE NAMED DEFENDANTS IN ANY LAWSUIT AND VENDOR MAY NOT AGREE TO ANY SETTLEMENT WITHOUT FIRST OBTAINING THE CONCURRENCE FROM THE OFFICE OF THE ATTORNEY GENERAL. VENDOR AND THE CUSTOMER AGREE TO FURNISH TIMELY WRITTEN NOTICE TO EACH OTHER OF ANY SUCH CLAIM.

SECTION 1 EXECUTION OF RESPONSE

FOR PROJECT NO. _____

Company Name: _____

Address: _____

_____

_____

Phone Number: _____

I, _____, am the above-referenced company's representative and I am authorized to submit this response and sign future contract documents. By signing, vendor certifies that if a Texas address is shown as the address, the vendor qualifies as a Texas Resident Bidder as defined in Texas Administrative Code, Title 34, Part 1, Chapter 20.

_____ _____
Authorized Signature Date

SECTION 2 COMPANY PROFILE SUMMARY AND HISTORY

FOR PROJECT NO. _____

(To be provided by Respondent)

SECTION 3 COMPANY REFERENCES

FOR PROJECT NO. _____

REFERENCE #1

Name of Organization:			
Business Address:			
Business City:			
Business State:		**Zip:**	
Contact Person Name:			
Contact Person Title:			
Phone Number:		**Fax:**	
Client Comments:			

THIS PAGE OR A REASONABLE FACSIMILE SHALL BE RETURNED WITH THE RESPONSE. FAILURE TO RETURN THIS PAGE OR A REASONABLE FACSIMILE WILL RESULT IN THE RESPONSE BEING CONSIDERED NON-RESPONSIVE. ANY NEGATIVE RESPONSE(S) MAY RESULT IN DISQUALIFICATION OF THE RESPONSE.

SECTION 3 COMPANY REFERENCES

FOR PROJECT NO. _____

REFERENCE #2

Name of Organization:			
Business Address:			
Business City:			
Business State:		**Zip:**	
Contact Person Name:			
Contact Person Title:			
Phone Number:		**Fax:**	
Client Comments:			

THIS PAGE OR A REASONABLE FACSIMILE SHALL BE RETURNED WITH THE RESPONSE. FAILURE TO RETURN THIS PAGE OR A REASONABLE FACSIMILE WILL RESULT IN THE RESPONSE BEING CONSIDERED NON-RESPONSIVE. ANY NEGATIVE RESPONSE(S) MAY RESULT IN DISQUALIFICATION OF THE RESPONSE.

SECTION 3 COMPANY REFERENCES

FOR PROJECT NO. _____

REFERENCE #3

Name of Organization:			
Business Address:			
Business City:			
Business State:		**Zip:**	
Contact Person Name:			
Contact Person Title:			
Phone Number:		**Fax:**	
Client Comments:			

THIS PAGE OR A REASONABLE FACSIMILE SHALL BE RETURNED WITH THE RESPONSE. FAILURE TO RETURN THIS PAGE OR A REASONABLE FACSIMILE WILL RESULT IN THE RESPONSE BEING CONSIDERED NON-RESPONSIVE. ANY NEGATIVE RESPONSE(S) MAY RESULT IN DISQUALIFICATION OF THE RESPONSE.

SECTION 4 RESUMES OF INDIVIDUALS

FOR PROJECT NO. _____

(To be provided by Respondent)

SECTION 5 Historically Underutilized Businesses Subcontracting Plan

FOR PROJECT NO. _____

Please see SECTION IV, GENERAL INFORMATION, No. 4.1-B5

All HUB Subcontracting Plan Forms must be completed and submitted with the Response.

The forms are entitled and can be found at:

HUB Subcontracting Plan Form
HUB Subcontracting Plan Form, SECTION 2 continuation sheet
HUB Subcontracting Plan Good Faith Effort - Method A (Attachment A)
HUB Subcontracting Plan Good Faith Effort - Method B (Attachment B)
HUB Subcontracting Opportunity Notification Form

http://comptroller.texas.gov/procurement/prog/hub/hub-subcontracting-plan/

SECTION 6 – OWNERSHIP OF BUSINESS ENTITY

(if applicable)

FOR PROJECT NO. _____

Name(s) and Social Security Number(s) of Each Person with at least 25 Percent Ownership of the Business Entity Submitting the RFQ

_____
Name

_____
Social Security Number

_____
Name

_____
Social Security Number

_____
Name

_____
Social Security Number

_____
Name

_____
Social Security Number

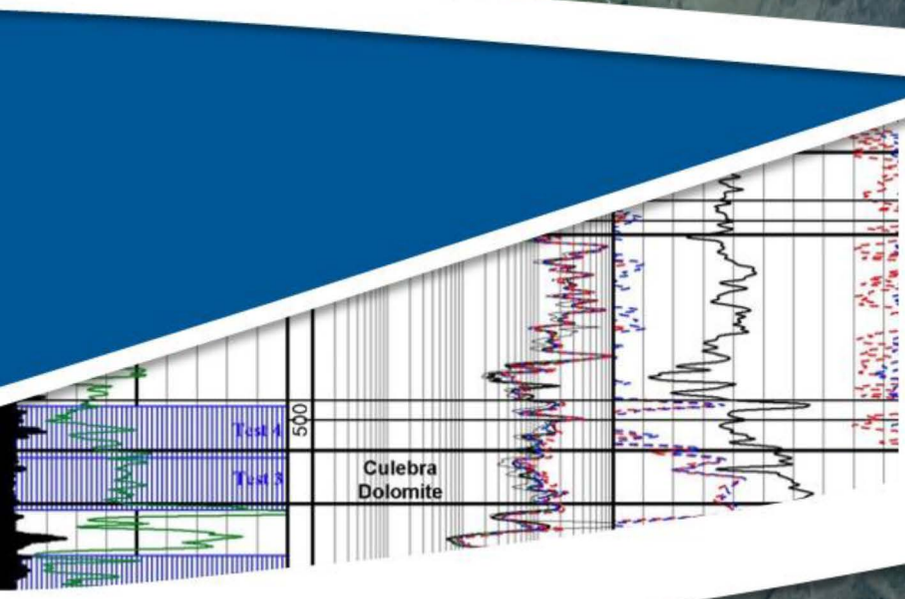
SECTION 7 SCOPE OF WORK

FOR PROJECT NO. _____

(To be provided by Respondent)

INTERA
GEOSCIENCE & ENGINEERING SOLUTIONS

INTERA Incorporated
1812 Centre Creek Drive, Suite 300
Austin, Texas 78754
512.425.2000



www.intera.com

EXHIBIT B

SCOPE OF WORK

Introduction

The INTERA Team's technical approach for conducting an evaluation of brackish groundwater in the Rustler Aquifer will result in a high quality product for the Texas Water Development Board (TWDB) that is completed on schedule and within the allotted budget. This section describes our approach to the scope of work tasks, the organizational and management approach we will use to complete the tasks, and the reports and other documentation that we will deliver to the TWDB over the course of the project.

Our technical approach to the scope of work tasks is based on more than 30 years of experience, both in west Texas and in southeast New Mexico, on projects involving characterization and modeling of the Rustler Formation. As part of developing the Rustler Groundwater Availability Model (GAM), INTERA worked closely with the TWDB Brackish Resources Aquifer Characterization System (BRACS) division staff to co-develop the Rustler structural contacts in the Delaware Basin. We have also recently completed several detailed hydrostratigraphic and groundwater resource evaluations in the Rustler Formation. The Rustler is a complex aquifer system with lithologic variability, fracturing (secondary porosity), dissolution collapse residuum, and structural features that include fault throws large enough to offset the entire Rustler sequence by more than 600 feet. Based on our experience in the Delaware and other basins, we believe that standard log-based water quality analysis techniques will be insufficient to adequately delineate water quality in the Rustler Aquifer. In light of this, we will augment standard techniques with more sophisticated technologies developed for the oil and gas industry. The INTERA Team's overall approach to completing the tasks necessary to delineate and quantify brackish groundwater in the Rustler incorporates the following key features.

Access to Additional Geophysical Logs. In order help obtain important geophysical logs for the project, we have established formal agreements with two commercial providers of well logs. Both firms—Drillinginfo and The Subsurface Library—have agreed to provide, at a minimum, the portions of the logs that include the Rustler Formation to the TWDB for public use.

Construction of a Log Database. In conjunction with the currently publicly-available logs, the additional logs acquired from Drillinginfo and The Subsurface Library will provide us with the geographically-distributed information needed to better define aquifer lithology, structure, and water quality across the Rustler footprint. We will design and construct a log database using a subset of the BRACS database schema to facilitate subsequent integration.

Rustler Stratigraphy and Lithology. As applicable, the INTERA Team will use the logs to make picks in the Rustler Aquifer footprint for the Vaca Triste Sandstone Member of the Salado Formation and all member units of the Rustler Formation. The presence and thickness of the Vaca Triste Sandstone correlates with Salado dissolution and concomitant collapse and development of secondary fracture and/or vuggy porosity in the overlying Magenta and Culebra Dolomites (Powers et al., 2003).

Delineation of Salinity Zones. The identification of fresh, brackish, and saline groundwater will be based on the classification developed by the U.S. Geological Survey (USGS) (Winslow and Kister, 1956).

Calculation of Volumes. We will develop and apply a methodology to calculate brackish volumes that is based on TWDB's approach to calculating Total Estimated Recoverable Storage. This methodology will incorporate the lithology, primary or secondary porosity controls, water bearing zones, and total dissolved solids (TDS) profiles obtained from the analyses of geophysical logs and validated using a resistivity sensitivity analysis.

Identification of Transmissive Brackish Areas. Potential production areas (PPAs) will be evaluated using a combination of legislative mandates, geophysical log interpretation (mainly presence/absence of definable member units) and, where available, water well production information.

Identification of Hydrogeological Barriers. As part of our work developing the Rustler GAM (Ewing and others, 2012), we mapped major faults in the Rustler and characterized their throw. The conductance of faults was estimated through conceptualization and calibration. Building on this knowledge, we will review lithologic boundaries to define features that may serve as hydrologic barriers between brackish and other types of groundwater that may potentially hinder production.

Assessment of Available Volumes. The INTERA Team will develop and apply groundwater flow models to determine the volume of brackish groundwater that can be produced over 30- and 50-year time periods without causing significant impacts to fresh groundwater or areas with existing brackish groundwater use. Multiple model runs will be performed to evaluate the sensitivity of the predicted pumping impacts to modeling assumptions and aquifer parameters. Sensitivity to fault conductance will also be evaluated.

In developing our approach to performing the brackish groundwater evaluation for the Rustler Aquifer, we considered three key criteria—all of which are indicative of the feasibility of the approach. As described below, these criteria are: scientific soundness, time efficiency, and cost effectiveness.

Scientific Soundness. First and foremost, our approach has to be scientifically-sound and produce results that are technically-defensible. Using geophysical well logs to determine water quality in areas that lack sampled water quality, like the Rustler Aquifer, is a scientifically proven and technically defensible method used regularly in water resource evaluations. Furthermore, because of the limited geographic coverage of available logs that include the Rustler, the INTERA Team has enlisted the support of Dr. Carlos Torres-Verdin, an expert in geophysical log analyses, to perform sensitivity analysis on the available geophysical logs and to provide further validation that the water quality interpretations we make are consistent with current, state-of-the-science petrophysical methods.

Time Efficiency. Our approach has to be time efficient and implementable within the required timeframe for the project (final version completed by 30 days after the Project Completion Date). One of the more time-consuming activities associated with the project is locating geophysical logs that are suitable for use in evaluating the Rustler Aquifer (i.e., logs with data that includes the Rustler interval). This is particularly true when only using public log databases. We have established formal agreements with two private log libraries/providers that not only provide us with access to vast quantities of catalogued geophysical logs, but that will allow the Rustler portions of acquired logs to be made available for public dissemination. This will enable us to focus more of our time on log interpretation which is critical to producing a high quality project that is accomplished in accordance with the TWDB's schedule requirements.

Cost-Effectiveness. Our approach has to be cost-effective in terms of meeting the TWDB's estimate for completing the Rustler Aquifer project. Accordingly, our approach defines a level of activities that is consistent with meeting the TWDB's cost expectations. INTERA's 15+ year track record of delivering work products to the TWDB at the agreed-upon cost provides added assurance that the budgetary constraints for this project will be met.

As the following detailed discussion of the scope of work tasks will confirm, the INTERA Team's approach is not only technically feasible, but will result in a high quality evaluation of brackish groundwater in the Rustler Aquifer that is completed on-time and on-budget. We are fully committed to delivering the information needed to support the TWDB's report to the legislature on brackish resources in the Rustler and three other aquifers by December 1, 2016.

We have divided the brackish groundwater evaluation of the Rustler Aquifer into six tasks. Discussions of the activities associated with each task, and our approaches to executing the tasks, are provided below.

Task 1 – Project Management

An expedited study of brackish groundwater in the Rustler Aquifer requires expertise in several facets of hydrogeology and well log interpretation. Imperative to the success of the project is a project manager that is intimately familiar with hydrogeologic data, models, the geology of the Rustler, and the TWDB groundwater program. To meet these requirements, Mr. Van Kelley, PG will serve as our Project Manager. Mr. Kelley has previously managed six TWDB contracts covering development and calibration or recalibration of seven GAMs including the model of the Rustler Aquifer. In his role as Project Manager, Mr. Kelley will serve as the single point of contact for the TWDB and stakeholders. We understand that given the importance, complexity, and accelerated schedule for completing the project, regular coordination and communication with the BRACS division staff will be critical to project success. Mr. Kelley's project management responsibilities will include providing prompt and comprehensive information to TWDB and stakeholders regarding the project's schedule, budget, and technical considerations. Specific project management activities include submitting monthly progress reports, attending review meetings with the TWDB, and providing senior technical review of the INTERA Team's project deliverables. Additional details on our project organization and management approach are provided in Figure7-6 (see Exhibit A). The INTERA Team's proposed project organization is

shown in Figure 7-5 (see Exhibit A). Our organization and management approach is designed to satisfy the following objectives: provide timely and effective administration of the contract; be highly responsive to TWDB; ensure efficient access to and optimal use of our personnel as required by each specific technical task; provide complete, on-schedule, on-budget, quality-assured performance on all tasks; and provide effective communication among team members and the TWDB and other stakeholders.

Our Project Managers use Axiom's Ajera Complete, a computer-based project control system that integrates time keeping, accounting, and accounts receivable. The Project Manager can monitor project hours and charges in real time since the system updates with every hour added on a timesheet (time is entered on a daily basis). This system provides for detailed tracking of resources and schedules and allows early identification of problem areas so that any required corrective measures can be applied in a timely manner. A key component to our management and control plan is the development of a detailed task plan. We have divided the Rustler Aquifer project scope of work into six primary tasks. These tasks are divided into subtasks that further break out the work scope. Our Project Manager will establish the budget for each task, and assign each element of work an appropriate task code designation. The Project Manager will monitor the performance of each work element and will prepare monthly progress reports.

Monthly status reports, including technical information regarding progress on the in the preceding month, will be provided to TWDB. The monthly report will summarize project progress relative to the schedule. Cost summaries, by task and subconsultant, will be provided to the TWDB with our monthly invoices. These cost summaries include personnel hours and direct costs charged to date, current estimates to complete the project, and a comparison of the current estimated total with the previously established budget. Monthly project reports will be used as a means of documenting issues, either technical or programmatic, which require consultation with the TWDB. Coordination with TWDB staff will be critical throughout the project. Exhibit E provides guidelines for a progress report.

The project management task also includes a minimum of six meetings. The minimum number of meetings includes Stakeholder Meetings 1 and 2 and TWDB Meetings 1, 2, 3, and 4. Stakeholder Meeting 1 already occurred on October 26, 2015 and was attended by at least one member of the INTERA Team. TWDB Meeting 1 will be for the project initiation, TWDB Meeting 2 will discuss and approve methodology, TWDB Meeting 3 will follow Stakeholder Meeting 2 and create a prioritized list of potential production areas for capacity analysis, and at TWDB Meeting 4 a formal presentation will be given at the completion of the project. Mr. Kelley will schedule and attend the project initiation meeting with the TWDB immediately after contract award and the project completion meeting upon submittal of the final technical report summarizing the project. He will also coordinate with the TWDB to establish the date, time, and location of Stakeholder Meeting 2. This meeting will provide information on the results of the project and solicit input on the identified potential production areas. The INTERA Team will attend and present data and interpretations at the meeting. Prior to this meeting, we will discuss an approach with the TWDB for presenting data and discussing technical issues. No later than four (4) business days before the meeting, we will provide a draft presentation to TWDB for review and comment. In addition, we anticipate regular communications with the TWDB's Project Manager

and other TWDB staff during the project. These additional meetings will be held either in person, through a webinar, or teleconference. INTERA's Austin office, located approximately five miles from the TWDB office, will facilitate communication throughout the project.

In accordance with the schedule requirements defined in the RFQ, the INTERA Team will have a draft version of the deliverables to TWDB by the Project Completion Date. Then TWDB will have two weeks to review the draft and the INTERA Team will have two weeks to respond to TWDB comments. Therefore, the final version of the report is due 30 days after the Project Completion Date. Table 7-1 (see Exhibit A) provides a breakdown of the percent of effort to be expended for each task along with a labor hour breakdown for each of the INTERA Team companies and consultants.

Task 1 Related Deliverables

See Section II of the Request For Qualifications (RFQ) NO. 580-16-RFQ0008 for detailed description of monthly progress reports, meetings and deliverables (Exhibit I). See Exhibit D for report formatting guidelines, Exhibit G for data requirements, and Exhibit H for report outline.

- Monthly Progress Reports.
    - Original or adjusted schedule and relative progress.
    - Project invoices.
    - Consistent with the budget description.
    - Issues that may arise.
    - See Exhibit E for guidelines.
- Stakeholder Meeting 1: Already held on October 26, 2015 in Austin, TX to explain TWDB's approach in implementing House Bill 30, solicit feedback on what constitutes "significant impact", and receive general comments concerning implementation of the legislation.
- TWDB Meeting 1: Project Initiation Meeting.
- TWDB Meeting 2: Discussion and approval of Project methodology; date to be determined by the Contractor.
- Presentation for the second stakeholder meeting no later than 4 business days before Stakeholder Meeting 2 for the TWDB to review.
- Stakeholder Meeting 2: Presentation and discussion of potential production areas with stakeholder in the morning; The Contractor will set the date and provide a minimum of one-month advance notice to TWDB. TWDB staff will organize the meeting and invite stakeholders.
- TWDB Meeting 3: Discuss prioritization of potential production areas for production calculations with TWDB staff in the afternoon on the same day or soon after Stakeholder Meeting 2. If agreed upon by both TWDB and INTERA, adjustments to the timing of meetings and review periods may be made to accommodate unanticipated delays that are outside of the contractor's control due to the aggressive schedule and unmovable deadline of 30 days after the Project Completion Date.
- TWDB Meeting 4: Project completion; formal presentation at the end of the Project.
- Draft final report and deliverables to TWDB by the Project Completion Date.
- Final Report and deliverables, with responses to TWDB comments, to TWDB 30 days after the Project Completion Date.

Additional technical meetings may be scheduled either in person, through a webinar, or teleconference venue to discuss project progress and issues. TWDB staff may periodically visit the Contractor's work premises to assess progress on the project.

Task 2 – Delineate Vertical and Horizontal Extent of Fresh, Brackish, and Saline Groundwater

The distribution of water wells with water quality data in the Rustler Aquifer from the TWDB's Groundwater Database, the USGS National Water Information System, and in various studies that incorporated groundwater quality (SPWLA (1982), Texas Water Commission (1989), Small and Ozuna (1993), Boghici (1997), Brown (1998), Boghici and Van Broekhoven (2001), TWDB (2015)) is shown in Figure 7-1. Ewing and others (2012) provided a dataset for all available water quality samples for the Rustler Formation in and surrounding the Rustler Aquifer footprint (Figure 7-1 shown here and Figure 4.8.2 in Ewing and others, 2012). The Ewing data is from the TWDB's historical records that were available in November 2012, published reports, and the USGS in New Mexico (Ewing and others, 2012).

In addition to the records Ewing and others (2012) compiled to develop the Rustler GAM, the INTERA Team has acquired three additional water quality samples from the TWDB records, six from the USGS records, and 15 water resistivity samples from a 1982 Society of Professional Well Log Analysts (SPWLA) publication. After querying the TWDB GWDB and USGS databases for water quality values in the project area, one of the resulting points appears to be a duplicate between the two datasets. However, the sampled water quality is in different ranges (Figure 7-1). Because the SPWLA samples include an R_w value, they provide both calculated water quality and additional data to estimate the resistivity of the water from the resistivity recorded on the geophysical logs (R_w from R_t). This concept is discussed in more detail in later sections.

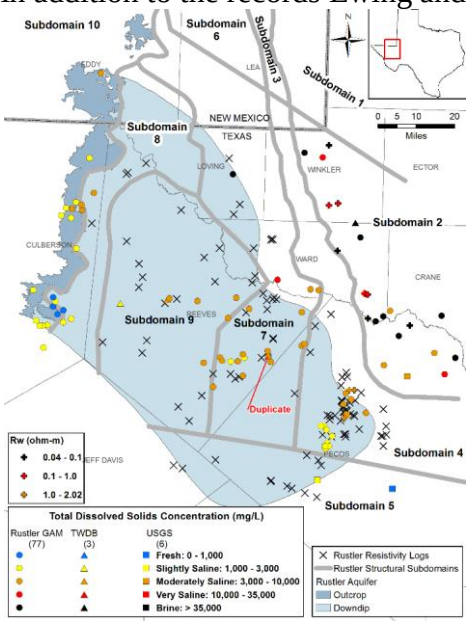


Figure 7-1 Rustler project area base map showing water quality samples, resistivity logs (from IHS) and structural subdomains.

Even with this additional data, the distribution of water quality samples within the Rustler Aquifer is still sparse. To help improve data coverage, the INTERA Team will contact GCDs that overlie the Rustler Aquifer in an effort to obtain additional water quality samples and well completion information for the public domain. With the advent of hydraulic fracturing, more oil and gas companies are using Rustler water for their operations. Our experience has shown that these companies commonly share well completion and water quality information with the GCDs. INTERA will use stakeholder meetings, in addition to the two stakeholder meetings required by the RFQ, to

make requests to non- GCD entities or persons for additional water quality data in the Rustler.

Given the sparse vertical and horizontal distribution of water quality samples from the Rustler Aquifer, additional water quality estimates would be of considerable value in delineating the brackish groundwater zones. Because calculated water quality, as opposed to sampled water quality, can provide a reasonable proxy for trends in the distribution of Total Dissolved Solids (TDS) in a groundwater basin, INTERA proposes to use electric logs to augment the data shown in Figure 7-1. In the Delaware Basin, oil and gas wells are typically drilled to the base of useable quality water, surface casing is installed, and the well is then drilled to the base of the Castile Formation, generally using a saturated saltwater mud to prevent dissolution of the Castile and Salado evaporites. A second string of casing is then normally installed. This often negates the possibility of an open-hole log being run through the aquifer(s) that overlie the evaporites. Although electric logs are not commonly run through the Rustler Aquifer, they do exist, and it is merely a matter of locating them, assessing their quality, establishing a means to provide them to the TWDB for public dissemination, and interpreting them. While all of these tasks are a challenge for the Rustler Aquifer, we have developed a strategy for acquiring useful well logs that can be made available to the public. The following subtask discusses this strategy.

Task 2.1 – Acquire and Digitize Geophysical Well Logs. The ability to efficiently access public and private well log databases to supplement currently available information is critical to the success of this project. For the public databases, we first queried TWDB's BRACS database. Shown in Figure 7-2, there are 682 wells within a 10-mile buffer around the Rustler Aquifer footprint with picks for either the Rustler or Salado and that have at least one raster log. In addition, there are 671 wells that do not have a geophysical log but have a pick for the Rustler or Salado. Geophysical logs and associated metadata in the BRACS database that fit the criteria for this evaluation will be integrated into a Petra- based project database. Petra is an integrated software application with a common database and interface for project and data management, well log analysis, mapping, cross-sections and seismic data integration. As INTERA demonstrated during the development of the High Plains Aquifer System GAM (Deeds and others, 2015), using Petra facilitates the process of formatting data for ultimate entry into the BRACS database.

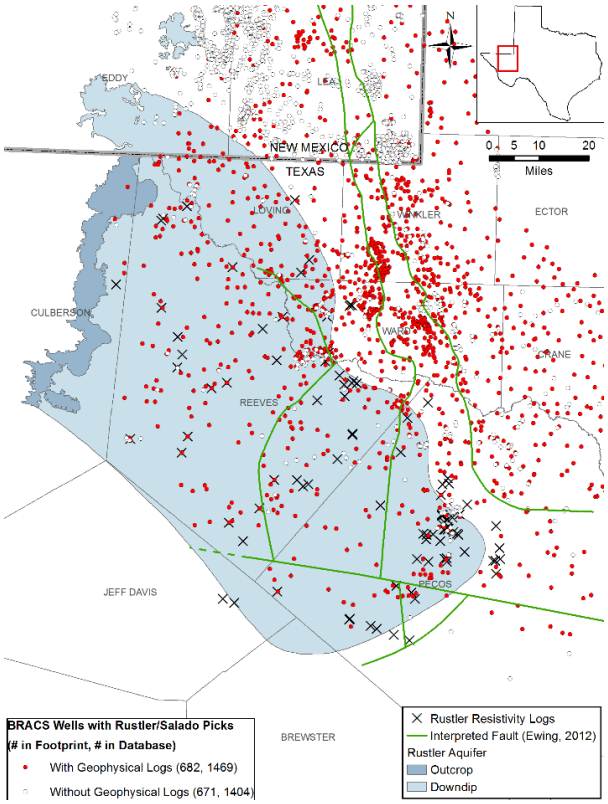


Figure 7-2. Rustler project area base map showing BRACS well log and pick availability along with inferred faults (from Ewing and others, 2012). Resistivity logs shown from a query of IHS data.

Other public databases in Texas that offer some potential to provide geophysical logs run through the Rustler Aquifer, but do not have the necessary metadata to readily query, are the databases at the Railroad Commission, the Bureau of Economic Geology and the University Lands. In New Mexico the Oil Conservation Division (OCD) retains the majority of all logs run in the state of New Mexico. The key issue with these log databases is that they lack the ability to query and subsequently access the logs in an efficient and timely manner on the scale required to support the evaluation of brackish groundwater in the Rustler. It is important to have a database that catalogues the top and bottom logging interval of every curve on the geophysical log for the well. With the exception of the BRACS database which will be used over the entire Rustler Aquifer extent, all of the aforementioned public databases will be used to infill small areas where there are data gaps as opposed to being primary data sources.

While public log databases are ideal when evaluating a small number of wells in a geographically small area, for larger areas and time-critical applications, more time can be spent on the actual analysis of the geophysical logs when the majority of the front end work has been completed by specialized commercial log database companies. The INTERA Team has developed a strategy that allows leveraging the efficiency and comprehensiveness of commercial log databases while allowing the logs to be made public as required for the proposed work.

To better evaluate the availability of resistivity logs, INTERA used our IHS subscription to determine the distribution of these logs in and around the Rustler Aquifer footprint. IHS has the world's largest log database for the Permian Basin. All wells that overlie the Rustler Aquifer footprint within a 5-mile buffer were queried, resulting in approximately 7,000 wells. For these wells, there were over 120,000 geophysical logs. A majority (>95%) of the logs had a top logging interval well below the base of the Rustler Formation, essentially making them unusable for this analysis. We then queried wells having a resistivity/induction or any other type of electric log run through the Rustler Aquifer with a buffer of 200 feet below the top of the Rustler and 200 feet above the base of the Rustler. The 200-foot buffer was applied in an attempt to not throw out logs that have the majority but not all of the Rustler Formation logged. This query resulted in a total of 329 wells with all of the logs having a gamma curve and 97 of them having some type of a resistivity (Figure 7-1).

Given the stipulation in the RFQ that "Geophysical well log data obtained for the project must be non- confidential and submitted in a Tagged Image Format (TIFF) and, if available, Log ASCII Standard (LAS) format", we cannot use the logs from the IHS database since IHS is unwilling to provide the geophysical well logs for public dissemination. However, recognizing the contribution that the private log databases can provide to the project, INTERA has received a written commitment (provided in Exhibit A) from Drillinginfo, an Austin based private log library with a log database comparable to the IHS Permian Basin database, to release to the TWDB for ultimate public dissemination the Rustler Aquifer portion of any logs purchased specifically for this project. Accordingly, INTERA will acquire logs from Drillinginfo, and these logs will be redacted below the Castile Formation/ top of the Delaware Mountain Group. Acquiring these logs means that less of the project budget will be spent on searching for publicly available logs and integrating them into our Petra database. Conversely, more time can be spent to ensure the accurate evaluation of the logs. In addition, since Drillinginfo will be working with INTERA to query out these logs, the end result will be a much larger number of higher quality logs that will ultimately be integrated into the BRACS database and provided to the public.

Drillinginfo, working with INTERA, has queried their database in the project area for logs with a curve in addition to natural gamma. The resulting dataset contained 548 wells with geophysical logs, in addition to gamma, that are run through the Rustler Formation with a buffer of 200 feet below the top and 200 feet above the base of the Rustler Formation. Drillinginfo will physically examine each one of these geophysical logs and determine/catalog the type of logs that are run through the Rustler Formation. We anticipate that the Drillinginfo database will include a large percentage of the resistivity logs we identified in the IHS database as well as additional logs not identified by IHS. For the resistivity logs that are not in the Drillinginfo database and for geographic areas that do not have any data in the database, we will use The Subsurface Library to search for logs (in addition to natural gamma) in the specific areas where additional data is needed. The Subsurface Library has also committed to allowing the Rustler portion of any acquired logs to be made publically available (see letter in Exhibit A).

In addition to resistivity/induction logs, the INTERA Team will search the databases for neutron porosity logs to support the analysis of structure, stratigraphy, and lithology for all of the member units of the Rustler Formation. Figure 7-3 (see Exhibit A) shows the units that comprise the Rustler Formation. Logs from the BRACS database will be the first to be integrated. Based on our past experience in assembling and analyzing logs, we believe it is likely that the majority of the logs for the 548 wells in the Drillinginfo database will have a neutron porosity log run through casing. While a neutron log run through casing is not ideal, Dr. Dennis Powers, a member of the INTERA Team, has considerable experience in evaluating these logs. In combination with the natural gamma signature, the neutron porosity log can be used to delineate the member units of the Rustler Formation and provide insights into the lithologic patterns and distribution of cementation, in addition to identifying areas of Salado Formation collapse. We are confident that an adequate distribution of logs can be assembled to refine the structure and lithology of the Rustler Formation and its member units.

<u>Task 2.1 Related Deliverables</u>
See Section II and III of the Request For Qualifications NO. 580-16-RFQ0008 for detailed

descriptions of deliverables (Exhibit I). See Exhibit D for report formatting guidelines, Exhibit G for data requirements, and Exhibit H for report outline.

- Log database using a subset of the BRACS database schema to facilitate subsequent integration, for the final report.
- Copies of water well reports, water quality reports, and geophysical well logs used in the project that were not already in the BRACS database, for the final report.
- Figure showing the project area and distribution of logs for the final report.

Task 2.2 – Draft Techniques and Approaches Report and Meeting. Once the best possible population of resistivity and neutron porosity/natural gamma logs has been identified, we will document the findings and draft a technical approach report for submission to the TWDB. The specific approach for geophysical well log interpretation of aquifer TDS concentration will be dependent on the availability and type of geophysical logs. The report will include information on the types of geophysical well logs available in the Rustler Aquifer area, how the interpreted TDS concentration from well log analysis relates to existing aquifer water chemistry as determined by direct measurements, how the log correction factors are determined, and how the interpretation techniques will be applied across the entire salinity range within the aquifer. We will then meet with staff at the TWDB to discuss the techniques and establish consensus on the overall approach.

After receiving TWDB approval of our approach, INTERA will digitize relevant logs to .las files and catalog all of the available header parameters. The digitized logs will serve two purposes. First, they will be used to facilitate the development of a series of structural cross-sections through the area of interest. Second, the digitized logs are essential for making calculations and correcting log signatures based on borehole conditions and formation thicknesses/parameters. For example, with water quality calculations from resistivity logs, areas of mud filtrate invasion must be identified before calculations of water quality can be made. If the log is digitized and the resistivity of the mud filtrate is documented in the log header, algorithms can be used to identify areas where the resistivity is reflective of the borehole mud filtrate as opposed to the formation water resistivity.

<u>Task 2.2 Related Deliverables</u>
See Section III of the Request For Qualifications NO. 580-16-RFQ0008 for more detailed descriptions of deliverables (Exhibit I). See Exhibit D for report formatting guidelines. See Exhibit G for data requirements.

- A draft report documenting the technique(s) and approaches for geophysical well log interpretation of aquifer total dissolved solids concentration approaches to TWDB up to 10 business days prior to TWDB Meeting 2 (see Task 1 for list of meetings) in both Microsoft Word and PDF formats.
- Digitized relevant logs as .las files for the final report.
- Cataloged header parameters for integration into the BRACS database for the final report.
- TWDB Meeting 2: Discussion and approval of Project methodology; date to be determined by the Contractor.

Task 2.3 – Evaluate Structure and Lithology. The first step in this task will be a thorough literature review encompassing publications relevant to the stratigraphy, structure, lithology, and water chemistry of the Rustler Formation. A significant repository of relevant Rustler publications was amassed by the INTERA Team as part of developing the Rustler GAM (Ewing and others, 2012) and by the BRACS group as part of the study on the Structure and Brackish Groundwater in the Pecos Valley Alluvial Aquifer (Meyer and others, 2012). Historical publications of significance include Hiss' 1975 PhD dissertation on the Stratigraphy and Ground-Water Hydrology of the Capitan Aquifer (Hiss, 1975) in addition to the structural map that he created for the Rustler Formation (Hiss, 1976). Dr. Dennis Powers used these and other publications as references for developing the structure of the Rustler Formation as part of the Rustler Aquifer GAM that was submitted to the TWDB (Ewing and others, 2012). Since the completion of the Rustler GAM and the Pecos Valley Alluvial Aquifer study, the USGS has published a series of reports related to the hydrogeology and hydrogeochemistry of the Edwards-Trinity and related aquifers in the Pecos County Region (Pearson and others, 2012, Bumgarner and others, 2012 and Clark and others, 2014). While these reports are mainly focused on the Edwards-Trinity system, data acquisition, analysis, and modeling efforts included the Rustler Formation and these reports will be used as a reference when considering the hydrogeology and hydrogeochemistry of the Rustler Aquifer.

Finally, the TWDB commissioned an evaluation of the hydrochemical and isotopic data in GMA 3 and GMA 7 (Kreitler and others, 2013). Data and conclusions from this report will be evaluated and used appropriately when considering the water quality in the Rustler Aquifer.

The INTERA team will maximize the use of available data by using the gamma and neutron porosity logs, along with any other supplementary logs, to make picks on the member units of the Rustler Formation along with a refined distribution of halite cementation and Salado collapse in the Rustler Aquifer footprint. A portion of the structure of the Rustler was jointly developed by INTERA and the BRACS Group as part of developing the Rustler GAM (Ewing and others, 2012 and Meyer, 2011). The structure of the Rustler is complex and a hydrostructural conceptual model was developed in Ewing and others (2012). The BRACS structure and the hydrostructural conceptual model will provide a foundation for this work. We will further evaluate halite presence, and dissolution and secondary cementation to help develop a model of lithology that will be central to log interpretation and ultimately quantification of groundwater volumes.

Halite in the Rustler commonly indicates where porosity is occluded, permeability is extremely low, and the salinity of any water is close to saturation with respect to halite (e.g., Powers et al., 2003, 2006). Specific log characteristics have been used to map halite cementation margins for Rustler members in parts of the Delaware Basin (Powers et al., 2003). These log characteristics were determined from shaft mapping (Holt and Powers, 1984, 1986, 1990) as well as core analysis and geophysical log interpretations (Holt and Powers, 1988, 2010; Powers, 2008; Ewing and others, 2012). The main source of data for developing the distribution of halite cementation is geophysical logs. The most thorough analysis can be made for boreholes with a more complete suite of logs (natural gamma, caliper, and density or sonic) (Powers and Holt, 2000). While drill holes with this suite of logs are variably distributed, they do provide good benchmarks. Through his more than 40 years of experience working in the Rustler Formation, Dr. Powers has acquired

a series of these benchmarking logs. The stratigraphy of the Rustler is dominantly determined on the basis of natural gamma (Holt and Powers, 1988; Powers and Holt, 2000). Members and informal units are widespread and facies changes are most common in the halitic units. Interval thickness and changes in the log character can be reasonably determined through gamma and neutron logs, again with corroborating evidence from a more complete suite, as available.

Another important contributor to Rustler hydraulic properties is dissolution of salt from the upper Salado. An evaluation of the distribution of hydraulic heads shows that the Tessey Limestone and the Rustler Aquifer outcrops in the Rustler Hills are the most likely locations for recharge to the Rustler Formation (Ewing and others, 2012). In these areas preferential flow paths are developed where recharged groundwater dissolves the halite cemented porosity in the Culebra and Magenta dolomites or recharging groundwater is initiating Salado dissolution and subsequent Rustler collapse. This serves to create a feedback loop where the transmissivities increase as the Rustler Formation Culebra and Magenta Dolomites continue to fracture following Salado collapse.

A metric for identifying upper Salado dissolution developed in the Delaware Basin uses the thickness of the interval between the Culebra Dolomite Member of the Rustler and the Vaca Triste Sandstone Member of the Salado Formation. Both units are widespread. Regional trends in depositional thickness (Powers et al., 2003) are disrupted at dissolution margins that are relatively sharp (Powers et al., 2003; Holt and Powers, 2010). Across large areas the upper Salado also displays natural gamma as well as other log characters (including neutron) that are related to regionally extensive marker beds and other units. For more detail, local log cross-sections can be correlated to reveal truncation of upper Salado beds (Powers, unpublished presentation to WIPP Peer Review Panel). The natural gamma character of the basal Rustler (Los Medaños Member, comprising siliciclastics, halitic mudstones, muddy halite, and sulfates (mainly anhydrite)) can reveal the amalgamation of upper Salado residues. Identifying these areas will contribute to discretization of areas of Salado collapse. Where Salado collapse has occurred, it is anticipated that the Rustler Formation Dolomites will exhibit a more cavernous (secondary) porosity and this will be factored into the delineation of potential production areas (PPAs).

<u>Task 2.3 Related Deliverables</u>

See Section II and III of the Request For Qualifications NO. 580-16-RFQ0008 for detailed descriptions of deliverables (Exhibit I). See Exhibit D for report formatting guidelines, Exhibit G for data requirements, and Exhibit H for report outline.

- At least 4 cross-sections (two along strike and two along dip) showing the overburden, Rustler Formation, member units of the Rustler Formation, top of the Salado Formation and top and base of the Vaca Triste Sandstone Member of the Salado Formation. These cross-sections will be used to highlight regional structure and log signatures for different lithologic regimes within the Rustler for the final report.
    - In areas where the individual member units of the Rustler Formation are indistinguishable, picks will be made for the Lower, Middle and Upper Members of the Rustler Formation.
    - It is anticipated that areas will exist where the discretization of

the Rustler Formation into its component Member Units will not be possible. These areas will likely be the result of solution collapse and they will be identified in a plan view map of the project area.

- An adequate distribution of geophysical logs with picks data for the BRACS Database, where discernable, for the tops of the Rustler Formation/Forty-Niner Member, Magenta Dolomite, Tamarisk, Culebra Dolomite, Los Medaños Member, top of the Salado Formation and top and base of the Vaca Triste Sandstone Member of the Salado Formation, for the final report.
- Figure showing the stratigraphy for the final report.
- Description of the stratigraphy and structure for the final report.

Task 2.4 – Generate Surfaces Defining Member Units of Rustler. Component member units of the Rustler Formation (see Figure 7-3 in Exhibit A) that were interpreted as part of Task 2.2 will be interpolated across the TWDB Rustler Aquifer extent using an interpolation algorithm in ESRI's ArcGIS v10.2 Spatial Analyst package. Surfaces for the top of the Vaca Triste Sandstone Member of the Salado Formation and top of the Salado Formation along with the tops of the Los Medaños, Culebra Dolomite, Tamarisk, Magenta Dolomite, and Forty-Niner members of the Rustler Formation will be interpolated to the extent possible. In areas where the formation tops are not identifiable, a best approximation for the top and base of the Rustler Formation will be made and these areas will be identified. In addition, domains reflecting like formational characteristics, mainly porosity (primary or secondary based on ability to identify member units), will be delineated and used to guide a formation parameter sensitivity analysis and to calculate volumes of available fresh, brackish, and saline groundwater in the Rustler Aquifer.

To assist in this process, all TWDB groundwater database wells and digitized submitted drillers reports with recorded production rates and screen information will be documented. For these wells, the top and bottom of the Rustler Formation will be established and all wells that fall within the Rustler Aquifer and have production values will be posted along with the areas of Salado Formation collapse. The distribution of the production rates will be evaluated in combination with the areas of Salado collapse to determine the existence of trends.

<u>Task 2.4 Related Deliverables</u>
See Section II and III of the Request For Qualifications NO. 580-16-RFQ0008 for detailed descriptions of deliverables (Exhibit I). See Exhibit D for report formatting guidelines, Exhibit G for data requirements, and Exhibit H for report outline.

- Description of the interpolation algorithm in ESRI's ArcGIS v10.2 Spatial Analyst package used to create surfaces and the data and parameters used as inputs for the final report.
- Tools, files and/or scripts used to interpolate surfaces developed for the project.
- Structural surfaces for the top and base of the Rustler Formation along with the tops of the Los Medaños, Culebra Dolomite, Tamarisk, Magenta Dolomite and Forty-Niner Members of the Rustler Formation. Where no further discretization of the Rustler into its member units is possible, a best approximation for the top and base of the Rustler

Formation will be made for the final report.

- A plan view map and shapefiles displaying areas where the Rustler Formation is still intact and likely a primary porosity flow system and areas where Rustler collapse has occurred and is likely a secondary porosity flow system. This map will be based on analysis from geophysical logs and production rates from wells screened to the Rustler Formation for the final report.
- Map and shapefiles for wells where the formation tops are not identifiable and a best approximation for the top and base of the Rustler Formation was made for the final report.

Task 2.5 – Formation Parameter Sensitivity Analysis. The calculation of water quality (calculated TDS) from resistivity is a standard technique to supplement areas where sampled water quality (sampled TDS) measurements are sparse. Examples of this include Alger (1966), Ayers and Lewis (1985), Fogg (1980), Fogg and Kreitler (1982), Fogg and Blanchard (1986), Hamlin (1988), Estepp (1998), and Meyer (2012). The majority of these applications were performed in the unconsolidated sediments of the Gulf of Mexico Basin where data availability and geographic distribution of electric logs is far greater than it is for the Rustler Formation within the TWDB Rustler Aquifer footprint. One possible exception is Collier's (1993a, b) evaluation of various consolidated formations (e.g., Cretaceous Edwards Formation, Trinity Group, Paleozoic limestones, etc.). In addition to the sparse distribution of resistivity logs, no detailed publications have been found that adequately discuss the calculation of water quality from resistivity or spontaneous potential measurements specifically in the Rustler Formation. Given the lithologic complexity of the units that make up the Rustler, standard techniques for water quality calculations can vary over many orders of magnitude if specific properties such as layer thickness, log type, porosity, cementation exponent, geothermal gradient, and permeability are not constrained.

Where resistivity logs exist (Figure 7-1), it is paramount that the sensitivities to potential variables be quantified. To that end, the INTERA Team includes Dr. Carlos Torres-Verdin, a professor in the University of Texas at Austin's Petroleum and Geosystems Engineering Department. Dr. Torres-Verdin will work closely with Dr. Powers and INTERA to evaluate the distribution of geophysical logs and determine, based on data density and availability, the best approach to characterizing water quality using resistivity logs.

Before water quality can be assessed from well logs, it is necessary that all borehole variables included in them be quantified. Depending on the specific conditions, some of the petrophysical affects can be greater than the impact of water quality. Well logs acquired in water-bearing rocks can be substantially affected not only by water quality (i.e., ion concentration, ion types, etc.) but also by rock properties such as porosity, permeability, irreducible water saturation, mud-filtrate invasion, borehole size, and layer thickness, in addition to the properties of the specific tools used to acquire them, especially considering the age of most of the logs run through the Rustler Formation. Most of the latter effects included in well logs are not typically accounted for by logging companies when providing well logs such as gamma ray, SP, resistivity, density porosity, and neutron porosity. Modern methods used in the interpretation of well logs invoke some degree of numerical simulation to quantify the relative impact of borehole and layer environmental

effects in the interpretation of layer petrophysical properties and saturating fluids.

The numerical simulation of well logs is performed by first defining all pertinent, available, geometrical properties such as borehole size, mud type (i.e., types of ions in solution and their concentrations), temperature, layer thicknesses, etc. Next, layer properties such as porosity, volume of shale, permeability, total water saturation, irreducible water saturation, and water quality are used to calculate effective layer properties such as electrical resistivity, natural radioactivity, compressional and shear wave velocities, and nuclear properties. The calculated layer physical properties, together with the definition of layer thicknesses and specific tool properties are then used to numerically simulate all well logs (e.g., gamma, SP, resistivity, etc.). Comparison of numerically simulated well logs against measured well logs provides quantitative verification of the relative impact of relevant formation properties on the well logs, including water quality.

A central contribution of the numerical simulation of well logs is the generation of expected well-log signatures for a wide variety of petrophysical, fluid, and water quality conditions, for comparison against existing well logs. When all petrophysical and geometrical conditions are accounted for in the numerical simulation of well logs, the matching of available well logs and their numerical simulations can explicitly yield quantitative estimates of water quality without invoking ad-hoc and/or empirical correlations. The method can equally be used for interpretation of evaporitic, clastic, or carbonate formations, all of which exist in the Rustler Formation.

Task 2.5 Related Deliverables

See Exhibit D for report formatting guidelines. See Exhibit G for data requirements.

- An analysis in the form of figures and text showing the relative sensitivity of the resistivity logs to geometrical and petrophysical conditions. This sensitivity analysis will guide the analysis of the resistivity logs for calculation of water quality for the final report.
- A value for the resistivity of the formation water (R_w) factoring in the sensitivity of the resistivity signature to the aforementioned geometrical and petrophysical conditions.
- Consultation on this methodology for the final report.
- Copy of the simulated well logs to add to the BRACS database for the final report.

Task 2.6 – Interpret Water Quality Based on Distribution of Resistivity. Resistivity (ohm-m2/m or ohm-m) can be defined as the degree to which a substance resists the flow of an electrical current. In general, resistivity is inversely related to conductivity (millisiemens per meter or mS/m) and generally inversely related to Total Dissolved Solids (mg/L). That is, the higher the resistivity, the fresher the water and the lower the resistivity, the more brackish the water. Resistivity is measured in a borehole by lowering a logging tool down the borehole and using a multiple-electrode array to apply a constant current into the formation and measure the voltage drop. The resulting True Resistivity (R_t) is recorded on a geophysical log and represents the varying resistivity values within and amongst the formations contacted in the borehole. Assuming that the units contacted by the borehole had no electronic, as opposed to electrolytic, conductivity, then the rocks are electrical insulators and would exhibit an infinite resistivity.

However, since rocks have a least some small amount of interconnected porosity, and that porosity is filled with a conducting fluid (oil, gas or water), the rock will have a measureable resistivity. Where the formation is 100 percent saturated with water (S_w = 100%) as opposed to some combination of water, oil or gas (S_w < 100%), as it is in the Rustler Aquifer, then the True Resistivity (R_t) is equal to the Resistivity of the rock filled with formation water (R_o). The Resistivity of the Water (R_w) is related to the Resistivity of the water filled formation (R_o) through the Archie Equation (Archie, 1942):
Where:

$$R_w = \frac{1}{\Phi^m} \times R_o$$

Where:

R_w = the resistivity of the water within the formation
Φ = porosity (provided from geophysical log interpretations and sensitivity analysis)
m = the cementation exponent (varied based on permeability of the Dolomite Members)
R_o = the resistivity of a 100 percent water saturated formation

The value of m reflects the tortuosity of current flow through the maze of rock pores (Dewan, 1983). Uncertainty in both the porosity and cementation exponent can result in a wide range of R_w calculations if not properly constrained. Fortunately, through numerical simulation using existing geophysical logs such as gamma, neutron porosity, resistivity, etc. in combination with known characteristics of the Rustler Aquifer, the porosity and cementation exponent can be appropriately constrained, resulting in a constrained calculation of R_w from R_t.

Once the resistivity of the formation water (R_w) has been parsed out of the true resistivity (R_t), the calculation of water quality (calculated TDS in mg/L) is relatively straightforward using the Archie Equation as an approximate guide:

First, the R_w at formation temperature must be corrected to R_w at 75°F based on formation temperature. Then, the formation water resistivity at 75°F ($R_{w\ 75}$) will be converted to Specific Conductance at 75°F:

$$C_{w75} = \frac{10{,}000}{R_{w75}}$$

Where:

C_{w75} = Specific Conductance at 75°F
R_{w75} = Formation water resistivity at 75°F

This is followed by the calculation of sodium chloride equivalent TDS:

$$TDS_{NaCl} = ct \times C_{w75}$$

Where:

TDS_{NaCl} = Sodium chloride equivalent Total Dissolved Solids in milligrams per liter (mg/L)

$ct = C_{w75}$ - TDS conversion factor (derived using water quality samples from water wells producing from the formation of interest which would be the Rustler in this case)
C_{w75} = Specific Conductance at 75°F

This conversion of R_w to TDS diverts from Estepp's R_{wa} Minimum TDS method (Estepp, 1998) in that we do not apply a correction factor based on ionic makeup of the water, but instead assume that the calculation is for a sodium chloride equivalent TDS. Based on analysis performed by Ewing and others (2012), the Rustler Formation water makeup is high calcium, high sulfate, and low carbonate.

The extra step in this calculation requires a conversion from sampled TDS at the well to TDS_{NaCl} using the Schlumberger Chart Gen-4 (formerly Gen-8) shown in Figure 7-4 of Exhibit A (2009). The chart is used to approximate the parts-per-million (ppm) concentration of a sodium chloride solution for which the total solids concentration of the solution is known (Schlumberger, 2009). Individual values for the ionic makeup of the Rustler Aquifer will be used to calculate an equivalent TDS_{NaCl} from the formation water samples and a ratio of the TDS_{NaCl} to calculated TDS will be developed. There are roughly 85 locations that have the necessary water quality data needed to calculate this ratio. This ratio will be used as the last step to convert from TDS_{NaCl} to calculated total dissolved solids (TDS_{calc}) using the following equation:

$$TDS_{calc} = TDS_{NaCl} \times cf_{Rustler}$$

TDS_{calc} = Calculated Total Dissolved Solids in milligrams per liter (mg/L)
TDS_{NaCl}= Equivalent sodium chloride TDS calculated from R_w
$cf_{Rustler}$ = Correction factor specifically derived for the Rustler Aquifer from existing water quality samples (Figure 7-1) and Schlumberger Chart Gen-4 (Figure 7-4 of Exhibit A)

While there are other methods for calculating TDS from resistivity logs, primarily the Mean Ro Method (Estepp, 2010), we do not anticipate that the data will be available to use this method. In addition to the Mean Ro Method, the spontaneous potential curve can be used to calculate TDS. However, given the high salt content of the drilling mud, our experience has shown that the margin of error from calculations using the SP log is too large. Regardless, this method will be investigated in combination with the sensitivity simulations generated in Task 2.4.

Geophysical logs with resistivity curves will be digitized to .las format. The resistivity signatures over the dolomite members of the Rustler Formation, as defined in Task 2.2 and 2.3, will be compared to the simulated resistivity logs generated as part of the sensitivity analysis performed in Task 2.4. Resulting comparisons will guide the parsing of R_w from R_t on a log-by-log basis. In addition, R_w values derived from SPWLA (1982) will be used as a general guide for the parsing of R_w from R_t.

Corrected resistivity values on a per-foot basis over the Culebra and Magenta dolomites will be used to calculate TDS. These calculated TDS values will then be averaged over each of the dolomite members of the Rustler Formation, where they are identifiable in Task 2.2. Where the two dolomite members are not identifiable, and it is suspected that collapse has occurred,

resistivity measurements will be evaluated over the entire Rustler Formation thickness. In these areas, an effort will be made to find and justify resistivity values that appear to make sense and that are not in stark contrast to surrounding water quality calculations or measurements. Resistivity logs in suspected collapse areas will be treated with caution. Where applicable, calculated TDS values will be compared to sampled water quality from water wells.
If values are significantly different, results from the sensitivity analysis will be used to guide modifications to the approach in order to reduce this mismatch. The result will be a calculated TDS for the Culebra and Magenta dolomites where they are able to be distinguished and calculated TDS over the entire Rustler Formation in areas where the dolomite members are not distinguishable.

Averaged water quality calculations, conversions of R_w to TDS_{calc}, and water quality samples will be tabulated. In areas where the calculation is being made from resistivity logs and the Culebra and Magenta dolomites are distinguishable, there will be one calculation for the Culebra and one for the Magenta. If the two values are reasonably close, they will be averaged for consistency. In areas where there is a water quality sample or a conversion from R_w to calculated TDS, the TDS measurement will be applied to both of the units. Where the Rustler Formation is suspected to be collapsed, the water quality sample, measurement, or conversion will be applied over the entire Rustler Formation thickness.

These point location values, along with the shapefile for porosity zonation generated in Task 2.4, will be brought into ArcGIS and interpolated to delineate cutoffs for fresh, slightly saline, moderately saline, and very saline groundwater based on the classification by Winslow and Kister (1956).

<u>Task 2.6 Related Deliverables</u>
See Section II and III of the Request For Qualifications NO. 580-16-RFQ0008 for detailed descriptions of deliverables (Exhibit I). See Exhibit D for report formatting guidelines, Exhibit G for data requirements, and Exhibit H for report outline.

- Tabulated calculations, conversions and water quality samples for integration in the BRACS database, for the final report, including:
    - Roughly 85 calculations of ionic values to equivalent TDS_{NaCl}.
    - Ratio(s) for TDS_{NaCl} to TDS_{calc} for the conversion of R_w.
    - R_w values parsed from R_t on a log-by-log basis.
    - Corrected resistivity values on a per-foot basis over the Culebra and Magenta dolomites.
    - Averaged resistivity values for each dolomite pick where the two were identifiable, evaluated resistivities for the entire Rustler where collapse is suspected.
    - Calculated TDS for the Culebra and Magenta dolomites where they are able to be distinguished and calculated TDS over the entire Rustler Formation in areas where the dolomite members are not distinguishable.
- Interpolated surfaces for fresh, slightly saline, moderately saline, and very saline for the final report.
- Extent polygons for salinity classes for the final report.

- Text describing Task 2.6 methodology for the final report.
- Figures describing Task 2.6 methodology for the final report.

Task 3 – Quantify Volume of Fresh, Brackish, and Saline Groundwater

The INTERA Team will develop a GIS-based application to calculate volumes of fresh, slightly saline, moderately saline, and very saline groundwater by aquifer (Rustler), member (Culebra and Magenta dolomites), county, GCD, and groundwater management area for the Rustler Aquifer. The application will consist of scripts that automate the workflow in ArcMap (and the Spatial Analyst extension) and enable volumes to be calculated. This guarantees both reproducible results and the ability to quickly assess sensitivity of volume calculations to uncertain parameters, such as storage properties.

Notable features of the scripted workflow include:

- Calculations made based on a snap grid to ensure a consistent raster-based geometry with a common origin, extent, and cell size.
- Incorporates surface rasters developed by the INTERA Team as part of this analysis for the top and base of the Culebra and Magenta dolomite members of the Rustler Formation and top and base of the Rustler Formation. A shapefile developed as part of Task 2.4 will be used to distinguish between areas of primary and secondary porosity. In areas that are identified as having primary porosity, volumetric calculations will be confined to the Culebra or Magenta dolomite or the combination of the two units. Porosities in these areas will be interpolated from porosities derived from neutron porosity logs. In areas identified as having secondary porosity, the volumetric calculations will be calculated over the entire Rustler Formation thickness and the porosity values will be reflective of secondary porosity systems in the project area.
- Provides options for different assumptions and approaches to calculate volume either based on porosity, as derived from a geophysical logs, or a drainage volume such as specific yield (S_y), as derived from the Rustler GAM (Ewing and others, 2012).
- Allows the user to calculate groundwater volumes for any polygon-defined area (i.e., allows subdivision of larger salinity zones into the PPAs for volume calculations).

The scripted workflow will be implemented in the following 6-step sequence.

Step 1. ***Load the BRACS database into the GIS project.*** The database will contain the porosity values, identification of porosity type (primary or secondary), thicknesses of the Culebra and Magenta Dolomites, and water quality estimates from the geophysical logs and water quality samples from water wells.

Step 2. ***Load Additional Control Points.*** To guide calculation of groundwater volumes in regions where the geophysical data is sparse or complex, the INTERA Team will develop a set of control points for porosities, specific yield, unit thicknesses (Rustler or Dolomite units) and TDS

concentrations that are based on an interpretation and extrapolation of geophysical data, measured water TDS concentrations at groundwater wells, R_w based water quality calculations, and published literature.

Step 3. ***Load Extents for Salinity Classes.*** The delineated areas for each salinity class will be defined by polygon shapefiles.

Step 4. ***Generate Unit Thickness and Average Porosity (or Specific Yield) by Formation for Each Raster Cell.*** The application will include scripts to generate rasters of unit thickness and average porosity. The interpolation of the data in the BRACS database and Control Points will use one of the several options supported by ArcMap. The scripts will include raster calculations that ensure that inversions in thickness or porosities outside of physical ranges do not occur.

Step 5. ***Generate Unit Thickness for each Water Quality Type.*** The application will provide scripts to calculate the thickness associated with each defined water quality category (fresh, slightly saline, moderately saline, or saline) by unit.

Step 6. ***Calculate Groundwater Volumes.*** The area of interest will be specified by using an existing shapefile or a list of grid cells and assumptions regarding drainage porosity and the unit(s) of interest. The GIS application will create an ASCII file containing the tabulated results and will create shapefiles that show the spatial distribution of fresh, slightly saline, moderately saline, and very saline groundwater volumes.

Prior to developing the GIS application to calculate groundwater volumes for the project, we will meet with the TWDB to explain the data available for the application, the options available for interpolating the data, and the options for calculating water volumes. The GIS application deliverable to the TWDB will include the top and bottom raster surfaces, thickness maps of the Culebra and Magenta dolomites in areas with suspected primary porosity, thickness maps of the Rustler Formation in areas of suspected secondary porosity, thickness maps of the Rustler over the entire TWDB-defined Rustler Aquifer boundary, salinity classification zone top and bottom raster surfaces, PPA top and bottom raster surfaces, well control point files, and project raster snap grid. All raster surfaces will share the same map projection and snap grid attributes.

<u>Task 3 Related Deliverables</u>
See Section II and III of the Request For Qualifications NO. 580-16-RFQ0008 for detailed descriptions of deliverables (Exhibit I). See Exhibit D for report formatting guidelines, Exhibit G for data requirements, and Exhibit H for report outline.

- Consultation on how to use the INTERA Team developed GIS-based application to calculate volumes.
- Tools, files and/or scripts used to delineate salinity zones and volumes for the final report.
- Shapefile of additional control points created from best professional judgement to guide interpolation for the final report.
- Extent polygons of the salinity classes for the final report.
- Thickness and average porosity rasters of stratigraphic unit(s) agreed upon after the TWDB meeting to discuss the draft report documenting techniques and approaches for

the final report.

- Thickness rasters associated with each defined water quality category (fresh, slightly saline, moderately saline, or saline) for the final report.
- Snap raster for the final report.
- Table showing the volumes of different groundwater salinity classes for zone, county, groundwater conservation district, and groundwater management area for the final report.
- Description of the salinity zones for the final report.
- Description of volume calculations for the final report.
- Description of the volumes for the final report.

Task 4 – Delineate Potential Production Areas (PPAs)

The INTERA Team will identify the vertical and lateral extent of brackish and saline groundwater in the Rustler in Task 3. This will generally define potential production areas (PPAs) for brackish groundwater in the Rustler. In Task 4, we will identify the areas where long-term pumping of a brackish zone will not significantly impact fresh groundwater or a brackish groundwater source currently serving as a significant water supply. To accomplish this task, we will extend our hydrostructural and transmissivity model developed in Ewing and others (2012), map potential hydrogeological barriers, and identify specific areas to be protected.

Task 4.1 Refine Hydrostructural Model and Transmissivity Estimates. The most refined regional structural analysis, and the only regional assessment of transmissivity of the Rustler, was performed as part of developing the Rustler GAM (Ewing and others, 2012). The structure of the Rustler is very complex (see Figure 7-2 showing major faults). Likewise, the hydrogeologic nature of the Rustler is a product of depositional environment, lithology, diagenesis, and post-depositional alteration of the Rustler and the underlying Salado Formation. As previously discussed, these factors are a proxy for interpreting transmissivity of the Rustler. In such a complex aquifer with a general lack of aquifer test data, we will rely on a conceptual understanding of the factors described above to estimate transmissivity on a regional basis. Ewing and others (2012) developed a conceptualization for the Rustler, termed a hydrostructural model, that was used to help define flow systems within the aquifer and to develop a model for transmissivity and storativity of the aquifer. We will use this framework as a foundation for our analysis. Any new results from the current project will be used to modify or refine the regional understanding documented in Ewing and others (2012).

<u>Task 4.1 Related Deliverables</u>
See Sections II and III of the Request For Qualifications NO. 580-16-RFQ0008 for detailed descriptions of deliverables (Exhibit I). See Exhibit D for report formatting guidelines, Exhibit G for data requirements, and Exhibit H for report outline.

- Overview of the existing Rustler GAM for the final report.
- Description of any new results from the current project and modifications made to incorporate those results in the Rustler GAM for this project for the final report, as applicable.

Task 4.2 Map Hydrogeologic Barriers. The primary objective of mapping hydrogeological barriers is to provide geologic constraints on the location and deliverability of brackish groundwater in the Rustler. Specifically, it is important to identify anhydrite or polyhalite sequences within the aquifer that act as regional aquitards/aquicludes or major structural features (faults) that separate sections of the aquifer. Ewing and others (2012) initiated the process of defining, through a hydrostructural conceptual model, lithology and diagenesis or post-depositional alteration that likely play a role in aquifer transmissivity. All major faults were mapped, fault throws were examined, and the regions where the Rustler remains in contact across the faults or the degree of separation that occurs, were defined. Using this structural data and through model calibration, fault conductances were calculated and their sensitivity to model calibration was investigated. The new research from this project will be used to augment the framework developed in Ewing and others (2012). Because cross-formational flow can be important to portions of the Rustler Aquifer flow field and the concepts of isolation, we will use stratigraphic contacts as well as modeled vertical conductance to review vertical isolation. This will include contacts across faults. In general, consideration of isolation below the Rustler is not warranted.

Task 4.2 Related Deliverables

See Sections II and III of the Request For Qualifications NO. 580-16-RFQ0008 for detailed descriptions of deliverables (Exhibit I). See Exhibit D for report formatting guidelines, Exhibit G for data requirements, and Exhibit H for report outline.

- Description of any hydrogeologic barriers identified for the final report.
- GIS datasets of any hydrogeologic barriers identified for the final report.
- Figure showing any hydrogeologic barriers identified for the final report.

Task 4.3. Identify Excluded Areas. As described in the RFQ, PPAs cannot include an aquifer with an average TDS concentration of more than 1,000 mg/L and that is serving as a significant source of water supply for municipal, domestic, or agricultural purposes. To identify these areas, we will review a current listing of groundwater registrations and permits from the GCDs in the aquifer boundaries, a current listing of public water supply (PWS) wells from the TCEQ, and the large-diameter wells listed in the TWBD's database on submitted driller's reports. In addition, we will coordinate with the TWDB to locate any other databases that can help identify a significant water source of interest. We will present potential significant sources at the second stakeholder meeting and take stakeholder input on the meaning and/or intent of "significant source." The RFQ also states that a PPA cannot include a part of a geologic stratum that is designated or used for wastewater injection through the injection or disposal wells. To identify these areas, we will review the TCEQ and Railroad Commission of Texas databases that contain records of permitted injection and disposal wells.

Task 4.3 Related Deliverables

See Sections II and III of the Request For Qualifications NO. 580-16-RFQ0008 for detailed descriptions of deliverables (Exhibit I). See Exhibit D for report formatting guidelines, Exhibit G for data requirements, and Exhibit H for report outline.

- Presentation on possible excluded areas for the second stakeholder meeting.

- Description of areas excluded from consideration as potential production areas, following the TWDB Meeting 3 (see Task 1 for the list of meetings), for the final report.
- GIS datasets delineating areas excluded from consideration as potential production areas for the final report.
- Figure showing areas excluded from consideration as potential production areas for the final report.

Task 4.4. Identify and Present Potential Production Areas (PPAs). Based on the findings from Tasks 4.1 through 4.3, the INTERA Team will identify PPAs. The areas must be brackish/saline, potentially productive, and hydrogeologically isolated from the excluded areas. As part of identifying PPAs, Dr. Justin Sutherland of Carollo will assist in determining the feasibility for treatment of any specific groundwater constituents that can impede desalination of brackish groundwater. These feasibility evaluations will be used as one of the evaluation criteria for prioritizing PPAs. Each of the PPAs will be assigned a unique identification number, and maps showing the locations of the PPAs will be created prior to Stakeholder Meeting 2 (see Task 1 for the meeting list) to discuss the PPAs with stakeholders.

<u>Task 4.4 Related Deliverables</u>
See Sections II and III of the Request For Qualifications NO. 580-16-RFQ0008 for detailed descriptions of deliverables (Exhibit I). See Exhibit D for report formatting guidelines, Exhibit G for data requirements, and Exhibit H for report outline.

- Tools, files and/or scripts used to delineate potential production areas produced as part of this project.
- Write up on potential production areas identified for the final report, each assigned a unique ID.
- Potential production areas GIS datasets with all production area attributes for the final report.
- Potential production areas table for integration into the BRACS Database for the final report.
- Figure(s) showing potential production areas for the final report.
- Before Stakeholder Meeting 2, create a description of possible impacts to water availability and water quality if the areas were produced
- A draft document of stakeholder input from Stakeholder Meeting 2.
- Feasibility evaluations for treatment of any specific groundwater constituents that can impede desalination of brackish groundwater for the potential production areas for the final report.

Task 4.5. Prioritize Potential Production Areas (PPAs). The INTERA Team will meet with TWDB staff for TWDB Meeting 3 (see Task 1 for the meeting list) to discuss the stakeholder comments on the identified PPAs from Stakeholder Meeting 2. Criteria for prioritizing the PPAs will be presented and specific areas for further analysis will be identified. The TWDB will provide the final criteria for prioritizing the PPAs. At the end of the meeting, or soon thereafter, a list of priority PPAs will be developed.

<u>Task 4.5 Related Deliverables</u>

See Sections II and III of the Request For Qualifications NO. 580-16-RFQ0008 for detailed descriptions of deliverables (Exhibit I). See Exhibit D for report formatting guidelines, Exhibit G for data requirements, and Exhibit H for report outline.

- After the Stakeholder Meeting 2 and TWDB Meeting 3, a prioritized list of potential production areas for 30-year and 50-year pumping estimates.

Task 5 – Determine Availability of Brackish Groundwater in Potential Production Areas (PPAs)

During TWDB Meeting 3, the INTERA Team will discuss an approach for using a groundwater model to determine brackish groundwater availability in the identified PPAs. For priority PPAs, the modeled availability will be calculated for 30-year and 50-year production periods. The modeling will evaluate metrics, agreed upon by TWDB and INTERA, to be used in later studies to define significant impacts.

Based on the complexity of the Rustler and the limited time frame and budget available for model development activities, we will use the Rustler GAM as the basis of our calculations to the extent practicable. Because brackish PPAs may have relatively small footprints and near-field hydraulics may be important to vertical connections, the model grid (currently on a 1/4-mile grid scale) may need to be refined. This can be accomplished with the MODFLOW-NWT (Niswonger and others, 2011) code used for the GAM or by using MODFLOW-USG (Panday and others, 2013). If the current GAM is determined to be inadequate for simulating the required hydraulics, we will adapt a semi-analytic approach. This, or another, approach will be discussed in detail with the TWDB before it is applied.

The number of PPAs to be modeled will be determined in consultation with the TWDB at TWDB Meeting 3. Once the modeling approach and formulations are approved, the next step will be to assign aquifer properties. While the current Rustler GAM is calibrated, as discussed in Ewing and others (2012), properties including transmissivity, storativity, and vertical and fracture/fault conductances are not well constrained. In addition, as part of this project we will be defining the individual members of the Rustler that may be contributing flow as well as the importance of secondary versus primary porosity on productivity. As a result, based on the GAM estimates and the characteristics of the brackish PPA groundwater bearing members, we will assign a best estimate (likely from the GAM unless inconsistent with current project interpretation), an upper value, and a lower value for each aquifer hydraulic property.

For the top prioritized brackish PPAs, a steady-state predevelopment scenario will be used as the initial condition for the 30-year and 50-year pumping scenarios. For the pumping scenarios, we will perform a series of Monte Carlo-type runs based on three to six different values of pumping and seven to 15 different sets of assumed aquifer parameters. The boundary condition and fault conductances can be evaluated using the GAM as well as the base case simulation. To look at uncertainty in hydraulic diffusivity of the Rustler due to reduced pore volume, secondary porosity, or general lack of data, we will post-process the base case results. Because the process

being modeled is confined groundwater flow, it will be linear with the possible exception of some areas near boundaries (which can be tested using the GAM). The ensemble of simulated hydraulic heads for each model run will be processed using scripts to calculate pumping impacts. Examples of pumping impacts that can be quantified include average drawdown across a region, drawdown values at a boundary, drawdown at existing wells, or changes to Desired Future Conditions.

Task 5 Related Deliverables

See Sections II and III of the Request For Qualifications NO. 580-16-RFQ0008 for detailed descriptions of deliverables (Exhibit I). See Exhibit D for report formatting guidelines, Exhibit G for data requirements, and Exhibit H for report outline.

- Tools, files and/or scripts used to estimate the capacity of potential production areas over 30 and 50 year periods, to calculate metrics approved by TWDB that will be used by stakeholders and TWDB to define significant impact, as defined in Task 4, for the final report.
- Description of the various pumping values, aquifer parameters and capacities for potential production areas over 30 and 50 year periods, for the final report.
- Table(s) or matrix and graph(s) of various pumping values, aquifer parameters and capacities for potential production areas over 30 and 50 year periods and associated metrics to be used to characterize significant impact by stakeholders and TWDB, without causing a significant impact, as defined in Task 4, for the final report.

Task 6 – Final Report, Documentation, and Technology Transfer

Because the Identification of Potential Brackish Groundwater Production Areas - Rustler Aquifer will support planners and decision makers in better formulating water management strategies for the resource, the thorough documentation of the project data, the methods used to generate the data, and the data analyses results is critical to ensuring it is scientifically-defensible. All documentation for the project will be prepared in a manner consistent with the format and content specified by TWDB in Section III – Deliverables of the RFQ (Exhibit I).

An abridged list of final deliverables, as specified by TWDB in Section III – Deliverables of the RFQ (Exhibit I), include:

- Final technical report summarizing the results of the project, delivered in both Microsoft Word and PDF formats. See Exhibit D for formatting guidelines and Exhibit H for the report outline.
- Updated data for the BRACS Database containing all new well records used in the project.
- Copies of water well reports, water quality reports, and geophysical well logs used in the project (unless those reports and logs already exist in the TWDB Groundwater or BRACS databases).
- Three-dimensional GIS datasets that delineate each of the groundwater salinity zones, PPAs, and the estimated volumes of brackish groundwater production for the prioritized PPAs in 30- and 50-year timeframes.

- All geophysical well logs interpreted for TDS and all interpretation data values documented in table(s) with links to attributes in a Microsoft Access database format that can be linked to existing BRACS Database tables.
- Tools and techniques used for determining the extent and volumes of the required ranges of total dissolved solids in the groundwater.
- The calculated volumes of groundwater within each aquifer and each TWDB-prioritized potential production areas organized by salinity classification zone, county, groundwater conservation district, and groundwater management area.

Having produced dozens of draft and final reports associated with our work on other hydrogeological studies and GAM projects for the TWDB, INTERA is intimately familiar with the BRACS and other program contract data requirements, including GIS data and map projection standards, BRACS database standards, and well report and geophysical well log file naming and organization standards.

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EXHIBIT C

TASK AND EXPENSE BUDGETS

TASK BUDGET

TASK	DESCRIPTION	AMOUNT
1	Project Management	$9,234.75
2	Delineate Vertical & Horizontal Extent of Fresh, Brackish & Saline Groundwater	97,687.86
3	Quantify Volume of Fresh, Brackish & Saline Groundwater	13,678.93
4	Delineate Potential Production Areas	20,531.76
5	Determine Availability of Brackish Groundwater in Potential Production Areas	23,086.34
6	Final Report, Documentation, and Tech Transfer	35,780.36
TOTAL		**$200,000.00**

EXPENSE BUDGET

CATEGORY	AMOUNT
Salaries & Wages[1]	$37,778.38
Fringe[2]	17,797.40
Travel[3]	687.90
Other Expenses[4]	30,000.00
Subcontract Services	54,000.00
Overhead[5]	44,695.61
Profit	15,040.71
TOTAL	**$200,000.00**

[1] Salaries and Wages is defined as the cost of salaries of engineers, draftsmen, stenographers, surveymen, clerks, laborers, etc., for time directly chargeable to this contract.
[2] Fringe is defined as the cost of social security contributions, unemployment, excise, and payroll taxes, workers' compensation insurance, retirement benefits, medical and insurance benefits, sick leave, vacation, and holiday pay applicable thereto.
[3] Travel is limited to the maximum amounts authorized for state employees by the General Appropriations Act, Tex. Leg. Regular Session, 2015, Article IX, Part 5, as amended or superseded
[4] Other Expenses is defined to include expendable supplies, communications, reproduction, postage, and costs of public meetings directly chargeable to this CONTRACT.
[5] Overhead is defined as the costs incurred in maintaining a place of business and performing professional services similar to those specified in this contract.

EXHIBIT D

GUIDELINES FOR AUTHORS SUBMITTING CONTRACT REPORTS TO THE TEXAS WATER DEVELOPMENT BOARD

1.0 Introduction

The purpose of this document is to describe the required format of contract reports submitted to the Texas Water Development Board (TWDB). Our reason for standardizing the format of contract reports is to provide our customers a consistent, and therefore familiar, format for contract reports (which we post online for public access). Another reason for standardizing the format is so that we can more easily turn a contract report into a TWDB numbered report if we so choose. Remember that your report will not only be seen by TWDB staff, but also by any person interested in the results of your study. A professional and high quality report will reflect well on you, your employer, and the TWDB.

Available upon request, we will provide a Microsoft Word template (used to write these instructions) that gives the fonts, spacing, and other specifications for the headings and text of the report. Please follow this template as closely as possible.

2.0 Formatting your report

The TWDB format is designed for simplicity. For example, we use Times New Roman for all text. We use 12 point, single-spaced text, left justification for paragraph text, 18 point bold for first-level headings, and 14 point bold for second-level headings. Page numbers are centered at the bottom of the page. Other than page numbers, please refrain from adding content to the document header or footer. Page setup should use one-inch margins on all four sides.

2.1 Text

The best way to format your document is to use the styles described and embedded in the template document (Authors_Template.dot) that is available on request from the TWDB. To use the Authors_Template.dot file, open it in Word (make sure *.dot is listed under Files of type) and save it as a .doc file. Advanced users can add the .dot file to their computers as a template. Make sure the formatting bar is on the desktop (to open, go to View→Toolbars→Formatting) or, to view all of the formatting at once, go to Format→Styles and Formatting and select Available Styles from the dropdown box at the bottom of the window. The formatting in the template document provides styles (such as font type, spacing, and indents) for each piece of your report. Each style is named to describe what it should be used for (for example, style names include Chapter Title, Body Text, Heading 1, References, and Figure or Table Caption). As you add to your report, use the dropdown list on the Formatting Toolbar or the list in the Styles and Formatting window to adjust the text to the correct style. The Authors_Template.dot file shows and lists the specifications for each style.

2.1.1 Title

Give your report a title that gives the reader an idea of the topic of your report but is not terribly long. In addition to the general subject (for example, “Droughts”), you may include a few additional words to

describe a place, methodology, or other detail focused on throughout the paper (for example, "Droughts in the High Plains of Texas" or "Evaluating the effects of drought using groundwater flow modeling"). Please capitalize only the first letter of each word except 'minor' words such as 'and' and 'of'. Never use all caps.

Use headings to help the reader follow you through the main sections of your report and to make it easier for readers to skim through your report to find sections that might be the most interesting or useful to them. The text of the report should include an executive summary and sections outlined in 4.4 of Attachment 1. Headings for up to five levels of subdivision are provided in the template; however, we suggest not using more than three or four levels of subdivision except where absolutely necessary. Please avoid stacked headings (for example, a Heading 1 followed immediately by a Heading 2), and capitalize only the first letter of headings or words where appropriate—never use all caps.

2.2 Figures and photographs

To publish professional-looking graphics, **we need all originals to be saved at 300 dots-per-inch** (dpi) and in grayscale, if possible, or in the CMYK color format if color is necessary. Excessive use of color, especially color graphics that do not also work in grayscale, will prevent us from publishing your report as a TWDB numbered report (color reproduction costs can be prohibitive). Preferred file formats for your original graphics are Adobe Illustrator (.ai), Photoshop (.psd), EPS with .tiff preview, .jpg, .png, or .tiff files. Refrain from using low resolution .jpg or .gif files. Internet images at 72 dpi are unacceptable for use in reports.
All graphics shall be submitted in two forms:

1. Inserted into the Microsoft Word document before you submit your report. Ideally, inserted graphics should be centered on the page. Format the picture to downsize to 6 inches wide if necessary. Please do not upsize a graphic in Word.
2. Saved in one of the formats listed above.

2.2.1 Other graphics specifications

It is easiest to design your figures separately and add them in after the text of your report is more or less complete. Graphics should remain within the 1-inch page margins of the template (6.5 inches maximum graphic width). Be sure that the graphics (as well as tables) are numbered in the same order that they are mentioned in the text. Figures should appear embedded in the report after being called out in the text. Also, remember to include a caption for each graphic in Word, not as part of the graphic. We are not able to edit or format figure captions that are part of the figure. For figures and photographs, the caption should appear below the graphic. For tables, the caption should appear above.

2.2.2 Creating publication-quality graphics

When designing a graphic, make sure that the graphic (1) emphasizes the important information and does not show unnecessary data, lines, or labels; (2) includes the needed support material for the reader to understand what you are showing; and (3) is readable (see Figures 1 and 2 for examples). Edward R. Tufte's books on presenting information (Tufte, 1983; 1990; 1997) are great references on good graphic design. Figures 1 through 3 are examples of properly formatted, easy to understand graphics. Do not include fonts that are less than 6 points.

For good-looking graphics, the resolution needs to be high enough to provide a clear image at the size you make them within the report. In general, 300 dpi will make a clear image—200 dpi is a minimum. Try to create your figures at the same size they will be in the report, as resizing them in Word greatly reduces image quality. Photographs taken with at least a two-megapixel camera (if using digital) and with good contrast will make the best images. Save the original, and then adjust color levels and size in a renamed image copy. Print a draft copy of your report to double-check that your figures and photographs have clear lines and show all the features that you want them to have.

Figures and photographs should be in grayscale. Color greatly adds to the cost of printing, so we are trying to keep it to a minimum. Also remember that your report may be photocopied, scanned, or downloaded and printed in black and white. For this reason, you should use symbols or patterns, or make sure that colors print as different shades in black and white. All interval or ratio data (data measuring continuous phenomena, with each color representing an equal interval) need to be displayed in a graded scale of a single color (Figure 3). This way your figures will be useful even as a photocopy.

If you need help with your graphics or have questions, please contact the TWDB graphics department at (512) 936-0129.

2.2.3 Using other people's graphics

Figures and photographs (and tables) need to be your own unless you have written permission from the publisher that allows us to reprint them (we will need a copy of this permission for our records). Avoid using any figures or photographs taken off the Internet or from newspapers or magazines—these sources are difficult to cite, and it is often time-consuming and expensive to gain permission to reproduce them.

2.3 Tables

Tables should be created in Microsoft Word (see Table 1). Tables should include a minimal amount of outlining or bold font to emphasize headings, totals, or other important points. Tables should be numbered separately from figures, and captions should appear above the text of the table.

Table 1: A sample table. Note caption above table.

Table text heading*

Table text	1940	1950	1960	1970	1980	1990	2000	%GW
Table text	15	441	340	926	196	522	83	97.4
Table text	64	944	626	173	356	171	516	99.9
Total	79	1385	966	1099	552	693	599	

* A footnote should look like this using 10 point Times New Roman.
%GW = percent groundwater
Be sure to describe any abbreviations or symbols, and, unlike in this table, be sure to note the units!

3.0 Units

Measurements should be in English units. Metric units may be included in parentheses after the English units.

All units of geologic time should conform to the most recent geologic timescale (Gradstein and others, 2004). A summary of this timescale is available from the International Commission on Stratigraphy's website at http://stratigraphy.org/chus.pdf.

4.0 Citations and references

It is important to give credit where credit is due. Therefore, be sure to use the appropriate citations and include references in your paper.

4.1 In-text citations

Each piece of information you use in your report that comes from an outside source must be cited within the text using the author's last name and the year of publication. If there are two authors, list the last name of each followed by the year, and if there are more than two authors, list the last name of the first author followed by "and others" and the year. For example: the end of the Jurassic Period occurred approximately 145.5 million years ago (Gradstein and others, 2004).

4.2 References

All sources that are cited within the report should be listed at the end of the paper under the heading References. The references should follow the guidelines in "Suggestions to Authors of the Reports of the United States Geological Survey" (Hansen, 1991). These are available online at http://www.nwrc.usgs.gov/lib/lib_sta.html (a link to the chapter "Preparing references for Survey reports," p. 234-241, is found here). Several examples of complete reference citations are listed at the end of these guidelines. Be sure that any citations that appear in tables or figures are included in the reference list. Also, before submitting the report, please check that all the citations in the report are included in the reference list and all references in the reference list are cited in the report. If at all possible, avoid web-based citations. These materials are often transient and therefore useless to future readers.

5.0 Submitting your report

Before you submit your report, proofread it. Look for spelling and grammatical errors. Also, check to see that you have structured the headings, paragraphs, and sentences in your paper so that it is easy to follow and understand (imagine you are a reader who does not already know the information you are presenting!).

6.0 Conclusions

Following the instructions above and providing accurate and readable text, tables, figures, and citations will help to make your report useful to readers. Scientists may read your report, as well as water planners, utility providers, and interested citizens. If your report successfully conveys accurate scientific information and explanations to these readers, we can help to create more informed decisions about the use, development, and management of water in the state.

7.0 Acknowledgments

Be sure to acknowledge the people and entities that assisted you in your study and report. For example: We would like to thank the Keck Geology Consortium, the American Society of Civil Engineers, and the

Texas Bar CLE for providing examples to use in developing these guidelines. In addition, we appreciate Mike Parcher for providing information on how to create publication-quality graphics, Shirley Wade for creating the data used in sample Figure 1, and Ian Jones for providing sample Figure 3.

8.0 References

Gradstein, F.M., J.G. Ogg, and A.G. Smith, eds., 2005, A geologic time scale 2004: Cambridge, Cambridge University Press, 610 p.

Hansen, W.R., ed., 1991, Suggestions to authors of the reports of the United States Geological Survey (7th ed.): Washington, D.C., U.S. Government Printing Office, 289 p.

Tufte, E. R., 1983, The visual display of quantitative information: Cheshire, C.T., Graphics Press, 197 p.

Tufte, E. R., 1990, Envisioning information: Cheshire, C.T., Graphics Press, 126 p.

Tufte, E. R., 1997, Visual explanations: Cheshire, C.T., Graphics Press, 156 p.

9.0 Examples of references

Arroyo, J. A., and Mullican, III, W. F., 2004, Desalination: *in* Mace, R. E., Angle, E. S., and Mullican, W. F., III, editors, Aquifers of the Edwards Plateau: Texas Water Development Board Report 360, p. 293-302.

Bates, R. L., and Jackson, J. A., 1984, Dictionary of geological terms: Anchor Press/Doubleday, Garden City, New York, 571 p.

Blandford, T. N., Blazer, D. J., Calhoun, K. C., Dutton, A. R., Naing, T., Reedy, R. C., and Scanlon, B. R., 2003, Groundwater availability of the southern Ogallala aquifer in Texas and New Mexico–Numerical simulations through 2050: contract report by Daniel B. Stephens and Associates, Inc., and the Bureau of Economic Geology, The University of Texas at Austin to the Texas Water Development Board, variably paginated.

Fenneman, N. M., 1931, Physiography of Western United States (1st edition): New York, McGraw-Hill, 534 p.

Hubert, M., 1999, Senate Bill 1–The first big bold step toward meeting Texas's future water needs: Texas Tech Law Review, v. 30, no. 1, p. 53-70.

Kunianski, E. L., 1989, Precipitation, streamflow, and baseflow in West-Central Texas, December 1974 through March 1977: U. S. Geological Survey Water-Resources Investigations Report 89-4208, 2 sheets.

Mace, R. E., Chowdhury, A. H., Anaya, R., and Way, S.-C., 2000, A numerical groundwater flow model of the Upper and Middle Trinity aquifer, Hill Country area: Texas Water Development Board Open File Report 00-02, 62 p.

Maclay, R. W., and Land, L. F., 1988, Simulation of flow in the Edwards aquifer, San Antonio Region, Texas, and refinements of storage and flow concepts: U. S. Geological Survey Water-Supply Paper 2336, 48 p.

For more examples of references, see p. 239-241 of "Suggestions to Authors of the Reports of the United States Geological Survey" at http://www.nwrc.usgs.gov/lib/lib_sta.html.

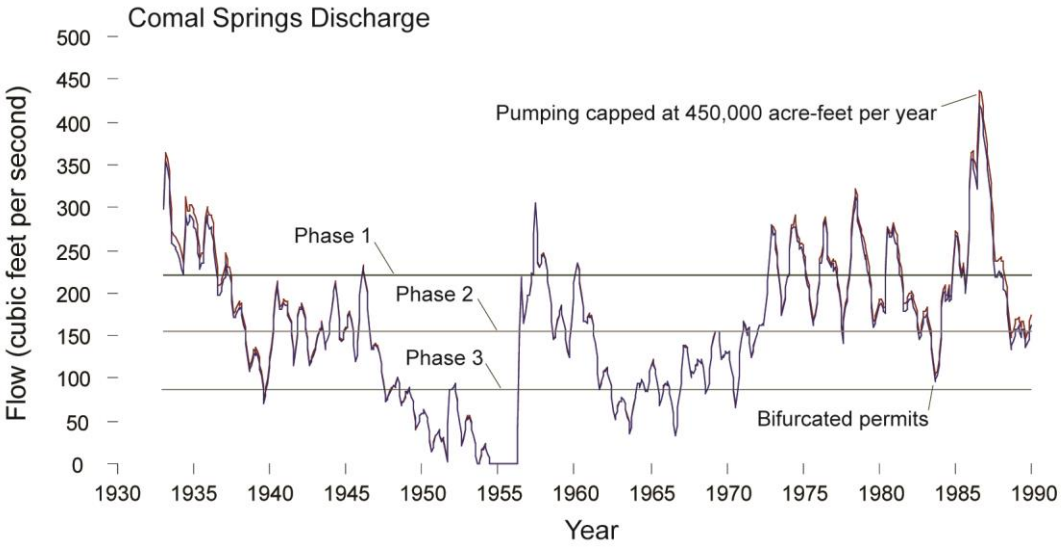

Figure 1. A sample figure showing only the information needed to help the reader understand the data. Font size for figure callouts or labels should never be less than 6 point.

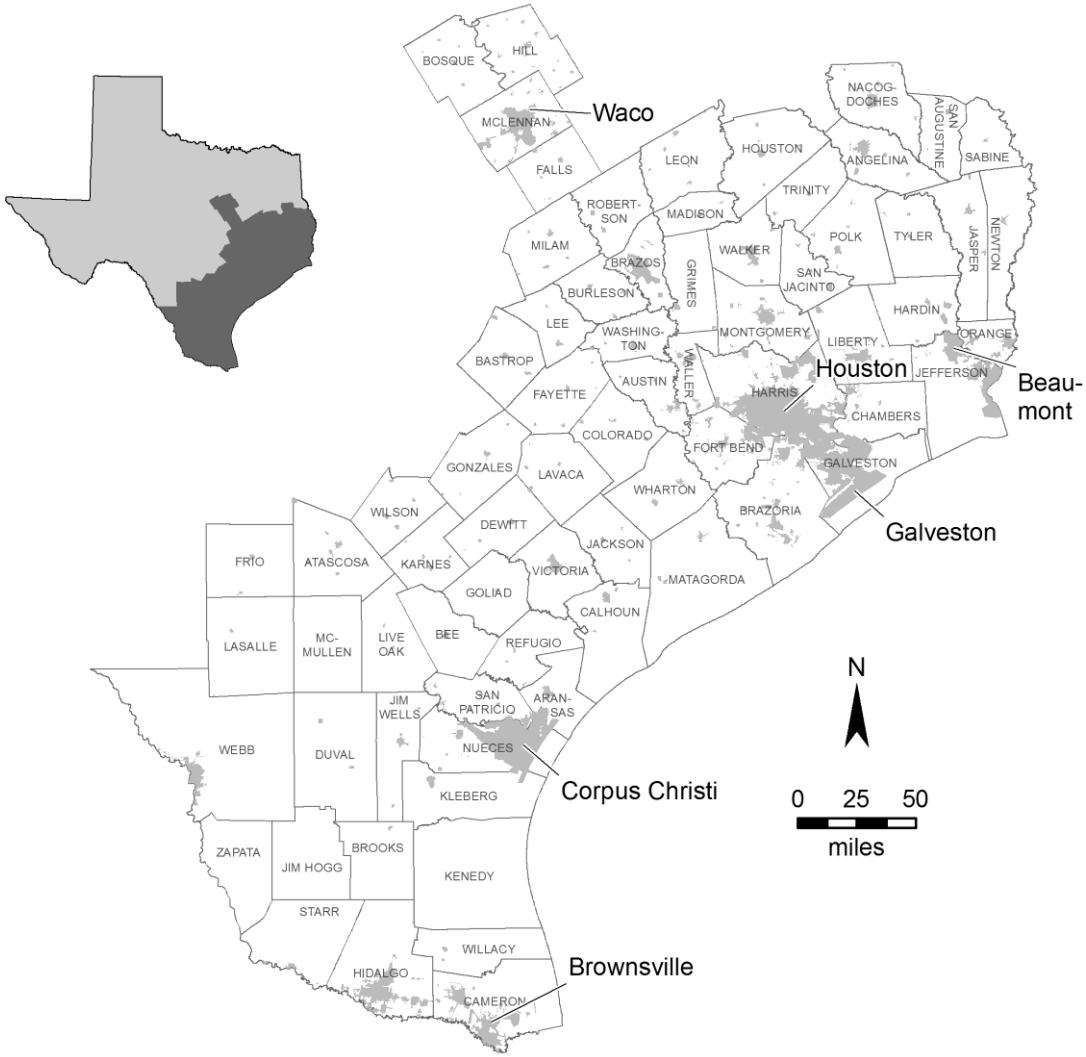

Figure 2. A sample subject area map, giving the reader enough information to understand the location being discussed in this conference. For map figures, be sure to include a north arrow to orient the reader, a scale, and, if needed, a submap that places the figure in greater geographic context. Be sure that text is readable and that any citations listed on the figure or in the figure caption are included in the reference list. Font size should never be less than 6 pt.

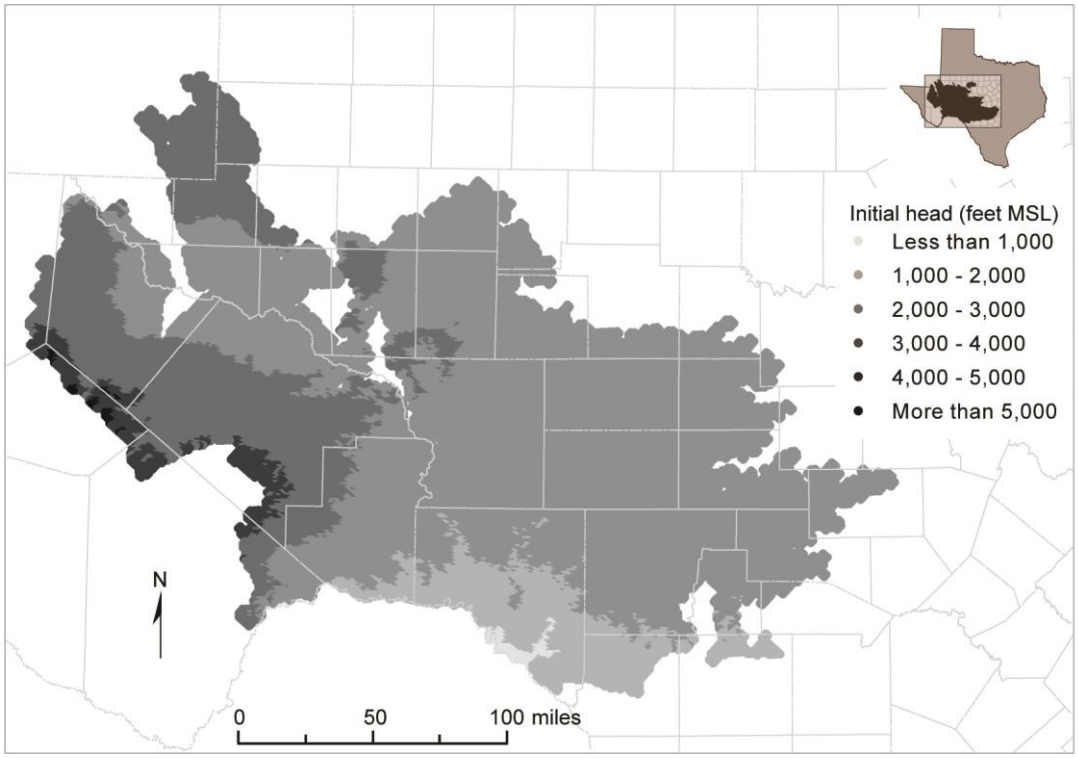

Figure 3. Initial hydraulic heads used in model simulations for layer 1. Note the use of grayscale shading to show differences.

EXHIBIT E

TWDB Guidelines for a Progress Report

Texas Water Development Board Contractors are required by their contracts to provide Progress Reports usually with the submission of an invoice/payment request.

The progress report should contain the following standard elements:

- Date: Date the memo is sent
- To: Name and position of the reader
- From: Name and position of the writer
- Subject: TWDB Contract Number and a clear phrase that focuses the reader's attention on the subject of the memo

Work Completed: *(The next section of a progress report explains what work has been done during the reporting period. Specify the dates of the reporting period and use active voice verbs to give the impression that you or you and your team have been busy) For Example:*

Task 1: Completed 3 draft chapters and all appendices. Met with sub consultants on their chapters.
Task 2: Completed sample collection throughout river reach.
Task 3: No work completed in reporting period.

Problems:
If the reader is likely to be interested in the glitches you have encountered along the way, mention the problems you have encountered and explain how you have solved them. If there are problems you have not yet been able to solve, explain your strategy for solving them and give tell the reader when you think you will have them solved.

EXHIBIT F

HUB SUBCONRACTING PLAN PROGRESS ASSESSMENT REPORT

(Use current form located at:
http://www.window.state.tx.us/procurement/prog/hub/hub-forms/)

EXHIBIT G

Brackish Resources Aquifer Characterization System Program

Contract Data Requirements

Revision Date: October 22, 2015

1. **Well Control**
    a. All data and information provided to TWDB must be non-confidential.
    b. All well attributes shall be added to the BRACS Database.
    c. All well reports, geophysical well logs, and other well information used in a project shall be provided to TWDB.
        i. Digital formats: well reports, PDF; Geophysical well logs, TIFF or LAS (if available).
    d. Data storage folder structure
        i. All well reports and geophysical well logs must be filed using this folder structure.
        ii. Water well and supporting data will be filed in a folder named DrillerWellLogs with subfolders named by state_county codes.
        iii. Geophysical well logs will be filed in a folder named GeophysicalWellLogs with subfolders named by state_county codes.
        iv. State_County code: example 42_029 for Bexar County. TWDB has a Microsoft Excel spreadsheet with the state and county codes.
    e. Digital file names
        i. Q-logs from the Railroad Commission of Texas Groundwater Advisory Unit: Example: Q123_029.tif. If there are multiple logs per well, add log1, log2, … to file name as a suffix. If more than one well is assigned the same Q number, add letters a, b, c, … to Q number, example Q123a_029.tif, Q123b_029.tif.
        ii. All other well control must have the State and County code prefix added to the filename (Example: 42029_123456.pdf.
        iii. The digital file name, file type, and folder name will be recorded in the BRACS Database table tblGeophysicalLog_Header or tblBracsWaterWellReports.

2. **BRACS Database**
    a. All new well control will be added to a copy of the BRACS Database.
    b. New data tied to existing well control in the BRACS Database, such as geology records (lithology; stratigraphic picks; salinity zones) will have applicable tables updated.

c. Use Brackish Resources Aquifer Characterization System Database Data Dictionary (TWDB Open File Report 12-02, Second Edition, September 2014) to understand table relationships, field names, and data types.
d. New well control provided by a contractor will begin with a specified well _id. Coordinate with TWDB BRACS staff for this starting well_id number. As a contractor appends new well control to their copy of the BRACS Database, TWDB staff will continue to update the official BRACS Database. When the project is complete, TWDB staff will take all new project well control records and append them to the official BRACS Database.

3. GIS files

a. All GIS files will be compatible with ESRI ArcGIS version 10.2.
b. Map projection.
Texas State Mapping System, Albers Equal Area. The ESRI projection parameters are:

Projection: Albers
False_Easting: 4921250.0
False_Northing: 19685000.0
Central_Meridian: -100.0
Standard_Parallel_1: 27.5
Standard_Parallel_2: 35.0
Latitude_Of_Origin: 31.25
Linear Unit: Foot_US (0.3048006096012192)

Geographic Coordinate System: GCS_North_American_1983
Angular Unit: Degree (0.0174532925199433)
Prime Meridian: Greenwich (0.0)
Datum: D_North_American_1983
Spheroid: GRS_1980
Semimajor Axis: 6378137.0
Semiminor Axis: 6356752.314140356
Inverse Flattening: 298.257222101

c. A project snap grid raster will be developed for each project using the Texas State Mapping System, Albers Equal Area projection. Each GIS raster file developed for a project will be snapped to this grid to ensure every grid cell in all rasters stack on top of each other without any offset. TWDB staff will create a snap grid slightly larger than the project area with a random integer cell value.
d. Standard GIS file naming conventions are essential. Refer to TWDB Report 383 for examples and table tblGisFile_NamingConventions in the BRACS Database for a broad range of codes. Contractor will provide TWDB with a list of new codes developed by the Contractor.

e. All GIS files will be summarized in an appendix in the technical report listing file names, type, and folder structure (see TWDB Report 383 for examples).
f. All GIS files will have descriptive metadata documenting the content, data structure, source(s), date(s), quality and other pertinent characteristics of the data using the Federal Geographic Data Committee (FGDC) metadata editor within ESRI's ArcCatalog.
g. All GIS file creation techniques will be described either in the technical report appendix for GIS files or in the section on a particular topic, such as net sand.
h. All well point files will contain field(s) with well identification numbers, such as the BRACS Database well_id, Groundwater Database state_well_number, Submitted Driller's Report track_number, API_number, or TCEQ Public Water Supply water_source code.
i. All GIS files (and subsequent map figures or tables) depicting groundwater salinity will use the color scheme shown in list item 5.
j. The TWDB Groundwater Availability Modeling (GAM) county shapefile will be used for mapping.
k. The TWDB 30 meter Digital Elevation Model (DEM) will be used for all elevations of well points and geologic formation surfaces. Should a better quality DEM become available for a project area, consult with TWDB staff and, if approved, provide the DEM to TWDB as a deliverable.

4. Groundwater salinity classification

a. Contractor will use the classification by Winslow, A.G., and Kister, L.R., 1956, Saline-Water Resources of Texas, U. S. Geological Survey Water Supply Paper 1365, 105 p.

Groundwater salinity classification	Salinity zone code	Total dissolved solids concentration (units: milligrams per liter)
Fresh	FR	0 to 1,000
Slightly saline	SS	1,000 to 3,000
Moderately saline	MS	3,000 to 10,000
Very saline	VS	10,000 to 35,000
Brine	BR	Greater than 35,000

b. The salinity zone code will be used for GIS file naming.
c. Technical report figures showing salinity zones or well control showing total dissolved solids concentration will use these colors.

d. Slightly and moderately saline (total dissolved solids concentration 1,000 to 10,000 milligrams per liter) groundwater is considered as brackish groundwater..

5. Water quality data

a. All water quality data that is not in the TWDB Groundwater Database will be provided to TWDB as a deliverable. Paper documents will be scanned in PDF format and filed in the appropriate state and county folder in the DrillerWellLogs folder. Water quality well control will be added to the BRACS Database, and a digital file name for the PDF well documents will be added to the table tblBracsWaterWellReports.

b. Water quality data will be evaluated to ensure that samples are accurately assigned to the correct aquifer and/or geologic formation using a systematic and reproducible technique.

c. Water quality data, if not in the TWDB Groundwater Database, will be appended to tables tblBRACSWaterQuality and tlbBRACSInfrequentConstituents in the BRACS Database.

6. Geophysical well log data

a. All new geophysical well log data used for a project will be provided to TWDB as a deliverable. Paper documents will be scanned in TIFF format and filed in the appropriate state_county code folder in the GeophysicalWellLogs folder. Well control will be added to the BRACS Database, the digital file name and additional attributes will be added to the table tblGeophysicalLog_Header, and log tools will be added to the table tblGeophysicalLog_Suite.

7. Methodology for interpreting total dissolved solids from geophysical well logs

a. The methods (computational, empirical) used to interpret total dissolved solids concentrations from geophysical well logs will be fully documented in the technical report. All well records, input and output values, correction factors, and assumptions will be recorded in the BRACS Database. Links to water quality samples for specific depth zones within an aquifer will be provided with the geophysical well log record. If a new technique (or modification of an existing technique) is used, tables will be designed to link to the existing BRACS Database design to store the above mentioned parameters. Contractor will provide a data dictionary description for the new table design. All geophysical well logs, if not in the BRACS Database, will be provided to TWDB.

b. A number of geophysical well log interpretation techniques are described in:

> Estepp, J.D., 1998, Evaluation of ground-water quality using geophysical logs: Texas Natural Resource Conservation Commission, unpublished report, 516 p.

8. Geologic formation lithology and stratigraphy

a. Geologic formation lithology and stratigraphic top/bottom depth values will be appended to the table tblWell_Geology.
b. Geologic formation lithology from driller well reports is converted to a simplified lithology using the BRACS Database table tblLkLithologicName_to_SimplifiedLithologicName. This table is updated as new terms are encountered.
c. Interpretation of sand/clay from geophysical well logs will use a four-tier classification system consisting of the following terms and sand percentages
    i. sand (100 percent sand)
    ii. sand with clay (65 percent sand)
    iii. clay with sand (35 percent sand)
    iv. clay (0 percent sand)

9. Well identification names and numbers

a. New well control added to the BRACS Database will have all well identification names or numbers added to the BRACS Database table tblBRACS_ForeignKey.
b. The BRACS Database table tblLkFK_ID_Name is a list of types of foreign keys. This table is updated as new sources of data are encountered. Consult with TWDB staff if this table needs updating during a project.
c. Wells used in a project cross section will have a record added to the BRACS Database table tblBRACS_ForeignKey.

10. Well locations

a. Latitude and longitude in decimal degree format will be used for each well.
b. NAD 83 horizontal datum will be used for each well.
c. Elevations using 30 meter DEM will be used.
d. Location attributes will be recorded in the BRACS Database table tblWell_Location.

11. Technical report

a. Use Times New Roman 12 point font.
b. Use one-inch margins.
c. Technical report will use the "Formatting Guidelines for Texas Water Development Board Reports" by Mace and others, 2007 http://www.twdb.texas.gov/about/contract_admin/index.asp
d. No abbreviations will be used in the report except BRACS, GIS, or TWDB. These abbreviations will be spelled out at first use.
e. Use proper grammar and spelling.
f. References must be listed in a separate section of the report and proper citations made within the text.

g. All GIS files used for figures will be provided as a deliverable.
h. The TWDB contract number will appear on the cover page.

EXHIBIT H

Brackish Resources Aquifer Characterization System Program

Outline for Report

Revision Date: January 13, 2016

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   - 6.2. Moderately saline zones
   - 6.3. Very saline zones
   - 6.4. Brine zones
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8. Data collection and analysis
9. Aquifer hydraulic properties
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11. Net sand analysis
12. Groundwater volume methodology
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14. Potential brackish groundwater production area analysis and modeling methodology
    - 14.1. Pumping analysis and results for 30-and 50-year periods
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    - 19.2. GIS file name codes

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EXHIBIT I

Original Request for Qualifications

`

Texas Water Development Board

REQUEST FOR QUALIFICATIONS NO. 580-16-RFQ0008

FOR

SERVICES ASSOCIATED TO STUDY BRACKISH AQUIFERS IN TEXAS

Class-Item Code(s): 918/55, 926/52

RESPONSES DUE:

NOVEMBER 25, 2015 12:00 PM

PLEASE NOTE:

This Request for Qualifications No. 580-16-RFQ0008 is revised and supersedes Request for Qualification No. 580-16-RFQ0007 and any other documents.

Texas Water Development Board
P.O. Box 13231
Austin, TX 78711-3231
Contact: Tina Newstrom
Phone: 512-463-7825
Email: contracts@twdb.texas.gov

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ATTACHMENT A **1**

EXECUTION OF RESPONSE 1

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SECTION 3 – COMPANY REFERENCES ERROR! BOOKMARK NOT DEFINED.

SECTION 4 – RESUMES OF INDIVIDUALSERROR! BOOKMARK NOT DEFINED.

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SECTION 6 **6**

SECTION I - OVERVIEW

1.1 OVERVIEW

The Texas Water Development Board (TWDB) request responses to this Request for Qualifications (RFQ) for the award of Services Contract(s) to conduct studies on six (6) Brackish Aquifers in Texas (hereafter referred to as "Project"). This RFQ is part of a requirement of House Bill 30, 84th Texas Legislative Session, for the TWDB to identify and designate brackish groundwater production zones in the aquifers of the state.

NOTE: Separate Statement of Qualifications (SOQ) is required to be submitted for each of the six (6) Projects as identified in Section II.

1.2 CONTRACT TERM

Service for each Project shall begin upon execution of the Contract. The completion date for three (3) of the Projects shall be August 31, 2016; and the remaining three (3) Projects shall be completed by August 31, 2017. Contract extensions for the studies will NOT be granted. The completion dates are identified in each Project.

NOTE: TWDB reserves the right to award each Project separately.

1.3 COMPENSATION

To be negotiated once the TWDB selects respondent(s) based on qualifications. Failure to arrive at mutually agreeable terms of a contract with the most qualified respondent shall constitute a rejection of the TWDB's offer and may result in subsequent negotiations with the next most qualified respondent. The TWDB reserves the right to reject any or all responses.

1.4 BACKGROUND

Planners and decision makers need reliable estimates of available fresh, brackish, and saline groundwater to better formulate water management strategies. Currently, the basis for determining the amount of brackish groundwater in Texas is decades-old data generated during a 2003 TWDB-funded study (LBG-Guyton, 2003, contract number 2001483395). The study helped lay the foundation for estimating brackish groundwater volumes in the state and documented that brackish groundwater is a tremendous asset in the state's water portfolio. However, the study was by design regional in scope, limited in areal extent, and narrow in its assessment of groundwater quality.

In 2009, the 81st Texas Legislature approved funding to establish the Brackish Resources Aquifer Characterization System (BRACS) program. The goal of the program is to map and characterize the brackish portions of the aquifers in Texas in sufficient detail to provide useful information and data to regional water planning groups and other entities interested in using brackish groundwater for desalination supplies. Since 2009, TWDB has completed three studies: the Pecos Valley Aquifer in West Texas (TWDB Report 382), Gulf Coast Aquifer in a four-county area in the Lower Rio Grande Valley (TWDB Report 383), and the Queen City and Sparta aquifers in part of a two-county area in south-central Texas (TWDB Technical Note 14-1). The TWDB also has two ongoing studies: the Carrizo-Wilcox Aquifer in a nine-county area in south-

central Texas scheduled for completion in spring 2016 and the Lipan Aquifer in a six-county area in West Texas scheduled for completion in summer 2016.

In 2015, the 84th Texas Legislature passed House Bill 30, directing the TWDB to conduct studies on and report to the legislature on a) four aquifers by December 1, 2016 and b) remaining aquifers in the state by December 1, 2022. This RFQ is for the Projects that require the TWDB to submit a report to the Texas Legislature by December 1, 2016, as well as additional studies. The Projects will also support implementation of House Bill 1232, (84th Texas Legislative Session), which requires mapping of confined and unconfined aquifers in the state by the TWDB.

SECTION II – STATEMENT OF WORK

2.1 DESCRIPTION OF SERVICES

The selected Contractor(s) will provide services, which shall include, but are not limited to, the requirements contained in this RFQ. Services set forth that contain the words "must" or "shall" are mandatory and must be provided as specified with no alterations, modifications or exceptions. Services set forth that contain the words "may" or "can" allow Respondents to offer alternatives to the manner in which the Services are provided. The selected Contractor(s) will provide assistance to the TWDB for activities described below for one or more of the Projects stated within this RFQ.

2.2 SCOPE OF WORK

General Requirements and Resource(s) for all six (6) Projects

To fulfill part of the requirements of House Bill 30, 84th Texas Legislature, 2015, the TWDB is requesting the Contractor to perform the following:

A. Delineate fresh, brackish, and saline groundwater both vertically and horizontally in the aquifers of the Project areas listed under The Projects.

B. Use the groundwater salinity classification developed by the U.S. Geological Survey (Winslow and Kister, 1956) to categorize the water delineated. The classification is based on the concentration of total dissolved solids (milligrams per liter) in water and includes the following: fresh (0 to 1,000); slightly saline (1,000 to 3,000); moderately saline (3,000 to 10,000); and very saline (10,000 to 35,000).

C. Quantify the volume of available fresh, brackish, and saline groundwater.

D. Delineate potential production areas that are separated by hydrogeologic barriers sufficient to prevent significant impacts to water availability or water quality in any part of the same or other fresh water aquifers. These potential production areas cannot include (a) an aquifer with an average total dissolved solids concentration of more than 1,000 milligrams per liter and which is serving as a significant source of water supply for municipal, domestic, or agricultural purposes, (b) a part of a geologic stratum that is designated or used for wastewater injection through the use of injection or disposal wells permitted under Texas Water Code Chapter 27, and/or (c) areas within the Harris-Galveston Subsidence District and the Fort Bend Subsidence District.

E. Meet with TWDB staff to discuss Contractor recommendations of potential production areas and develop a prioritized list of these areas for item 2.2G.

F. Meet with stakeholders to (1) explain TWDB's approach in implementing House Bill 30, (2) solicit feedback on what constitutes "significant impact", and (3) receive general comments concerning implementation of the legislation. *NOTE: Contractor(s) will not be making recommendations to the TWDB to designate brackish groundwater production zones; only the TWDB Executive Administrator will make these recommendations.*

G. Determine the volume of brackish groundwater that the potential production areas are capable of producing over a 30-year and a 50-year period without causing significant impact to water quality and quantity as described in item 2.2D.

H. **Resources**: The BRACS Database was developed to store and analyze well data for the completed BRACS studies. TWDB Open-File Report 12-02, Second Edition is a data dictionary for the BRACS Database. It describes the data objects or items in the database for the benefit of the user. In addition, previous and ongoing studies of the Groundwater Availability Modeling program have direct applicability to BRACS studies.

I. **Project Monitoring:** *At a minimum*, TWDB expects to meet with the Project Team (Contractor Meeting) four (4) times during the Project and conduct at least two (2) stakeholder meetings.

J. **Contractor Meetings shall include but not limited to:**
1) Project initiation; the beginning of the Project.
2) Discussion and approval of Project methodology; date to be determined by the Contractor.
3) Discussion of potential production areas and prioritization for production calculations; date to be determined by the Contractor.
4) Project completion; the end of the Project.

K. Additional technical meetings may be scheduled either in person, through a webinar, or teleconference venue to discuss Project progress and issues. TWDB staff may periodically visit the Contractor's work premises to assess progress on the Project.

L. Detailed monthly progress reports must be submitted to the TWDB outlining progress of the Project and include the original or adjusted schedule and detail how the Project is progressing relative to this yardstick. Project invoices cannot be processed without detailed descriptions of the progress made by tasks. Each of the Project tasks must be described in detail consistent with the budget description. The TWDB expects issues to be reported to the TWDB Project Manager immediately as they appear. Maintaining close coordination with TWDB throughout the Project will be critical.

M. A draft report documenting the technique(s) and approaches selected by the Contractor for geophysical well log interpretation of aquifer total dissolved solids concentration shall

be given to TWDB for review at a date determined by the Contractor. The report shall include information on the types of geophysical well logs available in the Project area, how the interpreted total dissolved solids concentration from geophysical well log analysis relates to existing aquifer water chemistry as determined by direct measurements (including specific examples), how the log correction factors are determined, and how the interpretation techniques will be applied across the entire salinity range within the aquifer. TWDB will have up to 10 business days to review the draft report, and the Contractor will schedule a meeting to discuss the techniques.

N. A meeting to discuss the potential production areas, at a date determined by the Contractor, shall be made prior to the end of the Project. Potential production areas will be prioritized for 30-year and 50-year pumping estimate task with input from stakeholders.

O. A formal presentation on the results of the Project shall be made to TWDB at the end of each Project.

P. **Stakeholder Meetings include but not limited to the following:**
1) For each Project, formal stakeholder meetings shall be scheduled and held.
2) The first general meeting was held October 26, 2015 from 10:00 am – 12:00pm in room 170 of the Stephen F. Austin Building in Austin, Texas. The general meeting was to explain TWDB's approach in implementing House Bill 30; solicit feedback on what constitutes "significant impact", and; receive general comments concerning implementation of the legislation.
3) The second meeting will be held at the end of the Project in the study area to provide information on the results of the Project and to solicit input on the potential production areas.

Q. TWDB will organize the meetings and invite stakeholders including at a minimum all the groundwater conservation districts within the Project area. The contractor will attend and make a presentation at the second stakeholder meeting.

R. Any meetings and/or conference calls will be held on regular business days (M - F) during regular business hours (8:00 am – 5:00 pm CT) upon agreed dates and times.

2.3 BRACKISH AQUIFERS

Project No. 1
Project Name: Gulf Coast Aquifer
Project Area: Gulf Coast Aquifer and adjacent strata (Catahoula Formation) that extend from the Texas-Louisiana border to the southern county lines of Brooks, Jim Hogg, and Kenedy counties and from the outcrop areas of these aquifers to the Gulf of Mexico.
Project Timeline: This Project must be completed no later than August 31, 2016. Contract extensions will not be granted.
Additional resources:

"Hydrogeochemical evaluation of the Texas Gulf Coast Aquifer system and implications for developing groundwater availability models" (Young and others, 2014, TWDB contract 1148301233),
"Updating the hydrogeologic framework for the northern portion of the Gulf Coast Aquifer" (Young and others, 2012, TWDB contract 1004831113),
"Hydrostratigraphy of the Gulf Coast Aquifer from the Brazos River to the Rio Grande" (Young and others, 2010 TWDB contract 0804830795),
"Groundwater resource evaluation and availability model of the Gulf Coast Aquifer in the Lower Rio Grande Valley of Texas" (Chowdhury and Mace, 2007, TWDB Report 368),
"Groundwater availability model of the central Gulf Coast Aquifer system: numerical simulations through 1999" (Chowdhury and others, 2004),
"Hydrogeology and simulation of groundwater flow and land-surface subsidence in the northern part of the Gulf Coast Aquifer system, Texas, 1891-2009" (Kasmarek, 2013, U.S. Geological Survey Scientific Investigations Report 2012-5154),
An alternative model "Groundwater management area 16 groundwater flow model" (Hutchison and others, 2011) was prepared for the Gulf Coast Aquifer.

TWDB is working on a groundwater model for the Gulf Coast Aquifer in groundwater management areas 15 and 16 scheduled for completion in December 2016.

Project No. 2
Project Name: Blaine Aquifer
Project Area: Blaine Aquifer, extent defined by the TWDB
Project Timeline: This Project must be completed no later than August 31, 2016. Contract extensions will not be granted.
Additional resources: "Groundwater availability model for the Seymour Aquifer" (Ewing and others, 2004, TWDB contract) that includes Permian formations in layer 2.

Project No. 3
Project Name: Rustler Aquifer
Project Area: Rustler Aquifer, extent defined by the TWDB
Project Timeline: This Project must be completed no later than August 31, 2016. Contract extensions will not be granted.
Additional resources: "Groundwater availability model report for the Rustler Aquifer" (Ewing and others, 2012 TWDB contract 0904831000)

Project No. 4
Project Name: Trinity Aquifer
Project Area: The northern and southern extent of Trinity Aquifer defined by the TWDB downdip until the total dissolved solids concentration in the aquifer transitions to at least 10,000 milligrams per liter.
Project Timeline: This Project must be completed no later than August 31, 2017. Contract extensions will not be granted.
Additional Resources:
"Updated groundwater availability model of the northern Trinity and Woodbine Aquifers" (Kelley and others, 2014),

"Groundwater availability model for the Hill Country portion of the Trinity Aquifer System, Texas" (Jones and others, 2009), and
"Northern Trinity/Woodbine aquifer groundwater availability model" (R.W. Harden and Associates and others, 2004, TWDB contract 2003483483)

Project No. 5
Project Name: Blossom Aquifer
Project Area: Blossom Aquifer extent defined by the TWDB downdip until the groundwater total dissolved solids concentration transitions to at least 10,000 milligrams per liter.
Project Timeline: This Project must be completed no later than August 31, 2017. Contract extensions will not be granted.
Additional Resources: TWDB Report 307

Project No. 6
Project Name: Nacatoch Aquifer
Project Area: Nacatoch Aquifer extent defined by the TWDB downdip until the groundwater total dissolved solids concentration transitions to at least 10,000 milligrams per liter.
Project Timeline: This Project must be completed no later than August 31, 2017. Contract extensions will not be granted.
Additional Resources: "Nacatoch Aquifer groundwater availability model" (Beach and others, 2009, TWDB contract 0604830588).

2.4 RESPONSE REQUIREMENTS FOP EVALUATION

Respondents to this RFQ are required to indicate in Section 4.1.B(7)(d) of their response their abilities in the areas listed below (A-L). Please include years of experience, educational degrees and any professional certifications.

A. General hydrogeology;
B. Hydrogeology of the Project aquifer;
C. Interpreting and using geophysical well logs, as applicable to the Project;
D. Using data from TWDB Groundwater Availability Modeling Projects and other TWDB-contracted studies in the Project area;
E. Groundwater modeling in order to evaluate potential production areas;
F. Geographic Information System (GIS) files, use, and metadata documentation;
G. Communicating with the public;
H. Technology transfer;
I. Producing high-quality technical reports;
J. Using the TWDB BRACS and Groundwater databases;
K. Contract management including the ability to meet short and strict deadlines within budget; and
L. Demonstrate their ability to meet Project completion deadlines since there will be no contract extensions.

SECTION III – DELIVERABLES

3.1 CONTRACT DELIVERABLES

The Contractor shall deliver the following items to the TWDB on the date determined by each Project:

A. Updated data for the BRACS Database containing all new well records used in the Project.

B. Copies of water well reports, water quality reports, and geophysical well logs used in the study (unless those reports and logs already exist in the TWDB Groundwater or BRACS databases).

C. Three-dimensional GIS datasets that delineate groundwater salinity zones using ranges of concentrations of total dissolved solids of 0 to 1,000 milligrams per liter (fresh), 1,000 to 3,000 milligrams per liter (slightly saline), 3,000 to 10,000 milligrams per liter (moderately saline), and 10,000 to 35,000 milligrams per liter (very saline).

D. Three-dimensional GIS datasets that delineate potential production areas and the estimated volumes of brackish groundwater production in 30- and 50-year timeframes.

E. A technical report summarizing the study.

F. All geophysical well logs interpreted for total dissolved solids will be submitted to TWDB and all interpretation data values (input and output) will be documented in table(s) with links to well numbers, log numbers, depths, and names of geological formations in a Microsoft Access database format that can be linked to existing BRACS Database tables. Geophysical well log data obtained for the Project must be non-confidential and submitted in a Tagged Image Format (TIFF) and, if available, Log ASCII Standard (LAS) format. New well control will be added to the BRACS Database with complete attributes. Water quality data will be compatible with the Groundwater Database table design and should include the source of the data.

G. To develop new and updated maps of the water resources, the Project should use current information from a variety of non-proprietary databases and geophysical log repositories that are publicly available.

H. The tools and techniques used for determining the extent and volumes of the required ranges of total dissolved solids in the groundwater shall be thorough, use defensible scientific means and approaches, and shall be documented in the technical report. The technique(s) used to determine if a potential production area is hydrogeologically separated from fresh water aquifers shall be thoroughly documented in the technical report. Each potential production area will be assigned a unique ID, and all production area attributes (ID, volume of brackish groundwater subdivided by salinity classification zones, 30-year and 50-year production calculation estimates) will be recorded in a

Microsoft Access database table, in supporting GIS files (top, bottom, and lateral extent), and in groundwater modeling files.

I. The calculated volumes of groundwater within each aquifer and each TWDB-prioritized potential production area will be organized by salinity classification zone, county, groundwater conservation district, and groundwater management area. All GIS data shall be thoroughly documented with metadata including source, field descriptions, and units (as applicable) and use BRACS program-naming conventions and map Projection parameters. Geologic formation top and bottom raster surfaces, net sand raster maps, salinity classification zone top and bottom raster surfaces, proposed production area top and bottom raster surfaces, well control point files, and Project raster snap grid will be submitted to TWDB. All raster surfaces will share the same map Projection and snap grid attributes. TWDB must be able to replicate the volumes estimated and techniques used to determine the extents of each of the salinity classification zones. All potential production area modeling files will be submitted to TWDB.

J. Training for TWDB staff shall be provided, as needed or requested. Training may include, but not limited to how the volumes were estimated and the techniques used to determine the extents of salinity zones.

K. All draft and final reports shall be delivered in Microsoft Word and PDF formats. Draft deliverables will be submitted for review and comment by TWDB. These comments must be addressed in the Final Report and a copy of the comments must be incorporated into the final deliverables. Acceptance of the Final Report indicates the successful completion of the Project.

L. The BRACS program contract data requirements are available on the TWDB website at http://www.twdb.texas.gov/innovativewater/bracs/projects.asp and include information on GIS data and map Projection standards, BRACS Database standards, well report and geophysical well log file naming and organization standards, and other useful information.

SECTION IV – GENERAL INFORMATION

4.1 SOQ REQUIREMENTS

A. **SUBMISSIONS**: The Respondent shall submit one (1) original and six (6) double-sided, single-spaced copies of their SOQ on and one electronic copy for *each Project*; please indicate the Project No. on each response as listed in Section 2.3. You can submit a response for all or one of the Projects. However, a separate response is required for each Project and MUST indicate the Project No.:

1) ORIGINAL: One (1) complete ORIGINAL response (marked Original) which shall include a copy of the RFQ solicitation document along with the SOQ contents listed in paragraph B, below for each Project. The SOQ pages should be numbered and contain an organized, paginated table of contents corresponding to the section and pages of the response.

2) ELECTRONIC: One Portable Document Format files of the submission on a CD/DVD or USB drive.
3) Response may be tab indexed.
4) Responses must be delivered to the address noted in the RFQ.
5) Responses must be clearly marked **RESPONSE TO RFQ 580-16-RFQ0008**.
6) Responses must be complete and comprehensive.

B. **CONTENTS**: The Respondent shall submit all information listed below, in the order given, separated by labeled and tabbed sheets, as the response to this RFQ. The SOQ will only be considered if all items are submitted as required. Incomplete/late responses to this RFQ will not be considered. NOTE: Since there are six (6) Projects, a separate response for each Project is required and the Project No. MUST be indicated. ***You may make copies of any attachments and/or forms in the RFQ for submission purpose ONLY.***

1) Section 1: Signed/dated Execution of Response to the Request for Qualifications (ATTACHMENT A)
2) Section 2: Company Profile Summary and History, two (2) pages maximum. Response should include the following:
   a. Legal company name, address, phone number, and legal status (corporation, partnership, joint venture, sole proprietorship)
   b. Legal name of each participant/potential user(s), their possible involvement with the Project, their phone number, and email address. Also include the contact person(s) information should questions come up regarding the response.
   c. Name, title, phone number and email address of person submitting the response with the authority to bind the company.
   d. Describe the general nature of previous work, the number of years in business, size and scope of operation.
3) Section 3: Company References - Provide references from a minimum of three (3) customers to whom the Respondent has provided services in the past 36 months similar to the scope of work described in this specification.
4) Section 4: Resumes of Individuals - Submit qualifications and experience of Project staff that will be directly involved, at any level, with this Project. ***PLEASE NOTE: Resumes do not count towards the two page maximum listed in Section 2.***
5) Section 5: Historically Underutilized Businesses Subcontracting Plan and applicable forms.
6) Section 6: Name(s) and Social Security Number(s) of Each Person with at least 25 Percent Ownership of the Business Entity submitting the RFQ (if applicable).
7) Section 7: Scope of Work - A detailed Scope of Work (SOW) describing the following:
   a. Each task, a percent of effort per each task, a proposed time schedule for each task, and the amount of time each team member will spend on the Project. This SOW shall not exceed 20 pages, using Times New Roman 12 font.

b. A description of project-monitoring procedures; In addition, the contractor should demonstrate they are able to meet project completion deadlines since there will be no contract extensions.
c. A description of the project deliverables (reports, plans, or other products that the Board will receive;
d. Indicate abilities as listed in Section 2.4(A-L).

4.2 RESPONSE COSTS

Respondents are responsible for all costs in the preparation and delivery of their response to this RFQ to TWDB.

4.3 TRAVEL EXPENSES

This contract may include travel throughout the State of Texas to perform the tasks therein. Any and all travel expenses shall be in accordance with the state travel and per diem allowances detailed at https://fmx.cpa.state.tx.us/fmx/travel/index.php.

4.4 MEETINGS

Any meetings and/or conference calls will be held on regular business days (M - F) during regular business hours (8:00 am – 5:00 pm CT) upon agreed dates and times.

4.5 SCHEDULE OF EVENTS:

The solicitation process for this RFQ will proceed according to the following schedule:

EVENT	DATE (Central Time)
Issue Request for Qualifications	Tuesday, November 10, 2015
Deadline for Submission of SOW	Wednesday, November 25, 2015 12:00 pm
Expected Date of Award of Contract	January, 2016
Expected Contract Start Date	January, 2016

4.6 REVISIONS TO SCHEDULE

TWDB reserves the right to change the dates in the Schedule of Events above upon written notification to prospective Respondent(s) as an addendum posted on the Electronic State Business Daily.

4.7 INQUIRIES

A. All inquiries shall be submitted in writing to the attention of TWDB Contract Administration Staff via e-mail to contracts@twdb.texas.gov.

B. Except as otherwise provided in this Section, upon issuance of this RFQ, other employees and representatives of TWDB will not answer questions or otherwise discuss the contents of this RFQ with any potential Respondent or its representatives. Failure to observe this restriction may result in disqualification of any subsequent RFQ. This restriction does not preclude discussions unrelated to this RFQ.

4.8 RESPONSE SUBMISSION

A. All responses must be received and date stamped by TWDB by the deadline listed in the Schedule of Events above. TWDB will NOT accept late submittals.

B. Responses should be placed in a separate envelope or package and correctly identified with the RFQ number and submittal deadline/RFQ opening date and time. It is Respondent's responsibility to appropriately mark and deliver this response to TWDB by the specified date.

C. Telephone, facsimile or emailed responses will not be accepted.

D. Receipt of all addenda, if applicable, to this response should be acknowledged by returning a signed copy of each addendum with the submitted response**.**

NOTE: Failure to return the required items with the response will result in rejection of your Response. TWDB will not be responsible for locating or securing information that is not included in your Response.

4.9 DELIVERY OF SUBMISSION

Responses may be submitted to TWDB by one of the following methods:

U.S. Postal Service
Texas Water Development Board
Contracting & Purchasing
P.O. Box 13231
Austin, TX 78711-3231

Overnight/Express Mail or Hand Delivery
Texas Water Development Board
1700 North Congress Avenue, 6th Floor
Austin, TX 78701
Hours: 8:00 am to 5:00 pm (CT)

4.10 OPENING

Responses will be opened at 1700 North Congress Avenue, 6th Floor, Austin, TX, at the submittal deadline. Only Respondent's names will be read.

All submitted response's become the property of TWDB after the submittal deadline/opening date. Responses submitted shall constitute an offer for a period of ninety (90) days or until selection is made by TWDB, whichever occurs first.

4.11 EVALUATION AND AWARD

A. TWDB shall award a Contract to the vendor whose response is most qualified to perform the Statement of Work for the State of Texas.

B. A committee will be established by TWDB (including TWDB employees) to evaluate the responses.

C. The evaluation applies to ***each*** Project, which will be evaluated separately. ***TWDB reserves the right to award each Project separately***.

The evaluation committee will determine best value by applying the following criteria:

Points Available	Evaluation Criteria
0 – 70	Qualifications and Experience
0 – 90	Technical Approach
0 – 40	Project Organization and Management
0 – 30	Reports and Deliverables
0 – 20	Feasible Approach
250	**Total Points Possible**

D. TWDB may, at its discretion, elect to have Respondents provide oral presentations and respond to inquiries from the evaluation committee related to their SOQ.

E. Past Performance: A Respondent's past performance will be measured based upon pass/fail criteria, in compliance with applicable provisions of §2155.074, 2155.075, 2156.007, 2157.003, and 2157.125, Gov't Code. Respondents may fail this selection criterion for any of the following conditions:

1) A score of less than 90% in the Vendor Performance System;
2) Currently under a Corrective Action Plan through the CPA;
3) Having repeated negative Vendor Performance Reports for the same reason; or
4) Having purchase orders that have been cancelled in the previous 12 months for non-performance (i.e. late delivery, etc.).

Contractor performance information is located on the CPA web site at: http://comptroller.texas.gov/procurement/prog/vendor_performance/

SECTION V – GENERAL TERMS AND CONDITIONS

5.1 GENERAL TERMS

Any Contract awarded as a result of this RFQ will contain the general terms and conditions provided in this document. Subcontractors must also comply. In addition, any Contract awarded as a result of this RFQ shall be governed, construed, and interpreted under the laws of the State of Texas. The factors listed in Texas Government Code, Title 10, Subtitle D, Section 2155.074, 2155.144, 2156.007, and 2157.003 shall also be considered in making an award when specified. Any legal actions must be filed in Travis County, Texas.

5.2 PATENTS OR COPYRIGHTS

The Contractor agrees to protect the State and TWDB from claims involving infringement of patents or copyrights. TWDB will not consider any RFQ that bears a copyright. RFQ will be subject to the Texas Public Information Act, Texas Government Code, Chapter 552, and may be disclosed to the public upon request. Subject to the Act, Respondents may protect trade and confidential information from public release. Trade secrets or other confidential information,

submitted as part of a RFQ, shall be clearly marked at each page it appears. Such marking shall be in **boldface type at least 14 point font.**

5.3 CONTRACTOR ASSIGNMENTS

Respondent hereby assigns to TWDB any and all claims for overcharges associated with this Contract arising under the antitrust laws of the United States 15 U.S.C.A. Section 1, et seq. (1973), and the antitrust laws of the State of Texas, TEX. Bus. & Comm. Code Ann. Sec. 15.01, et seq. (1967).

5.4 HISTORICALLY UNDERUTILIZED BUSINESSES SUBCONTRACTING PLAN

It is the policy of TWDB to make a good faith effort to achieve the annual program goals by contracting directly with Historically Underutilized Businesses (HUBs) or indirectly through subcontracting opportunities in accordance with the Texas Government Code, Chapter 2161, Subchapter F, and HUB Rules promulgated by the Comptroller of Public Accounts (CPA), 34 TAC, Chapter 20.

HUBs are strongly urged to respond to this RFQ. Under Texas law, state agencies are required to make a good faith effort to assist HUBs in receiving certain percentages of the total value of contract awards. Vendors who meet the qualifications are strongly encouraged to apply for certification as HUBs.

TWDB has determined that subcontracting is probable under any Contract awarded as a result of this RFQ. ALL VENDORS RESPONDING TO THIS RFQ, INCLUDING THOSE THAT ARE HUB CERTIFIED OR THOSE WHO DO NOT PLAN TO SUBCONTRACT, MUST COMPLETE A HUB SUBCONTRACTING PLAN (HSP) IN ACCORDANCE WITH THE STATE'S POLICY ON UTILIZATION OF HUBs. THE HSP MUST BE INCLUDED AS PART OF THE RFQ TO THIS RFQ. FAILURE TO COMPLETE THE HSP AS INSTRUCTED MAY RESULT IN DISQUALIFICATION OF THE RFQ FROM CONSIDERATION. Please review the HSP forms carefully and allow sufficient time to identify and contact HUBs and allow them to respond. Note that Vendors must demonstrate a good faith effort to contract with new HUBs if currently proposed HUBs have performed as subcontractors to the Vendor for more than five (5) years. If the Vendor does not plan to subcontract, Vendor must state that fact in their plan. An original, signed paper copy of the HSP must be submitted in an envelope that is separate from the rest of the RFQ. The completed plan shall become a part of the contract that may be awarded as a result of this RFQ.

5.5 HUB CONTINUING PERFORMANCE

Any Contract(s) awarded as a result of this RFQ shall include reporting responsibilities related to HUB subcontracting. Awarded Vendors may not change any subcontractor without submitting a revised HUB Subcontracting Plan (HSP) to TWDB. Any change to a subcontractor and revised HSP must be approved in writing by TWDB prior to implementation.

5.6 HUB RESOURCES AVAILABLE

A list of certified HUBs is available on the Texas Comptroller of Public Accounts (CPA) Web site at: http://www.window.state.tx.us/procurement/cmbl/hubonly.html. For additional information, contact the CPA's HUB program office at Texas4hubs@cpa.state.tx.us. If Vendors

know of any businesses that may qualify for certification as a HUB, they should encourage those businesses to contact the CPA HUB program office.

5.7 RESPONDENT'S AFFIRMATION

Signing this response (ATTACHMENT A - Execution of Response to the Request for Qualifications) with a false statement is a material breach of Contract and shall void the submitted response or any resulting Contract(s), and the Respondent shall be removed from all bid lists. By signature hereon affixed on ATTACHMENT A, the Respondent hereby certifies that:

A. The Respondent has not given, offered to give, nor intends to give at any time hereafter any economic opportunity, future employment, gift, loan, gratuity, special discount, trip, favor, or service to a public servant in connection with the submitted bid;

B. Neither the Respondent nor the firm, corporation, partnership, or institution represented by the Respondent, or anyone acting for such firm, corporation or institution has violated the antitrust laws of this State or the Federal Antitrust Laws, nor communicated directly or indirectly this RFQ made to any competitor or any other person engaged in such line of business;

C. The Respondent is not a member of the TWDB, a TWDB staff member or a member of their immediate family;

D. Pursuant to Section 2155.004, Government Code, the Respondent has not received compensation for participation in the preparation of the specifications for this RFQ;

E. Pursuant to Section 231.006 (d), Family Code, re: child support, the Respondent certifies that the individual or business entity named in this bid is not ineligible to receive the specified payment and acknowledges that this contract may be terminated and payment may be withheld if this certification is inaccurate;

F. Under Section 2155.004 Government Code, the Respondent certifies that the individual or business entity named in this RFQ or Contract is not ineligible to receive the specified Contract and acknowledges that this Contract may be terminated and payment withheld if this certification is inaccurate;

G. The Respondent shall defend, indemnify, and hold harmless the State of Texas, all of its officers, agents and employees from and against all claims, actions, suits, demands, proceedings, costs, damages, and liabilities, arising out of, connected with, or resulting from any acts or omissions of Contractor or any agent, employee, subcontractor, or supplier of Respondent in the execution or performance of this contract;

H. Respondent agrees that any payments due under this contract will be applied towards any debt, including but not limited to delinquent taxes and child support that is owed to the State of Texas;

I. Respondent certifies that they are in compliance with Section 669.003 of the Government Code, relating to contracting with executive head of a State agency. If Section 669.003 applies, the Respondent will complete the following information in order for the bid to be evaluated:

Name of Former Executive: _____
Name of State Agency: _____
Date of Separation from State Agency: _____
Position with Respondent: _____

Date of Employment with Respondent: _____

J. Respondent agrees to comply with Government Code Section 2155.4441, pertaining to service contract use of products produced in the State of Texas; and

K. Respondent understands that acceptance of funds under this contract acts as acceptance of the authority of the State Auditor's Office, or any successor agency, to conduct an audit or investigation in connection with those funds. Respondent further agrees to cooperate fully with the State Auditor's Office or its successor in the conducting of the audit or investigation, including providing all records requested. Respondent will ensure that this clause concerning the authority to audit funds received indirectly by subcontractors through Respondent and the requirement to cooperate is included in any subcontract it awards.

5.8 EXECUTIVE ORDER 13224

The TWDB is federally mandated to adhere to the directions provided in the President's Executive Order (EO) 13224, Executive Order on Terrorist Financing – Blocking Property and Prohibiting Transactions with Persons Who Commit, Threaten to Commit, or Support Terrorism, effective 9/24/2001 and any subsequent changes made to it via cross-referencing Respondents/Contractors with the Federal General Services Administration's Excluded Parties List System (EPLS, http://www.sam.gov), which is inclusive of the United States Treasury's Office of Foreign Assets Control (OFAC) Specially Designated National (SDN) list.

5.9 FAMILY CODE REQUIREMENTS

Pursuant to Section 231.006 (c), Family Code, bid must include Names and Social Security Numbers of each person with at least 25% ownership of the business entity submitting the bid. Enter Name & Social Security Numbers for each person.

5.10 ADDITIONAL TERMS

Any terms and conditions attached to this RFQ will not be considered unless specifically referred to on this RFQ and may result in disqualification of this RFQ.

5.11 DISPUTE RESOLUTION

The dispute resolution process provided for in Chapter 2260 of the Texas Government Code must be used by the TWDB and the Respondent to attempt to resolve all disputes arising under this Contract.

5.12 NON-APPROPRIATION OF FUNDS

The State's funds are contingent on the availability of lawful appropriations by the Texas Legislature. If the Texas Legislature fails to continue funding for the payments due under an order referencing this Contract, the order will terminate as of the date that the funding expires, and TWDB will have no further obligation to make any payments.

5.13 PUBLIC INFORMATION ACT

Information, documentation, and other material in connection with this solicitation or any resulting Contract may be subject to public disclosure pursuant to Chapter 552 of the Texas

Government Code (the "Public Information Act"). Any part of the RFQ that is of a confidential or proprietary nature must be clearly and prominently marked as such by the Respondent.

5.14 TECHNOLOGY ACCESS CLAUSE

The Respondent expressly acknowledges that State funds may not be expended in connection with the purchase of an automated information system unless that system meets certain statutory requirements relating to accessibility by persons with visual impairments. Accordingly, the Respondent represents and warrants to the qualified ordering entity that the technology provided to the qualified ordering entity for purchase is capable, either by virtue of features included within the technology or because it is readily adaptable by use with other technology, of:

A. Providing equivalent access for effective use by both visual and non-visual means;
B. Presenting information, including prompts used for interactive communications, in formats intended for both visual and non-visual use; and
C. Being integrated into networks for obtaining, retrieving, and disseminating information used by individuals who are not blind or visually impaired.

For purposes of this clause, the phrase "equivalent access" means a substantially similar ability to communicate with or make use of the technology, either directly by features incorporated within the technology or by other reasonable means such as assistive devices or services that would constitute reasonable accommodations under the Federal Americans with Disabilities Act or similar state or federal laws. Examples of methods by which equivalent access may be provided include, but are not limited to, keyboard alternatives to mouse commands and other means of navigating graphical displays and customizable display appearance.

5.15 ETHICS

Under Section 2155.003, Government Code, an individual who interacts with public purchasers in any capacity is required to adhere to the guidelines established in Section 1.2 of the State of Texas Procurement Manual, which outlines the ethical standards required of public purchasers, employees, and bidders who interact with public purchasers in the conduct of state business, and with any opinions of or rules adopted by the Texas Ethics Commission. Entities who are interested in seeking business opportunities with the State must be mindful of these restrictions when interacting with public purchasers of TWDB or purchasers of other state agencies. Specifically, a TWDB employee may not have an interest in, or in any manner be connected with a contract or bid for a purchase of goods or services by an agency of the state; or in any manner, including by rebate or gift, accept or receive from a person to whom a contract may be awarded, directly or indirectly, anything of value or a promise, obligation, or Contract for future reward or compensation. Entities who are interested in seeking business opportunities with the State must be mindful of these restrictions when interacting with public purchasers of TWDB or purchasers of other State agencies.

5.16 FRAUD STATEMENT

Respondents understand that the TWDB does not tolerate any type of fraud. The TWDB's policy is to promote consistent, legal, and ethical organizational behavior by assigning responsibilities and providing guidelines to enforce controls. Any violations of law, agency policies, or standards of ethical conduct will be investigated, and appropriate actions will be

taken. Providers are expected to report any possible fraudulent or dishonest acts, waste, or abuse to the agency's Internal Audit division at 512-463-7978 or Nicole.Campbell@twdb.texas.gov.

5.17 CONFLICT OF INTERESTS

A RFQ will not be selected if it has a conflict of interest that will or may arise during the performance of its obligations under the Contract. For this reason, the submission in response to this RFQ must disclose all business interest and all relationships that could reasonably be considered to pose possible conflicts of interest in the offer's performance of contract obligations. In addition, Offers must represent and warrant in its response to this RFQ and in the contract that in the performance of services under the contract, (1) Respondent does not have and will not have any actual or potential conflict of interest, and (2) Respondent will take whatever reasonable actions may be necessary and prudent to avoid even the appearance of impropriety.

5.18 CONTRACT ADMINISTRATION

The TWDB shall designate a Project Manager for this Contract. The Project Manager will serve as the point of contact between the TWDB and the selected Contractor. The TWDB's Project Manager shall supervise the TWDB's review of contractor's technical work, deliverables, draft reports, the final report, payment requests, schedules, financial and budget administration, and similar matters. The Project Manager does not have any express or implied authority to vary the terms of the Contract, amend the Contract in any way or waive strict performance of the terms or conditions of the Contract.

5.19 CONTRACT REVISIONS

The contract may only be revised through a contract amendment process.

5.20 VENDOR PERFORMANCE

State agencies shall report a vendor's performance on any purchase of $25,000 or more from contracts administered by the commission or any other purchase made through an agency's delegated authority or a purchase made pursuant to the authority in Government Code, Title 10, Subtitle D or a purchase exemption from CPA/TPASS procurement rules and procedures.

5.21 DEFAULT

If Contractor is found to be in default under any provision of this Contract, TWDB may cancel the Contract without notice and either re-solicit or award the contract to the next best responsive and responsible Respondent. In the event of abandonment or default, Contractor will be responsible for paying damages to TWDB including but not limited to re-procurement costs, and any consequential damages to the State of Texas or TWDB resulting from Contractor's non-performance. The defaulting Contractor will not be considered in the re-solicitation and may not be considered in future solicitations for the same type of work, unless the specification or scope of work is significantly changed.

5.22 FORCE MAJEURE

Neither Contractor nor TWDB shall be liable to the other for any delay in, or failure of performance, of any requirement included in any PO resulting from this RFP caused by force majeure. The existence of such causes of delay or failure shall extend the period of performance until after the causes of delay or failure have been removed provided the non-performing party

exercises all reasonable due diligence to perform. Force majeure is defined as acts of God, war, fires, explosions, hurricanes, floods, failure of transportation, or other causes that are beyond the reasonable control of either party and that by exercise of due foresight such party could not reasonably have been expected to avoid, and which, by the exercise of all reasonable due diligence, such party is unable to overcome. Each party must inform the other in writing, with proof of receipt, within three (3) business days of the existence of such force majeure, or otherwise waive this right as a defense.

5.23 OWNERSHIP/INTELLECTUAL PROPERTY, INCLUDING RIGHTS TO DATA, DOCUMENTS AND COMPUTER SOFTWARE

For the purposes of this Contract, the term "Work" is defined as all reports, statistical analyses, work papers, work products, materials, approaches, designs, specifications, systems, documentation, methodologies, concepts, research, materials, intellectual property or other property developed, produced, or generated in connection with this Contract. All work performed pursuant to this Contract is made the exclusive property of TWDB. All right, title and interest in and to said property shall vest in TWDB upon creation and shall be deemed to be a work for hire and made in the course of the services rendered pursuant to this Contract. To the extent that title to any such work may not, by operation of law, vest in TWDB, or such work may not be considered a work made for hire, all rights, title and interest therein are hereby irrevocably assigned to TWDB. TWDB shall have the right to obtain and to hold in its name any and all patents, copyrights, registrations or such other protection as may be appropriate to the subject matter, and any extensions and renewals thereof. Contractor must give TWDB and/or the State of Texas, as well as any person designated by TWDB and/or the State of Texas, all assistance required to perfect the rights defined herein without any charge or expense beyond those amounts payable to Contractor for the services rendered under this Contract.

Contractor shall maintain and retain supporting fiscal and any other documents relevant to showing that any payments under this Contract funds were expended in accordance with the laws and regulations of the State of Texas, including but not limited to, requirements of the Comptroller of the State of Texas and the State Auditor. Contractor shall maintain all such documents and other records relating to this Contract and the State's property for a period of four (4) years after the date of submission of the final invoices or until a resolution of all billing questions, whichever is later. Contractor shall make available at reasonable times and upon reasonable notice, and for reasonable periods, all documents and other information related to the "Work" as defined in paragraph 11.30 of this Contract. Contractor and the subcontractors shall provide the State Auditor with any information that the State Auditor deems relevant to any investigation or audit. Contractor must retain all work and other supporting documents pertaining to this Contract, for purposes of inspecting, monitoring, auditing, or evaluating by TWDB and any authorized agency of the State of Texas, including an investigation or audit by the State Auditor.

Contractor shall cooperate with any authorized agents of the State of Texas and shall provide them with prompt access to all of such State's work as requested. Contractor's failure to comply with this Section shall constitute a material breach of this Contract and shall authorize the TWDB and the State of Texas to immediately assess appropriate damages for such failure. Pursuant to Government Code, §2262.003 the acceptance of funds by Contractor or any other

entity or person directly under this Contract, or indirectly through a subcontract under this Contract, shall constitute acceptance of the authority of the State Auditor to conduct an audit or investigation in connection with those funds. Contractor acknowledges and understands that the acceptance of funds under this Contract shall constitute consent to an audit by the State Auditor, Comptroller or other agency of the State of Texas. Contractor shall ensure that this paragraph concerning the State's authority to audit funds received indirectly by subcontractors through Contractor and the requirement to cooperate is included in any subcontract it awards. Furthermore, under the direction of the legislative audit committee, an entity that is the subject of an audit or investigation by the State Auditor must provide the State Auditor with access to any information the State Auditor considers relevant to the investigation or audit.

5.24 DRUG FREE WORKPLACE POLICY

The contractor shall comply with the applicable provisions of the Drug-Free Work Place Act of 1988 (Public Law 100-690, Title V, Subtitle D; 41 U.S.C. 701 ET SEQ.) and maintain a drug-free work environment; and the final rule, government-wide requirements for drug-free work place (grants), issued by the Office of Management and Budget and the Department of Defense (32 CFR Part 280, Subpart F) to implement the provisions of the Drug-Free Work Place Act of 1988 is incorporated by reference and the contractor shall comply with the relevant provisions thereof, including any amendments to the final rule that may hereafter be issued.

5.25 INSURANCE

Contractor represents and warrants that it will, within five (5) business days of executing this agreement, provide TWDB with current certificates of insurance or other proof acceptable to TWDB of the following insurance coverage: Standard Workers Compensation Insurance covering all personnel who will provide services under this Contract;

Commercial General Liability Insurance, personal injury and advertising injury with, at a minimum, the following limits: $500,000 minimum each occurrence; $1,000,000 per general aggregate. Contractor represents and warrants that all of the above coverage is with companies licensed in the state of Texas, with "A" rating from Best, and authorized to provide the corresponding coverage. Contractor also represents and warrants that all policies contain endorsements prohibiting cancellation except upon at least thirty (30) days prior written notice to TWDB. Contractor represents and warrants that it shall maintain the above insurance coverage during the term of this Contract, and shall provide TWDB with an executed copy of the policies immediately upon request.

5.26 ORDER PRECEDENCE

In the event of conflicts or inconsistencies between this contract and its exhibits or attachments, such conflicts or inconsistencies shall be resolved by reference to the documents in the following order of priority: Signed Contract (or Notice of Award), Attachments to the Contract (or Notice of Award), Request for Proposals, and Respondent's Response to Request for Proposals.

5.27 PROPRIETY INFORMATION

The TWDB is a government agency subject to the Texas Public Information Act (PIA), Chapter 552, Gov't Code. The Proposal and other information submitted to the TWDB by the Respondent are subject to release as public information. The Proposal and other submitted information shall

be presumed to be subject to disclosure unless a specific exception to disclosure under the PIA applies. If it is necessary for the Respondent to include proprietary or otherwise confidential information in its Proposal or other submitted information, the Respondent must clearly label that proprietary or confidential information and identify the specific exception to disclosure in the PIA. Merely making a blanket claim that the entire Proposal is protected from disclosure because it contains some proprietary information is not acceptable, and shall make the entire Proposal subject to release under the PIA. In order to trigger the process of seeking an Attorney General opinion on the release of proprietary or confidential information, the specific provisions of the Proposal that are considered by the Respondent to be proprietary or confidential must be clearly labeled as described above. Any information which is not clearly identified as proprietary or confidential shall be deemed to be subject to disclosure pursuant to the PIA.

All contracts shall include the following language**:** "**Contractor is required to make any information created or exchanged with the state pursuant to this contract, and not otherwise excepted from disclosure under the Texas Public Information Act, available in a format that is accessible by the public at no additional charge to the state**." In addition to this recommended language, the Comptroller also advises that in order to ***comply with the new statutory requirements***, each state governmental entity should supplement this provision with the additional terms agreed upon by the parties regarding the specific format by which the vendor is required to make the information accessible by the public.

5.28 PUBLIC DISCLOSURE

No public disclosures or news releases pertaining to this contract shall be made without prior written approval of TWDB.

5.29 SUBSTITUTIONS

Substitutions are not permitted without written approval of TWDB.

5.30 TAXES

Contractor represents and warrants that it shall pay all taxes or similar amounts resulting from this Contract, including, but not limited to, any federal, State, or local income, sales or excise taxes of Contractor or its employees. TWDB shall not be liable for any taxes resulting from this Contract.

5.31 ACTS OR OMISSIONS

Vendor shall indemnify and hold harmless the State of Texas and Customers, AND/OR THEIR OFFICERS, AGENTS, EMPLOYEES, REPRESENTATIVES, CONTRACTORS, ASSIGNEES, AND/OR DESIGNEES FROM ANY AND ALL LIABILITY, ACTIONS, CLAIMS, DEMANDS, OR SUITS, AND ALL RELATED COSTS, ATTORNEY FEES, AND EXPENSES arising out of, or resulting from any acts or omissions of the Vendor or its agents, employees, subcontractors, Order Fulfillers, or suppliers of subcontractors in the execution or performance of the Contract and any Purchase Orders issued under the Contract. THE DEFENSE SHALL BE COORDINATED BY VENDOR WITH THE OFFICE OF THE ATTORNEY GENERAL WHEN TEXAS STATE AGENCIES ARE NAMED DEFENDANTS IN ANY LAWSUIT AND VENDOR MAY NOT AGREE TO ANY SETTLEMENT WITHOUT FIRST OBTAINING THE CONCURRENCE FROM THE OFFICE OF THE

ATTORNEY GENERAL. VENDOR AND THE CUSTOMER AGREE TO FURNISH TIMELY WRITTEN NOTICE TO EACH OTHER OF ANY SUCH CLAIM.

5.32 INFRINGEMENTS

a) Vendor shall indemnify and hold harmless the State of Texas and Customers, AND/OR THEIR EMPLOYEES, AGENTS, REPRESENTATIVES, CONTRACTORS, ASSIGNEES, AND/OR DESIGNEES from any and all third party claims involving infringement of United States patents, copyrights, trade and service marks, and any other intellectual or intangible property rights in connection with the PERFORMANCES OR ACTIONS OF VENDOR PURSUANT TO THIS CONTRACT. VENDOR AND THE CUSTOMER AGREE TO FURNISH TIMELY WRITTEN NOTICE TO EACH OTHER OF ANY SUCH CLAIM. VENDOR SHALL BE LIABLE TO PAY ALL COSTS OF DEFENSE INCLUDING ATTORNEYS' FEES. THE DEFENSE SHALL BE COORDINATED BY VENDOR WITH THE OFFICE OF THE ATTORNEY GENERAL WHEN TEXAS STATE AGENCIES ARE NAMED DEFENDANTS IN ANY LAWSUIT AND VENDOR MAY NOT AGREE TO ANY SETTLEMENT WITHOUT FIRST OBTAINING THE CONCURRENCE FROM THE OFFICE OF THE ATTORNEY GENERAL.

b) Vendor shall have no liability under this section if the alleged infringement is caused in whole or in part by: (i) use of the product or service for a purpose or in a manner for which the product or service was not designed, (ii) any modification made to the product without Vendor's written approval, (iii) any modifications made to the product by the Vendor pursuant to Customer's specific instructions, (iv) any intellectual property right owned by or licensed to Customer, or (v) any use of the product or service by Customer that is not in conformity with the terms of any applicable license agreement.

c) If Vendor becomes aware of an actual or potential claim, or Customer provides Vendor with notice of an actual or potential claim, Vendor may (or in the case of an injunction against Customer, shall), at Vendor's sole option and expense; (i) procure for the Customer the right to continue to use the affected portion of the product or service, or
(ii) modify or replace the affected portion of the product or service with functionally equivalent or superior product or service so that Customer's use is non-infringing.

5.33 TAXES/WORKERS' COMPENSATION/UNEMPLOYMENT INSURANCE – INCLUDING INDEMNITY

1) VENDOR AGREES AND ACKNOWLEDGES THAT DURING THE EXISTENCE OF THIS CONTRACT, VENDOR SHALL BE ENTIRELY RESPONSIBLE FOR THE LIABILITY AND PAYMENT OF VENDOR'S AND VENDOR'S EMPLOYEES' TAXES OF WHATEVER KIND, ARISING OUT OF THE PERFORMANCES IN THIS CONTRACT. VENDOR AGREES TO COMPLY WITH ALL STATE AND FEDERAL LAWS APPLICABLE TO ANY SUCH PERSONS, INCLUDING LAWS REGARDING WAGES, TAXES, INSURANCE, AND WORKERS' COMPENSATION. THE CUSTOMER AND/OR THE STATE SHALL NOT BE LIABLE TO THE VENDOR, ITS EMPLOYEES, AGENTS, OR OTHERS FOR THE PAYMENT OF TAXES OR THE PROVISION OF UNEMPLOYMENT INSURANCE AND/OR WORKERS'

COMPENSATION OR ANY BENEFIT AVAILABLE TO A STATE EMPLOYEE OR EMPLOYEE OF ANOTHER GOVERNMENTAL ENTITY CUSTOMER.

2) VENDOR AGREES TO INDEMNIFY AND HOLD HARMLESS CUSTOMERS, THE STATE OF TEXAS AND/OR THEIR EMPLOYEES, AGENTS, REPRESENTATIVES, CONTRACTORS, AND/OR ASSIGNEES FROM ANY AND ALL LIABILITY, ACTIONS, CLAIMS, DEMANDS, OR SUITS, AND ALL RELATED COSTS, ATTORNEYS' FEES, AND EXPENSES, RELATING TO TAX LIABILITY, UNEMPLOYMENT INSURANCE AND/OR WORKERS'
COMPENSATION IN ITS PERFORMANCE UNDER THIS CONTRACT. VENDOR SHALL BE LIABLE TO PAY ALL COSTS OF DEFENSE INCLUDING ATTORNEYS' FEES. THE DEFENSE SHALL BE COORDINATED BY VENDOR WITH THE OFFICE OF THE ATTORNEY GENERAL WHEN TEXAS STATE AGENCIES ARE NAMED DEFENDANTS IN ANY LAWSUIT AND VENDOR MAY NOT AGREE TO ANY SETTLEMENT WITHOUT FIRST OBTAINING THE CONCURRENCE FROM THE OFFICE OF THE ATTORNEY GENERAL. VENDOR AND THE CUSTOMER AGREE TO FURNISH TIMELY WRITTEN NOTICE TO EACH OTHER OF ANY SUCH CLAIM.

ATTACHMENT A
EXECUTION OF RESPONSE
FOR PROJECT NO. _____

Company Name: _____

Address: _____

_____

_____

Phone Number: _____

I, _____, am the above-referenced company's representative and I am authorized to submit this response and sign future contract documents. By signing, vendor certifies that if a Texas address is shown as the address, the vendor qualifies as a Texas Resident Bidder as defined in Texas Administrative Code, Title 34, Part 1, Chapter 20.

_____ _____

Authorized Signature Date

SECTION 2
COMPANY PROFILE SUMMARY AND HISTORY
FOR PROJECT NO. _____

(To be provided by Respondent)

SECTION 3

COMPANY REFERENCES
FOR PROJECT NO. _____

REFERENCE #1

Name of Organization:			
Business Address:			
Business City:			
Business State:		**Zip:**	
Contact Person Name:			
Contact Person Title:			
Phone Number:		**Fax:**	
Client Comments:			

THIS PAGE OR A REASONABLE FACSIMILE SHALL BE RETURNED WITH THE RESPONSE. FAILURE TO RETURN THIS PAGE OR A REASONABLE FACSIMILE WILL RESULT IN THE RESPONSE BEING CONSIDERED NON-RESPONSIVE. ANY NEGATIVE RESPONSE(S) MAY RESULT IN DISQUALIFICATION OF THE RESPONSE.

SECTION 3

COMPANY REFERENCES
FOR PROJECT NO. _____

REFERENCE #2

Name of Organization:			
Business Address:			
Business City:			
Business State:		**Zip:**	
Contact Person Name:			
Contact Person Title:			
Phone Number:		**Fax:**	
Client Comments:			

THIS PAGE OR A REASONABLE FACSIMILE SHALL BE RETURNED WITH THE RESPONSE. FAILURE TO RETURN THIS PAGE OR A REASONABLE FACSIMILE WILL RESULT IN THE RESPONSE BEING CONSIDERED NON-RESPONSIVE. ANY NEGATIVE RESPONSE(S) MAY RESULT IN DISQUALIFICATION OF THE RESPONSE.

SECTION 3

COMPANY REFERENCES
FOR PROJECT NO. _____

REFERENCE #3

Name of Organization:			
Business Address:			
Business City:			
Business State:		**Zip:**	
Contact Person Name:			
Contact Person Title:			
Phone Number:		**Fax:**	
Client Comments:			

THIS PAGE OR A REASONABLE FACSIMILE SHALL BE RETURNED WITH THE RESPONSE. FAILURE TO RETURN THIS PAGE OR A REASONABLE FACSIMILE WILL RESULT IN THE RESPONSE BEING CONSIDERED NON-RESPONSIVE. ANY NEGATIVE RESPONSE(S) MAY RESULT IN DISQUALIFICATION OF THE RESPONSE.

SECTION 4
RESUMES OF INDIVIDUALS
FOR PROJECT NO. _____

(To be provided by Respondent)

SECTION 5

Historically Underutilized Businesses Subcontracting Plan

FOR PROJECT NO. _____

Please see SECTION IV, GENERAL INFORMATION, No. 4.1-B5

All HUB Subcontracting Plan Forms must be completed and submitted with the Response.

The forms are entitled and can be found at:

HUB Subcontracting Plan Form
HUB Subcontracting Plan Form, SECTION 2 continuation sheet
HUB Subcontracting Plan Good Faith Effort - Method A (Attachment A)
HUB Subcontracting Plan Good Faith Effort - Method B (Attachment B)
HUB Subcontracting Opportunity Notification Form

http://comptroller.texas.gov/procurement/prog/hub/hub-subcontracting-plan/

SECTION 7
(if applicable)
FOR PROJECT NO. _____

Name(s) and Social Security Number(s) of Each Person with at least 25 Percent Ownership of the Business Entity Submitting the RFQ

_____
Name

_____
Social Security Number

_____
Name

_____
Social Security Number

_____
Name

_____
Social Security Number

_____
Name

_____
Social Security Number

SECTION 7
SCOPE OF WORK
FOR PROJECT NO. _____

(To be provided by Respondent)

MEMORANDUM

TO: Kevin Patteson

THRU: Robert Mace _____
Kaye Schultz _____
Oscar Ramirez _____
Sanjeev Kalaswad _____
Erika Mancha _____
Andrea Croskrey _____
Angie Gutierrez _____
David Carter _____

FROM: Phyllis Thomas

RE: Research Contract between the Texas Water Development Board (TWDB) and INTERA Incorporated (INTERA), TWDB Contract No. 1600011949

DATE: March 1, 2016

Two copies of the TWDB's Research Contract with INTERA, a Contract Initiation Form, and a transmittal letter are attached for your signature.

The Total Study Cost of this project is $200,000.00. TWDB funding will not exceed the lesser of $200,000.00 or 100% of the project cost to be provided from the General Revenue Fund. Funding was approved at the January 6, 2016 Board meeting.

Contingent upon approval at all required levels, the completed package should be returned to Contracts Administration for distribution.

Attachments