

STATE OF COLORADO
Colorado Water Conservation Board
Grant Agreement
with
Water Environment Research Foundation
Contract Number C150456

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1. PARTIES

This Grant Agreement (hereinafter called "Grant") is entered into by and between the Water Environment Research Foundation (hereinafter called "Grantee"), and the STATE OF COLORADO acting by and through the Department of Natural Resources, Colorado Water Conservation Board (hereinafter called the "State or CWCB").

2. EFFECTIVE DATE AND NOTICE OF NONLIABILITY.

This Grant shall not be effective or enforceable until it is approved and signed by the Colorado State Controller or designee (hereinafter called the "Effective Date"). The State shall not be liable to pay or reimburse Grantee for any performance hereunder, including, but not limited to costs or expenses incurred, or be bound by any provision hereof prior to the Effective Date.

3. RECITALS

A. Authority, Appropriation, And Approval

Authority for the agency entering into this Contract arises from Colorado Revised Statutes (CRS) 39-29-109(2)(c), 37-75-102 and 37-75-104(2)(c) and Senate Bill 06-179 adopted by the 2006 General Assembly, and a sufficient unencumbered balance thereof remains available for payment. Required approvals, clearance and coordination have been accomplished from and with appropriate agencies.

B. Consideration

The Parties acknowledge that the mutual promises and covenants contained herein and other good and valuable consideration are sufficient and adequate to support this Grant.

C. Purpose

The Water Supply Reserve Account provides money for grants and loans to complete water activities, which are broadly defined and include water supply and environmental projects and/or studies. This Grant is for the Demonstration of Membrane Zero Liquid Discharge Process for Drinking Water Systems in the Metro, South Platte, and Arkansas Basins.

D. References

All references in this Grant to sections (whether spelled out or using the § symbol), subsections, exhibits or other attachments, are references to sections, subsections, exhibits or other attachments contained herein or incorporated as a part hereof, unless otherwise noted.

4. DEFINITIONS

The following terms as used herein shall be construed and interpreted as follows:

A. Budget

"Budget" means the budget for the Work described in **Exhibit A**.

B. Evaluation

"Evaluation" means the process of examining Grantee's Work and rating it based on criteria established in §6 and **Exhibit A**.

C. Exhibits and other Attachments

The following are attached hereto and incorporated by reference herein: **Exhibit A (Statement of Work)**.

D. Goods

"Goods" means tangible material acquired, produced, or delivered by Grantee either separately or in conjunction with the Services Grantee renders hereunder.

E. Grant

"Grant" means this Grant, its terms and conditions, attached exhibits, documents incorporated by reference under the terms of this Grant, and any future modifying agreements, exhibits, attachments or references incorporated herein pursuant to Colorado State law, Fiscal Rules, and State Controller Policies.

F. Grant Funds

"Grant Funds" means available funds payable by the State to Grantee pursuant to this Grant.

G. Party or Parties

"Party" means the State or Grantee and "Parties" means both the State and Grantee.

H. Program

"Program" means the Water Supply Reserve Account grant program that provides the funding for this Grant.

I. Review

"Review" means examining Grantee's Work to ensure that it is adequate, accurate, correct and in accordance with the criteria established in §6 and **Exhibit A**.

J. Services

"Services" means the required services to be performed by Grantee pursuant to this Grant.

K. Sub-grantee

"Sub-grantee" means third-parties, if any, engaged by Grantee to aid in performance of its obligations.

L. Work

"Work" means the tasks and activities Grantee is required to perform to fulfill its obligations under this Grant and **Exhibit A**, including the performance of the Services and delivery of the Goods.

M. Work Product

"Work Product" means the tangible or intangible results of Grantee's Work, including, but not limited to, software, research, reports, studies, data, photographs, negatives or other finished or unfinished documents, drawings, models, surveys, maps, materials, or work product of any type, including drafts.

5. TERM and EARLY TERMINATION.

Initial Term-Work Commencement

The Parties respective performances under this Grant shall commence on the later of either the Effective Date or January 1, 2011. This Grant shall terminate on June 30, 2013 unless sooner terminated or further extended as specified elsewhere herein.

6. STATEMENT OF WORK

A. Completion

Grantee shall complete the Work and its other obligations as described herein and in **Exhibit A** on or before June 30, 2013. The State shall not be liable to compensate Grantee for any Work performed prior to the Effective Date or after the termination of this Grant.

B. Goods and Services

Grantee shall procure Goods and Services necessary to complete the Work. Such procurement shall be accomplished using the Grant Funds and shall not increase the maximum amount payable hereunder by the State.

C. Employees

All persons employed by Grantee or Sub-grantees shall be considered Grantee's or Sub-grantees' employee(s) for all purposes hereunder and shall not be employees of the State for any purpose as a result of this Grant.

7. PAYMENTS TO GRANTEE

The State shall, in accordance with the provisions of this §7, pay Grantee in the following amounts and using the methods set forth below:

A. Maximum Amount

The maximum amount payable under this Grant to Grantee by the State is \$800,000, as determined by the State from available funds. Grantee agrees to provide any additional funds required for the successful completion of the Work. Payments to Grantee are limited to the unpaid obligated balance of the Grant as set forth in **Exhibit A**. The maximum amount payable by the State to Grantee during each State fiscal year of this Grant shall be:

\$800,000 in FY2011
\$800,000 in FY2012, minus any funds expended in FY2011
\$800,000 in FY2013, minus any funds expended in FY2011 and 2012

i. Advance, Interim and Final Payments

Any payment allowed under this Grant or in **Exhibit A** shall comply with State Fiscal Rules and be made in accordance with the provisions of this Grant or such Exhibit. Grantee shall initiate any payment requests by submitting invoices to the State in the form and manner set forth in approved by the State.

ii. Interest

The State shall fully pay each invoice within 45 days of receipt thereof if the amount invoiced represents performance by Grantee previously accepted by the State. Uncontested amounts not paid by the State within 45 days may, if Grantee so requests, bear interest on the unpaid balance beginning on the 46th day at a rate not to exceed one percent per month until paid in full; provided, however, that interest shall not accrue on unpaid amounts that are subject to a good faith dispute. Grantee shall invoice the State separately for accrued interest on delinquent amounts. The billing shall reference the delinquent payment, the number of day's interest to be paid and the interest rate.

iii. Available Funds-Contingency-Termination

The State is prohibited by law from making fiscal commitments beyond the term of the State's current fiscal year. Therefore, Grantee's compensation is contingent upon the continuing availability of State appropriations as provided in the Colorado Special Provisions, set forth below. If federal funds are used with this Grant in whole or in part, the State's performance hereunder is contingent upon the continuing availability of such funds. Payments pursuant to this Grant shall be made only from

available funds encumbered for this Grant and the State's liability for such payments shall be limited to the amount remaining of such encumbered funds. If State or federal funds are not appropriated, or otherwise become unavailable to fund this Grant, the State may immediately terminate this Grant in whole or in part without further liability in accordance with the provisions herein.

iv. Erroneous Payments

At the State's sole discretion, payments made to Grantee in error for any reason, including, but not limited to overpayments or improper payments, and unexpended or excess funds received by Grantee, may be recovered from Grantee by deduction from subsequent payments under this Grant or other Grants, grants or agreements between the State and Grantee or by other appropriate methods and collected as a debt due to the State. Such funds shall not be paid to any party other than the State.

B. Use of Funds

Grant Funds shall be used only for eligible costs identified herein and/or in the Budget. The State's total consideration shall not exceed the maximum amount shown herein.

C. Matching Funds

Grantee shall provide matching funds as provided in **Exhibit A**.

8. REPORTING - NOTIFICATION

Reports, Evaluations, and Reviews required under this §8 shall be in accordance with the procedures of and in such form as prescribed by the State and in accordance with §19, if applicable.

A. Performance, Progress, Personnel, and Funds

Grantee shall submit a report to the State upon expiration or sooner termination of this Grant, containing an Evaluation and Review of Grantee's performance and the final status of Grantee's obligations hereunder. In addition, Grantee shall comply with all reporting requirements, if any, set forth in **Exhibit A**.

B. Litigation Reporting

Within 10 days after being served with any pleading in a legal action filed with a court or administrative agency, related to this Grant or which may affect Grantee's ability to perform its obligations hereunder, Grantee shall notify the State of such action and deliver copies of such pleadings to the State's principal representative as identified herein. If the State's principal representative is not then serving, such notice and copies shall be delivered to the Executive Director of the Colorado Department of Natural Resources.

C. Noncompliance

Grantee's failure to provide reports and notify the State in a timely manner in accordance with this §8 may result in the delay of payment of funds and/or termination as provided under this Grant.

D. SubGrants

Copies of any and all subGrants entered into by Grantee to perform its obligations hereunder shall be submitted to the State or its principal representative upon request by the State. Any and all subGrants entered into by Grantee related to its performance hereunder shall comply with all applicable federal and state laws and shall provide that such subGrants be governed by the laws of the State of Colorado.

9. GRANTEE RECORDS

Grantee shall make, keep, maintain and allow inspection and monitoring of the following records:

A. Maintenance

Grantee shall make, keep, maintain, and allow inspection and monitoring by the State of a complete file of all records, documents, communications, notes and other written materials, electronic media files, and communications, pertaining in any manner to the Work or the delivery of Services (including, but not limited to the operation of programs) or Goods hereunder. Grantee shall maintain such records (the Record Retention Period) until the last to occur of the following: (i) a period of three years after the date this Grant is completed or terminated, or (ii) final payment is made hereunder, whichever is later, or (iii) for such further period as may be necessary to resolve any pending matters, or (iv) if an audit is occurring, or Grantee has received notice that an audit is pending, then until such audit has been completed and its findings have been resolved (the "Record Retention Period").

B. Inspection

Grantee shall permit the State, the federal government and any other duly authorized agent of a governmental agency to audit, inspect, examine, excerpt, copy and/or transcribe Grantee's records related to

this Grant during the Record Retention Period for a period of three years following termination of this Grant or final payment hereunder, whichever is later, to assure compliance with the terms hereof or to evaluate Grantee's performance hereunder. The State reserves the right to inspect the Work at all reasonable times and places during the term of this Grant, including any extension. If the Work fails to conform to the requirements of this Grant, the State may require Grantee promptly to bring the Work into conformity with Grant requirements, at Grantee's sole expense. If the Work cannot be brought into conformance by re-performance or other corrective measures, the State may require Grantee to take necessary action to ensure that future performance conforms to Grant requirements and exercise the remedies available under this Grant, at law or inequity in lieu of or in conjunction with such corrective measures.

C. Monitoring

Grantee shall permit the State, the federal government, and other governmental agencies having jurisdiction, in their sole discretion, to monitor all activities conducted by Grantee pursuant to the terms of this Grant using any reasonable procedure, including, but not limited to: internal evaluation procedures, examination of program data, special analyses, on-site checking, formal audit examinations, or any other procedures. All monitoring controlled by the State shall be performed in a manner that shall not unduly interfere with Grantee's performance hereunder.

D. Final Audit Report

If an audit is performed on Grantee's records for any fiscal year covering a portion of the term of this Grant, Grantee shall submit a copy of the final audit report to the State or its principal representative at the address specified herein.

10. CONFIDENTIAL INFORMATION-STATE RECORDS

Grantee shall comply with the provisions on this §10 if it becomes privy to confidential information in connection with its performance hereunder. Confidential information, includes, but is not necessarily limited to, state records, personnel records, and information concerning individuals. The State shall notify the Grantee in writing and notate any State records and information that are classified by the State as being "Confidential" and given to the Grantee in connection with its performance hereunder. The provisions of this Section 10 shall only apply to such notated records and information.

A. Confidentiality

Grantee shall keep all State records and information confidential at all times and to comply with all laws and regulations concerning confidentiality of information. Any request or demand by a third party for State records and information in the possession of Grantee shall be immediately forwarded to the State's principal representative.

B. Notification

Grantee shall notify its agent, employees, Sub-grantees, and assigns who may come into contact with State records and confidential information that each is subject to the confidentiality requirements set forth herein, and shall provide each with a written explanation of such requirements before they are permitted to access such records and information.

C. Use, Security, and Retention

Confidential information of any kind shall not be distributed or sold to any third party or used by Grantee or its agents in any way, except as authorized by this Grant or approved in writing by the State. Grantee shall provide and maintain a secure environment that ensures confidentiality of all State records and other confidential information wherever located. Confidential information shall not be retained in any files or otherwise by Grantee or its agents, except as permitted in this Grant or approved in writing by the State.

D. Disclosure-Liability

Disclosure of State records or other confidential information by Grantee for any reason may be cause for legal action by third parties against Grantee, the State or their respective agents. Grantee shall indemnify, save, and hold harmless the State, its employees and agents, against any and all claims, damages, liability and court awards including costs, expenses, and attorney fees and related costs, incurred as a result of any act or omission by Grantee, or its employees, agents, Sub-grantees, or assignees pursuant to this §10.

11. CONFLICTS OF INTEREST

Grantee shall not engage in any business or personal activities or practices or maintain any relationships which conflict in any way with the full performance of Grantee's obligations hereunder. Grantee acknowledges that with respect to this Grant, even the appearance of a conflict of interest is harmful to the State's interests. Absent the State's prior written approval, Grantee shall refrain from any practices, activities or relationships that reasonably appear to be in conflict with the full performance of Grantee's obligations to the State hereunder. If a conflict or appearance exists, or if Grantee is uncertain whether a conflict or the appearance of a conflict of interest exists, Grantee shall submit to the State a disclosure statement setting forth the relevant details for the State's consideration. Failure to promptly submit a disclosure statement or to follow the State's direction in regard to the apparent conflict constitutes a breach of this Grant.

12. REPRESENTATIONS AND WARRANTIES

Grantee makes the following specific representations and warranties, each of which was relied on by the State in entering into this Grant.

A. Standard and Manner of Performance

Grantee shall perform its obligations hereunder in accordance with the highest standards of care, skill and diligence in the industry, trades or profession and in the sequence and manner set forth in this Grant.

B. Legal Authority – Grantee and Grantees Signatory

Grantee warrants that it possesses the legal authority to enter into this Grant and that it has taken all actions required by its procedures, by-laws, and/or applicable laws to exercise that authority, and to lawfully authorize its undersigned signatory to execute this Grant, or any part thereof, and to bind Grantee to its terms. If requested by the State, Grantee shall provide the State with proof of Grantee's authority to enter into this Grant within 15 days of receiving such request.

C. Licenses, Permits, Etc.

Grantee represents and warrants that as of the Effective Date it has, and that at all times during the term hereof it shall have, at its sole expense, all licenses, certifications, approvals, insurance, permits, and other authorization required by law to perform its obligations hereunder. Grantee warrants that it shall maintain all necessary licenses, certifications, approvals, insurance, permits, and other authorizations required to properly perform this Grant, without reimbursement by the State or other adjustment in Grant Funds. Additionally, all employees and agents of Grantee performing Services under this Grant shall hold all required licenses or certifications, if any, to perform their responsibilities. Grantee, if a foreign corporation or other foreign entity transacting business in the State of Colorado, further warrants that it currently has obtained and shall maintain any applicable certificate of authority to transact business in the State of Colorado and has designated a registered agent in Colorado to accept service of process. Any revocation, withdrawal or non-renewal of licenses, certifications, approvals, insurance, permits or any such similar requirements necessary for Grantee to properly perform the terms of this Grant shall be deemed to be a material breach by Grantee and constitute grounds for termination of this Grant.

13. INSURANCE

Grantee and its Sub-grantees shall obtain and maintain insurance as specified in this section at all times during the term of this Grant: All policies evidencing the insurance coverage required hereunder shall be issued by insurance companies satisfactory to Grantee and the State.

A. Grantee

i. Public Entities

If Grantee is a "public entity" within the meaning of the Colorado Governmental Immunity Act, CRS §24-10-101, et seq., as amended (the "GIA"), then Grantee shall maintain at all times during the term of this Grant such liability insurance, by commercial policy or self-insurance, as is necessary to meet its liabilities under the GIA. Grantee shall show proof of such insurance satisfactory to the State, if requested by the State. Grantee shall require each Grant with Sub-grantees that are public entities, providing Goods or Services hereunder, to include the insurance requirements necessary to meet Sub-grantee's liabilities under the GIA.

ii. Non-Public Entities

If Grantee is not a "public entity" within the meaning of the GIA, Grantee shall obtain and maintain during the term of this Grant insurance coverage and policies meeting the same requirements set forth in §13(B) with respect to sub-Grantees that are not "public entities".

B. Sub-Grantees

Grantee shall require each Grant with Sub-grantees, other than those that are public entities, providing Goods or Services in connection with this Grant, to include insurance requirements substantially similar to the following:

i. Worker's Compensation

Worker's Compensation Insurance as required by State statute, and Employer's Liability Insurance covering all of Grantee and Sub-grantee employees acting within the course and scope of their employment.

ii. General Liability

Commercial General Liability Insurance written on ISO occurrence form CG 00 01 10/93 or equivalent, covering premises operations, fire damage, independent Grantees, products and completed operations, blanket Grantual liability, personal injury, and advertising liability with minimum limits as follows: (a) \$1,000,000 each occurrence; (b) \$1,000,000 general aggregate; (c) \$1,000,000 products and completed operations aggregate; and (d) \$50,000 any one fire. If any aggregate limit is reduced below \$1,000,000 because of claims made or paid, Sub-grantee shall immediately obtain additional insurance to restore the full aggregate limit and furnish to Grantee a certificate or other document satisfactory to Grantee showing compliance with this provision.

iii. Automobile Liability

Automobile Liability Insurance covering any auto (including owned, hired and non-owned autos) with a minimum limit of \$1,000,000 each accident combined single limit.

iv. Additional Insured

Grantee and the State shall be named as additional insured on the Commercial General Liability and Automobile Liability Insurance policies (leases and construction Grants require additional insured coverage for completed operations on endorsements CG 2010 11/85, CG 2037, or equivalent).

v. Primacy of Coverage

Coverage required of Grantee and Sub-grantees shall be primary over any insurance or self-insurance program carried by Grantee or the State.

vi. Cancellation

The above insurance policies shall include provisions preventing cancellation or non-renewal without at least 30 days prior notice to the Grantee and Grantee shall forward such notice to the State in accordance with §16 (Notices and Representatives) within seven days of Grantee's receipt of such notice.

vii. Subrogation Waiver

All insurance policies in any way related to this Grant and secured and maintained by Grantee or its Sub-grantees as required herein shall include clauses stating that each carrier shall waive all rights of recovery, under subrogation or otherwise, against Grantee or the State, its agencies, institutions, organizations, officers, agents, employees, and volunteers.

C. Certificates

Grantee and all Sub-grantees shall provide certificates showing insurance coverage required hereunder to the State within seven business days of the Effective Date of this Grant. No later than 15 days prior to the expiration date of any such coverage, Grantee and each Sub-grantee shall deliver to the State or Grantee certificates of insurance evidencing renewals thereof. In addition, upon request by the State at any other time during the term of this Grant or any sub-grant, Grantee and each Sub-grantee shall, within 10 days of such request, supply to the State evidence satisfactory to the State of compliance with the provisions of this §13.

14. BREACH

A. Defined

In addition to any breaches specified in other sections of this Grant, the failure of either Party to perform any of its material obligations hereunder in whole or in part or in a timely or satisfactory manner,

constitutes a breach. The institution of proceedings under any bankruptcy, insolvency, reorganization or similar law, by or against Grantee, or the appointment of a receiver or similar officer for Grantee or any of its property, which is not vacated or fully stayed within 20 days after the institution or occurrence thereof, shall also constitute a breach.

B. Notice and Cure Period

In the event of a breach, notice of such shall be given in writing by the aggrieved Party to the other Party in the manner provided in §16. If such breach is not cured within 30 days of receipt of written notice, or if a cure cannot be completed within 30 days, or if cure of the breach has not begun within 30 days and pursued with due diligence, the State may exercise any of the remedies set forth in §15. Notwithstanding anything to the contrary herein, the State, in its sole discretion, need not provide advance notice or a cure period and may immediately terminate this Grant in whole or in part if reasonably necessary to preserve public safety or to prevent immediate public crisis.

15. REMEDIES

If Grantee is in breach under any provision of this Grant, the State shall have all of the remedies listed in this §15 in addition to all other remedies set forth in other sections of this Grant following the notice and cure period set forth in §14(B). The State may exercise any or all of the remedies available to it, in its sole discretion, concurrently or consecutively.

A. Termination for Cause and/or Breach

If Grantee fails to perform any of its obligations hereunder with such diligence as is required to ensure its completion in accordance with the provisions of this Grant and in a timely manner, the State may notify Grantee of such non-performance in accordance with the provisions herein. If Grantee thereafter fails to promptly cure such non-performance within the cure period, the State, at its option, may terminate this entire Grant or such part of this Grant as to which there has been delay or a failure to properly perform. Exercise by the State of this right shall not be deemed a breach of its obligations hereunder. Grantee shall continue performance of this Grant to the extent not terminated, if any.

i. Obligations and Rights

To the extent specified in any termination notice, Grantee shall not incur further obligations or render further performance hereunder past the effective date of such notice, and shall terminate outstanding orders and sub-Grants with third parties. However, Grantee shall complete and deliver to the State all Work, Services and Goods not cancelled by the termination notice and may incur obligations as are necessary to do so within this Grant's terms. At the sole discretion of the State, Grantee shall assign to the State all of Grantee's right, title, and interest under such terminated orders or sub-Grants. Upon termination, Grantee shall take timely, reasonable and necessary action to protect and preserve property in the possession of Grantee in which the State has an interest. All materials owned by the State in the possession of Grantee shall be immediately returned to the State. All Work Product, at the option of the State, shall be delivered by Grantee to the State and shall become the State's property.

ii. Payments

The State shall reimburse Grantee only for accepted performance up to the date of termination. If, after termination by the State, it is determined that Grantee was not in breach or that Grantee's action or inaction was excusable, such termination shall be treated as a termination in the public interest and the rights and obligations of the Parties shall be the same as if this Grant had been terminated in the public interest, as described herein.

iii. Damages and Withholding

Notwithstanding any other remedial action by the State, Grantee also shall remain liable to the State for any damages sustained by the State by virtue of any breach under this Grant by Grantee and the State may withhold any payment to Grantee for the purpose of mitigating the State's damages, until such time as the exact amount of damages due to the State from Grantee is determined. The State may withhold any amount that may be due to Grantee as the State deems necessary to protect the State, including loss as a result of outstanding liens or claims of former lien holders, or to reimburse the State for the excess costs incurred in procuring similar goods or services. Grantee shall be liable for excess costs incurred by the State in procuring from third parties replacement Work, Services or substitute Goods as cover.

B. Early Termination in the Public Interest

The State is entering into this Grant for the purpose of carrying out the public policy of the State of Colorado, as determined by its Governor, General Assembly, and/or Courts. If this Grant ceases to further the public policy of the State, the State, in its sole discretion, may terminate this Grant in whole or in part. Exercise by the State of this right shall not constitute a breach of the State's obligations hereunder. This subsection shall not apply to a termination of this Grant by the State for cause or breach by Grantee, which shall be governed by §15(A) or as otherwise specifically provided for herein.

i. Method and Content

The State shall notify Grantee of such termination in accordance with §16. The notice shall specify the effective date of the termination and whether it affects all or a portion of this Grant.

ii. Obligations and Rights

Upon receipt of a termination notice, Grantee shall be subject to and comply with the same obligations and rights set forth in §15(A)(i).

iii. Payments

If this Grant is terminated by the State pursuant to this §15(B), Grantee shall be paid an amount which bears the same ratio to the total reimbursement under this Grant as the Services satisfactorily performed bear to the total Services covered by this Grant, less payments previously made. Additionally, if this Grant is less than 60% completed, the State may reimburse Grantee for a portion of actual out-of-pocket expenses (not otherwise reimbursed under this Grant) incurred by Grantee which are directly attributable to the uncompleted portion of Grantee's obligations hereunder; provided that the sum of any and all reimbursement shall not exceed the maximum amount payable to Grantee hereunder.

C. Remedies Not Involving Termination

The State, its sole discretion, may exercise one or more of the following remedies in addition to other remedies available to it:

i. Suspend Performance

Suspend Grantee's performance with respect to all or any portion of this Grant pending necessary corrective action as specified by the State without entitling Grantee to an adjustment in price/cost or performance schedule. Grantee shall promptly cease performance and incurring costs in accordance with the State's directive and the State shall not be liable for costs incurred by Grantee after the suspension of performance under this provision.

ii. Withhold Payment

Withhold payment to Grantee until corrections in until corrections in Grantee's performance are satisfactorily made and completed.

iii. Deny Payment

Deny payment for those obligations not performed, that due to Grantee's actions or inactions, cannot be performed or, if performed, would be of no value to the State; provided, that any denial of payment shall be reasonably related to the value to the State of the obligations not performed.

iv. Removal

Demand removal of any of Grantee's employees, agents, or Sub-grantees whom the State deems incompetent, careless, insubordinate, unsuitable, or otherwise unacceptable, or whose continued relation to this Grant is deemed to be contrary to the public interest or not in the State's best interest.

v. Intellectual Property

If Grantee infringes on a patent, copyright, trademark, trade secret or other intellectual property right while performing its obligations under this Grant, Grantee shall, at the State's option (a) obtain for the State or Grantee the right to use such products and services; (b) replace any Goods, Services, or other product involved with non-infringing products or modify them so that they become non-infringing; or, (c) if neither of the foregoing alternatives are reasonably available, remove any infringing Goods, Services, or products and refund the price paid therefore to the State.

16. NOTICES and REPRESENTATIVES

Each individual identified below is the principal representative of the designating Party. All notices required to be given hereunder shall be hand delivered with receipt required or sent by certified or registered mail to such

Party's principal representative at the address set forth below. In addition to, but not in lieu of a hard-copy notice, notice also may be sent by e-mail to the e-mail addresses, if any, set forth below. Either Party may from time to time designate by written notice substitute addresses or persons to whom such notices shall be sent. Unless otherwise provided herein, all notices shall be effective upon receipt.

A. State:

Greg Johnson, Water Supply Planning Section
Colorado Water Conservation Board
1580 Logan Street, Suite 200
Denver, CO 80203
Gregory.Johnson@state.co.us

B. Grantee:

Daniel M. Woltering, Ph.D. Director of Research
Water Environment Research Foundation
635 Slaters Lane, Suite G-110
Alexandria, Virginia 22314
dwoltering@werf.org

17. RIGHTS IN DATA, DOCUMENTS, AND COMPUTER SOFTWARE

Any software, research, reports, studies, data, photographs, negatives or other documents, drawings, models, materials, or Work Product of any type, including drafts, prepared by Grantee in the performance of its obligations under this Grant shall be the jointly owned property of the State and the Grantee and, all Work Product shall be delivered to the State by Grantee upon completion or termination hereof, with Grantee entitled to retain a copy of such Work Product pursuant to its joint ownership. The parties' jointly held ownership rights in such Work Product shall include, but not be limited to, the right to copy, publish, display, transfer, and prepare derivative works. It is not anticipated that revenue will be generated from any Work Product. However, in the event that revenue may be generated from any Work Product, State and Grantee waive their respective rights to claim royalties from the other.

18. GOVERNMENTAL IMMUNITY

Notwithstanding any other provision to the contrary, nothing herein shall constitute a waiver, express or implied, of any of the immunities, rights, benefits, protection, or other provisions of the Colorado Governmental Immunity Act, CRS §24-10-101, et seq., as amended. Liability for claims for injuries to persons or property arising from the negligence of the State of Colorado, its departments, institutions, agencies, boards, officials, and employees is controlled and limited by the provisions of the Governmental Immunity Act and the risk management statutes, CRS §24-30-1501, et seq., as amended.

19. STATEWIDE GRANT MANAGEMENT SYSTEM

If the maximum amount payable to Grantee under this Grant is \$100,000 or greater, either on the Effective Date or at anytime thereafter, this §19 applies.

Grantee agrees to be governed, and to abide, by the provisions of CRS §24-102-205, §24-102-206, §24-103-601, §24-103.5-101 and §24-105-102 concerning the monitoring of vendor performance on state Grants and inclusion of Grant performance information in a statewide Grant management system.

Grantee's performance shall be subject to Evaluation and Review in accordance with the terms and conditions of this Grant, State law, including CRS §24-103.5-101, and State Fiscal Rules, Policies and Guidance. Evaluation and Review of Grantee's performance shall be part of the normal Grant administration process and Grantee's performance will be systematically recorded in the statewide Grant Management System. Areas of Evaluation and Review shall include, but shall not be limited to quality, cost and timeliness. Collection of information relevant to the performance of Grantee's obligations under this Grant shall be determined by the specific requirements of such obligations and shall include factors tailored to match the requirements of Grantee's

obligations. Such performance information shall be entered into the statewide Grant Management System at intervals established herein and a final Evaluation, Review and Rating shall be rendered within 30 days of the end of the Grant term. Grantee shall be notified following each performance Evaluation and Review, and shall address or correct any identified problem in a timely manner and maintain work progress.

Should the final performance Evaluation and Review determine that Grantee demonstrated a gross failure to meet the performance measures established hereunder, the Executive Director of the Colorado Department of Personnel and Administration (Executive Director), upon request by the CWCB, and showing of good cause, may debar Grantee and prohibit Grantee from bidding on future Grants. Grantee may contest the final Evaluation, Review and Rating by: (a) filing rebuttal statements, which may result in either removal or correction of the evaluation (CRS §24-105-102(6)), or (b) under CRS §24-105-102(6), exercising the debarment protest and appeal rights provided in CRS §§24-109-106, 107, 201 or 202, which may result in the reversal of the debarment and reinstatement of Grantee, by the Executive Director, upon showing of good cause.

20. GENERAL PROVISIONS

A. Assignment and SubGrants

Unless otherwise specified in Exhibit A, Statement of Work, Grantee's rights and obligations hereunder are personal and may not be transferred, assigned or subGranted without the prior, written consent of the State. Any attempt at assignment, transfer, subGranting without such consent shall be void. All assignments, subGrants, or Sub-grantees approved by Grantee or the State are subject to all of the provisions hereof. Grantee shall be solely responsible for all aspects of subGranting arrangements and performance.

B. Binding Effect

Except as otherwise provided in §20(A), all provisions herein contained, including the benefits and burdens, shall extend to and be binding upon the Parties' respective heirs, legal representatives, successors, and assigns.

C. Captions

The captions and headings in this Grant are for convenience of reference only, and shall not be used to interpret, define, or limit its provisions.

D. Counterparts

This Grant may be executed in multiple identical original counterparts, all of which shall constitute one agreement.

E. Entire Understanding

This Grant represents the complete integration of all understandings between the Parties and all prior representations and understandings, oral or written, are merged herein. Prior or contemporaneous additions, deletions, or other changes hereto shall not have any force or affect whatsoever, unless embodied herein.

F. Indemnification-General

Grantee shall indemnify, save, and hold harmless the State, its employees and agents, against any and all claims, damages, liability and court awards including costs, expenses, and attorney fees and related costs, incurred as a result of any act or omission by Grantee, or its employees, agents, Sub-grantees, or assignees pursuant to the terms of this Grant; however, the provisions hereof shall not be construed or interpreted as a waiver, express or implied, of any of the immunities, rights, benefits, protection, or other provisions, of the Colorado Governmental Immunity Act, CRS §24-10-101 et seq., or the Federal Tort Claims Act, 28 U.S.C. 2671 et seq., as applicable, as now or hereafter amended.

G. Jurisdiction and Venue

All suits, actions, or proceedings related to this Grant shall be held in the State of Colorado and exclusive venue shall be in the City and County of Denver.

H. Modification

i. By the Parties

Except as specifically provided in this Grant, modifications of this Grant shall not be effective unless agreed to in writing by both parties in an amendment to this Grant, properly executed and approved in accordance with applicable Colorado State law, State Fiscal Rules, and Office of the State Controller Policies, including, but not limited to, the policy entitled MODIFICATIONS OF GRANTS - TOOLS AND FORMS.

ii. By Operation of Law

This Grant is subject to such modifications as may be required by changes in Federal or Colorado State law, or their implementing regulations. Any such required modification automatically shall be incorporated into and be part of this Grant on the effective date of such change, as if fully set forth herein.

I. Order of Precedence

The provisions of this Grant shall govern the relationship of the State and Grantee. In the event of conflicts or inconsistencies between this Grant and its exhibits and attachments including, but not limited to, those provided by Grantee, such conflicts or inconsistencies shall be resolved by reference to the documents in the following order of priority:

- i. Colorado Special Provisions,
- ii. The provisions of the main body of this Grant,
- iii. Exhibit A.

J. Severability

Provided this Grant can be executed and performance of the obligations of the Parties accomplished within its intent, the provisions hereof are severable and any provision that is declared invalid or becomes inoperable for any reason shall not affect the validity of any other provision hereof.

K. Survival of Certain Grant Terms

Notwithstanding anything herein to the contrary, provisions of this Grant requiring continued performance, compliance, or effect after termination hereof, shall survive such termination and shall be enforceable by the State if Grantee fails to perform or comply as required.

L. Taxes

The State is exempt from all federal excise taxes under IRC Chapter 32 (No. 84-730123K) and from all State and local government sales and use taxes under CRS §§39-26-101 and 201 et seq. Such exemptions apply when materials are purchased or services rendered to benefit the State; provided however, that certain political subdivisions (e.g., City of Denver) may require payment of sales or use taxes even though the product or service is provided to the State. Grantee shall be solely liable for paying such taxes as the State is prohibited from paying for or reimbursing Grantee for them.

M. Third Party Beneficiaries

Enforcement of this Grant and all rights and obligations hereunder are reserved solely to the Parties, and not to any third party. Any services or benefits which third parties receive as a result of this Grant are incidental to the Grant, and do not create any rights for such third parties.

N. Waiver

Waiver of any breach of a term, provision, or requirement of this Grant, or any right or remedy hereunder, whether explicitly or by lack of enforcement, shall not be construed or deemed as a waiver of any subsequent breach of such term, provision or requirement, or of any other term, provision, or requirement.

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21. COLORADO SPECIAL PROVISIONS

The Special Provisions apply to all Grants except where noted in italics.

A. 1. CONTROLLER'S APPROVAL. CRS §24-30-202 (1).

This Grant shall not be deemed valid until it has been approved by the Colorado State Controller or designee.

B. 2. FUND AVAILABILITY. CRS §24-30-202(5.5).

Financial obligations of the State payable after the current fiscal year are contingent upon funds for that purpose being appropriated, budgeted, and otherwise made available.

C. 3. GOVERNMENTAL IMMUNITY.

No term or condition of this Grant shall be construed or interpreted as a waiver, express or implied, of any of the immunities, rights, benefits, protections, or other provisions, of the Colorado Governmental Immunity Act, CRS §24-10-101 et seq., or the Federal Tort Claims Act, 28 U.S.C. §§1346(b) and 2671 et seq., as applicable now or hereafter amended.

D. 4. INDEPENDENT CONTRACTOR

Grantee shall perform its duties hereunder as an independent Grantee and not as an employee. Neither Grantee nor any agent or employee of Grantee shall be deemed to be an agent or employee of the State. Grantee and its employees and agents are not entitled to unemployment insurance or workers compensation benefits through the State and the State shall not pay for or otherwise provide such coverage for Grantee or any of its agents or employees. Unemployment insurance benefits shall be available to Grantee and its employees and agents only if such coverage is made available by Grantee or a third party. Grantee shall pay when due all applicable employment taxes and income taxes and local head taxes incurred pursuant to this Grant. Grantee shall not have authorization, express or implied, to bind the State to any Grant, liability or understanding, except as expressly set forth herein. Grantee shall (a) provide and keep in force workers' compensation and unemployment compensation insurance in the amounts required by law, (b) provide proof thereof when requested by the State, and (c) be solely responsible for its acts and those of its employees and agents.

E. 5. COMPLIANCE WITH LAW.

Grantee shall strictly comply with all applicable federal and State laws, rules, and regulations in effect or hereafter established, including, without limitation, laws applicable to discrimination and unfair employment practices.

F. 6. CHOICE OF LAW.

Colorado law, and rules and regulations issued pursuant thereto, shall be applied in the interpretation, execution, and enforcement of this grant. Any provision included or incorporated herein by reference which conflicts with said laws, rules, and regulations shall be null and void. Any provision incorporated herein by reference which purports to negate this or any other Special Provision in whole or in part shall not be valid or enforceable or available in any action at law, whether by way of complaint, defense, or otherwise. Any provision rendered null and void by the operation of this provision shall not invalidate the remainder of this Grant, to the extent capable of execution.

G. 7. BINDING ARBITRATION PROHIBITED.

The State of Colorado does not agree to binding arbitration by any extra-judicial body or person. Any provision to the contrary in this contract or incorporated herein by reference shall be null and void.

H. 8. SOFTWARE PIRACY PROHIBITION. Governor's Executive Order D 002 00.

State or other public funds payable under this Grant shall not be used for the acquisition, operation, or maintenance of computer software in violation of federal copyright laws or applicable licensing restrictions. Grantee hereby certifies and warrants that, during the term of this Grant and any extensions, Grantee has and shall maintain in place appropriate systems and controls to prevent such improper use of public funds. If the State determines that Grantee is in violation of this provision, the State may exercise any remedy available at law or in equity or under this Grant, including, without limitation, immediate termination of this Grant and any remedy consistent with federal copyright laws or applicable licensing restrictions.

I. 9. EMPLOYEE FINANCIAL INTEREST. CRS §§24-18-201 and 24-50-507.

The signatories aver that to their knowledge, no employee of the State has any personal or beneficial interest whatsoever in the service or property described in this Grant. Grantee has no interest and shall not acquire any interest, direct or indirect, that would conflict in any manner or degree with the performance of Grantee's services and Grantee shall not employ any person having such known interests.

J. 10. VENDOR OFFSET. CRS §§24-30-202 (1) and 24-30-202.4.

[*Not Applicable to intergovernmental agreements*] Subject to CRS §24-30-202.4 (3.5), the State Controller may withhold payment under the State's vendor offset intercept system for debts owed to State agencies for: (a) unpaid child support debts or child support arrearages; (b) unpaid balances of tax, accrued interest, or other charges specified in CRS §39-21-101, et seq.; (c) unpaid loans due to the Student Loan Division of the Department of Higher Education; (d) amounts required to be paid to the Unemployment Compensation Fund; and (e) other unpaid debts owing to the State as a result of final agency determination or judicial action.

K. 11. PUBLIC GRANTS FOR SERVICES. CRS §8-17.5-101.

[Not Applicable to Agreements relating to the offer, issuance, or sale of securities, investment advisory services or fund management services, sponsored projects, intergovernmental Agreements, or information technology services or products and services] Grantee certifies, warrants, and agrees that it does not knowingly employ or Grant with an illegal alien who shall perform work under this Grant and shall confirm the employment eligibility of all employees who are newly hired for employment in the United States to perform work under this Grant, through participation in the E-Verify Program or the State program established pursuant to CRS §8-17.5-102(5)(c). Grantee shall not knowingly employ or Grant with an illegal alien to perform work under this Grant or enter into a Grant with a Sub-grantee that fails to certify to Grantee that the Sub-grantee shall not knowingly employ or Grant with an illegal alien to perform work under this Grant. Grantee (a) shall not use E-Verify Program or State program procedures to undertake pre-employment screening of job applicants while this Grant is being performed, (b) shall notify the Sub-grantee and the Granting State agency within three days if Grantee has actual knowledge that a Sub-grantee is employing or Granting with an illegal alien for work under this Grant, (c) shall terminate the subGrant if a Sub-grantee does not stop employing or Granting with the illegal alien within three days of receiving the notice, and (d) shall comply with reasonable requests made in the course of an investigation, undertaken pursuant to CRS §8-17.5-102(5), by the Colorado Department of Labor and Employment. If Grantee participates in the State program, Grantee shall deliver to the Granting State agency, Institution of Higher Education or political subdivision, a written, notarized affirmation, affirming that Grantee has examined the legal work status of such employee, and shall comply with all of the other requirements of the State program. If Grantee fails to comply with any requirement of this provision or CRS §8-17.5-101 et seq., the Granting State agency, institution of higher education or political subdivision may terminate this Grant for breach and, if so terminated, Grantee shall be liable for damages.

L. 12. PUBLIC GRANTS WITH NATURAL PERSONS. CRS §24-76.5-101.

Grantee, if a natural person eighteen (18) years of age or older, hereby swears and affirms under penalty of perjury that he or she (a) is a citizen or otherwise lawfully present in the United States pursuant to federal law, (b) shall comply with the provisions of CRS §24-76.5-101 et seq., and (c) has produced one form of identification required by CRS §24-76.5-103 prior to the effective date of this Grant.

SPs Effective 1/1/09



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22. SIGNATURE PAGE

Grant Routing Number 09 PDA _____


THE PARTIES HERETO HAVE EXECUTED THIS GRANT

* Persons signing for Grantee hereby swear and affirm that they are authorized to act on Grantee's behalf and acknowledge that the State is relying on their representations to that effect.

<p align="center">GRANTEE</p> <p align="center">Water Environment Research Foundation</p> <p>By: Daniel M. Woltering, Ph.D. Title: Director of Research</p> <p> *Signature</p> <p>Date: <u>1-24-11</u></p>	<p align="center">STATE OF COLORADO</p> <p align="center">John W. Hickenlooper, GOVERNOR</p> <p align="center">Department of Natural Resources Mike King, Executive Director</p> <p> By: Eric Hecox, Section Chief, Water Supply Planning Section, CWCB</p> <p>Signatory avers to the State Controller or delegate that Grantee has not begun performance or that a Statutory Violation waiver has been requested under Fiscal Rules</p> <p>Date: <u>2/2/11</u></p>
<p align="center">2nd Grantee Signature if Needed</p> <p>By: N/A Title:</p> <p>_____ *Signature</p> <p>Date: _____</p>	<p align="center">LEGAL REVIEW</p> <p align="center">John W. Suthers, Attorney General</p> <p>By: <u>NA</u> Signature - Assistant Attorney General</p> <p>Date: _____</p>

ALL GRANTS REQUIRE APPROVAL BY THE STATE CONTROLLER

CRS §24-30-202 requires the State Controller to approve all State Grants. This Grant is not valid until signed and dated below by the State Controller or delegate. Grantee is not authorized to begin performance until such time. If Grantee begins performing prior thereto, the State of Colorado is not obligated to pay Grantee for such performance or for any goods and/or services provided hereunder.

<p>STATE CONTROLLER</p> <p>David J. McDermott, CPA</p> <p>By:  _____ Date: <u>3/18/2011</u></p>

**STATE OF COLORADO
Colorado Water Conservation Board
Grant Agreement
with
Water Environment Research Foundation
Contract Number C150456**

- 23. STATEMENT OF WORK, TIMETABLE AND BUDGET - Attached**

STATE OF COLORADO
Colorado Water Conservation Board
Grant Agreement
with
Water Environment Research Foundation
Contract Number C150456

SCOPE OF PROFESSIONAL SERVICES

Demonstration of Membrane Zero Liquid Discharge Process for Drinking Water Systems

This project is administratively managed by the Water Environment Research Foundation (WERF), but the actual project work will be conducted through subcontractors.

WATER ACTIVITY NAME - Demonstration of Membrane Zero Liquid Discharge Process for Drinking Water Systems

GRANT RECIPIENT – Water Environment Research Foundation (WERF)

This project is administratively managed by the Grantee, the Water Environment Research Foundation, but the actual project work will be conducted by subcontractors (WERF will subcontract with HDR Engineering, and HDR will subcontract with MWH.)

FUNDING SOURCE¹ –

Water Supply Reserve Account (WSRA) grant funds, including:

- \$700,000 from the WSRA Statewide fund,
- \$50,000 from the Metro Basin WSRA fund,
- \$25,000 from the South Platte Basin WSRA fund, and
- \$25,000 from the Arkansas Basin WSRA fund.

I. Statement of Work (Scope of Work)

INTRODUCTION AND BACKGROUND

Increasing demands for potable water in Colorado have forced drinking water utilities to consider water supply from lower quality sources. These lower quality sources require the use of advanced treatment technologies such as reverse osmosis (RO) or nanofiltration (NF) membranes to treat the water to a level suitable for human consumption. At present, drinking water utilities have been reluctant to undertake RO or NF membrane projects due to the uncertainty surrounding the availability of feasible disposal options for the concentrate which may be of concern to wastewater treatment plants. Zero liquid discharge (ZLD) is a potentially sustainable disposal option that may represent a long-term solution to concentrate disposal for utilities that need membrane treatment to produce safe drinking water. The primary barrier to implementing ZLD is the lack of cost and performance data developed for drinking water systems under conditions unique to Colorado. A pilot test demonstrating ZLD

¹ This scope of services and budget also reflects WERF's match of \$243,087[\$88,000 in cash and \$155,087 of in-kind (coming from partners)], of which \$140,000 is required as the 20% match to the \$700,000 from the WSRA Statewide Fund.

will help address the technical and financial uncertainties which currently hinder its implementation. With this knowledge, utilities will be more likely to undertake membrane projects that depend on lower quality water sources.

OBJECTIVES

Objectives of the pilot study include:

- Comparing the performance of two ZLD technologies;
- Developing capital, operating and maintenance costs for ZLD technologies;
- Determining the quantity and quality of the water recovered from the ZLD process;
- Characterizing the quantity and composition of brine/concentrate created by the process;
- Determining the handling, transportation and disposal requirements for brine/concentrate created by the process;
- Identifying potential marketable residuals from the ZLD process and summarizing applicable case studies;
- Disseminate information and results to the water quality community

TASKS

Task 0 – Project Review and Public Outreach Meetings

Description: The contractual Project Review portion of this task is comprised of Project Meetings held with the Project Subcommittee (PSC). This task also consists of project outreach to the Membrane Treatment Workgroup (MTWG) and the wider water community in Colorado. The purpose of the Project Subcommittee meetings is to solicit and obtain technical and programmatic guidance for the project from the Project Subcommittee formed by the Water Environment Research Foundation (see Task 9). The purpose of the public outreach meetings/workshops is to provide project status and technical transfer of information to interested parties represented in the MTWG and to provide technical transfer of information the wider Colorado water community. This task consists of three subtasks:

Task 0.1 - Participate in up to two meetings with the Project Subcommittee

Task 0.2 - Participate in up to four meetings with the Membrane Treatment Workgroup

Task 0.3 - Participate in up to two Outreach Workshops

Method/Procedure: Participate in meetings. Participation will include verbal presentation of relevant materials to the Project Subcommittee or MTWG.

Assumptions:

- Project Subcommittee and MTWG meetings will be held in Denver
- Duration of Project Subcommittee meeting is one and one half day
- Duration of MTWG meetings is one half day
- Workshops will be held in Denver, and one Colorado location outside the Denver area
- Duration of the Workshops is expected to be one half day

Deliverables:

- Attendance and briefings at meetings
- Briefing materials for the Project Subcommittee based on the Progress Reports
- Presentation at one national water quality community conference.

Task 1 – Perform Literature Review for Confirmation of Equipment/Processes Selected for Testing

Description: This contractual task is comprised of a review of the work completed by the State of Colorado Membrane Treatment Workgroup and the available literature on high-recovery reverse osmosis processes and zero liquid discharge technologies. Initially, a review of the previously completed MTWG report will be conducted to summarize all of the major conclusions of that report pertaining to the technologies to be tested. Once this step is completed, a review of the available literature will be conducted to update the conclusions of the MTWG report, and determine the most suitable technologies for the Brighton and La Junta pilot sites. The literature review will include high-recovery reverse osmosis as well as concentrate minimization, or zero liquid discharge technologies. The efforts of the literature review will be summarized in a Technical Memorandum (TM) and submitted in the first Periodic Progress Report. This task consists of two subtasks:

Task 1.1 – Perform Literature Review

Task 1.2 - Develop Technical Memo documenting results of Literature Review

Method/Procedure: Desk-top literature review documented in Technical Memo

Assumptions:

- Technical memo will be formatted for inclusion as a chapter in the project final report (Task 8.2)
- Technical memo will be reviewed prior to and approved by Project Subcommittee at the first Project Subcommittee meeting (Task 0.1). A failure by the Project Subcommittee to provide timely approval will require adjustment to project schedule and budget.

Deliverables and Due Dates:

- One (1) electronic copy of draft TM included in the First Periodic Progress Report (Task 8.1)
- One (1) electronic copy of final TM included in the Final Report (Task 8.2)

Task 2 - Develop Experimental and Sampling Plan

Description: This contractual Task is to develop the Experimental Plan for testing at the Brighton and La Junta sites. The Experimental Plan will contain the following: the objectives of the testing, equipment provided and site needs, success criteria of testing, breakdown of responsibilities, and the weekly or monthly test plan of major activities. Quality control procedures and any health and safety plans will be prepared, as required by the individual plant sites. The Experimental Plan will include a process flow diagram for each of the two sites showing major pieces of equipment, sampling locations and interface points for mechanical and electrical connections. The Experimental Plan will clearly define primary and secondary data types, and data acceptance criteria. It will also present data reporting and reduction and requirements and will be reviewed by the Project Subcommittee.

Develop the Sampling Plan for testing at the Brighton and La Junta sites. The Sampling Plan will address sampling and analytical requirements for both liquid and solid samples, generated from membrane concentrate. The Sampling Plan will contain at a minimum the following: sampling requirements, sampling locations, sampling frequency, analytical methods, chain of custody procedures and quality control procedures. The Sampling Plan will also coordinate the distribution of samples for analysis between utility laboratories providing in-kind laboratory services for the project.

This task consists of five subtasks:

Task 2.1 – Perform site visit (Brighton, La Junta)

Task 2.2 - Interface with equipment vendors

Task 2.3 – Identify permitting requirements

Task 2.4 - Develop and revise experimental plan

Task 2.5 – Develop and revise sampling plan

Method/Procedure: Identify experimental objectives and data requirements to evaluate if objectives have been met. Develop the plan in a logical order starting with the objective and outline the sequences necessary to produce the final delivery product for each site.

Assumptions:

- Experimental and Sampling Plans will be reviewed prior to and approved by the Project Subcommittee at the first Project Subcommittee meeting (Task 0.1)

Deliverables:

- One (1) electronic copy of the Draft Experimental Plan included in the First Periodic Progress Report (Task 8.1)
- One (1) electronic copy of the Draft Sampling Plan included in the First Periodic Progress Report (Task 8.1)
- One (1) electronic copy of the Final Experimental Plan included in the Second Periodic Progress Report (Task 8.1)
- One (1) electronic copy of the Final Sampling Plan included in the Second Periodic Progress Report (Task 8.1)

Task 3 – Design of Pilot Equipment and Site Coordination

Description: This contractual Task requires the preparation of the overall design for the pilot plants at each site. The design involves both the equipment design and the piping and electrical interconnections. Equipment lists, rough piping layouts, drainage requirements, equipment placement, and electrical connections/feeds will be designed. A schedule of activities will be prepared to outline the coordination and arrival of equipment and chemical feed systems. Pilot equipment rental contracts will be established and additional equipment procured during this phase. This task consists of five subtasks:

Task 3.1 – Site coordination (Brighton, La Junta)

Task 3.2 - Apply for permits (as required)

Task 3.3 – Vendor coordination

Task 3.4 - Develop site layouts

Task 3.5 – Develop equipment drawings

Method/Procedure: The Consultant will coordinate with each site and establish the location and coordination requirement for installation of the pilot equipment. Consultant will coordinate with vendors to integrate equipment onsite.

Assumptions:

- All electrical supply as well as connections to existing electrical feed sources will be provided by the Cities of Brighton and La Junta;
- Concentrate supply will be provided uninterrupted by the two cities;
- Sewer or other drains will be provided for any pilot plant discharge by the two cities.

Deliverables:

- None

Task 4 – Site Modifications/Installation of Pilot Equipment

Description: This contractual Task sets forth the necessary activities that the Consultant perform to oversee site modifications need to support the pilot test(s). Once the equipment arrives on site, the Consultant's pilot engineers shall arrive to oversee the installation. Pilot technicians and plumbers (as needed) will be required to install the mechanical elements of the pilot plant including tanks, pumps, and piping. Electrical connections to the pilot's central control panel will be provided by the site owner. Electrical connections from the pilot's central control panel to other pilot equipment will be made by the vendor under supervision of the Consultant. This task consists of four subtasks:

Task 4.1 – Oversee site modifications

Task 4.2 - Coordinate equipment shipping

Task 4.3 – Oversee equipment installation

Task 4.4 - Commission and start-up

Method/Procedure: Installation: In accordance with design drawings, local codes and National Electric Code (NECC).

Assumptions:

- Cities will provide labor for connections to any full-scale electrical and water connections.
- Cities will provide labor for disconnecting full-scale electrical and water connections upon completion of piloting.
- Consultant shall provide materials for connections to any full-scale electrical and water connections.
- Cities will provide level and accessible sites for installation of the pilot equipment.
- Consultant shall coordinate with selected vendors for delivery, unloading, handling, and placing pilot plant equipment.
- Consultant shall coordinate with selected vendors to handle, load, and remove equipment from each site upon completion of pilot testing.

Deliverables and Due Dates:

- Complete and operable pilot plant equipment at Brighton site.
- Complete and operable pilot plant equipment at La Junta site.

Task 5 – Operation of Pilot Plants

Description: This contractual Task requires the commissioning and start-up activities and operation of both pilot plants. During commissioning check-out of the hydraulics, electrical, and data and sampling collection methods will be established. Commissioning will include trouble shooting to minimize start-up activities.

Start-up of the pilot units involves determining the baseline conditions of each unit. Baseline conditions include the initial permeability or specific flux of RO membranes, cleaning procedures and frequencies and the feed flow rate. Establishing the baseline conditions is estimated to take between one and four weeks at each site depending on the equipment installed.

After the baseline conditions are established, the operation of the pilot plant will commence. Pilot equipment at each site will be operated for a minimum of three (3) months and a maximum of six (6) months. This will allow the testing of multiple conditions and firm establishment of operating conditions to determine costs.

This task consists of seven subtasks:

Task 5.1 – Operate pilot units - Brighton

Task 5.2 - Provide consumables

Task 5.3 – Decommission units – Brighton

Task 5.4 – Operate pilot units – La Junta

Task 5.5 - Provide consumables

Task 5.6 – Decommission units – La Junta

Task 5.7 – Provide rental equipment

Method/Procedure: Operations according to the “Experimental Plan” (Task 2.4) and “Sampling Plan” (Task 2.5)

Assumptions:

- Consultant will provide “full-time” “technical/pilot support engineer(s)” at each of the two sites.
- It is not anticipated that both the Brighton and La Junta sites will be in start-up at the same time. It is anticipated that the second pilot plant will start up about three (3) months after the first site activity commences.
- While pilot plants may continue to operate over the weekends, operational changes and sampling is not expected to be conducted outside of the normal work week or normal working hours.
- Cities will provide:
 - Uninterrupted RO concentrate stream (except disruption for prescheduled maintenance and unexpected corrective or emergency repairs)
 - Once per day site checks of provided services (i.e. RO concentrate and electrical power) during normal work week hours
 - Any prescheduled amendments to WTP process for RO concentrate delivery during these once-per-day site checks.
 - Assistance with making unexpected repairs to pilot equipment and processes, if urgent and required.

Deliverables and Due Dates:

- Raw data from operating both plants under baseline and multiple conditions to establish operating conditions and determine capital and operating costs included in the third and fourth Periodic Progress Report (Task 8.1)
- Water and solid samples as described for analysis described in Task 6 included in the third Periodic Progress Report (Task 8.1)

Task 6 – Water Quality Sampling & Solids Analyses

Description: Sampling will be performed on the pilot equipment to monitor performance for real-time adjustments or optimization and to collect performance information for cost comparisons and capital and operational cost estimates. Some water quality sampling, such as pH, silt density index, and conductivity will be conducted on-site using handheld probes or test units. The remainder of the water quality will be collected with composite samplers or as otherwise defined by the sampling plan (Task 2.6).

Sampling will also be performed on solids slurry streams to collect performance information for cost comparisons and capital and operational cost estimates as well as for characterization of salt recovery options. These samples will be grab samples. In addition, the potential markets for recoverable salts will be identified for Colorado.

This task consists of three subtasks:

Task 6.1 – Liquid sample analysis

Task 6.2 - Solid sample analysis

Task 6.3 – Data reduction and analysis

Method/Procedure:

- Water analyses will be conducted in accordance with Standard Methods, latest edition. Modifications to this requirement will be allowed for analyzing high salinity samples and will be addressed in the Sampling Plan (Task 2.6)

Assumptions:

- Samples will be 24 hour composites or as otherwise defined in the Sampling Plan (Task 2.6).
- Consultant shall collect samples and shall deliver or arrange for delivery of samples to laboratories.

- ***Deliverables and Due Dates:***

- Data analysis will be included in Period Progress Reports (Task 8.1), as pilot/sampling data becomes available.

Task 7 – Energy Evaluation and Support of Renewable Energy Study

Description: This task was designed to evaluate energy requirements and coordinate with a separate investigation and design project aimed at providing affordable renewable energy for ZLD.

Deleted – Renewable Energy Study has not been funded.

Task 8 –Reports

Description: Periodic progress reports will be prepared during the course of the project and a draft and final report will be prepared at the conclusion of the project. The progress reports will be provided by the Consultant to Water Environment Research Foundation for distribution, review, comment and approval by the Project Subcommittee. Copies of the progress reports will be provided to the Colorado Water Conservation Board (CWCB) by the Water Environment Research Foundation (see Task 9).

The draft final report will be provided by the Consultant to Water Environment Research Foundation for distribution, review, comment and approval by the Project Subcommittee. Copies of the draft final report and the final report will be provided to the Colorado Water Conservation Board (CWCB) by the Water Environment Research Foundation.

The periodic progress reports will provide the Water Environment Research Foundation and the Project Subcommittee information regarding the status and progress of the project. As noted above, deliverables under Tasks 1, 2, 3 and 6 will be included in the Progress Report.

The final report will contain information established for the experimental plan such as objectives, success criteria and the equipment descriptions. In addition, all of the water quality and operational data will be summarized and analyzed. The optimum operating parameters of each unit process will be established with capital and operating costs for the sizes of plants relevant to the needs of MTWG members. A mathematical relationship will be prepared with a graphical illustration that can be used to project costs for varying plant sizes. The accuracy of the equation and graph will be estimated by the Consultant and reviewed by the PSC.

The report is to include a section regarding “next best alternative” for utilities with impaired water quality as their source water.

This task consists of three subtasks:

Task 8.1 – Prepare Periodic Progress Reports

Task 8.2 - Develop draft final report

Task 8.3 – Revise and release final report to WERF

Method/Procedure: Use of the Experimental Plan and Sampling Plan as the basis and results from the pilot plant study to prepare the final report. Materials from the Periodic Progress Reports will be included in the final report as appropriate.

Assumptions:

- Water Environment Research Foundation will provide copies of Periodic Progress Reports to CWCB
- Water Environment Research Foundation will provide copies of Draft Final Report and Final Report to CWCB
- Project Subcommittee will review the Draft Final Report and approve the Final Report, each within four weeks of submission.

Deliverables and Due Dates:

- Four (4) Periodic Reports during the course of the project.
 - One (1) electronic copy of each report will be provided of each Periodic Report
 - These reports will be due: 3 months after Project Start, 6 months after Project Start, 9 months after Project Start, and 12 months after Project Start
- One (1) electronic copy of the Draft Final Report due 14 months after Project Start
- One (1) electronic copy of the Final Report due 18 months after Project Start

Task 9 – Project Management by WERF

Description: WERF will oversee and manage the Research Project. WERF will enter into a research contract with HDR Engineering, Inc. to conduct the research and implement the tasks listed above in this Scope of Work. The research contract shall incorporate the objectives and details of the Research Project and the timetable for carrying out and completing the Research Project as well as the deliverables. WERF shall exercise its best efforts to enforce the principal investigator’s performance under the Research Contract. The contractual portion of the project is expected to start somewhere between February 1st, 2011 and March 30th, 2011, and a projected end date of December 30th, 2012. WERF will implement its information dissemination activities and meet all other requirements of this Grant Agreement by June 30th, 2013. WERF will organize a Project Subcommittee (PSC) to provide technical review and advice on the Research Project progress. The PSC will provide feedback to the Research Team, advice on technical issues associated with the Research Project, and approval of the Final Report. The PSC will represent expertise from academia, technical professionals, water quality community (utilities) and regulatory agencies. WERF will also organize a Steering Committee to keep partners informed of the progress of the research. The Steering Committee will include one representative from each of the Contributing Partners (at Partner’s discretion). WERF will publish the results of the Research Project (“Final Report”) and make them available to the State of Colorado Water Conservation Board and the water quality community at large. WERF will apply its Peer Review procedures to provide technical review of the Research Project. WERF will manage the financial

aspects of the project paying invoices and submitting payment requests to the State of Colorado Water Conservation Board as set forth in this contract. WERF will coordinate the collection and documentation of the Partners' cash and in-kind contributions.

Method/Procedure:

- WERF will apply its Peer Review procedures to provide technical review of the Research Project implementing its EPA approved Quality Management Plan (QMP).

Deliverables and Due Dates:

- Quarterly Reports (provided 30 days after the end of each Quarter) on the progress of the Research Project including a financial status of the activities;
- A Final Report on the project including all financial information (and close out materials) by no later than the last day of this agreement (June 30th, 2013);
- At least one Workshop in Denver, Colorado presenting the findings of the workshop to the water quality community of Colorado.

II. Personnel

Key personnel for the project are as follows:

Overall Project Manager – Jeff Moeller, PE: WERF

Support Project Management – Claudio Ternieden: Assistant Director of Research, WERF

Principal Investigator – Philip Brandhuber, PhD: HDR Engineering

Co-Principal Investigator – Karla Kinser, PE: MWH Americas

Project Engineers – Adriano Vieira, PhD: HDR Engineering,

Technical/Pilot Support Engineers – Stewart Bodtke: HDR Engineering, Engineer to be designated by MWH Americas

III. Schedule/Timetable for the Project Contractual Activities (Tasks 0-8)

Task	Description	2011												2012											
		Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Aug	Sep	Oct	Dec			
0	Project Meetings																								
0.1	Hold 2 PSC meetings																								
0.2	Support 4 MWG meetings																								
0.3	Hold 2 Workshops/2 Presentations																								
1	Literature Review																								
1.1	Perform literature review																								
1.2	Develop technical memo																								
2	Develop Experimental Plan																								
2.1	Site visit (Brighton/ La Junta)																								
2.2	Interface with vendors																								
2.3	Identify permitting requirements																								
2.4	Develop & revise experimental plan																								
2.5	Develop & revise sampling plan																								
3	Pilot Design & Coordination																								
3.1	Site coordination (Brighton& La Junta)																								
3.2	Apply for permits (if required)																								
3.3	Vendor coordination																								
3.4	Develop site layouts																								
3.5	Develop equipment drawings																								
4	Site Modification/Equip Installation																								
4.1	Oversee site modification																								
4.2	Coordinate shipping																								
4.3	Oversee installation																								
4.4	Commission & start up																								
5	Pilot Plant Operation																								
5.1	Operate units (Brighton)																								
5.2	Consumables (Brighton)																								
5.3	Decommissioning (Brighton)																								
5.4	Operate units (La Junta)																								
5.5	Consumables (La Junta)																								
5.6	Decommissioning La Junta																								
5.7	Equipment Rental																								
6	Water Sampling & Data Analysis																								
6.1	Sample analysis																								
6.2	Solid sample prep and analysis																								
6.3	Data reduction and analysis																								
7	Support Energy Study																								
7.1	Deleted																								
8	Reports																								
8.1	Prepare periodic status report																								
8.2	Develop draft final report																								
8.3	Revise & release final report																								

IV. Budget

Water Environment Research Foundation			
Budget Detail - By Year			
Program: WERF Zero Liquid Discharge - Colorado TCR			
Program Period: February 1, 2011 - June 30, 2013			
Description	Total Budget	2011	2012/13
Personnel	\$38,549	\$28,629	\$9,920
Fringe Benefits @ 26.37%	10,166	7,550	2,616
Travel	25,000	10,000	15,000
Equipment	0	0	0
Supplies	0	0	0
Contractual - HDR *	788,000	723,975	64,025
Other Expense **	14,952	4,008	10,944
Total Direct Costs	876,667	774,162	102,505
Indirect Costs @ 29.40%***	11,333	8,417	2,916
Total Costs	\$888,000	\$782,579	\$105,421
In-Kind Costs Share	155,087	138,771	16,316
Total Value Including In-Kind Costs	\$1,043,087	\$921,350	\$121,737
* HDR Contractual Project Budget (Attached)			
**Other Expense includes: Publications			
Rent allocation charges based on actual ratio of timesheet program charges.			
*** Indirect Costs @ 29.40% of Personnel (Salaries)			
Matching Funds: WERF's 20% (of Statewide Fund) required match is of \$140,000.00 in cash and/or in-kind.			
This budget reflects the current contributions of \$88,000 in cash and \$155,087 of in-kind.			

HDR Contractual Project Budget WERF5T10

PERSONNEL (Applicant Organization Only)

Name	Project Role	% time	Salary Requested	Fringe Benefits	WERF Cost	In-Kind	Total Project Cost
Brandhuber	Principal		66142	31020	97162	45087	142249
Vieria	Project Engineer		37301	17494	54796		54796
Staff Engineer	Staff Engineer		31450	14750	46201		46201
Kwan	QA/QC		1748	820	2569		2569
Administrative	Clerical Support		835	391	1226		1226
Accounting	Admin Support		1658	778	2436		2436
Subtotal					204389	45087	249476

OTHER DIRECT COSTS

EQUIPMENT (Use additional pages for itemization if necessary)

Equipment Rental		30000		30000
Subtotal		30000	0	30000

SUPPLIES (Use additional sheets if necessary)

Consumables		5000		5000
Subtotal		5000	0	5000

TRAVEL

Domestic	22400	22400		22400
Foreign				
Subtotal		22400	0	22400

SUBCONTRACTS

MVH	264000	264000		264000
Subtotal		264000	0	264000

DISADVANTAGED BUSINESSES (If none, steps taken by proposer must be described for justification to be accepted.)

Subtotal		0	0	0
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Other Costs (Itemize)

Utility Lab Support		19957	45000	64957
Utility Site support			65000	65000
Subtotal		19957	110000	129957

TOTAL DIRECT COSTS:		545746	155087	700833
INDIRECT COSTS:	90.00 % (See instructions for calculation)	183950		183950
FEE (if applicable):	% x (Personnel + Indirect Cost)	58305		58305
Total Cost		788000	155087	943088