



COLORADO

**Colorado Water
Conservation Board**

Department of Natural Resources
1313 Sherman Street, Room 718
Denver, CO 80203

**WSRF – Methane Mitigation
POGG1 2019-2929**

June 4, 2019

Delta Brick & Climate Company, Ltd.
Attn: Christopher Caskey, Founder
1732 Wazee St., #206
Denver, CO 80202

Dear Grantee:

We are pleased to inform you that the Colorado Department of Natural Resources, Colorado Water Conservation Board (CWCB) has approved your grant request for funding pursuant to the WSRF Grant Program (“Program”). This letter authorizes you to proceed with the Methane Mitigation Project (“Project”) in accordance with the terms of this Grant Award Letter.

Attached to this letter are the terms and conditions of your Grant. Please review these terms and conditions, as they are requirements of this Grant to which you, Delta Brick & Climate Company, Ltd., agree by accepting the Grant Funds.

If you have any questions or concerns regarding the project, please contact Anna Mauss, Project Manager at 303-866-3441 or at Anna.Mauss@state.co.us. Please send all grant correspondence directly to Anna and cc me on your invoice billing requests.

Thank you.

Sincerely,

//s//

Doriann Vigil
Program Assistant II
O 303-866-3441 ext. 3250
1313 Sherman Street, Rm. 719, Denver, CO 80203
Dori.vigil@state.co.us / cwcb.state.co.com





STATE OF COLORADO
Department of Natural Resources

Page 1 of 1

ORDER		*****IMPORTANT*****				
Number:	POGG1,PDAA,201900002929	The order number and line number must appear on all invoices, packing slips, cartons, and correspondence.				
Date:	6/4/19	BILL TO				
Description:	PDAA 2500 WSRF DELTA BRICK METHANE MIT_GUNN BASIN	COLORADO WATER BOARD CONSERVATION 1313 SHERMAN STREET, ROOM 718 DENVER, CO 80203				
Effective Date:	06/03/19	SHIP TO COLORADO WATER BOARD CONSERVATION 1313 SHERMAN STREET, ROOM 718 DENVER, CO 80203				
Expiration Date:	12/31/20					
BUYER		SHIPPING INSTRUCTIONS Delivery/Install Date: - FOB: FOB Dest, Freight Allowed				
Buyer:						
Email:						
VENDOR						
DELTA BRICK & CLIMATE COMPANY LTD 1732 WAZEE ST STE 206 DENVER, CO 80202						
Contact:	CHRISTOPHER CASKEY					
Phone:	.					
VENDOR INSTRUCTIONS						
EXTENDED DESCRIPTION						
Line Item	Commodity/Item Code	UOM	QTY	Unit Cost	Total Cost	MSDS Req.
1	G1000		0	0.00	\$18,000.00	<input type="checkbox"/>
Description:		PDAA 2500 WSRF DELTA BRICK METHANE MIT_GUNN BASIN				
Service From:		06/03/19	Service To:		12/31/20	
TERMS AND CONDITIONS						
https://www.colorado.gov/pacific/osc/small-dollar-grant-award-terms-conditions						
DOCUMENT TOTAL = \$18,000.00						



Last Update: January 9, 2018

Colorado Water Conservation Board	
Water Supply Reserve Fund	
<u>Exhibit A - Statement of Work</u>	
Date:	November 2018
Water Activity Name:	Chemical Production of Water via Methane Mitigation
Grant Recipient:	Delta Brick & Climate Company
Funding Source:	Gunnison Basin Roundtable
Water Activity Overview: (Please provide brief description of the proposed water activity (no more than 200 words). Include a description of the overall water activity and specifically what the WSRF funding will be used for.	
<p>Delta Brick & Climate Company Ltd has the opportunity to partner with Vessels Coal Gas LLC to produce a new source of water in the North Fork of the Gunnison River basin. Vessels Coal Gas produces greenhouse gas offsets and electricity from coal mine methane under the following reaction: $\text{CH}_4 + 2\text{O}_2 \rightarrow \text{CO}_2 + 2\text{H}_2\text{O} + \text{energy}$. This water is created chemically and would not otherwise exist. Methane is a very potent greenhouse gas, and the water can be thought of as a naturally-occurring by-product of methane destruction. The water is currently vented as vapor, and only a tiny fraction returns to the watershed as precipitation. The proposed water activity is the condensation of this steam into a new water source.</p> <p>Gunnison Basin Roundtable funds will be used for engineering design, purchase, and installation of a pilot condensation apparatus. Successful testing of this pilot apparatus would result in additional combusting of gas that is currently venting.</p>	
Objectives: (List the objectives of the project)	
<p>Design, build, install, and monitor a water-condensation apparatus on an existing coal mine methane combustion project.</p>	



Last Update: January 9, 2018

Tasks
Provide a detailed description of each task using the following format:
<u>Task 1 - Engineering and Design of Condensation Apparatus</u>
Description of Task: <p>Delta Brick & Climate Company will design and engineer a condensation apparatus suitable for attachment to existing coal mine methane combustors. These combustors are owned and operated by Vessels Coal Gas LLC. Use of these combustors, which cost around \$400,000, is considered an in-kind contribution. Vessels Coal Gas will likely serve as an engineering subcontractor in this task.</p> <p>Budget breakdown: \$5000 for engineering time, up to 10 hours subcontracted to Vessels. Additional engineering time provided by DBCC in-kind as needed.</p> <p>All labor rates are \$150/hour for Sr Scientists and Engineers and \$100/hour for technicians.</p>
Method/Procedure: <p>The condensation apparatus will be a heat pump that extracts energy from methane combustion and produces coldness (refrigeration). This coldness will put in contact with the exhaust stream, causing condensation. This can be accomplished in a number of ways and will be guided by the following sub-tasks:</p> <p>1.1: Understand candidate host combustors Multiple types and locations of combustors are available. They have different geometries, constraints on their use, and ease of access for maintenance.</p> <p>1.2 Identify relevant considerations including: costs, geometry, moving parts, maintenance needs, energy fluxes, energy conversion efficiencies, data reporting, etc. Weight these considerations by importance.</p> <p>1.3 Produce a few candidate designs, and rank them according to compliance with weighted considerations from subtask 1.3. Choose a design and price components.</p> <p>1.4 Estimate water discharge based on design and apply for water discharge permit if needed.</p>
Grantee Deliverable: (Describe the deliverable the grantee expects from this task)
Knowledge of suitable design criteria and costs for pilot condensation apparatus
CWCB Deliverable: (Describe the deliverable the grantee will provide CWCB documenting the completion of this task)
DBCC will provide general design information to CWCB in mid-project and final reports. However, disclosures may be constrained by intellectual property considerations.



Last Update: January 9, 2018

Tasks
Provide a detailed description of each task using the following format:
<u>Task 2 - Component Purchase and Construction of Pilot Condensation Apparatus</u>
Description of Task: <p>Purchase components of apparatus designed in Task 1. Assemble components.</p> <p>Budget: \$8,000 for component purchase and shipping. Assembly time provided by DBCC in-kind.</p> <p>All components are expected to be available in a variety of sizes. The size of the apparatus will be chosen to condense as much water as possible for under \$8,000. This will likely be much less water than is available in the exhaust stream, but will serve as a useful proof-of-concept.</p>
Method/Procedure: <p>Spend a lot of time on McMaster-Carr's website.</p> <p>Assemble components at Delta Brick & Climate's office in Denver or operational headquarters in the North Fork. DBCC's founder is an experienced designer and builder of electromechanical systems. See https://www.cmcaskey.com/#/vacuum-chamber-build/</p>
Grantee Deliverable: (Describe the deliverable the grantee expects from this task)
At the end of task 2, DBCC will have a functioning water condensation apparatus.
CWCB Deliverable: (Describe the deliverable the grantee will provide CWCB documenting the completion of this task)
DBCC will inform CWCB of progress through mid- and final project reports.



Last Update: January 9, 2018

Tasks
Provide a detailed description of each task using the following format:
<u>Task 3 - Installation of Pilot Condensation Apparatus</u>
Description of Task: The assembled pilot apparatus will be attached to the chosen methane combustor. Budget \$4,000 for engineering/mechanic time. Up to half of this will be subcontracted to Vessels Coal Gas. Additional effort will be provided by DBCC in-kind. Candidate methane combustors consume ~78 million cf/year, which equates to 2.8 af/year water vapor. We may be able to condense 10% of this with a pilot apparatus, or 257 gallons of water per day.
Method/Procedure: Physically bolt or otherwise attach condensation apparatus to methane combustor. Pipe condensed water past a flow meter and to nearby stream.
Grantee Deliverable: (Describe the deliverable the grantee expects from this task)
At the end of Task 3, DBCC will have an water condensation apparatus in operation on a methane combustor.
CWCB Deliverable: (Describe the deliverable the grantee will provide CWCB documenting the completion of this task)
Water in a Colorado stream! Or at least dampness. DBCC will inform CWCB of progress through mid- and final project reports.



Last Update: January 9, 2018

Tasks
Provide a detailed description of each task using the following format:
Task 4 - Monitoring and Reporting
Description of Task: DBCC will monitor the effectiveness of the condensation apparatus, water produced, and maintenance needs. The period of monitoring will be 1 year or device failure, whichever comes first. The purpose of this task is to understand: 1) How well the condenser performs 2) Other methane sources where the technology is relevant 3) Total water producible and methane mitigatable across Colorado, based on publicly-available numbers Budget \$1,000 for DBCC staff time. Additional effort provided by DBCC in-kind.
Method/Procedure: Passive monitoring equipment will be incorporated in the design. Performance will be extrapolated to other combustion and condensation opportunities.
Grantee Deliverable: (Describe the deliverable the grantee expects from this task)
DBCC will gain an understanding of the potential and scale of condensation technology.
CWCB Deliverable: (Describe the deliverable the grantee will provide CWCB documenting the completion of this task)
DBCC will write a final report and deliver it to CWCB.



Last Update: January 9, 2018

Budget and Schedule

Exhibit B - Budget and Schedule: This Statement of Work shall be accompanied by a combined [Budget and Schedule](#) that reflects the Tasks identified in the Statement of Work and shall be submitted to CWCB in excel format. A separate excel formatted Budget is required for engineering costs to include rate and unit costs.

Reporting Requirements

Progress Reports: The grantee shall provide the CWCB a progress report every 6 months, beginning from the date of issuance of a purchase order, or the execution of a contract. The progress report shall describe the status of the tasks identified in the statement of work, including a description of any major issues that have occurred and any corrective action taken to address these issues. The CWCB may withhold reimbursement until satisfactory progress reports have been submitted.

Final Report: At completion of the project, the grantee shall provide the CWCB a Final Report on the grantee's letterhead that:

- Summarizes the project and how the project was completed.
- Describes any obstacles encountered, and how these obstacles were overcome.
- Confirms that all matching commitments have been fulfilled.
- Includes photographs, summaries of meetings and engineering reports/designs.

Payments

Payment will be made based on actual expenditures, must include invoices for all work completed and must be on grantee's letterhead. The request for payment must include a description of the work accomplished by task, an estimate of the percent completion for individual tasks and the entire Project in relation to the percentage of budget spent, identification of any major issues, and proposed or implemented corrective actions.

The CWCB will pay the last 10% of the entire water activity budget when the Final Report is completed to the satisfaction of CWCB staff. Once the Final Report has been accepted, and final payment has been issued, the water activity and purchase order or contract will be closed without any further payment. Any entity that fails to complete a satisfactory Final Report and submit to CWCB within 90 days of the expiration of a purchase order or contract may be denied consideration for future funding of any type from CWCB.

Performance Requirements

Performance measures for this contract shall include the following:

(a) Performance standards and evaluation: Grantee will produce detailed deliverables for each task as specified. Grantee shall maintain receipts for all project expenses and documentation of the minimum in-kind contributions (if applicable) per the budget in Exhibit B. Per Grant Guidelines, the CWCB will pay out the last 10% of the budget when the final deliverable is completed to the satisfaction of CWCB staff. Once the final deliverable has been accepted, and final payment has been issued, the purchase order or grant will be closed without any further payment.

(b) Accountability: Per the Grant Guidelines full documentation of project progress must be submitted with each invoice for reimbursement. Grantee must confirm that all grant conditions have been complied with on each invoice. In addition, per the Grant Guidelines, Progress Reports must be submitted at least once every 6 months. A Final Report must be submitted and approved before final project payment.

(c) Monitoring Requirements: Grantee is responsible for ongoing monitoring of project progress per Exhibit A. Progress shall be detailed in each invoice and in each Progress Report, as detailed above. Additional inspections or field consultations will be arranged as may be necessary.

(d) Noncompliance Resolution: Payment will be withheld if grantee is not current on all grant conditions. Flagrant disregard for grant conditions will result in a stop work order and cancellation of the Grant Agreement.

Last Update: July 31, 2018



COLORADO

Colorado Water
Conservation Board

Department of Natural Resources

Colorado Water Conservation Board

Water Supply Reserve Fund

EXHIBIT B - BUDGET AND SCHEDULE - Direct & Indirect (Administrative) Costs

Date: 26Nov2018

Water Activity Name: Chemical Water Production via Methane Mitigation

Grantee Name: Delta Brick & Climate Company Ltd

<u>Task No.</u> ⁽¹⁾	<u>Description</u>	<u>Start Date</u> ⁽²⁾	<u>End Date</u>	<u>Matching Funds</u> (cash & in-kind) ⁽³⁾	<u>WSRF Funds</u> (Basin & Statewide combined) ⁽³⁾	<u>Total</u>
1	Engineering & Design of Condensation Apparatus	June 2019	July 2019	\$2,000	\$5,000	\$7,000
2	Component Purchase and Construction Pilot of Condensation Apparatus	July 2019	August 2019	\$0	\$8,000	\$8,000
3	Installation of Pilot Condensation Apparatus	August 2019	September 2019	\$1,000	\$4,000	\$5,000
4	Monitoring and Reporting	September 2019	December 2020	\$2,000	\$1,000	\$3,000
						\$0
						\$0
						\$0
						\$0
						\$0
						\$0
						\$0
						\$0
						\$0
						\$0
						\$0
Total				\$5,000	\$18,000	\$23,000

(1) The single task that include costs for Grant Administration must provide a labor breakdown (see Indirect Costs tab below) where the total WSRF Grant contribution towards that task does not exceed 15% of the total WSRF Grant amount.

(2) Start Date for funding under \$100K - 45 Days from Board Approval; Start Date for funding over \$100K - 90 Days from Board Approval.

(3) Round values up to the nearest hundred dollars.

- Additional documentation providing a Detailed/Itemized Budget may be required for contracting. Applicants are encouraged to coordinate with the CWCB Project Manager to determine specifics.

- NTP will not be accepted as a start date. Project activities may commence as soon as the grantee enters contract and receives formal signed State Agreement.

The CWCB will pay the last 10% of the entire water activity budget when the Final Report is completed to the satisfaction of the CWCB staff project manager. Once the Final Report has been accepted, the final payment has been issued, the water activity and purchase order (PO) or contract will be closed without any further payment. Any entity that fails to complete a satisfactory Final Report and submit to the CWCB with 90 days of the expiration of the PO or contract may be denied consideration for future funding of any type from the CWCB.

- Additionally, the applicant shall provide a progress report every 6 months, beginning from the date of contract execution