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Final Report
Chemical Production of Water *via* Waste Methane Destruction
2019-2929 WSRF

Matt Stearns
Colorado Water Conservation Board
1313 Sherman St, Suite 718
Denver, CO

Dear Mr Stearns,

The project is successful and complete.

Task 1, Engineering and design of Condensation Apparatus, is complete.

The selected design is a passive radiator through which the water-rich exhaust is routed. We considered other designs including radiators with active cooling and radiators employing a physical water-absorbing material.

Task 2, Component purchase and construction, is complete.

The radiator is constructed from silencers (mufflers) and 12” diameter steel pipe. 160 feet of 12” diameter pipe was purchased from Gunnison Energy. Western Maintenance Enterprises was the construction subcontractor.

Note that the original budget called for the assembly of the apparatus at Delta Brick’s facility with subsequent transport to the mine site. We made the decision to assemble the apparatus during installation. For this reason, the invoice reflects less cost in Task 2 and more cost in Task 3.

Task 3, Installation of a Pilot Apparatus, is complete.

3MW LLC agreed to host the Pilot Apparatus. 3MW is an electric generating company burning waste methane leaking from the abandoned Elk Creek Mine. It is operated by Vessels Carbon Solutions (now MethaneRx) and majority owned by Aspen Ski Co. More information on 3MW can be found here. Disclosure: As of August 2021, Delta Brick is the contract manager of MethaneRx.

Task 4, Monitoring and reporting, is complete for the purposes of this project. That said, monitoring will continue indefinitely. Major takeaways from monitoring are:

- The apparatus produces 200 to 300 gallons of water per day when operating. Over 6,000 gallons per day are available
- The inside of the apparatus has rusted. This is decreasing the heat transfer efficiency and resulting in high iron content of the collected water. Future designs will need to prevent rust formation.
- Unrelated operational issues at 3MW have restricted the uptime of the condenser to about 20%. That is, we operate one or two days per week. For this reason, we have deferred plans for wetland construction and water discharge permitting until this summer and fall.

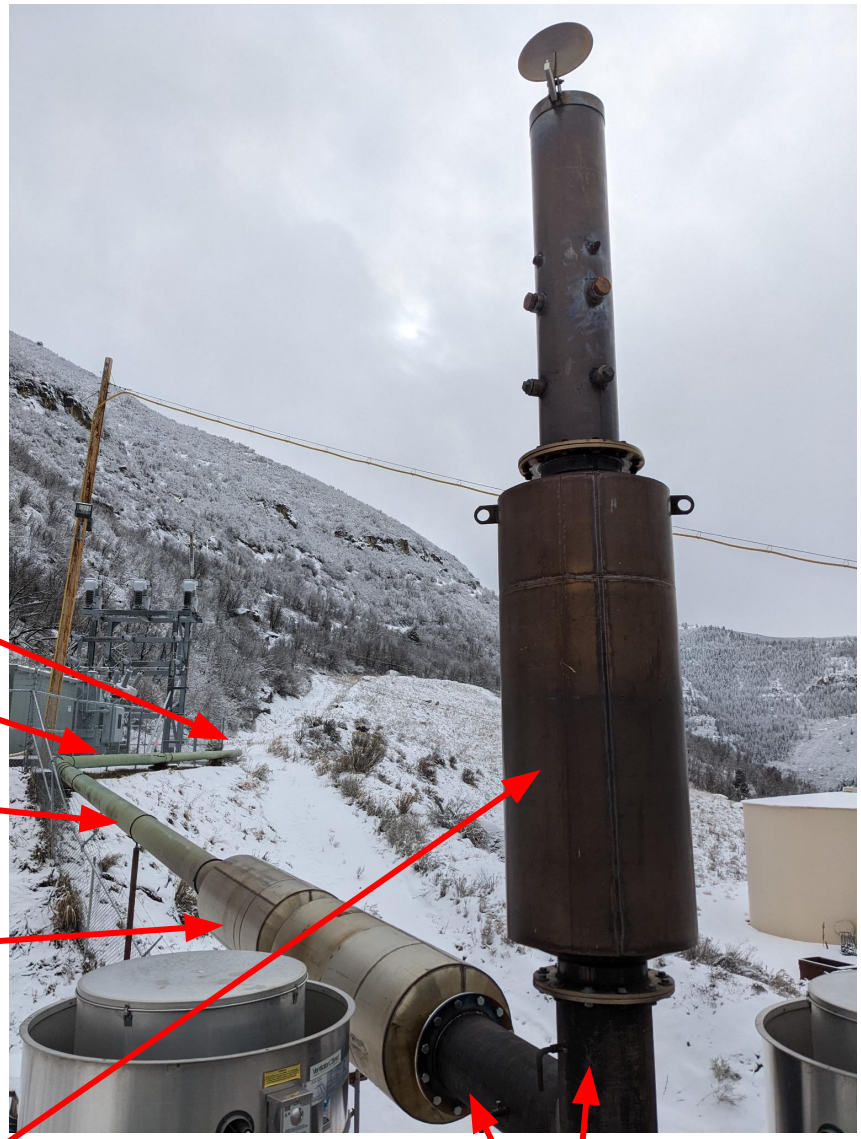
Delta Brick is in talks with stakeholders in Pitkin County to capture and use methane leaking from the mines in Coal Basin, the historic mining district above Redstone. These are some of the gassiest mines in the state, and stakeholders are interested in a variety of use schemes including electricity generation and water production. Delta Brick has led numerous tours of 3MW and the water production facility for these stakeholders.

These conversations resulted in a $1.2 million appropriation from the federal government to work on these issues. The subcontracts are still being finalized, and it is likely that $200,000 or more will be spent on water production. CWCB's grant for water production was a big reason that the federal government stepped in to continue the work. So thank you!

Construction of water production apparatus

Geometry of water production apparatus

Photo taken from the top of the electric generator



Testing of water production apparatus

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