

**9. Provide a description of your signage plan for the testing site. Provide as an attachment.**

The Strongbox pilot will be located in a secure outdoor location behind fencing and is inaccessible to the general public. Signage required by the BGNDRF is typically related to safety and will be a collaborative process that involves the review of the pilot plan and job hazard analysis.

**10. Provide a description of your site security plan, including training and site restriction methods.**

There is not a site security plan but there is safety training done via Teams prior to any clients coming to the site. The safety training includes applicable information related to Reclamation's safety manual ( <https://www.usbr.gov/safety/rshs/>), laboratory safety, site safety (heat/cold, rattlesnake/other hazards, etc.), site access rules, and OSHA.

**12. List the source(s) of the produced water including basin of origin. Describe how the produced water be transported to and from the site including origin and disposal locations and onsite storage safety precautionary methods. Provide as an attachment.**

The water would be provided by a SWD in their Permian and delivered by a certified water hauler. They have been doing for three years.

**13. Provide the disposal and decommissioning plan for the expected byproducts, waste products and other potentially contaminated materials. Plan should include disposition of equipment, soils, plants and piping required disposal and the expected disposal locations for each. Provide as an attachment.**

The NM PWRC is responsible for the delivery and disposal of produced water from oil and gas activities in New Mexico. There are two 100-barrel (4,000 gallon) storage tanks located inside a containment at the BGNDRF. The Strongbox pilot system will also be located in an appropriate spill containment near the NM PWRC storage tanks. The waste and treated water are sent to a common waste tank and the NM PWRC handles transport and disposal at an SWD.

**14. Describe the expected contaminants in the untreated produced water and the treated produced water (e.g. contaminants being studied, known contaminants, known additives). Include estimated concentrations if known and copies of laboratory analyses of untreated and treated produced water. Provide as an attachment.**

BGNDRF has a list of normal raw Permian PW quality and what the expected treated water quality would be. They have data on that from other thermal processes. In our case BGNDRF will recombine and then disposed and hauled off to an SWD.

**15. Describe all components of the produced water processing, treatment storage, secondary containment, and produced water system (e.g., pre-treatment units, above ground storage tanks, etc.). Include site layout map, closed loop processing plans, and specifications.**

Our system primarily consists of our multi-patented Mobile Flash Vaporization System (MFVS). It is a mobile unit which sets on a 26' gooseneck trailer to be easily transported with only a HD pick-up truck. The MFVS alone only takes a few hours to tie into utilities and begin processing. The MFVS has an internal pressure blower induced combustion chamber, which is heated utilizing a fully automated low Nox, 85+% efficient gas burner, capable of running on natural well gas, line gas, CNG, LNG, or propane. It also has an internal supply/mix tank to temper all incoming water to be treated. As product water enters the system it enters the mix tank which is automated/level sensor controlled. From the mix tank the product water is pumped into the combustion tank media at approx. 50 gpm. The burner flame is introduced into the chamber to cause the flash vaporization. The unit can vaporize up to 20 gpm. The remaining un-vaporized product water is collected into the Combustion Chamber bottom to be recirculated for reprocessing. The uniqueness of our system is that it separates the solids from the product water into the residual portion of our mix tank while destroying 98% of VOCs. As the quantity of residual increases, we pump it into a separate holding vessel. Normally it is a heavy brine that can be utilized by production operations. The MFVS is fully automated, capable of running 24 hours per day for up to 30 days without maintenance, depending on incoming water quality. The entire system rests upon an integrated internal spill tank system capable of containing all internal liquids, that is automated and controlled. All systems are PLC/touchscreen controlled on-site in the unit with VFD pump motor operation. It has over 30 controlled, and monitored programmed safety points, including internal CO<sub>2</sub>, H<sub>2</sub>S, and combustible gas sensors, along with (4) sperate location temperature sensors. Any or all safety points can be programmed to shut the unit down immediately, and the entire system is also remotely monitored/controlled via WIFI, to preprogrammed cell phones, tablets, or PC devices. Previously we had permitting to exhaust the vapor directly to atmosphere. With the increased demand for water reuse and reclamation we wish to test a new add-on system to reclaim the condensed vapor for reuse in New Mexico.

We wish to test at the BGNDRF facility our new add-on Water Vapor Reclamation System (WVRS). It will consist of a modified frac holding tank, recirculation pump, and stack exhaust vapor condenser units. We are hopeful to take the cooler incoming product water from the BGNDRF supply tank system whether it be well water, brine, brackish, or O&G production water, and cycle it through the stack condensers chill side for enhanced condensation, and then collect the reclaimed water and remaining vapor into our adjacent frac tank. If additional cooling is required, we could utilize additional chilling and test those options on-site as well. Out of the frac tank we can sample water for quality and reuse. If additional “polishing” is requested, we can then test those systems as well. We are also hopeful that the initial collected reclaimed water will initially be a positive resource for reclamation or reintroduction in agriculture or livestock applications ASAP.

The residual heavy brine we collect and then discharge will also be tested for reuse. Depending on the wishes/direction of all involved, it will either be utilized by BGNDRF or the New Mexico Produced Water Research Consortium, who would be coordinating and providing all incoming production water from additional sponsors. If so desired/directed it could also be redirected to the BGNDRF evap pond system as well. We have worked with and planned all of these tests coordinating with and under the direction of BRGDRF director Malynda Cappelle after touring that facility and Mike Hightower, director of the NMPWRC. Their assistance has been invaluable. We have submitted all the application information they have requested for the testing as well.

