



## Standing Stone Gas Well Wastewater Treatment Facility Pretreatment & Crystallization to Allow Recycle

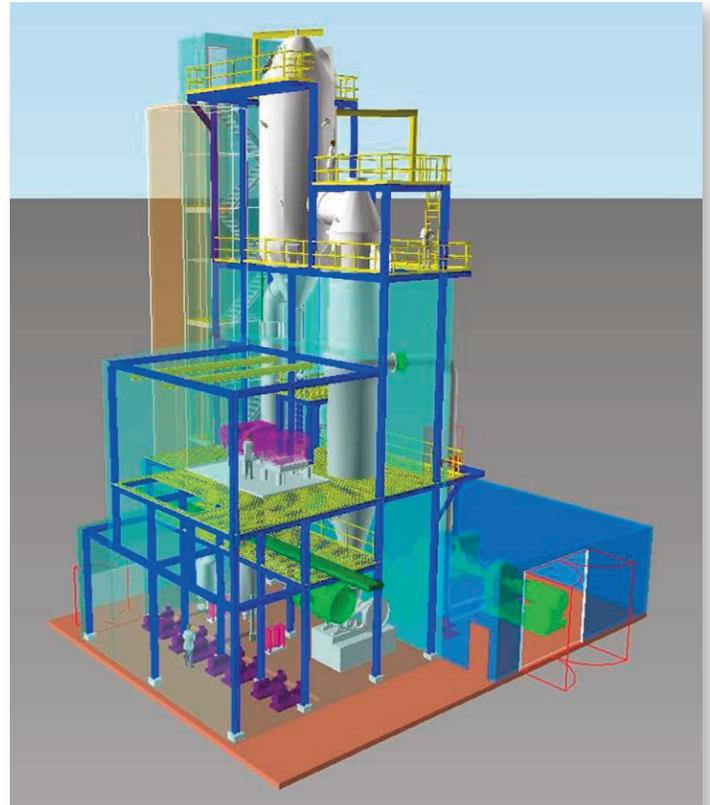
### Project Information & Schedule

Eureka Resources has been the leading provider of wastewater treatment, recycle and reuse services for the Oil and Gas industry in the Marcellus Play since 2008. The Standing Stone facility maximizes recycle opportunities and provides beneficial byproduct reuse opportunities. Eureka is committed to providing state-of-the-art gas well wastewater treatment and protecting the water quality of Pennsylvania.

Eureka Resources, LLC (Eureka) has obtained all the necessary permits from the Pennsylvania Department of Environmental Conservation (PADEP) and local planning approvals to construct and operate a gas well related centralized wastewater treatment facility designed to treat wastewater for the purpose of recycle back to gas well developers. Construction of the facility was completed in October 2013, and the facility was fully operational by March 2014. The Eureka facility utilizes industry-leading, state-of-the-art treatment processes that allow for maximized recycling of Marcellus shale wastewaters for use at well sites, as well as a concentrated brine crystallizer to allow production of valuable byproducts that will be extracted from the wastewater. In addition, the facility provides gas developers and producers an economical option to disposal via injection into disposal wells. The water stays in the hydrologic cycle and truck traffic is reduced.

The facility was constructed in two phases. **Phase I**, completed in October 2013, included pretreatment and bulk storage tank systems capable of pretreating 10,000 barrels per day of gas well related wastewater, including tophole water, spent drilling fluids and muds, and flowback and produced water generated during development and operation of oil and gas wells. **Phase I** also included a 5,000 barrel per day concentrated brine crystallizer that allows Eureka to provide additional treatment of the effluent.

This is the first facility to process highly concentrated brine for reuse in Pennsylvania. The crystallizer unit generates evaporated salt crystals, a concentrated liquid brine purge stream and distilled water that has a total dissolved solids (TDS) level of approximately 50 mg/l which is well below the PADEP standard of 500 mg/l. These salt crystals can be used in salt water swimming pools, and the facility is currently supplying the market between 70-80 tons/day.



**Crystallizer Schematic**

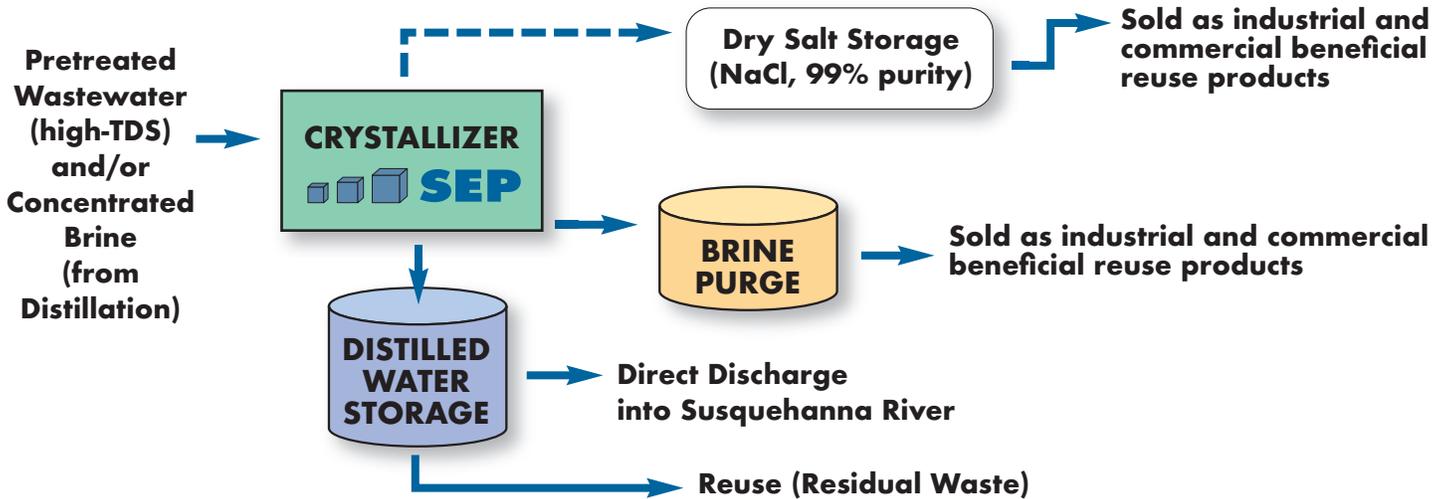
Eureka has obtained a long-term commitment with the largest distributor of NaCl in the nation. The facility operates 24-hours per day, seven days per week and employs approximately 30 full-time employees.

**Phase II** included upgrading the facility to include membrane biological reactor (MBR) and reverse osmosis (RO) treatment of the distilled water to generate ultra clean water that achieves PADEP's WMGR123 requirements for declassifying (dewasting) the wastewater. This allows direct discharge and/or storage in fresh water impoundments. **Phase II** was completed in April 2014. (US Patent No. 9,796,612)



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# STANDING STONE FACILITY



## FREQUENTLY ASKED QUESTIONS:

**Q** How much wastewater is treated at the Standing Stone facility?

**A** The Pretreatment Process is designed to treat approximately 10,000 barrels (420,000 gallons) per day. The crystallizer is designed to treat 5,000 barrels (210,000 gallons) per day of pretreated effluent with the balance being reused by gas well developers.

**Q** Where does the sludge generated in the pretreatment process go?

**A** It is disposed of in landfills. Eureka performs routine analyses to monitor the quality of the sludge and verify suitability for landfill disposal. Eureka has been operating this same Pretreatment Process at our existing Williamsport facility since 2008 with no issues related to sludge disposal.

**Q** What byproducts are generated by the crystallizer?

**A** The crystallizer generates dry salt, distilled water, and concentrated brine, all of which have potential beneficial reuses. With some enhancements (a second-stage crystallizer), there is also the potential to reduce the amount of concentrated brine generated by producing a 34-38% concentrated calcium chloride byproduct for beneficial reuse.

**Q** Will radiation levels (naturally occurring radioactive material – NORM) be a concern at the Standing Stone facility?

**A** No radiation levels have been detected since the installation/use of the crystallizer at the Standing Stone facility in 2014. Eureka has been operating similar treatment processes at our existing Williamsport facility since 2008. Furthermore, Eureka routinely monitors radiation levels throughout all facilities in accordance with plans required by the PADEP with no issues. (US Patent No. 9,796,612)



## GAS WELL WASTEWATER TREATMENT

### CORPORATE OFFICE LOCATION:

454 Pine Street, Williamsport, Pennsylvania 17701

### STANDING STONE FACILITY:

**Type:** Oil and Gas Wastewater Treatment

**Location:** Off Route 6 near Towanda, just east of Fisher Road, Standing Stone Township, Bradford County, Pennsylvania

Please contact us at for more information: **570-651-9972**

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