Eureka Resources, LLC - Marcellus Wastewater Treatment - Case Study April 18, 2013



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Eureka Resources – Centralized Treatment Approach

Existing:

- 420,000 GPD facility in Williamsport
- Pre-treatment and distillation treatment

Proposed Projects:

- 2013 Expansion Projects
 - Williamsport #2 Reach Road
 - Bradford County (Standing Stone)
- Proposed construction of a new centralized plant in Tioga County (Mansfield), PA
- Crystallization and dewasting capability can be applied to all locations.
- UIC disposal well capability in OH.
- Centralized treatment in OH.



Eureka's Long-Term Business Plan For Maximizing Recycle and Protecting Water Quality

Pretreatment (phys-chem)



Blend w/fresh water for reuse.

Secondary
 Treatment
 (Distillation and Crystallization)



Blend w/fresh water for reuse



POTW indirect discharge



Concentrated brine reused as cold-weather drilling fluid

Advanced brine management (crystallizer)





 Tertiary Treatment (Biological/RO)



Unrestricted storage and reuse options

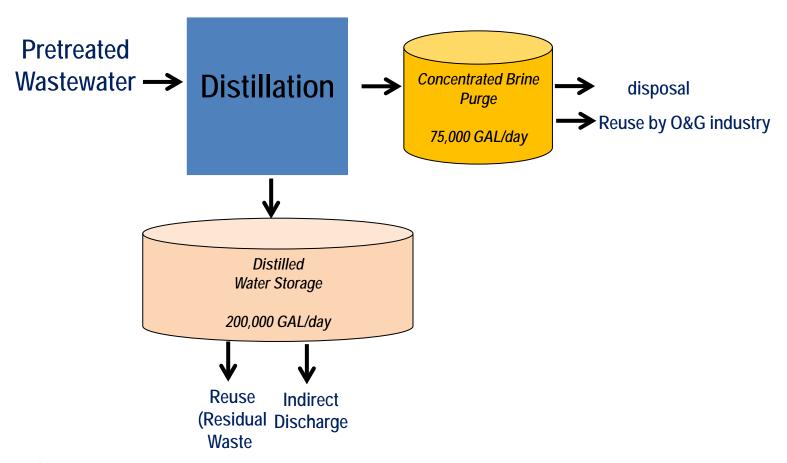
Salts for reuse.



Direct discharge

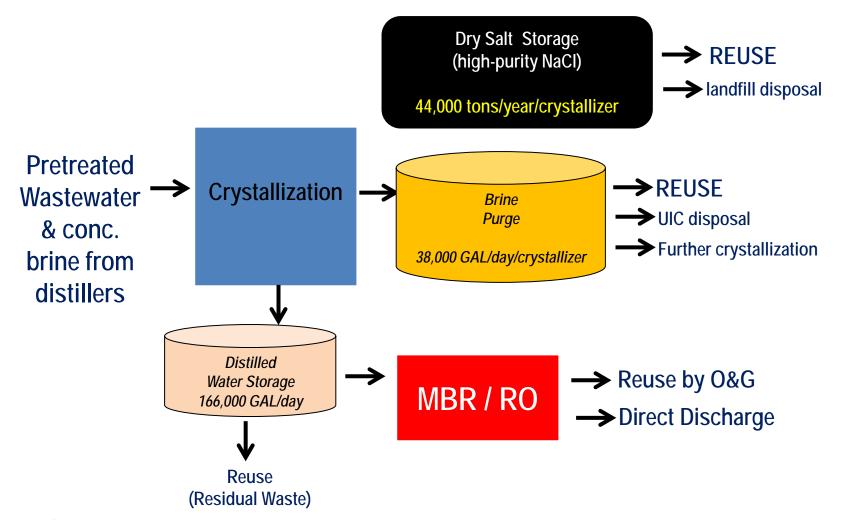


Reuse: The Present – Distillation





Co-Product Recovery/Reuse: The Future – NaCl Crystallization/Direct Discharge

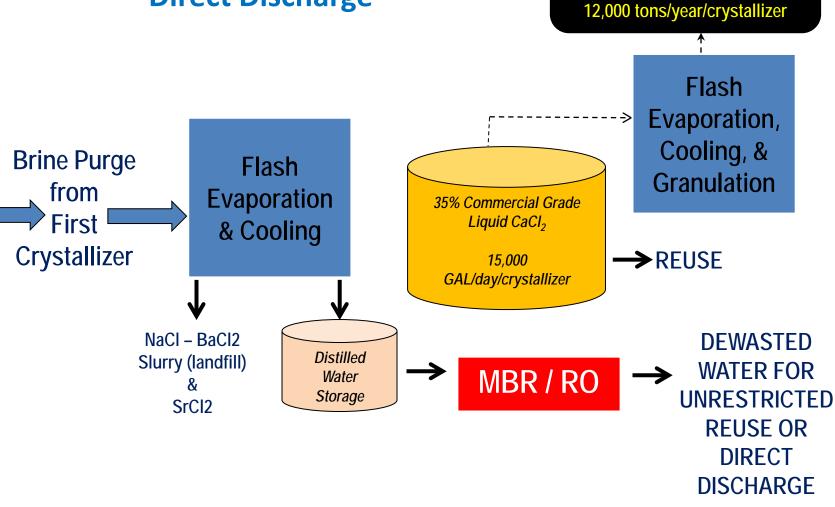




Co-Product Recovery/Reuse: The Future – CaCl₂ Crystallization/ Direct Discharge

94-97% High-Purity
CaCl₂ granules (bagged)

REUSE





Membrane Biological Reactor (MBR)/Reverse Osmossis (RO) Treatment

- Successful 6-month pilot study
- Patent pending
- Target effluent equivalent to WMGR123 standards for declassification (dewasting)
- Allows unrestricted reuse and direct discharge



Co-Product Reuse Studies

- Initial characteriztion completed
- Prepare work plan for characterization of commercial road salt, sodium chloride (NaCl) and calcium chloride (CaCl₂) – for review by PaDEP
- Collect and analyze samples samples collected and at laboratory
- Prepare co-product determination (beneficial reuse under 25 PA Code Parts 287.1 and 287.8) for submission to PaDEP
- Initiate PaDOT pilot study winter 2013-2014

