

# SHALE GAS WATER TREATMENT AND PURIFICATION



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# Wastewater and the Oil and Gas Industry

- Hydrofracturing can use between one and eight million gallons of water



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The water that comes back up the well bore during the hydrofracturing phase is commonly called:

## Frac Flowback

- High flows for short duration
- 10 to 40% of frac fluid recovered
- Most recovered in first 1 to 2 weeks
- TDS quickly climbs to 30,000 mg/L up to 200,000 mg/L
- Contains chemical additives and naturally occurring constituents



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# Treatment Options Currently in Use

Injection or Disposal Wells

Discharge to POTW

(Publicly Owned Treatment Works)

Discharge to COTW

(Commercially Owned Treatment Works)



Reuse

- Raw water
- Treatment



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# Permitting Requirements

## Facilities Discharging to the Waters of the Commonwealth Require:

- Earth Disturbance & Stormwater Permits
- NPDES Permits

May also require:

- Residual Waste Mgmt permits
- Air Quality Permits
- Local Zoning or municipal approval



**New Regulation to go into effect by 2011 will require a limit of 500 mg/l TDS on discharges**



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## **Underground Injection Wells Require:**

- State DEP Oil & Gas Permitting
- Federal EPA Permitting

## **Off-Site Wastewater Transfer Stations Require:**

- DEP Waste Mgmt Residual Waste Permitting
- Earth Disturbance & Stormwater Permitting

## **Large Centralized Storage Impoundments Require:**

- Earth Disturbance & Stormwater Permits
- Dam Safety Permits
- Construction Standards



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## Reuse of Frac Flowback May Require:

- Pretreatment
- Blending
- Raw Frac Water is also being reused



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# Reuse

- Makes Sense
- Raw water
- Blending
- Lessens need for water withdrawal
- On site Pre-Treatment
  - Filtration
  - Chemical Treatment



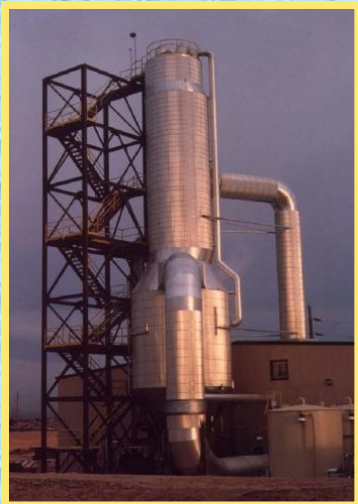
# Other Technologies

Source Water

- Acid Mine Drainage



Enhanced Evaporation/Distillation



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# QUESTIONS ?



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