

INDUSTRIAL PRODUCTS: AquaTex™ COG



Eco-friendly wastewater reclamation & treatment systems since 1988

AquaTex™ COG (Coal, Oil & Gas)

Scope of Services – Wastewater Resources Inc. (WRI) has teamed up with the Water Group of Black & Veatch, a global architectural and engineering firm, to offer **Lifecycle Water Management Services** to the Upstream Oil & Gas Industry:

- feasibility studies and bench scale testing
- site design & construction
- facilities design & construction
- water procurement & waste disposal
- wastewater treatment technologies and
- system integration, operation, and maintenance.

To significantly reduce water management costs over the lifecycle of oil and gas fields, we advocate a **100% Water Recycle Model**. This turnkey model allows producers to continuously reclaim, treat, and recycle all wastewaters for further drilling and completion operations. The continuous recycling of treated wastewaters significantly reduces freshwater acquisition and hauling costs, as well as wastewater hauling and disposal costs, to increase the producer's IRR.

Applications – WRI brings bench testing services and proprietary wastewater treatment technologies to the team's **Lifecycle Water Management Services**. Our COG (Coal, Oil & Gas) product line is meticulously engineered to treat well wastewaters (i.e., drilling fluids, frac flowback and produced water) from drilling, completion, and production operations.

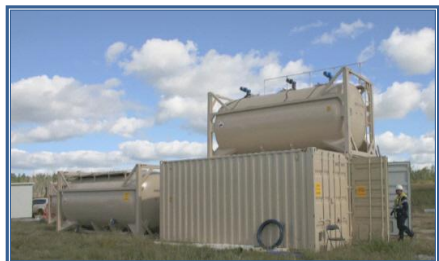
Wastewater Treatment Plants – WRI has commercialized two treatment products exclusively for the upstream industry: **AquaTex™ COG** pretreats wastewaters to reduce total suspended solids (TSS), and **AquaTex™ COG Advanced** reclaims and treats wastewaters to remove both TSS and total dissolved solids (TDS). Both of these state-of-the-art products are deployable as portable, mobile, or central wastewater treatment plants in oil, gas, and coalbed methane fields, and can be purchased or engaged under a standard equipment lease agreement.



Locations – AquaTex™ COG and AquaTex™ COG Advanced can be deployed to:

- drilling pads
- water storage tanks
- water impoundments and
- central water treatment sites.

Primary Treatment Technology – AquaTex™ COG was developed as an extension to traditional hydraulic separation technology to provide a simpler, rugged pretreatment plant for mobile deployment. Our robust technology removes total suspended solids (TSS) such as oils, grease, metals, BOD, COD and VOC. Following primary treatment, flow water can be recycled, deep well injected or channeled for advanced treatment. It is ideal for pretreating drilling fluids and flowback to remove TSS for additional fracking, Likewise, AquaTex™ COG can pretreat produced



water for fracking, deep well injection or advanced treatment.

WRI's Industrial Process Water Products:

- AquaTex™ COG (Coal, Oil & Gas)
- AquaTex™ BIO (Bioreactor)
- AquaTex™ MBR (Membrane Bioreactor)
- AquaTex™ HS (Hydraulic Separation)
- AquaTex™ SBR (Sequence Batch Reactor)
- AquaTex™ LLD (Limited Liquid Discharge)
- AquaTex™ CT (Cooling Tower)

*Wastewater Resources and Black & Veatch offer **Lifecycle Water Management Services** to the upstream industry.*

*Our **100% Water Recycle Model** continuously treats and recycles wastewaters in the field.*

Our technology treats drilling fluids, flowback and produced water to specifications or regulatory standards.

The COG product line functions as mobile or central wastewater treatment plants.

Our wastewater plants may be purchased or deployed under a water service agreement.

They can be deployed to wellsites, water impoundments or storage tanks, and offsite water treatment sites.

AquaTex™ COG is a rugged, reliable, automated pretreatment plant for removing total suspended solids from wastewaters.

AquaTex™ COG mobilized in a natural gas field for pretreating drilling fluids and flowback (left)

Wastewater Resources Inc.

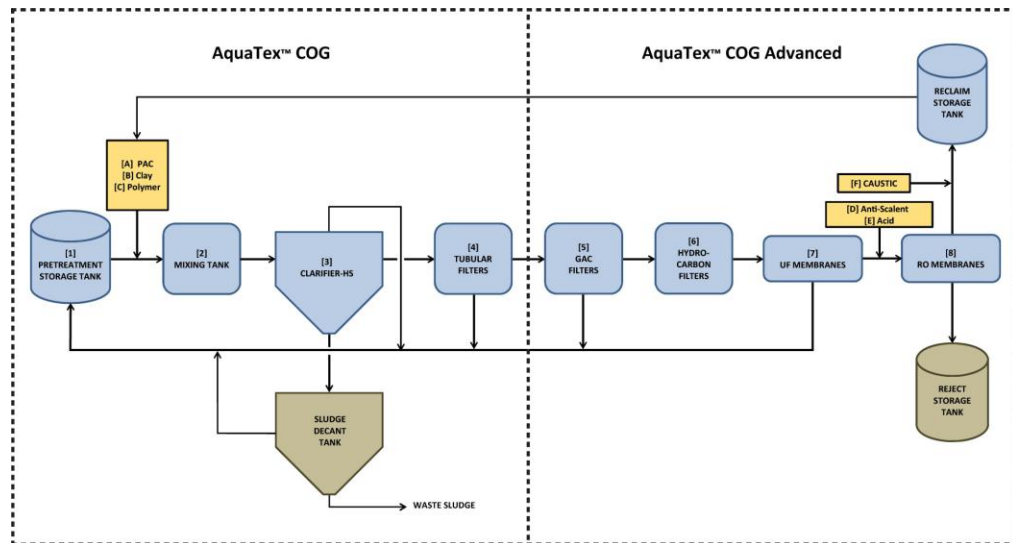
9318 N. 95th Way, Suite 102

Scottsdale, Arizona 85258

Office (480) 391.9939

Website www.h2oreuse.com

AquaTex™ COG was designed to reduce moving parts, provide a fully-enclosed treatment unit, prevent recovered product from remixing with separator discharge, and remove product without interfering with separator operations. After mixing and flocculation, it functions as a combined Hydraulic Separator (HS) and Clarifier through a unique proprietary design. Our engineers converted an ISO-rated sealed tank into single HS/Clarifier module. After separation, lighter particles rise to the top of the tank for removal in the HS sequence, and heavy particles, the bulk of the waste, settle to the bottom of the clarifier. From here, heavier particles are sent on to a Sludge Decant Tank for dewatering and removal as nontoxic sludge for transfer to a pit for encapsulation or hauled offsite for disposal. Pretreated water is then filtered and recycled to the drilling pad for use as frac water.



AquaTex™ COG is ideal for pretreating frac flowback for continuous use in drilling and completion operations.

AquaTex™ COG can also pretreat and recycle produced water for fracking.

AquaTex™ COG can be delivered on three platforms in oil and gas fields:

- Portable (1,000 bbls/day model)
- Mobile (3,500 & 7,500 bbl/day models)
- Central (7,500 & 15,000 bbl/day models).

Influent Capacities:

- 1,000 bbl/day**
- 3,500 bbl/day**
- 7,500 bbl/day**
- 15,000 bbl/day**

Advanced Treatment Technology – AquaTex™ COG Advanced integrates our primary

treatment with advanced treatment technologies at the back end of the treatment train to remove total dissolved solids (TDS). It combines the pretreatment train with GAC filtration, hydrocarbon filtration, ultrafiltration (UF), and reverse osmosis (RO) for the advanced treatment of wastewaters. AquaTex™ COG Advanced is engineered for deployment as a mobile or central water plant to treat produced water prior to discharge or for beneficial uses, such as agriculture, livestock, recreation, and energy



Our advanced model integrates pretreatment and advanced treatment technologies to remove both TSS and TDS from wastewater.

AquaTex™ COG Advanced reclaims and treats produced water and recycles treated water or distributes it for beneficial uses.

Example of AquaTex™ COG's RO system for treating wastewaters (left)

generation. It is ideal for cleaning large volumes of produced water from coalbed methane wells with TDS levels under 20,000 mg/L.

System Automation – Every wastewater treatment plant

manufactured comes equipped with state-of-the-art automated control panels and the latest Siemens technology. Our computerized control modules offer user-friendly color touch screen programming for onsite system monitoring and Internet connectivity with full reach-back capabilities to the corporate office for remote monitoring and management. Whether wastewater streams are from oil wells, copper mines or cruise ships, we lead the industry in system automation technologies.



All of our COG products are equipped with computerized, user friendly technologies for onsite and remote monitoring and management.

AquaTex™ COG control panel (left) with color touch screen programming

Benefits – Our COG product lines yield many returns over the life of oil and gas reservoirs:

- Reduction or elimination of freshwater procurement and hauling costs
- Recycle and reuse of treated wastewaters for beneficial uses
- Reduction of environmental footprints and regulatory risks
- Branding as a good steward of all natural resources and
- Increase IRR's over the life of oil and gas reservoirs.

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