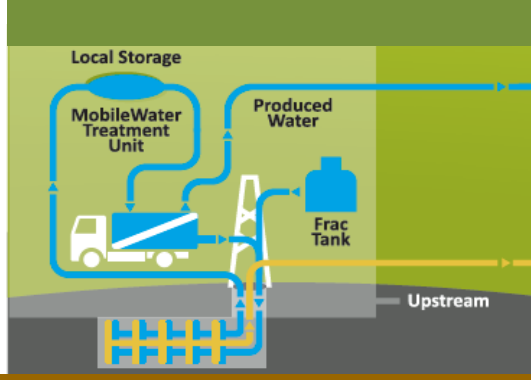
WASTEWATER RESOURCES INC.

Wastewater Treatment Solutions for the Upstream Oil & Gas Industry



Eco-friendly wastewater reclamation & treatment systems since 1988

Product Models & Specifications

Business Philosophy

Wastewater Resources Inc. (WRI) is an original equipment manufacturer of patented and proprietary wastewater treatment plants for the municipal and industrial markets. For the past 20 years, we have advocated a 100% water recycle model – the continual reuse of treated wastewater over the lifecycle of an industrial process. In the upstream oil and gas industry, it makes good business sense to recycle treated wastewater for future drilling and completion needs. Through our **100% Water Recycle Solution**, producers reduce or eliminate expensive water acquisition and hauling costs, as well as wastewater hauling and disposal costs. It also makes business sense to become a good steward of another one of our natural resources – water.

Products & Services

Our AquaTex™ COG (Coal, Oil & Gas) products are proprietary reclamation, pretreatment, and advanced treatment technologies designed by WRI exclusively for the upstream oil & gas industry. We sell our state-of-the-art, fully-automated products as portable, mobile and central wastewater treatment plants or deployed and operate them under a standard equipment lease. We have also teamed up with leading architectural, engineering and project management partners to offer a full suite of lifecycle water management services. Our team delivers turnkey water management solutions over the life of oil and gas reservoirs, including the design and construction of site improvements, and the selection, fabrication, and operation the wastewater treatment plants.

Design Philosophy

Our design objectives are to treat drilling fluids, frac flowback, and produced water:

- Under remote and rugged field conditions
- Using a minimum system footprint
- With minimum operating overhead
- To reduce TSS, TDS, and other dissolved minerals and organics
- At influent flow rates of 1,000 to 15,000 barrels per day
- To recover a maximum amount of treated water
- For future drilling operations or beneficial reuse.

Influent Capacities:

1,000 bbl/day

3,500 bbl/day

7,500 bbl/day

15,000 bbl/day

Product Line

AquaTex™ COG is designed for portable or mobile deployment to water storage tanks or impoundments or as a central wastewater pretreatment plant to remove total suspended solids (TSS) and several dissolved minerals and organics.

AQUATEX™ COG (1)

Product Model Number	Raw Water Inlet Supply	Typical Percent Recovery	Reclaimed Water	Reject Waste	Sludge Waste	Typical Power Consumption	Typical Chemical Consumption	Typical System Footprint	
								Mobile Plant 20ft ISO Containers	Central Plant Building Footprint
	BBL/day	%	BBL/day	BBL/day	BBL/day	kW/h	$/BBL	# of Containers	Square Feet
1000	1,000	99%	993	N/A	7	7	$0.03	2	1,600
3500	3,500		3,476		25	9	$0.05	4	2,000
7500	7,500		7,448		53	16	$0.10	6	2,400
15000	15,000		14,895		105	29	$0.20	10	4,000

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AquaTex™ COG Advanced is designed as a mobile or central water treatment plant to reclaim, treat, and recycle or reuse treated wastewaters. The advanced model removes total dissolved solids (TDS) to specification while further reducing TSS levels.

AQUATEX™COG ADVANCED (1)									
Product Model Number	Raw Water Inlet Supply	Typical Percent Recovery	Reclaimed Water	Reject Waste	Sludge Waste	Typical Power Consumption	Typical Chemical Consumption	Typical System Footprint	
								Mobile Plant 20ft ISO Containers	Central Plant Building Footprint
	BBL/day	%	BBL/day	BBL/day	BBL/day	kW/h	$/BBL	# of Containers	sq. ft
1000	1,000	65%	650	343	7	60	$0.05	4	4,200
3500	3,500		2,275	1,201	25	85	$0.09	8	5,600
7500	7,500		4,875	2,573	53	142	$0.19	12	8,000
15000	15,000		9,750	5,145	105	263	$0.38	16	11,200

(1) Specifications are approximate for most categories; final characteristics are based on water quality specifications for a specific water management project.

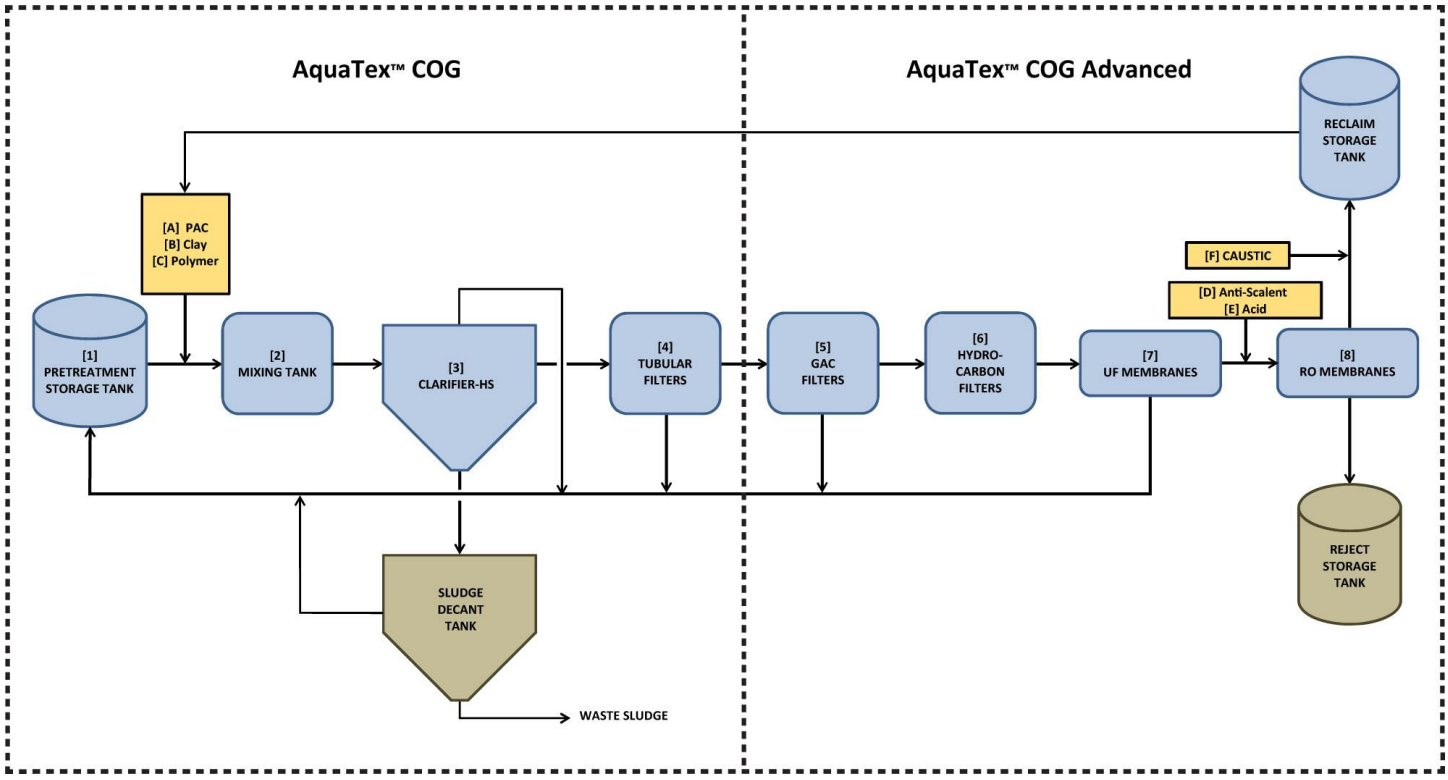
Treatment Train

Our automated treatment trains are meticulously engineered to meet all recycling, reuse and discharge specifications:

AquaTex™ COG integrates mixing, flocculation, combined hydraulic separation/clarification, and final filtration technologies into the treatment train to pretreat and recycle drilling fluids, frac flowback, and produced water.

AquaTex™ COG Advanced integrates the pretreatment train with GAC filtration, hydro carbon filtration, ultra filtration (UF), and reverse osmosis (RO) technologies for the advanced treatment of drilling fluids, frac flowback, and produced water.

Pretreatment and Advanced Treatment Flow Diagram



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Treatment Process

AquaTex™ COG takes wastewater from the field into the Mixing Tank where it subjected to a positive stirring action so it mixes and reacts with a proprietary set of chemicals. Flocculent chemicals are added after the flow water leaves the Mixing Tank for blending and activation prior to injection. The flow water then passes through a Static Mixer before entering the enclosed Tube Flocculator/Clarifier tank. Sludge from the Clarifier is pumped to the Sludge Decant Tank. After decanting, the final sludge is pumped to adjacent lined storage for further drying and disposal. Decanted clear water from the Sludge Decant Tank flows to the Sump Tank and is then transferred to the Pretreatment Storage Tank. The Decant Tank thickens the sludge by pressing water at the bottom of the tank. The remaining sludge can be pumped to an adjacent solids disposal pit or dewatered. Decanted water flows to the Sump Tank and then to the Pretreatment Storage Tank. Finally, a Tube Filter is utilized to polish the clarified water. Filter tubes backwash to the Pretreatment Storage Tank for retreatment, and filtered water is discharge into a storage tank for recycling.

AquaTex™ COG Advanced passes pretreated water from the above described pretreatment process through to the Granular Activated Carbon (GAC) Filters for organic and H2S reduction and onto the Hydrocarbon Filters, which utilize a special media to absorb trace hydrocarbons from the feed water and then into the GAC Effluent Tank. Water is then pumped through the Ultrafilter Unit. Water from the Ultrafilter process flows into the UF Permeate Tank and is pumped through a cartridge filter and on to RO Membranes for final treatment and pH adjustment. Clean water from the RO Membranes flows into the Reclaim Storage Tank for distribution to drilling and completion operations or to beneficial uses such as agriculture, livestock, wildlife, recreation, and industry.

Field Designed Features

AquaTex™ COG, our wastewater pretreatment plant, has been engineered and weatherized for remote, rugged oil, gas, and coalbed methane fields. The modular, skid-mounted system is installed in ISO-rated shipping containers and then mounted on tractor trailer flatbeds equipped for rugged field conditions. All COG units come with vibration damping devices, ISO-rated water tanks, redundant critical components, and critical spare parts. AquaTex™ COG Advanced, our advanced treatment solution, has been engineered as a distributed mobile or central wastewater plant for operating onsite with minimal personnel, oversight, and overhead.

Automation Features

Every automated wastewater treatment plant that we engineer for the upstream oil and gas industry comes equipped with a state-of-the-art computerized control panel configured with the latest Siemens PLC technology, robust system software and user-friendly color touch screen. Our automated technologies integrate leading-edge hardware and software solutions for easy onsite system monitoring and management, and Internet connectivity with full reach-back capabilities to our corporate office for remote monitoring and management.

Benefits

Deploying AquaTex™ COG and COG Advanced to well sites or pads generates financial, social, and regulatory returns on the capital investment. Recycling treated wastewaters onsite reduces or eliminates freshwater procurement and hauling costs, as well as wastewater hauling and disposal costs, saving producers $200,000 to $600,000 per well annually during drilling operations and up to $1.5 million per well over the lifecycle of a reservoir.

Other direct and indirect returns on investment include:

- Reduces the volume of truck trips on state, county, and local roads
- Reduces noise and air pollution from thousands of water hauling trucks

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- Accelerates pit closure at wellsites or eliminates the need for pits
- Reduces freshwater withdrawals from local natural resources
- Recycles treated wastewater for further fracking operations
- Reuses treated wastewater for beneficial purposes
- Brands a positive social image in affected communities and
- Saves environmental assets from exposure to untreated wastewater.

Test Results

Wind River Bench Case Study (Produced Water)

Wastewater Resources Inc. also offers bench scale testing services to clients. Appearing below are bench test results for a major oil and gas company who shipped samples of produced water from three active wells in a Rocky Mountain basin to our headquarters in Scottsdale. During a typical bench scale test, we perform an extensive evaluation of the treatment process through detailed chemical analyses of the produced water before and after treatment, as well as calculations of chemical and power consumption.

Parameter	Unit	Raw Water Inlet		Bench Scale Primary Treatment 09/30/10	
				Bench Test Results	% Reduction
		Inlet - Contract	Inlet - Average	ID: 10100608-01	
Arsenic, TR	mg/l	0.025	0.030	0.013	57%
Iron, dissolved	mg/l	0.550	0.21	0.05	76%
Lead, dissolved	mg/l	0.0200	0.05	0.01	80%
Manganese, dissolved	mg/l	0.030	0.04	0.03	25%
Molybdenum, dissolved	mg/l	0.020	0.008	0.005	40%
Oil and grease	mg/l	5.0	8.0	5.0	38%
Radium 226, TR	pCi/l	10	57.5	3.6	94%
Radium 228, TR	pCi/l	7	8.8	6.2	30%
Silver, dissolved	mg/l	0.0030	0.009	0.005	42%
Sulfide - H2S	mg/l	0.250	0.93	0.21	77%
COD	mg/l	n/a	2,077	630	70%
Diesel Range Organics (DRO)	mg/l	n/a	222	5.4	98%
Gasoline Range Organics (GRO)	mg/l	n/a	1013	25	98%
Silicon as SiO_2	mg/l	n/a	85.1	36.1	58%
TPH as DRO + GRO	mg/l	n/a	1243	30	98%
TSS	mg/l	n/a	22	12	45%

As can be seen from the results of the bench test, not only did our primary treatment process reduce TSS to 12 mg/l but it also significantly reduced many other dissolved minerals and organics in the produced water.

Barnett Shale Case Study (Frac Water)

Wastewater Resources Inc. completed a field test of its gasfield desalination technology in the Barnett Shale Trend of Central Texas in late 2006. Frac flowback was pretreated onsite to remove several targeted contaminants. Pretreated water was then fed through a membrane system for removal of colloidal material, residual hydrocarbons and dissolved solids. The chart below shows the water chemistry at various stages of the wastewater treatment process:

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Test Data (mg/l) for RO Treatment of Barnett Shale Frac Flowback				
Analyte	Untreated Water	After Pretreatment	Ultrafilter Permeate	Final RO Permeate
Alkalinity (total as CaCO3)	160	58	57.4	4.69
Bicarbonate as HCO3	195	70.7	70.1	5.72
Carbonate as CO3	< 1.2	<1.2	<1.2	<1.2
Hydroxide as OH	< 1	<1	<1	<1
pH	6.86	6.82	6.15	6.28
Total Suspended Solids	4,200	54	<4	<4
Potassium	77.4	39.3	39.2	1.13
Magnesium	72	43	40.3	0.094
Calcium	676	472	448	0.662
Sodium	4,504	2,934	2,876	63.6
Boron	9.29	6.5	6.15	3.18
Total Dissolved Solids	14,590	10,429	9,990	191
Chloride	7,830	5,386	5,412	105
Sulfate	396	597	584	1.2
Bromide	77	52	55	1.33
Phosphorus	56	<1.5		<0.1
Iron	173	12.2	0.934	0.017
Manganese	3.7	2.4	2.34	0.0023
Aluminum	106	0.44	0.115	<0.03
Barium	936	0.874	1.08	0.0007

Central Wyoming Case Study (Produced Water)

In October 2007, Wastewater Resources Inc. ran a one-week gasfield test in central Wyoming for a major oil and gas producer using a 20 gallon/minute portable test unit. The objective of the test was to determine the water recovery rate and operational costs of treating produced water containing corrosion inhibitors, alcohols and surfactants. The produced water was pretreated using a chemical coagulation/flocculation process, and resulting pretreated water was then passed through a membrane system. The system successfully processed the feedwater as shown by the input-output water chemistry comparison below: These pretreatment and advanced treatment processes were subsequently used to engineer a 7,500 bbl/day central wastewater treatment plant, known as AquaTex COG Advanced, for the producer in a Wyoming natural gas field.

Central Wyoming Produced Water Test Data Before & After Treatment Comparison		
	Feed Concentration	Output Concentration
Constituent	(Before Processing)	(After Processing)
	(mg/L)	(mg/L)
Bicarbonate	2248	19
Carbonate	ND	ND
Chloride	4020	32
Sulfate	1.5	2.3
Calcium	34	ND
Iron	0.1	ND
Magnesium	1.7	ND
Barium	9.7	ND
Potassium	50	ND
Sodium	3382	28
pH	7	6.3
Total Dissolved Solids	9737	82
Total Suspended Solids	25	ND
Total Petroleum Hydrocarbons	41	ND
ND = Non Detectable		

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