

## Frack Water Treatment Technologies

**Ecosphere Technologies Inc., based in Stuart, Fla.**, is one of the dominant providers of water treatment for the shale-gas industry, according to Lux Research, a technology research and consulting firm. The company's technology avoids the use of chemicals typically employed to treat wastewater.

Ecosphere's process forces dirty water through pipes where ozone breaks down contaminants with the help of sound waves, electrically charged particles and changes in pressure. No waste is created in the process, because while the technology renders contaminants harmless it doesn't filter anything out.

**WaterTectonics Inc., based in Everett, Wash.** uses a process called electric coagulation, in which an electric charge forces contaminant particles into clumps that can be removed after they either rise to the surface of the water or sink to the bottom. The process avoids the use of chemicals, but it does produce waste that has to be disposed of.

**Altela Inc., based in Albuquerque, N.M.**, earned a spot on Artemis Project's 2011 list of the 50 most innovative water-technology companies in the U.S. Its technology mimics rainmaking. Wastewater is heated to the point of evaporation, which produces clean water in the form of vapor, leaving contaminant particles behind. The vapor is then condensed back into liquid form.

The basic process, called thermal distillation, isn't new, but Altela has found a way to make it more efficient, by capturing the heat generated by condensation and using it for evaporation. Ned Godshall, the company's chief executive, says Altela's method uses a third of the energy typically required for conventional thermal distillation.

### **Integrated Water Technologies, Inc.**

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### **Heckmann Corp. (NYSE: HEK)**

But on Tuesday afternoon, shares were up 42.19% to \$3.83 after the company announced it was acquiring Power Fuels Inc., a North Dakota-based wastewater treatment company with involvement in the Bakken. Pennsylvania-based Heckmann is already involved in fracking in the big shale plays including the Marcellus shale, Utica shale, and the Eagle Ford shale. It doesn't have access to

the Bakken, however, one of the biggest shale plays in North America, and Power Fuels will give it that access.

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**AbTech Holdings, Inc.** ([OTCBB: ABHD](#)) announced last week the successful completion of field testing of its Smart Sponge® Mixed Media Contactor ("Contactor") to treat produced water at a Wyoming natural gas exploration and production site. The AbTech Contactors were designed to remove the hydrocarbons present in the produced water in order to protect and thereby substantially increase the useful life of downstream treatment equipment and technologies including a reverse osmosis system. The Smart Sponge Mixed Media Contactors removed 99.99% of the free oil and dissolved phase hydrocarbons (BTEX). Field testing and [data](#) collection was done under rigorous conditions throughout the fall of 2011.

**Ecosphere Technologies, Inc** ([OTCBB:ESPH](#)) announced that its majority-owned subsidiary, Ecosphere Energy Services, LLC has treated approximately 1.095 billion gallons of frac water since 2008 for major energy exploration and production companies to eliminate chemicals and preserve vital water resources.

**GreenHunter Water, LLC**, a wholly owned subsidiary of GreenHunter Energy, Inc. ([NYSE Amex: GRH](#)), announced earlier this month that it has secured a significant new order to provide equipment rental and services which include thirty (30) new frac storage tanks to an independent oil and gas operator active in the Eagle Ford Shale drilling region of South Texas. Delivery of the new frac

tanks was completed approximately one week ago. The initial one year contract includes rental and management of multiple sized fluid tanks, including 500 BBL water storage tanks, manifolds and other services. This new customer is also exploring other business opportunities offered by GreenHunter's Total Water Management Solutions™. These include water treatment and reuse of "clean brine", RAMCAT™ remote access monitoring equipment, water hauling and commercial salt water disposal, and advanced logistics optimization.

**Wescorp Energy Inc. (OTCBB:WSCE)** is focused on applications for environmental remediation, metering and measurement, oil and gas field intelligence solutions, and solutions for unconventional oil and gas. The company's technology has been field tested for produced water but has frac water applications as well. H2Omaxx utilizes proprietary next generation aeration technology to clean and separate oil and solids from water. It has been proven to be safe, effective, economical and an environmentally-friendly process. Independent test results have shown the H2Omaxx technology will reduce the oil content in oil well produced water to less than 10 parts per million without the use of chemicals, filters or heat.

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# Cleaning Up?

A rundown of selected technologies for treating contaminated fracking water

## BAG FILTERS

**How they work:** Sand and grit is trapped in a filter, while the rest of the water comes through.

**Pro:** Cheap.

**Con:** Leaves all the other pollutants in the water.

## CHEMICAL PRECIPITATION

**How it works:** Chemicals are added into the water; the chemicals precipitate metals into insoluble form, and the metals are then removed.

**Pros:** Widely used; relatively cheap.

**Cons:** Does not remove salt; generates a sludge requiring disposal.

## ELECTRIC COAGULATION

**How it works:** Charged particles attach to metals and separate them from water; the pollutants are then skimmed off.

**Pro:** Avoids the use of chemicals for treating water.

**Cons:** Does not remove salt; not widely used for large scale applications; generates a sludge requiring disposal.

## COMBINATION

*Several methods such as adding ozone, ultrasound, electricity and pressure*

**How it works:** Oxygen molecules change the composition of pollutants, making them less harmful.

**Pros:** Almost no waste is created; destroys bacteria.

**Con:** Does not remove salt.

## DISTILLATION

**How it works:** Uses heat to evaporate fresh water.

**Pro:** Only method that removes salts from waters with high concentration of solids.

**Con:** More expensive as it has high energy input and may require pretreatment to remove metals.

## MEMBRANE FILTRATION

**How it works:** A nano filter is used to remove metals.

**Pros:** Can effectively reduce metals and to some degree salts; requires little or no pre-treatment.

**Con:** Filter media may need to be replaced frequently, raising costs.

Sources: WSJ reporting; David Yoxtheimer, Penn State Marcellus Center for Outreach and Research