



LIVESTOCK WATER RECYCLING

The future of manure management.




WHO WE ARE

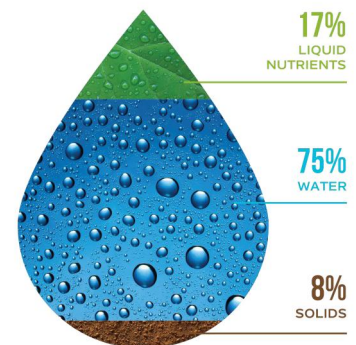
Livestock Water Recycling, Inc (LWR) has a passion for manure and waste management. This passion grew out of a desire to clean the world's water and make a difference in how the world manages manure.

Our innovative, patented, and proven manure treatment technology can be used at dairy, hog, and anaerobic digester operations to economically capture and concentrate the valuable nutrients contained in livestock manure, while recycling up to 75% clean, reusable water. The result is reduced transport and handling costs, improved operating profit margins, 100% nutrient accessibility, clean reusable water, reduced greenhouse gas emissions, reduced odor, and a 75% smaller manure footprint.

The LWR system's process technology can integrate with any liquid manure livestock operation and is compatible with flush, scrape, deep pit, lagoon, anaerobic digester, and solid-liquid separators. The process chemically conditions the manure stream in order to obtain fine solids for removal from the water. The chemicals that we use in the treatment process were thoughtfully selected based on their impact on the environment and safe use for land spreading.

The LWR manure treatment process takes into account the unique composition of manure liquids and is designed to treat manure in an environmentally safe way that allows for segregation, concentration and re-use of nutrients. The system creates the following outputs:

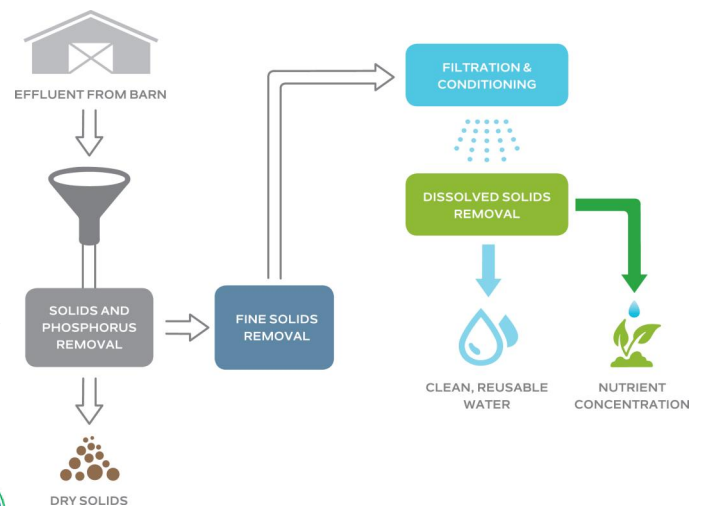
-  **Water:** A completely nutrient free effluent; Clean, potable water accounts for seventy to eighty percent (70%-80%) of the liquid volume. The water can be reused for crop irrigation, cleaning or watering of livestock.
-  **Nutrient Solids:** Dry and rich in phosphorus, solids can be strategically land-applied to crops as fertilizer to increase crop production. The solids also contain trace amounts of potassium and nitrogen.
-  **Liquid Nutrient Concentrate** –Containing ammonium sulphate and potash, the liquid concentrate is fifteen to thirty percent (15–30%) of the total liquid volume and can be strategically land applied as crop fertilizer. It is stabilized for easy transport to neighboring farms.



Our team of manure treatment experts was the first to envision the idea of recycling clean, reusable water from manure while concentrating valuable fertilizer nutrients. We were the first to develop a successful process, and we continue to be the world leader in manure treatment technology.

With commercialized systems operating throughout the US, including Wisconsin, Indiana, New York and Michigan, we have been awarded patents in Canada, New Zealand and Russia, and are patent-pending in five other jurisdictions.

Our patented process technology uses mechanical and chemical treatment for the removal of manure contaminants from the discharge waters of concentrated animal feeding operations (CAFOs). The system is focused on the reduction of solids, phosphorous, potassium, ammonia, and nitrogen from livestock manure. As the waste flows through this process, solids are sequentially removed from the influent stream.













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OUR STORY

-  In 1989, LWR president and co-founder Ross Thurston started a waste recovery business. This company specialized in on-site treatment of hazardous waste and waste water remediation. Its primary focus became groundwater treatment completing over 2000 water remediation projects in North America and around the world.
-  In 2006, a shift in vision emerged as the company wanted to become more involved in sustainability. Based on our success of treating fine particles with silt systems, we began researching the possibility of treating manure waste water. Manure contains very fine particles and has similar properties to the waste water that IWR had successfully treated for nearly two decades. A new company was formed. Under the LWR umbrella, significant research and development was underway.
-  In 2007, we determined that there were no viable solutions to completely treat manure, so lab testing began at the LWR facility based around a preliminary design. A market study was commissioned to evaluate the livestock market niche, quantify the industry and identify areas for growth. Several small models were built, including bench scale testing at the LWR facility, which led to the design, complete drawings and construction of a partial prototype system. The system was then installed and operated at a hog facility in Alberta, Canada.
-  In 2008, bench scale testing continued along with running prototype trials and doing more research. Eventually, a system design that was suitable was developed.
-  In 2009, we collaborated with a nearby hog farm to install the first full-scale system. This site was integral to the success of LWR and this collaboration allowed for extensive learning opportunities about manure. LWR ran trials and testing for months, installed and attempted numerous prototypes. The process was a challenging experience that led to system modifications. Eventually, a solid design was adapted that could treat manure at various livestock operations. It was at this time that LWR filed for its patent applications.
-  In 2010, LWR partnered in an investment royalty agreement with AVAC Ltd. and initiated a commercialization plan through a series of pilot projects.
-  In 2011 and 2012, LWR completed development of the hog and dairy manure treatment systems. A third party review was completed in December 2011 by Olds College (Alberta based), which confirmed the technical capacity of the system to produce clean reusable water and concentrated fertilizers.
-  We currently have commercialized systems operating throughout the US, including Wisconsin, Indiana, New York and Michigan.



LWR INNOVATION CENTER

Our Innovation Center is focused on always improving the LWR System and its process and the next step in our innovation is to advance our existing process technology. This year we introduced washable bag filters to eliminate the consumable cost of buying bags, and launched a product called ManuRenew™ that has decreased chemical cleaning costs while being safer for the environment. We had a goal to create drier solids and went from a solid output that contained approximately 18 – 19% dry matter and have progressed to 27% dry matter with our latest screw presses. We are working hard to positively impact the environmental footprint of the LWR System as well by introduced bulk chemical purchasing and can now offer our clients the lowest chemical pricing that we have ever seen. We are proud to offer the lowest electrical cost on the market, and have introduced a solar option to reduce that consumption even more.





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WHAT THEY'RE SAYING ABOUT US

"Farms can stop importing chemical fertilizer from faraway places, we can stop putting thousands of trucks on the road – it's a win-win for society. Less environmental risk, better agronomic practices, less compaction, less traffic on roads, better for the neighborhood, less odour and clean, reusable water. It's truly a win and that's why we are so excited about this."

JIM OSTROM, Partner, Milk Source at the World Dairy Expo Virtual Farm Tour

"Before the LWR system, our manure was not only labor intensive, but it wasn't a clean job. We wanted to improve our image and do a better job of taking care of our soils. Now we are doing a lot better job handling the material, and we're being better neighbors with the folks that live around us. It's been easier to manage our lagoons since we started up the LWR System. We have less activity hauling the material out because we are separating the phosphorous and nitrogen. It's become a much easier problem to handle in our business."

JIM McCormick, McCormick Farms

LATEST NEWS

WISCONSIN DAIRY SOLVES WATER CONSTRAINTS WITH INSTALLATION OF LWR SYSTEM AVOIDS HIGH CAPACITY WELL DISCUSSIONS

LOYAL, WI (MAR 21, 2016) – Meyer Family Dairy in Clark County, Wisconsin, has included the LWR Manure Treatment System as part of their latest expansion strategy. This addition will allow the dairy to add more cows without having to acquire more land for manure storage. Also, by concentrating manure nutrients into a stable fertilizer, no additional land will be required for manure spreading. Most significantly, by adding the LWR System they will have the ability to recycle up to 75% of the water back from the dairy manure, eliminating of the need to drill a high-capacity well.

Meyer Family Dairy is located in a dryer part of the state and was considering the installation of a high-capacity well before deciding to install the LWR System. "We've had some fairly aggressive growth over the last few years." says dairy spokesperson Mike Meyer. "In order to achieve our targets, we needed an additional water source to wash our sand bedding. This installation will allow us to achieve our expansion in a sustainable way." He adds.

The regulation of groundwater withdrawals has been a highly debated topic in the state of Wisconsin, as it is in most parts of the US. Although farmers use groundwater in reasonable and productive ways, they continue to be faced with regulatory pressure.

Wells are regulated depending on capacity, such as 70 gallons per minute, or 100,000 gallons per day. Farmers must acquire a permit for a high-capacity well and that permit must be approved by the Department of Natural Resources. In 2011, the Wisconsin Supreme Court issued its Lake Beulah decision which has led to regulatory uncertainty in the state for any reconstructed wells, replacement wells, existing wells and new wells.

"It has been said that groundwater is the number one issue of the future" says Ross Thurston, President of LWR. "By installing the LWR System, Meyer Family Dairy will have more control over their water resources. They won't have to drill an additional well, battle regulations, or ask permission to access more water. They have water already available to them and that water can now be unlocked by the LWR System. This is an exciting installation as it demonstrates that the LWR system is not only a manure management tool, but that it is truly a sustainable water source for livestock operations."

The system, scheduled for installation this summer, will be the third in the state of Wisconsin.





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LWR SYSTEM TO BE INSTALLED IN BLACK RIVER WATERSHED

LOWVILLE, NY (JAN 12, 2016) – A 7,500 cow dairy that operates in the Middle Black River watershed on the edge of the Adirondacks, has made a clear commitment to sustainable farming by being the latest to install the LWR manure treatment system, replacing their existing centrifuge system.

Marks Farms, once a small, family owned and operated dairy with 250 Holsteins, has grown to be one of the largest, most progressive, self-contained dairy enterprises in the state of New York, and has a major economic impact in Lewis County.

“Our success is attributed to a mix of sound business practices, applied science and technology and proactive planning, but we are still a closely held family business” says David Peck, managing partner of Marks Farms. “We firmly believe that our successes will continue as long as we strive to always act responsibly. Our goal is to maintain our family atmosphere while staying focused on animal health and well being.”

LWR President Ross Thurston says that the LWR System will allow Marks Farms to achieve their goals, while protecting the Middle Black River Watershed. “Marks Farms is a great example of how progress can be achieved while maintaining committed to protecting the environment. They will now have the ability to reduce their manure footprint while continuing to protect their community from nutrient runoff.”

“Water treatment and wetlands development has always been part of our business plan, and the LWR System will help us achieve those goals faster.” Adds Peck.

With the LWR System, Marks Farms will be able to recover 62 million gallons of water annually from dairy manure on the farm while concentrated valuable nutrients for fertilizer. The recycled water will be used to clean sand bedding and maintain the overall cleanliness of the dairy.

Marks Farms will be the first site with an LWR System to install the automated flushing bag filter system. With its high flow capacity, high solids loading, and unsurpassed performance, this bag filter system won't require any filter disposal, making it even better for the environment.

The system is scheduled for installation next month around the same time as World Ag Expo in Tulare, California.

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LWR SELECTED TO PRESENT AT WORLD AG EXPO

TULARE, CA (JAN 16, 2016) – LWR President Ross Thurston has been selected by the World Ag Expo committee to present a one hour seminar during at World Ag Expo this February. Direct and indirect water usage at dairies in the state of California results in approximately 85 gallons per cow each day being extracted from depleted ground water and manure has become absolutely vital to the long term viability of California dairies for it's high water content. Thurston will explain how by recycling clean, potable water from manure liquids, dairies can reduce their daily fresh water withdrawals and will present real world examples of just how much water can be recycled from livestock manure.

LWR has set a new standard when it comes to manure management, a technological approach to segregating, concentrating, and stabilizing manure nutrients and it's water content, can improve operating profit margins, reduce the number of trucks on local roads, reduce field compaction, and protect the environment.

When manure is managed properly, the risk of nutrient loss to water, soil and air is significantly decreased and nutrient losses can be costly. Join us in Tulare and learn more about how you can position your farm for the future by meeting the new standard in manure management. The seminar is scheduled for 3:30 on Tuesday, February 9th in the Seminar Center at World Ag Expo in Tulare, CA.

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LWR MANURE TREATMENT SYSTEM GOES SOLAR

CALGARY, AB – (SEPT 21, 2015) Solar energy is now making it easier for farms to implement the manure treatment technology that is revolutionizing the livestock industry. Livestock Water Recycling's Innovation Centre has just released the latest advancement in manure treatment technology which allows farmers the ability to power their LWR Manure Treatment System by solar energy. "Farmers inherently want to leave the world better than they found it" says Gareth Jenkins, LWR design engineer who oversaw the solar power project; "Environmentalism is core to their belief system, and with the help of new technologies, they are able to continue to grow their business, while leaving a legacy for future generations" Jenkins adds.

With a commitment to R&D, and a strong desire to innovate, the LWR Innovation Centre is always looking to find ways to help livestock farmers become more efficient and sustainable. One of the ways to do that is to make it easier for them to install manure treatment technology. "With federal and state funding pushing the implementation of solar energy, it was clearly the right time to move this project forward" says Jenkins.

The Obama administration announced Wednesday morning a series of efforts worth more than \$120 million aimed at boosting solar and other clean energy sources. The initiatives focus on the Department of Energy, where the bulk of the funding will go to programs to develop solar power technology and get it into homes, businesses and other facilities. "President Obama and Vice President Biden are committed to promoting smart, simple, low-cost technologies to help America transition to cleaner and more distributed energy sources, help households save on their energy bills, and to address climate change," the White House said in a fact sheet outlining the efforts." All told, this funding will drive the development of affordable clean energy throughout the country," it said.

California currently leads the solar market in the US, largely due to their supportive solar policies. As the first state to generate more than 5% of electricity from utility scale solar, there is enough solar energy installed in California to power 2,891,000 homes. In 2014 alone, \$11.773 billion was invested on solar installations in California. General Manager JR Brooks says "The livestock industry has looked to us to provide them with something that they have never had before; the ability to recycle an abundant amount of clean water from their manure, while concentrating valuable nutrients for fertilizer. We have commercialized systems operating successfully at livestock facilities across the US, but it is important that we keep innovating. This solar project was the next step in that innovation, and we are proud to announce that it will be available in early 2016." Farmers will always turning to new innovations and technology to ensure that they are positioned for the future. LWR's commitment to ongoing research and development is one of the reasons that the company is considered to be experts in the field of manure treatment and farming innovation.





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IN THE PRESS

FROM DIRTY TO CLEAN ON NEW YORK DAIR

McCormick Farms installs a new LWR system that recycles manure into drinking water. Although the farm isn't using the clean water as drinking water, they are using it to provide clean water to their barns and fields. [Click here for article.](#)

MANAGING MANURE FOR CLEAN WATER

The LWR System was featured by the Kewaunee County Star-News as an emerging manure treatment technology that can help solve groundwater and surface water contamination problems in Kewaunee County. [Click here for article.](#)

INNOVATION OF THE YEAR: LIVESTOCK WATER RECYCLING INC.

Manure, like death and taxes, is a certainty of life. But how we manage it has become a hotly debated topic among scientists, environmentalists and, yes, even billionaires. "Manure has tremendous inherent value," explains **Ross Thurston**, founder and President of Calgary's Livestock Water Recycling, Inc. "Extracting its nutrients and cleaning the water turns it into something reusable, sustainable and profitable." [Click here for article.](#)

TECHNOLOGY HELPS FARMERS MANAGE THEIR NUTRIENTS

Manure is a daily fact of life for farmers. They spend a lot of time and energy figuring out how to use it. Gordon Speirs, owner and general manager of Shiloh Dairy in Brillion, Wis., thinks he has found a solution. His dairy became the first one in Wisconsin to install the Livestock Water Recycling (LWR) Manure Treatment System, which uses patented water treatment technology designed especially for dealing with manure. "I like to say that I don't have a manure problem. I have a water problem," Speirs said. "This new technology helps us address that." [Click here for article.](#)

CONTACT

For follow-up interviews and questions, please contact:

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MANURE MANAGER
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Arctic snorkelling, a great hike & more

SAVING WATER
A REVOLUTIONARY ENVIRO HERO

Ross Thurston's innovation is eliminating agricultural waste

