



Newsletter of the Trinity River Authority of Texas

Spring 2017



The future of biosolids



About TRA's *Biosolids Program*

TRA's mission is to promote conservation, reclamation, protection and development of the natural resources of the river basin for the benefit of the public. In line with that mission, our biosolids program was started in 1996. TRA's Central Regional Wastewater System (an award winning plant) produces beneficial Class AB biosolids, a wastewater treatment byproduct. CRWS, the largest of our five wastewater treatment plants, serves Denton, Tarrant, Dallas and Ellis counties.

This newsletter provides a primer on biosolids.

The cause-and-effect relationship between our everyday lives and biosolids is a function of the treatment of the waste we produce from our bodies. We welcome the opportunity to provide information and presentations on the process employed by TRA at our CRWS facility. Regarding wastewater (the conveyer of untreated biosolids), we live, we eat, and we generate both fluid and solid waste that must be treated and returned to the environment. There is a science and a beauty in the transformation process that cleans wastewater to the point that it's separated into three products, two of which can be recycled. Only the first product removed in the process, which is the grit, grease and other solid objects that find their way into the waste stream in our sewer lines, is not recyclable. Those items are taken by truck to a landfill. The next product is the crystal clean and safe effluent water that is discharged according to permit into the Trinity River. The final product, the subject of this newsletter, consists of all the small solid particles removed from the effluent. That product is further processed with safe chemical treatment, then tested and finally recycled for beneficial use.

Adhering to Texas Commission on Environmental Quality and federal Environmental Protection Agency rules and guidelines, CRWS produces biosolids that are treated and tested to exceed TCEQ regulations. Biosolids have a slight musty and ammonia odor after processing. The CRWS treatment process produces a biosolids product that does not pose any air quality, environmental or health risks. In adherence to our mission and standards and TCEQ and EPA guidelines, there are no disease-causing organisms, medical waste or foreign objects in the biosolids that leave the CRWS facility.



General Manager J. Kevin Ward

When the biosolids have completed the production cycle, they are loaded onto trucks and applied to land by a licensed contractor for beneficial use as a soil amendment.

The use and land application of biosolids occurs in the state of Texas, nationally and internationally. Farming requires regeneration of the soils in fields to enhance fertility for crops grown year after year, and the land application of biosolids plays a central role. As a fertilizer, biosolids assist with soil regeneration and are a sustainable, green product. TRA's product is used by farmers on private land that produces crops for livestock only.

It is also important to note that a scientific approach is applied to the use of biosolids. The Water Environment Federation cites reviews conducted on the health of farm families, coupled with decades of research, to show that the correct use of biosolids is safe.

Currently, for most farmers, the alternative to the use of land-applied biosolids would be a commercial fertilizer, which is much more expensive and comes with the risk of storing large, potentially volatile chemical elements. Additionally, it too has an odor.

TRA's goal is to do its best to ensure that we produce a product that exceeds the standards established by regulations. TRA's biosolids processing is going to see a change in the coming years. The transformation is already in motion. On page 2, you will be introduced to where innovation is taking TRA's biosolids program, which will produce a very different and higher-quality product that can be recycled in new and innovative ways.

Our shared vision

The Trinity River Authority of Texas is an innovative, adaptive leader, enriching the Trinity basin as a resource for Texans.

The TRA mission

The Trinity River Authority's mission is to promote conservation, reclamation, protection and development of the natural resources of the river basin for the benefit of the public.



Upgrading biosolids treatment for *a better product, the first of its kind in Texas*

In 2014, TRA's Northern Region Manager Fiona Allen, P.E., and General Manager Kevin Ward visited a thermal hydrolysis and anaerobic plant (the Blue Plains facility, pictured above) that was under construction in Washington, D.C. The facility at DC Water is the first North American facility to use thermal hydrolysis to clean wastewater. TRA plans to be the second by improving the way we treat wastewater solids.

The Trinity River Authority completed a solids Master Plan in 2011 to guide TRA toward a new way of treating biosolids. To obtain the solids management improvements laid out in the plan, TRA has undertaken a four-phased development process to heat and pressurize its wastewater solids using thermal hydrolysis and convert roughly half of the solids to biogas through anaerobic digestion.

The solids improvement plan's central goals include achieving a Class A biosolids product, minimizing the amount of biosolids produced and transported and ensuring that throughout the implementation of the thermal hydrolysis process, there is sufficient overlap for a seamless transition as well as managing and minimizing any odors. The plan also recommends that consideration be given to other beneficial reuses for the biosolids, such as composting.

"The carefully evaluated improvement plan consists of multiple projects that are each self-contained," noted Senior Engineer Sherri van der Wege, P.E.

Phase I is nearly complete. It will begin to build the backbone of the new system that will modify and expand several existing processes and facilities. Phase II continues the work started in the first phase, with construction underway slated for completion in mid-2018.

Phase III, which is being completed in two subphases, will be the implementation of thermal hydrolysis and anaerobic digestion to permanently and entirely replace the current solids management process of lime stabilization. The phase will involve three thermal hydrolysis units, three new digesters, solids storage, gas treatment and associated mechanicals and odor control. The first subphase includes site preparation and utility relocation; construction is expected to be complete in the summer of 2017. The second subphase includes the installation of the new facilities, with construction to be completed by 2020.

"There are limits to what we can do with the lime stabilized solids currently being produced," stated van der Wege. "With the new process, we evaluated a number of technologies and strategies in the master plan, and we determined that it was the best option in Phase III to replace our current solids management

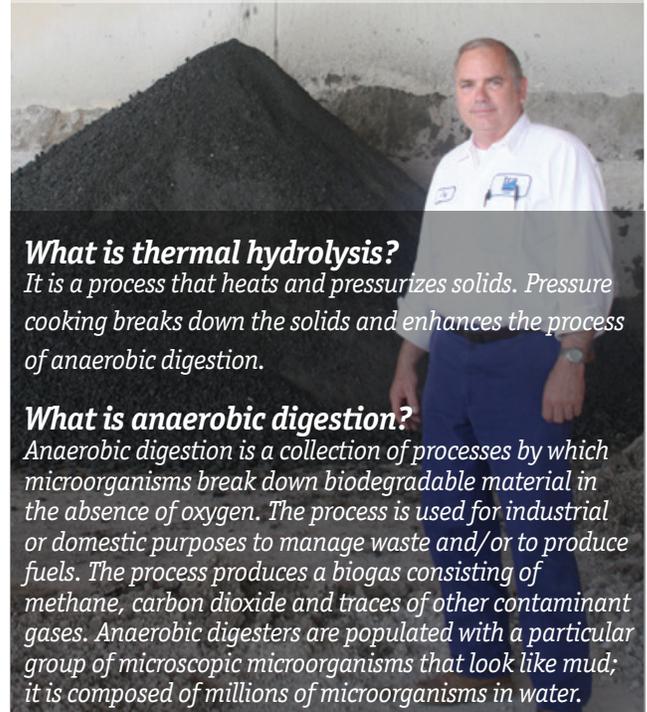
program entirely. Because the lime equipment's life span is limited, and it takes a lot of maintenance, it made sense to replace it with the new process rather than investing more resources only to replace it within a few short years."

Throughout the construction phases, TRA will continue to meet all the requirements for Class AB biosolids.

Phase IV of the solids improvements will be designed and constructed after 2020; it will include expansions and additional solids treatment capacity to meet TRA's 2040 expected wastewater flows and solids production loads.

"We've done our due diligence, and we've looked carefully at the technologies that will accomplish what we need, which is to generate a solids product that has less odor, less volume and meets and accounts for all standards and future needs. It is important that we reduce expenses, reduce the biosolids going out of the plant and use thermal hydrolysis to produce a better product," remarked van der Wege. "Moving forward with this project makes TRA a leader in the field and also a participant in a carefully thought-out process that will have a longer shelf life than the current process."

Biosolids staging area



What is thermal hydrolysis?

It is a process that heats and pressurizes solids. Pressure cooking breaks down the solids and enhances the process of anaerobic digestion.

What is anaerobic digestion?

Anaerobic digestion is a collection of processes by which microorganisms break down biodegradable material in the absence of oxygen. The process is used for industrial or domestic purposes to manage waste and/or to produce fuels. The process produces a biogas consisting of methane, carbon dioxide and traces of other contaminant gases. Anaerobic digesters are populated with a particular group of microscopic microorganisms that look like mud; it is composed of millions of microorganisms in water.

Trinity River Authority Biosolids Program *Frequently Asked Questions*

Q: *What are biosolids?*

A: Biosolids are created through the transformation of liquid and solid matter in wastewater. The transformation of what goes down the shower and sink drains, the garbage disposal and toilets in private homes, businesses and restaurants involves physical, chemical and biological processes designed to remove conventional pollutants. TRA produces a nutrient-rich biosolids product that exceeds the TCEQ regulations, production and testing and monitoring standards.

Q: *Why do we have biosolids?*

A: We have biosolids because of the wastewater treatment process. Wastewater treatment plants are our nation's first line of defense against dangerous diseases such as cholera, while also protecting the environment.

Q: *What do biosolids look like?*

A: Biosolids produced at TRA's CRWS plant look a lot like dirt, consisting of small, crumbly particles of a dry material.

Q: *Do biosolids smell?*

A: Biosolids typically produce less odor than commonly used animal fertilizers such as dairy manure. The biosolids produced at CRWS have an earthy odor. However, once properly applied to soil, any odor will usually dissipate within a few days. Biosolids also may have an ammonia odor, which can be intensified if the product gets wet from rain before it is land applied.

Q: *How are TRA's biosolids used?*

A: The biosolids produced by TRA's CRWS plant are applied to the land with specially designed spreading equipment (no dumping occurs) for local farmers as fertilizer. Agricultural uses of biosolids must meet strict quality criteria and application rates and have been shown to produce significant improvements in crop growth and yield. Land application of biosolids serves as an environmentally responsible alternative or substitute for more expensive chemical fertilizers. In addition, land application of biosolids improves soil quality and returns nutrients back to the soil in an endlessly renewable cycle that dramatically reduces our carbon footprint while reducing our need for additional landfills.

Q: *Is it safe to use biosolids on land?*

A: The biosolids produced by TRA's CRWS plant have been approved by the TCEQ for use as fertilizer. Studies show that neither contact with biosolids nor foods grown with the organic fertilizer pose a risk to human health.

The nutrients in biosolids offer several advantages over chemical fertilizers because they are organic and are released slowly.



Q: *Will it harm my water?*

A: Site management practices for biosolids (such as buffer zones and restrictions on application timing) are part of the land application best management practices that TRA adheres to in safeguarding watersheds.

Q: *What is the difference between biosolids and sludge?*

A: Biosolids are treated sewage sludge. Biosolids are carefully treated and monitored and must be used in accordance with regulatory requirements. The biosolids production method at TRA reduces the 10 EPA-regulated metals by more than 90 percent. The reduction of the metals is achieved through an aggressive regulatory pretreatment program that controls and monitors industry discharges into the wastewater system.

Q: *How long has Trinity River Authority had a biosolids program?*

A: TRA started its program in 1996.

Q: *Do biosolids contain pharmaceuticals or medical waste?*

A: Multiple studies have shown that it would take many lifetimes of working or playing around biosolids to equal a person’s everyday exposure to many common products. For instance:

- *In terms of over-the-counter pain relievers such as Tylenol, a child would have to play around biosolids for 43,298 years to receive the equivalent of one dose; an adult gardener, 77,266 years of exposure; a hiker, 454,112 years and an agricultural worker, 24,507 years.*
- *With prescription antibiotics, it would take a child 541,224 years of playing around biosolids to equal one dose; an adult gardener, 965,819 years of exposure; a hiker, 431,900 years and an agricultural worker, 23,309 years.*
- *In terms of antimicrobial agents used in antibacterial soaps, toothpaste and deodorant, a child at play would have to experience 5,478 years to equal one dose; an adult gardener, 9,775 years of exposure; a hiker, 4,008 years and an agricultural worker, 216 years.*

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY (TCEQ) BIOSOLIDS TESTING REQUIREMENTS

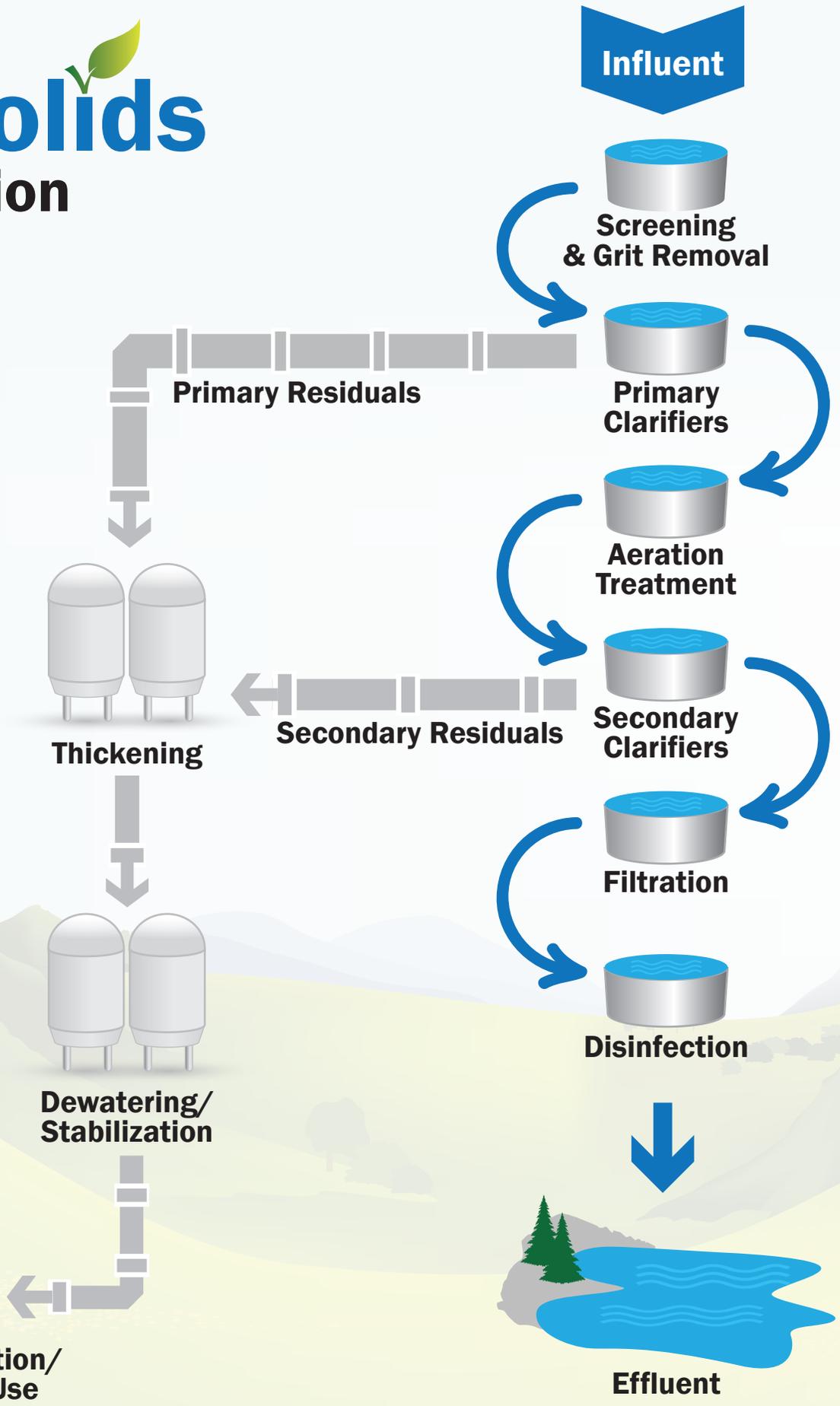
Minimum of monthly testing required for:	
✓ Vector and Attraction Reduction (pH)	TRA tests weekly
✓ Fecal Coliforms	TRA tests trimonthly
✓ Viable Helminth Ova	TRA tests bi-monthly
✓ Enteric Virus	TRA tests bi-monthly
✓ Pollutant Metals	TRA tests monthly
Minimum of annual testing required for:	
✓ Toxicology Characteristics Leaching Procedure (TCLP)	TRA tests bi-annually
✓ Polychlorinated Biphenyls (PCBs)	TRA tests bi-annually

TRA’s testing standard surpasses the minimum sampling requirements.

Source: TRA, Water Environment Federation (WEF), EPA, TCEQ

For more information or questions about TRA’s biosolids program, visit our website at www.trinityra.org or call 817-467-4343.

Biosolids production



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Enriching the Trinity Basin as a Resource for Texans



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