

Maximum Capacity Expected

Increased population in Paragould, Ark., forces city to expand wastewater treatment plant to better manage sludge disposal

By Christopher L. Komline

Does this sound familiar? Your lagoon is filling with both primary and secondary sludge, and will be at capacity within the next two years.

Paragould, Ark., a growing city of 22,500 located in northeast Arkansas, had just that problem. Due to rapid growth, the city needed to expand its wastewater treatment plant. As a part of the expansion, a better method of sludge disposal was needed or the 20 acre lagoon would soon be full.

The city of Paragould utility considered several options and initially decided upon land application of a Class B sludge. Paragould investigated the possibility of purchasing an adjoining 240 acres of land and obtaining a land application permit from the state's regulatory agency. Public opposition was so strong during this permitting process that the utility decided not to pursue this option. Therefore, they turned to sludge drying and the production of Class A Exceptional Quality biosolids.

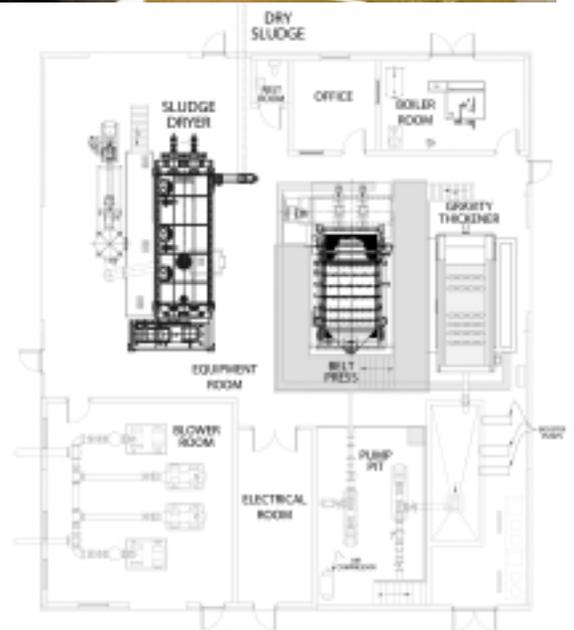
Future on tap

Building for the future and producing a Class A Exceptional Quality biosolids meant a major expansion to the wastewater treatment facility.

The existing plant consisted of two redwood trickling filters and activated sludge basins, which would eventually be replaced by three carousel oxidation ditches as new process requirements called for thickening the sludge prior to digestion.

To meet this goal, a Komline-Sanderson Gravabelt gravity belt thickener was added prior to the new aerobic digester. Following digestion, the city of Paragould added a Komline-Sanderson Kompress belt filter press and a Komline-Sanderson Biosolids Drying System. These upgrades allowed the city of Paragould to meet their future needs and give them the flexibility of producing Class A Exceptional Quality biosolids.

Even with this major plant expansion, the only new building required was a 78 ft x 68 ft structure which houses the blowers for the digester and oxidation ditches, as well as the gravity belt thickener, belt filter press, biosolids drying system,



all ancillary equipment and an office.

The purpose of the gravity belt thickener is to reduce the water content of the sludge prior to digestion thus increasing the capacity and efficiency of the digester. Approximately 400 gpm of sludge from the primary and secondary clarifiers is processed by the two meter wide Gravabelt. Retention time in the digester is approximately 30 days, after which time the solids are dewatered using the belt filter press prior to entering the dryer. Flow to the Kompress is approximately 60 gpm.

Paragould currently operates the K-S Biosolids Drying System 12 hours per day, four days per week and generates approximately 10 cu yd per week of biosolids dried to 95-99% solids. Processing to Class A Exceptional Quality biosolids gives Paragould more flexibility for beneficial reuse of the material. This is the highest quality as defined by the U.S. Environmental Protection Agency.

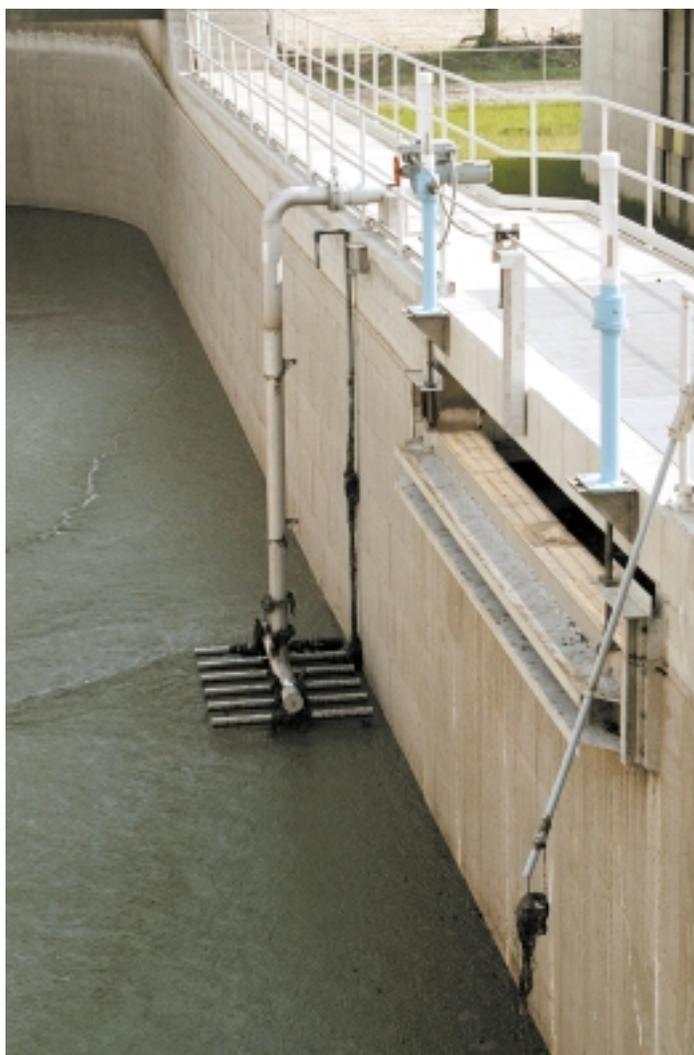
The Biosolids Drying System is based on an indirectly heated paddle dryer. Indirect dryers have a metal wall that separates the biosolids from the heat source, which is either steam or thermal fluid.

The city of Paragould incorporates a boiler that generates steam to heat the dryer. This is the first electric boiler in the U.S. to be used for the drying of municipal biosolids. An electric boiler was selected due to the city's favorable electric costs. High thermal efficiency is obtained because the heat from the steam or thermal fluid goes directly into the biosolids and not into heating air. The biosolids are heated via conduction as it comes into contact with the heated metal surfaces.

Because the dryer is insulated, very little heat is lost. Exhaust gas volume is minimal and at a low temperature. Therefore, the volume of non-condensable gas from the dryer, which requires treatment, is small.

For odor control, the city of Paragould has the off-gas compressed after the spray tower condenser and directed to coarse bubble diffusers in the oxidation ditch.

Due to rapid population growth, the city of Paragould, Ark., was forced to increase the capacity of their wastewater treatment plant.



The city of Paragould incorporates a boiler that generates steam to the heat dryer. This is the first electric boiler in the U.S. to be used for the drying of municipal biosolids.

Sticky situation

Wet cake from the belt press at 15% solids is conveyed to a 20 cu yd storage silo with a live bottom and then metered by a progressing cavity pump to the dryer. When the sludge is partially dried to approximately 40% solids it becomes very sticky.

One advantage of the dryer is the high torque design, which is able to handle this sticky phase of drying without the need for complex feed pre-conditioning.

Dried biosolids are discharged at approximately 95-99% solids and 115°C into a cooling conveyor, which cools the biosolids to less than 50°C and transports it to a waiting truck. The facility produces 10 cu yd per week of Class A Exceptional Quality product. Experience has shown that cooling the biosolids prior to storage or transport is beneficial.

This product has been sold to area farmers and a golf course located within the city limits. The sludge has a fertilizer value of 3.4% nitrogen, 3.0% phosphorus, and 0.3% potassium, and appears to be an excellent soil conditioner.

Since the system was put on line in September 2002, the only maintenance performed has been the weekly lubrication of the bearings and inspection of items such as filtration belts and stuffing boxes. Maintenance expenditures have been the cost of normal consumable items such as belts and grease with the exception of the boiler where several seals were replaced.

Producing a Class A Exceptional Quality product is not only environmentally friendly but also incurs great cost savings due to the lack of required paperwork. If the utility had been able to proceed with land application of Class B sludge there would have been much paperwork required for the disposal. With a Class A Exceptional Quality product, the city of Paragould's beneficial reuse options are more flexible.

Where landfill or land application costs are high or are not available options, producing a Class A Exceptional Quality product is the most efficient and effective solids management tool. www.watandwast.com

Christopher L. Komline is a vice president at Komline-Sanderson. He can be reached at clkomline@komline.com or by phone at 908/234-1000.