

Two Sludges – One Belt Press

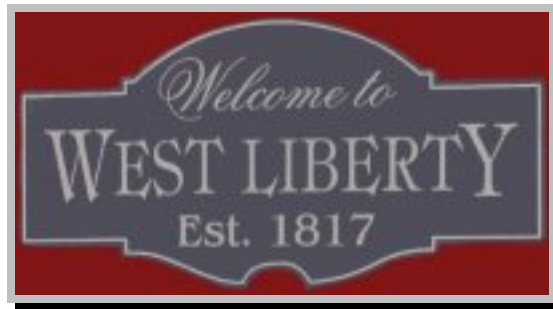
Waste Activated Sludge and Lime Sludge Handling

“We are very satisfied with the Or-Tec Belt Press & the service provided by the Or-Tec Company.”

- Bob Harrison, Superintendent of Water and Wastewater, West Liberty

WEST LIBERTY

The village of West Liberty is situated in rolling farmland about 50 miles northwest of Columbus, Ohio. The area was once called home by frontiersmen General Simon Keaton, Issac Zane and the Shawnee Indian Chiefs Blue Jacket and Blackfoot. Today the village is better known for its two 1860's era castles, a cavern and scenic countryside.



West Liberty, Ohio

OLD DEWATERING METHOD

The town's wastewater treatment plant processes on average 0.3 mgd of mainly municipal effluent per day. This flow produces 27 tons of dry solids per year for disposal that has always been dried on sand beds and land applied. So for many years the plant operators cast a weather-eye skyward and if the rain looked like holding off for a while sludge was poured on the beds and fingers were crossed. Sometimes they got it right and sometimes, inevitably, they did not. Winter months were of course the worst. In the unlikely event they managed to get the sludge dry enough to haul, the farmers on whose land the sludge was due to be spread were understandably reluctant as they did not want heavy vehicles driving on their wet fields.

In November 2000 Mr. Bob Harrison, the Superintendent of Water and Wastewater, in West Liberty visited Oak Harbor WWTP and saw an OR-TEC belt press system in operation. In March of the following year onsite trials were conducted with a full sized OR-TEC demonstration belt press at the West Liberty WWTP. Plant operators were able to spend a week or so operating the belt press to see if it would suit their needs.

Following these trials the decision was made that West Liberty would change their solids handling from sludge drying beds to mechanical dewatering using a belt press system. In December 2002 following a successful bid OR-TEC were awarded the contract.

“Our press has several improvements over the model we used in 2001. One is the automatic belt tracking system and the other is the pressed sludge output sensor system. I would recommend both to anyone buying an Or-Tec press as they provide us with “peace of mind” when we are operating the press unattended.

- Bob Harrison, Superintendent of Water and Wastewater, West Liberty

NEW DEWATERING EQUIPMENT

The system selected for the application was an OR-TEC Mk II 1500 Belt Press. The skid mounted system arrived onsite with the control panel, sludge pump, wash water pump, polymer dosing system and sludge flowmeter piped, wired and ready for operation. The entire system is constructed of stainless steel as is the OR-TEC Screw Auger. (The all stainless steel construction later proved to be a very good thing!) The system was placed in the purpose built 20' x 30' room in a steel building. The auger conveys the sludge from the discharge of the belt press 25' at a 30 degree angle to the next room ready for disposal. The sludge is discharged from the auger at a height of 10' to a purpose built concrete storage pad that is sized to hold the sludge for up to 90 days. (An additional 90 days of storage space has been added subsequently).

The system was started up early in 2003 much to the delight of the plant operators who no longer had to contend with wet weather and shoveling drying beds. Initial results of sludge cake samples for the belt press were promising and over the course of the next year averaged out as follows:

WEST LIBERTY lab test results over the first year of operation

WAS Inlet Solids Concentration (typical):	2.1%
Final Sludge Cake (typical):	17%



OR-TEC Belt Press System dewatering WAS to 17% solids

The belt press system is typically operated for 6 – 7 hours a week. The system is fully automated so during operation plant operators are free to continue with their other duties and simply check in with the belt press occasionally.

NEW DEWATERING CHALLENGE

As previously noted, Bob Harrison is the water treatment plant supervisor in addition to being the wastewater treatment plant supervisor. The water plant uses lime for settlement and typically produces 640,000 gallons of lime sludge per year at an average of 6% solids. Historically this sludge had been disposed of at a nearby farm where it was used a beneficial additive to the soil. As the farm was local to the water treatment plant, hauling costs were minimal. Additionally there were no charges for the actual disposal making it an easy and inexpensive option for handling the lime sludge.

In early 2004 however, the farmer upped stakes, sold the farm and that was the end of the lime sludge disposal program. Bob called OR-TEC to see if they could help out. Lime sludges are normally relatively easy to dewater using a belt press system and following testing at the OR-TEC lab this was found to be the case. However, there were no funds available for a new belt press system and a renting a belt press would only serve to delay the problem not solve it. At OR-TEC's suggestion Bob sent on a sample of the WWTP sludge and further tests were carried out on a mixture of the water plant's lime sludge and wastewater treatment plant's waste activated sludge. The two sludges were mixed at a ratio of 50:50 in the lab and tested for pH and dewatering properties. The mixture proved suitable for dewatering and Bob set about doing a full scale trial, dewatering the WAS sludge and lime sludge on the belt press. The WAS digester was emptied to the halfway point using the belt press. Over a three week period about 36,000 gallons of lime sludge was trucked over from the water treatment plant and dumped in to the WAS digester. The sludges were mixed using the digester's aeration system.



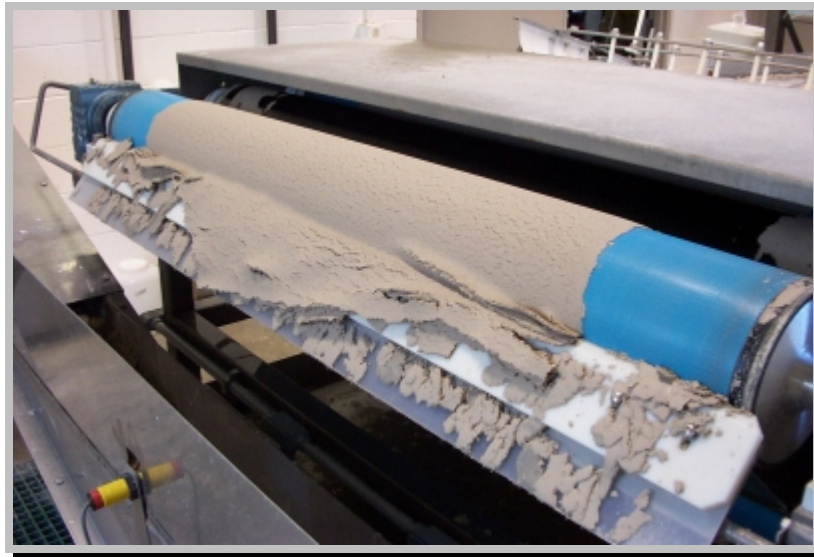
Digester at WWTP with WAS and Lime sludges at 50:50 ratio

The sludge was then dewatered using the OR-TEC belt press system. No new equipment whatsoever was required. The new sludge dewatered well and produced a cake in excess of 27% solids.

The operation has continued successfully since early 2004 and has allowed West Liberty to dispose of two sludges with one system. Results of the lab test and onsite operation are as follows:

WEST LIBERTY lab test results typical over the first eleven months of belt press operation

pH:	9 – 9.5
Inlet Solids:	3.3%
Sludge Cake:	24 - 30%
Sludge Cake pH:	10.0
Polymer Usage:	150ml/L
Polymer Type:	OR-TEC 2525
Volume Reduction:	86%



Belt Press dewatering WAS/Lime sludge mixture

Some differences were noted between operating the belt press with the WAS and with the WAS/Lime mixture. They are:

1. The WAS/Lime sludge has a narrower band for correct flocculation. More care is therefore required in polymer selection, make-down, dosage point and rate.
2. The WAS/Lime sludge while dewatering very well and producing good filtrate also produces a cake product that does not “pile” quite as well as regular WAS dewatered sludge cake.
3. The WAS being dewatered prior to the addition of the lime was a very stable sludge and produced almost no odor whatsoever in the belt press facility. Addition of the lime did change the odor with the lime now being easily detectable.
4. Lime sludge added to the WAS digester has a tendency to settle out quickly. To that end the plant operators now run the digester blowers continuously to prevent settling.

5. The WAS/Lime sludge and cake have a pH of 10 typically. If the belt press and auger were not constructed entirely of stainless steel continuous operation over an extended period with this pH would not be possible.



WAS/Lime sludge cake on concrete storage pad at pH10

“Combining the waste activated sludge with the lime sludge produces more solids for disposal but we have to dispose of both sludges anyway. Combining the lime sludge with the waste activated sludge helps us meet our “SOUR” requirement.”

- Bob Harrison, Superintendent of Water and Wastewater, West Liberty

GOING FORWARD

Going forward a number of interesting possibilities present themselves. One of these is Class A sludge. With the pH of the sludge cake now at 10 the possibility of raising it to 12.5 arises. Initial lab tests have shown positive results in terms of the quantity of dry lime required for this process. Future trials are being considered. Production of a Class A sludge with the aid of the waste from the water treatment plant would be a boon, turning a problem waste into a potentially valuable product.