



New Dewatering Device Provides Economical Flexibility

By Daniel W. Miller, P.E.

Biosolids land application costs continue to rise and the time window to land apply biosolids is shrinking with newly proposed regulations prohibit that spreading on frozen ground. As a result many communities will look to increase their biosolids disposal flexibility and options. The Village of North Baltimore, Ohio was in such a position.

The Village had “as-needed” arrangements with a private biosolids application firm to land apply their anaerobically digested liquid sludge. While their liquid solid storage tank (200,000 gallons) could provide approximately 120 days of storage, the Village still experienced difficulty managing solids between land application periods. Additionally, the Village had also experienced elevated zinc levels in their sludge which could prevent land application of the biosolids.

Jones & Henry performed a study and determined that the Village’s disposal flexibility could easily be improved by adding solids dewatering to permit landfilling of their solids in addition to land application.

The drawback to landfilling is that the costs are typically greater than liquid land application. Land filling can be competitive and even economical if the cake solids can be produced



economically, with a high solids content. Also with landfilling, the nutrients contained in biosolids are not recycled.

Traditional dewatering alternatives have been either a belt filter press or a centrifuge. New devices recently on the market include a rotary fan press, screw press and the volute dewatering press.

While new to the US market, the

volute dewatering press was developed in Japan 25 years ago and has over 850 installations worldwide. This track record and the device’s claims of high cake solids, minimal operator attention, lower energy consumption and reduced washwater usage, caught the attention of the plant’s superintendent, Andy Patterson.

The Village and Jones & Henry made a visit to a new installation

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(con't)

in Oscoda, Michigan and had a pilot study conducted at the plant by PW Tech. The pilot study was successful and the project moved ahead.

A volute dewatering press is similar to a traditional screw press; however it utilizes a unique "dewatering drum". The drum has a series of fixed and moving rings. The slow constant movement of the rings developed by the internal screw, cuts into the sludge to expose wetted surfaces and allow the passage of filtrate without clogging. As the pitch of the screw narrows and the gaps between the fixed and moving rings decrease, the sludge dewatering increases.

Volute dewatering presses are sized based on dry pounds per hour, and an 850 dry pound/hour unit was selected for North Baltimore the next to largest unit made. Based on their 107 dry tons of solids generated each year, the device would require approximately 250 hours of operation, or less than one day per week.

North Baltimore's installation also included enclosed storage for their disposal container (to minimize odors and vector attraction) as well as space for vehicle storage adjacent to the dewatering equipment.

As with most dewatering devices, a feed pump, grinder, and polymer feed equipment were installed at the new dewatering facility.

The results have been terrific.

The press typically achieves 30-35% solids utilizing 20-30 pounds of polymer per dry ton. The unit requires minimal

operator attention during operation, is very quiet, and utilizes only 20 total connected horsepower during operation including all pumps, grinder, and discharge screws.

Disposal costs including landfill disposal, power, and polymer will be approximately \$17,300 per year. This equates to approximately \$0.031 per gallon. Their current liquid land application program was costing \$0.035 per gallon.

The key is flexibility! Biosolids can now be removed from the plant at anytime, reducing concerns with land application timing limitations, and biosolids which do not comply with the biosolids regulations. Recently, the plant experienced plugging in its discharge line from the anaerobic digester. In order to unplug it, the entire contents of the digester was transferred to the storage tank. This sludge was not completely digested and could not be land applied. With the new volute dewatering press, the Village pressed the material and delivered it to the landfill at minimal cost.

The entire project's construction cost was approximately \$780,000.



Iron/Arsenic Removal Water Treatment Plant, Reading, Michigan

by Paul S. Romano, P.E. & John Bayha

Jones & Henry recently completed the design and construction administration of a new 0.25 mgd water treatment plant (WTP) designed to remove iron and arsenic from the City of Reading's drinking water supply. Jones & Henry and the City have been working together for several years to implement a treatment system to remove the metal arsenic from the City's drinking water. Throughout this process J&H has been in close contact with the Michigan Department of Environmental Quality (MDEQ) which has been functioning in an oversight capacity for the project. J&H also assisted the City in obtaining the project's funding from United States Department of Agriculture-Rural Development (USDA-RD) and Community Development Block Grant (CDBG) sources (final construction cost \$1.65 million).

Background

The City of Reading is located in western Hillsdale County. The City has a population of approximately 1,086 (2007) that has remained relatively stable in recent times. The City's water system was originally built in the early 1900's, and since that time it has been upgraded on several occasions.



Iron/Arsenic Removal Water Treatment Plant, Reading, Michigan (con't)

With the revised (2004) maximum contaminant levels (MCL) for arsenic of 10ppb (Drinking Water Standard), the City's water supply was in violation.

Funding Assistance

Given the substantial cost of a new iron/arsenic removal WTP, the City requested assistance from J&H in securing project funding through various government programs. Through the USDA-RD Program the City was able to secure a \$1.15M low interest loan as well as a grant for \$0.35M.

Due to the City's challenging economic conditions with a certain percentage of the population qualifying as low-to-moderate income (i.e. LMI), an additional \$0.50M grant was awarded from the Michigan Economic Development Corporation through the CDBG program.

Existing Water System

The existing Reading water distribution system is fed by two wells, each with a capacity of 600 gpm. The water was treated with a poly-phosphate blend to sequester the iron, and chlorine was added to control against microbial activity.

Proposed Project Alternative

Following a review of possible treatment options for the City's well water, J&H designed a central water treatment facility that would remove the arsenic from the City's water to a level below the MCL and remove iron. Included in the design was a building or "plant" to house the necessary equipment for the treatment processes and provide a secure location for laboratory testing and chemical addition.

A vertical pressure vessel filtration system was chosen for its proven record of iron/arsenic removal and its low operational costs.

Construction of the WTP

Construction of the new WTP began in early 2008, and was completed in early 2009. The building that houses the treatment equipment was constructed for the long-term with concrete masonry block walls, reinforced concrete slab floor, and a roof deck of pre-cast concrete panels. The WTP is located at the site of the City's wells and was designed to be relatively nondescript to fit with the existing conditions of the site.

The building was also sized for the future with provisions made during the construction process to allow for the installation of additional filter trains for increased capacity and future installation of high-service pumps and related

control equipment.

A laboratory/office was also included in the building as well as storage and restroom amenities.

The project also included improvements to the existing well houses including: new piping and flow meters, a variable frequency drive on one of the pumps, and new controls and monitoring equipment.

The entire site is now served by a new 280 kW diesel generator that is capable of powering the WTP and wells.

Current Situation

Recent tests of the finished water from the WTP have indicated an arsenic level that is virtually non-detectable (± 0.3 ppb), and it is anticipated that this will be reduced further following a "break-in" period for the filters after which the Plant's filtration equipment will reach an equilibrium state.

The City of Reading is now in compliance with the MDEQ requirements for arsenic and is currently undergoing the process of implementing new operational/reporting procedures for the WTP.



Congratulations

Jones & Henry would like to congratulate the following individuals and communities that received awards at recent conferences.

Ohio WEA

Dean Stewart - Frank D'Ambrosia (Archbold, Ohio)

OWEA Facility Image Award - Toledo Bay View

Quarter Century Operation - Michael Carson (Toledo)

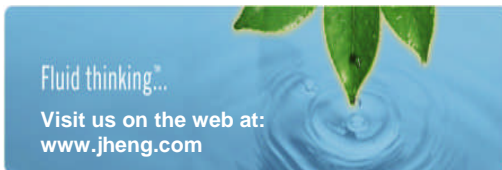
Michigan WEA

WEF Award - A.S. Bedell - Larry DeLong (Battle Creek)

WEF Award - Burke Safety - Benton Harbor-St. Joseph

MWEA Award - Health & Safety - Benton Harbor-St. Joseph (large muni)

MWEA Award - Willard F. Shephard Award - Frank Szopo (Kalamazoo)



The GREEN Building Movement...

WHAT it is...

WHEN it's important...

WHY it's critical to remember building FUNDAMENTALS.

For a slightly different perspective on Green Building, read the full article by Jeff Hersha at www.jheng.com/Featured%20Projects

J&H Obtains Training Certification

Jones & Henry has obtained certification from the Ohio EPA as an Approved Contact Hour Training Provider. As such, we can administer and provide training eligible for contact hours for Ohio operators. Jones & Henry can work with clients to establish special training opportunities for their staff, or to provide training

opportunities through workshops and vendor presentations in conjunction with ongoing projects.

Recently, Jones & Henry provided training for the Villages of Anna and Russia, Shelby County, and the City of Eaton. The training included six, two-hour sessions scheduled at the end of normal

workdays. The arrangement was economically attractive since the communities shared the cost and their staff did not have to travel long distances.

If you would be interested in arranging training sessions in your area, please contact Doug Brookhart at 419-473-9611, or dbrookhart@jheng.com.