

[CS-WW-SCS-02]

Customer: Mullins Cheese

Location: Mosinee WI

Product: Cheese and Whey products

Metrics: Influent of 80,000 gallons per day of sludge at approximately 1 dwt% solids.

Results: Achieved effluent solids of 2.8 and up to 3.5 dwt%.

Membrane type: Tubular ultra-filtration

PROJECT OVERVIEW

The customer takes in nearly 10 million pounds / day of milk at the facility. The milk is used to produce various cheese and whey products. The customer has a focus on environmental stewardship and invests heavily in equipment and processes to lessen their impact on the environment. Mullins treats all their wastewater at a membrane biological reactor (MBR) prior to discharge. The microorganism population must be actively managed in order to maintain a healthy biological system. A portion of the biosolids must be wasted out of the system each day and disposed of. To lower sludge disposal costs, the removed solids must first be thickened, which removes the excess water from the solids.

THE CHALLENGE

Mullins thickened their biological solids using a dissolved air flotation (DAF) process. This process consumed significant amounts of Polymer, generates odor and requires a great deal of operator attention. The DAF unit concentrates the solids to 1.6 dwt%, that can be hauled out in liquid form or further dewatered via a mechanical screw press. The screw press presses out remaining liquid prior to disposal. The solids are disposed at local farm fields providing beneficial nutrients. This process was inefficient due to high chemical and operating costs as well as low final thickened sludge concentrations, which led to excessive trucks needed for hauling.

THE SOLUTION

CFR proposed a membrane sludge thickening process to bypass the DAF process. With this approach the process pumps the sludge from the MBR into a crossflow membrane configuration. A high flow pump recirculates the sludge through the membrane modules. The sludge travels through the channels of the membrane and the liquid permeates through the membrane leaving behind a concentrated sludge. The concentrate can then be hauled out at a higher solids liquid or further dewatered using the existing screw press. The software provided in the membrane sludge thickener package provides maximum operator flexibility to adjust process variables and monitor the performance. The tendency to scale the membrane surface with organic and inorganic substances is greatly reduced due to the high crossflow velocity within the channels of the membrane. The high concentration of solids within the loop actually improves the membrane performance as it continuously scours the surface allowing high permeate flux rates. The membrane skid has an integrated backwash process that reverses the flow of clean permeate to keep the membrane surface clean. This reduces membrane fouling, reduces the need for CIP's, and extends membrane life. This membrane thickener process concentrates the solids from 1 dwt% up to 3 dwt%, or a 66% reduction in the volume.

"We knew we needed to take a hard look at our wastewater issues. We also knew we could be more sustainable and save money. Complete Filtration got us there at breakneck speed! Their quick assessment and practical solution will save our plant an estimated \$300,000 annually by eliminating trucking and polymer expense. This was our answer!" – Don Mullins