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Wastewater Experts

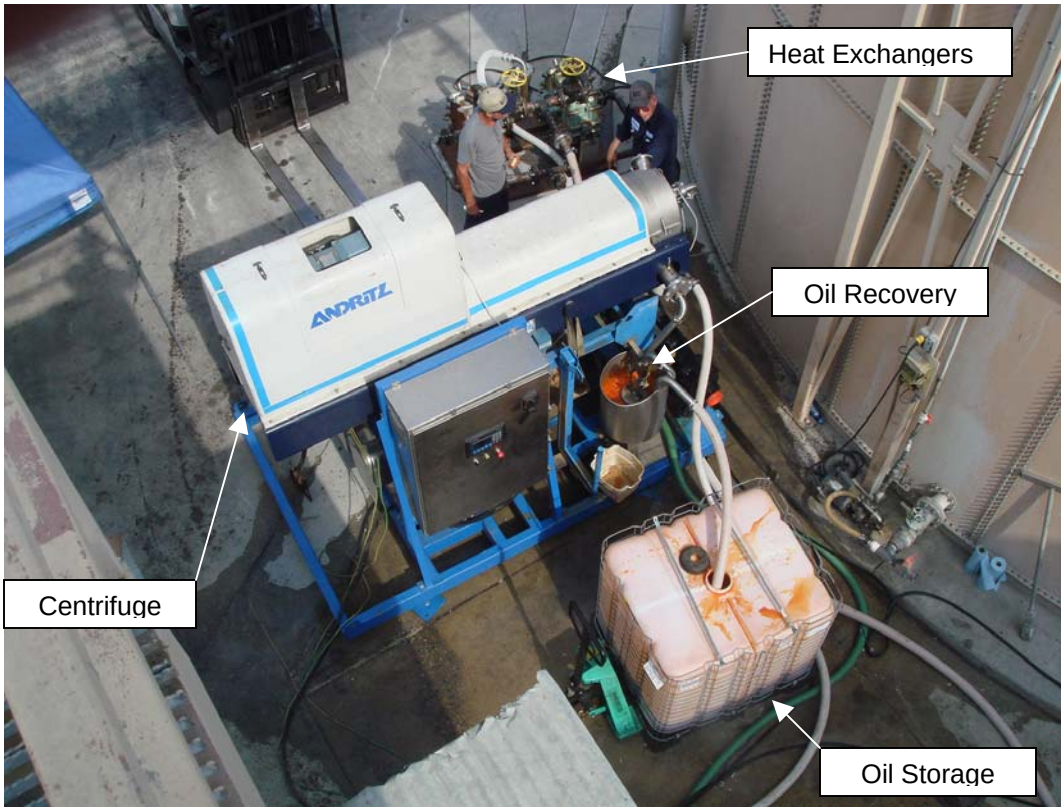
# Sludge Dewatering and Oil Recovery

This facility generates 5,000 gallons of 4-6% solids sludge from their DAF using Floccin 1105. In addition, there are 24 bins per day (about 1 cubic yard each or 250 gallons) of nonedibles defined as off spec materials, cooking oil, batter, hot dogs, and chicken parts. Currently, 13 loads are transported for disposal to offsite disposal facilities that have hauling as well as tipping fees. In an effort to reduce cost through reduced hauloff weight and volume, a sludge dewatering test was performed onsite using a Andritz D3 tricanter centrifuge. The goal of the test was to reduce the sludge volume by a 4:1 ratio.

**DAF Sludge**

The dewatering of the DAF sludge (5.1% solids) was performed at 10 gpm flow to the centrifuge with no additional polymer added. The centrate suspended solids going back to the Equalization Tank was 500 ppm, the % solids of the sludge cake was 39.3%, therefore the capture efficiency of the centrifuge by weight of solids removed was 98.5%.

| | | |
|---|---|---|
| Centrate | 8.5 gpm | 770 ppm |
| Recovered Oil | 0.5 gpm | % oil = 76% |
| Sludge Cake | 1.5 gpm | % solids = 39.3% |

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The solids generated 7 fork lift bins of sludge over an 8 hour period and was dumped into the garbage dumpster for local landfill disposal. The oil split generated 275 gallons of oil (76% purity) over the days test. The volume reduction was the difference in sludge feed at 10 gpm which was reduced to 1.5 gpm in dewatered sludge dropping from the centrifuge or an overall volume reduction of 85%. This exceeded the required 4:1 reduction or 75%.

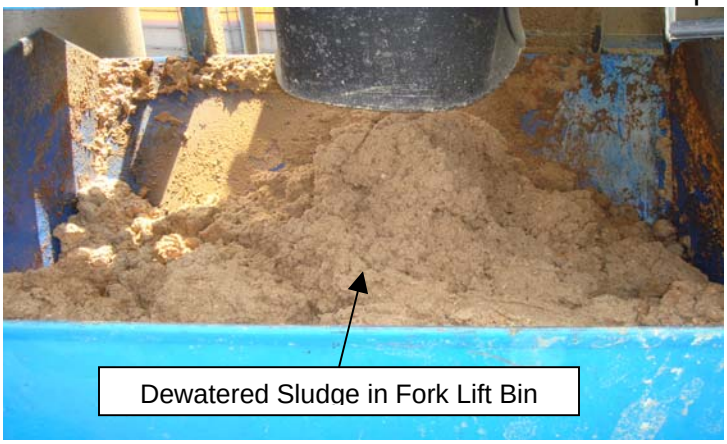
**DAF and Non-edible Sludges**

The second test was the addition of 75% ground nonedibles (with water so it could be pumped) and mixing this with 25% by volume of DAF sludge before dewatering in the centrifuge. A tank and chopper pump were installed to macerate the nonedibles before pumping over to the DAF sludge Tank. Once enough water was added, the two waste streams (nonedibles and DAF sludge) were combined and mixed for an hour. The centrifuge pump could only pump 10 gpm to the centrifuge as the combined sludge was much thicker than the DAF sludge estimated at 11% solids. The limitation for the flow was due to the pilot unit progressing cavity pump having to pull the sludge as it was plumbed to pull the sludge from the sludge tank and not pump it, therefore, the pump had a suction limitation and lost prime on occasion (suction vacuum due to piping friction loss exceeded sludge vapor pressure). This will not happen in the future operations as the existing sludge pump has a flooded suction and will be pumping the sludge to the centrifuge (pushing, not pulling).

| | | |
|---|---|---|
| Centrate | 8.5 gpm | TSS = 1,000 ppm |
| Recovered Oil | 0.1 gpm | % oil = 22% |
| Sludge Cake | 1.4 gpm | % solids = 39.8% |

No addition of polymer was needed and we were successful at maintaining a sludge flow of 10 gpm (after the addition of the water) with a resultant sludge volume reduction of 85%. There was less oil recovery as the sludge tended to retain the oil due to the increase in batter which acted as an absorbent.

I reviewed this information with the Andritz staff and was informed that the D3 unit could run at a flow of 20 gpm as long as the sludge was in the 6-10% solids range and plumbed as outlined above. The sludge generated for both days was 39% solids and the volume reduction would exceed the 4:1 required by the client.

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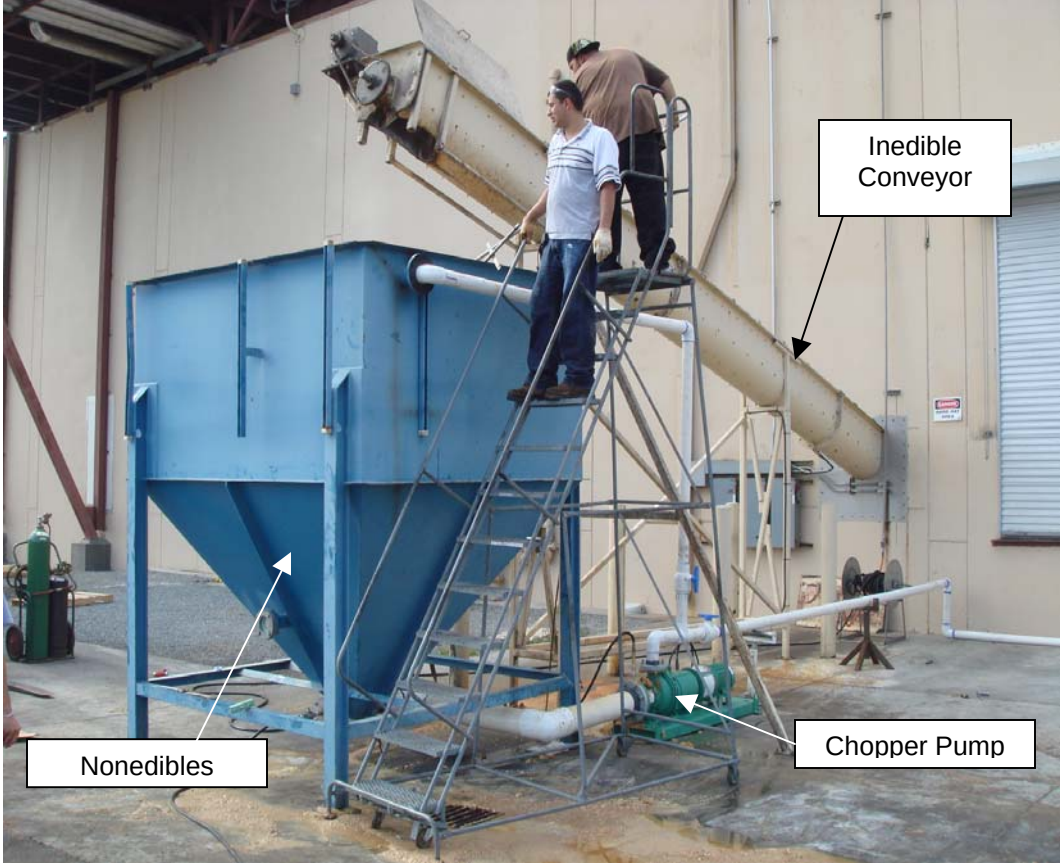


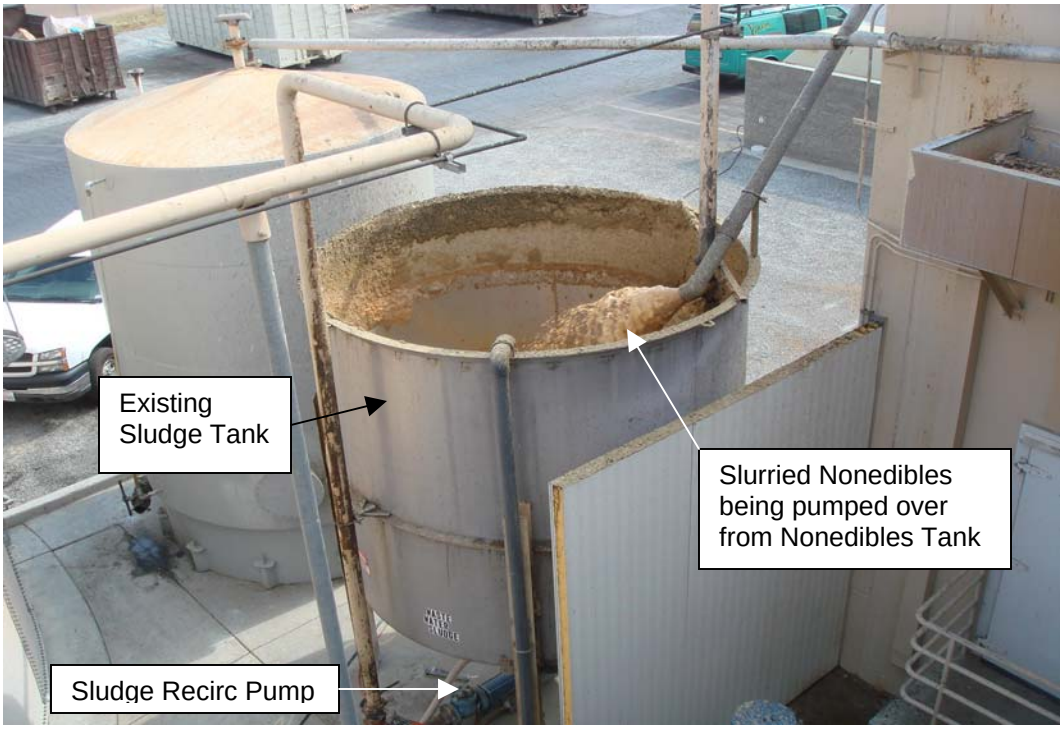


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