

WASTE MANAGEMENT

DOLPHIN SERVICES

UNLOCKING ROI AND EFFICIENCY

How a leading poultry producer optimized a complex sludge dewatering and oil recovery process

INNOVATIVE LEADER LOOKS FOR IMPROVEMENTS

EXECUTIVE SUMMARY

A large-scale national poultry producer with complex sludge dewatering and oil recovery wanted to unlock the operational and ROI potential of its centrifuge and wastewater processing system. Starting with a comprehensive audit and step-by-step recommendations, a Waste Management affiliate Dolphin Services & Chemicals, LLC applied its expertise to bring operations to full capacity, reduce downtime, amplify solids concentration and increase the yield and value of recovered oil by 4-5 times.

BACKGROUND

With a dozen plants across the U.S., this leading national poultry producer processes an extraordinary volume of poultry annually. The client is also recognized for its high quality standards and adoption of technological innovations. They were one of the first companies in this industry to work with a third party for dewatering and thermal drying.

The client's pretreatment wastewater operation started with an Equalization Tank (EQ Tank) that ran to a primary DAF (for dissolved air flotation) then to an aerobic treatment vessel, a secondary DAF and finally to the municipal treatment system.



CLIENT

Large, national poultry producer that prepares chicken products for restaurants, grocery stores and other food service clients

GOALS

Complex sludge dewatering and oil recovery improvements

SERVICES

Expertise and management to improve their centrifuge operation and complex sludge processing



THE CHALLENGE: IMPROVE EFFICIENCY AND ROI

With a horizontal decanter centrifuge installed in 2015, the client was off to a good start, but was driven to see how much of the centrifuge process they could improve. They had encountered the unexpected challenge of maintaining a highly functioning centrifuge. This was limiting the ability to achieve the full return on investment and margin expansion they had calculated.

Running at half capacity

The original centrifuge was purchased to dewater sludge and recover cooking oil. Based on the manufacturer's rated hydraulic capacity, the centrifuge should have been capable of fully processing the plant's daily volume of combined DAF sludge. However, the client could only run roughly half of the plant's total sludge without seriously degrading outputs. Remaining sludge had to be hauled off in bulk for land application at high cost with zero revenue for recovered oil.

Quality inconsistencies

The client had to maintain a specific blend of DAF 1 and DAF 2 sludge to maintain speed or output quality. Water returned to the head of the treatment plant was highly inconsistent, swinging from 1,000 Total Suspended Solids (TSS) to 6,500, causing significant challenges to wastewater treatment options. To aid separation and maintain any level of consistency, the client was forced to add a solidification agent to the process. Despite this added cost, the process was only able to produce dewatered cake in the range of 20-25% solids by weight.

Complex waste products

Adding to the complexity was the need to process *very* diverse waste products and complex sludges. The client produces hundreds of different products using numerous different recipes. This complex emulsion of ever-changing cooking ingredients creates a highly dynamic environment that requires a high degree of maintenance to maintain optimal separation.

It all boiled down to an inefficient, costly process with frequent downtime. Recovered oil was also given an "industrial grade" rating—the lowest commodity value.

CHALLENGES

- Only operating at half capacity without degrading outputs
- Remaining sludge hauled off, adding operational cost
- Inconsistent water return to the wastewater head works
- High variance in solids concentrations
- Recovered oil rated at lowest commodity value

THE SOLUTION: DEEP ANALYSIS AND GUARANTEED RESULTS

Every plant has unique requirements and effective solutions demand expertise that goes beyond equipment. WM Dolphin Services brought in its team of expert engineers, analysts and operators to assess the client's situation and goals to frame the solution.

AUDIT PROCESS STEPS:

1. Analyzed inputs and outputs: WM Dolphin Services evaluated the composition of sludge waste in the company's high variable, complex emulsion environment. We also evaluated outputs, including dryness of solids and resource recovery.

2. Found efficiencies: WM Dolphin Services fine-tuned the process to account for product variations. Every variable in the centrifuge process was manipulated to gain better results, including spin rates, feed rates, pH and elimination of the double handling of processed solids.

3. Quality assurance: An unmatched QA process ensures that the centrifuge remains running at optimal levels. Operators are trained to sample feeds for water, solids and oil outputs to test, analyze and monitor multiple variables. WM Dolphin Services now offers an always-on automated system that pulls data to a server. Daily or hourly reports can be generated on key metrics, including solid dryness, water and oil clarity, from volumes processed and polymer consumption.

4. Maintenance: Our teams also helped the client flatten maintenance costs and dramatically increased equipment uptime. We added a predictive maintenance platform with accelerated parts and repair capabilities.



WASTE MANAGEMENT PROPOSAL: QUICKLY DEMONSTRATE RESULTS

With all clients, our ultimate goal is not to simply provide recommendations, but to quickly demonstrate results. The proposal we provided was straightforward: a 90-day trial, running 5 days per week and 12 hours per day.

Goals:

- Guarantee to process *all* remaining sludge for this client
- Improve all outputs (better water, drier solids, cleaner oil)
- Improve overall consistency (tighter tolerances on outputs, less downtime)
- Eliminate use of solidification agent in centrifuge process

Waste Management customizes goals and solutions for each client's unique needs.

RESULTS: SIGNIFICANT SHORT-TERM AND LONG-TERM RESULTS

Within the first 45 days, the client was receiving dramatic results in uptime and output quality.

- Extra liquid sludge hauling was eliminated
- 45 days in, the company shut down its horizontal decanter centrifuge
- Waste Management began processing all plant sludge on a 24-hour schedule
- Average solids concentration increased to 35% by weight
- Solids concentration range narrowed from 34% to 37% by weight consistently
- Use of solidification agent eliminated
- Water quality range narrowed to 1,000 to 2,500 TSS
- Oil yield and clarity improved significantly

We also outlined steps for additional improvements:

- Developed plans for environmentally safe management of dewatering logistics to remove water without causing harm to the ecosystem and community

- Recommended additional storage to allow for sludge accumulation over weekends, eliminating weekend operations
- Implemented a dedicated solids conveyor system to cut downtime throughout the day, replacing a process that required forklifts and forced shutdowns every 30-45 minutes
- Segregated DAF 1 and DAF 2 sludge with dedicated parameters for each to reduce polymer consumption, further improve all outputs, treatment schedules and increase recovered oil yield
- Reduced schedule to 5 days a week, 20 hours a day, effectively eliminating overtime processing

OVERALL RESULTS: GOALS EXCEEDED

The client was able to exceed its efficiency and cost improvement goals across all metrics. The results were so significant that the client installed a second operation at a sister plant in 2018.

Higher profits

- 4-5 times increase in value per pound of recovered oil
- Increased recovered oil yield
- Upgraded recovered oil rating from industrial grade to premium
- Eliminated solidification agent

Lower transportation and disposal costs

- Improved solids from 20% by weight to 35%
- Nearly doubled the solids output concentration

More predictable operating conditions

- Reduced variations from 500% per day to 5-10%
- Minimized swings in residual contaminants in water, increasing predictability almost 100 times
- Reduced polymer consumption and further improved all outputs

SUMMARY: EXTRACTING VALUE FROM WASTE

Sludge management is a complex process. Each operation has its own unique challenges and specific goals. Whether you're a poultry producer, a large cattle processor or a niche pork facility, successful protein processing demands more than just a centrifuge and equipment. It takes expertise and a true understanding of a client's goals and operations to create solutions that prove their value, day in and day out.

WE KNOW PROTEIN PROCESSING

As the largest environmental solutions provider in North America, Waste Management has deep expertise in centrifuge processing built from decades of experience.

Dolphin Services & Chemicals, LLC is a passionate group of experts working tirelessly to help you get the most out of your sludge and wastewater treatment operations. We help clients in the poultry, beef and pork industries fine-tune operations to maximize value, reduce costs and increase value of output extracted. We design and operate dewatering solutions and enhance oil recovery for complex protein sludges.

We enable you to focus on what you do best: food, while we focus on what we do best, waste management.

OUR SERVICES

-  Technical Discovery
-  Process Design
-  Specification Validation
-  Detailed Process Design
-  Facility Construction
-  Equipment Operation
-  Waste Management
-  Recycling and Commodity Recovery

WM DOLPHIN SERVICES AUDIT PROCESS

- Initial site audit
- Data collection and verification
- Comprehensive briefing of findings for client consideration
- Further discovery of client's existing sludge-handling operation, including current cost assessment
- Trial proposal: When a trial is warranted, steps include: expected/desired operational improvements and cost savings; step-by-step implementation of proposed process improvements; and long-term path forward
- Long-term proposal: Build from trial learnings to outline operational improvements, cost savings, implementation steps and ROI

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