

How Food Producers can Reduce Costs and Increase Efficiency in their Wastewater Treatment System

A white paper for the packaged-food industry.

Foremost in many companies' capital-investment strategies these days is achieving fast return on investment (ROI). This especially is true in packaged foods, an industry adjusting to higher commodity prices and increased price sensitivity. At the same time, consumers are pressuring packaged-foods manufacturers to make their processes more environmentally friendly, or "green."

Producers that can meet both of these challenges will have a competitive advantage in a market that analysts expect to be under increased stress in the short term. Moody's Investors Service warned in February 2009 of a worsening outlook for U.S. food producers in the next 12 to 18 months.¹



"Most food producers have significant fixed costs; hence, a drop in sales volume is likely to hurt profitability and cash flow. In addition, the tight credit markets intensify problems for lower-rated packaged-food companies and especially for meat producers."

This white paper examines how smart food producers are investing in equipment that lowers costs while enabling the manufacture of high-quality products through efficient processes. Specifically, we will examine equipment known as oil skimmers that separate oil from other fluids (usually separating used cooking oil from wastewater for food producers). We will list the various ways companies remove used oil from wastewater and document how two Midwest packaged-food manufacturers have used continuous-tube oil skimmers to reduce costs for energy, waste treatment, waste removal, machine maintenance, and regulatory fees. They also have improved their images as green producers and found new potential revenue streams in the resale of used oil. Both report that their continuous-tube oil skimmers solutions achieved substantial ROI quickly and easily.

Smart Capital Investment

Foodprocessing.com research revealed that 97% of interviewed companies are worried about energy costs. In the prior year's survey, 90% said they were worried.² This reflects concerns within the entire manufacturing sector, which is the largest consumer of energy in the United States. Uncertainty in energy supply will continue to drive up costs.

One way companies can offset rising energy bills is by investing in equipment that makes processes more efficient, such as oil skimmers. According to the *IndustryWeek*/Manufacturing Performance Group 2007 Census of Manufacturers, more than 70% of surveyed manufacturers said they were able to improve financial performance through the application of new capital equipment.

Capital Equipment Investments and Financial Performance

How has application of new capital equipment affected plant performance (i.e., profitability)?	Major Increase	10%
	Some Increase	62%
	No Change	24%
	Some Decrease	4%
	Major Decrease	1%

Source: *IndustryWeek*/Manufacturing Performance Group 2007 Census of Manufacturers²

The key to improving financial performance through capital equipment purchases is to invest in well-made, market-tested machinery that will address problems immediately and continue to address them in the future without further investment.

The Challenge

One such problem that exists for many food producers is the presence of oil in wastewater. With the increase demand for prepared and snack foods, companies have increased their production thus putting additional strain on their wastewater treatment system. Large quantities of oil are used in the preparation of a wide variety of food products such as salad dressings, chicken or potato chips. A majority of the spent oil is drained from the cooking “pots” and recycled, but a surprising amount remains behind and is flushed out during the cleaning process. This oil becomes part of the wastewater stream and a challenge for most food producers.

The presence of vegetable oil and /or animal fats lead to greater use of treatment chemicals thus additional costs. The life of filter media and it’s efficiency is reduced. The amount of sludge requiring disposal increases, and labor costs associated with the treatment increases. Municipal surcharges may be imposed and a valuable commodity is lost. Thus it is most essential that this oil be separated and removed.

Removal Methods

Food manufacturers traditionally have used a variety of methods to remove used oil from wastewater. These include:

Displacement: Operators raise the water level in order to overflow the oil that rests on top. This method rarely separates the oil and water fully, so oil remains in the tank, and the displaced oil contains water, which lowers or eliminates its resale value.

Floating Pump: A pump sucks the oil off of the top of the water. This, too, is an inefficient method in terms of clean separation of oil and water, because a large amount of water remains in the removed oil. Also, it requires hands-on maintenance, which is time-consuming and labor-intensive. Alternative methods such as continuous-tube skimmers can safely operate independently.

Absorbent Padding: Pads made from oil-absorbing materials are cast upon the mixture in an attempt to soak up the oil. This method often is used for oil-spill incidents, but it does not make sense as an ongoing, procedural solution for a business because it is expensive and labor-intensive.

Removal Services: Third-party technicians pump out the oil and remove it from the customer’s site. This can be expensive and inefficient, as it requires someone to take time to set up a service. Also, allowing oil to build up degrades the quality of the oil and increases chances for the oil to escape.

Oil Skimmers: Equipment removes oil by cyclically introducing an oil-attracting surface into the mixed oil and water and then cleaning the oil off the surface before it is reintroduced. The oil collects in a separate repository as it is removed. The oil-adhering surface can be made from a variety of materials and be introduced using a variety of methods. Oil skimmers can use floating drums, belts, mops, discs, or tubes.

Oil skimmers achieve fast ROI because they can be a low-impact capital investment in terms of cost, space, and time. Compact skimmers sell for under \$10,000, are quickly and easily installed, and have an immediate impact.

Reselling Waste, Saving Landfill Space

Brakebush Brothers, a family-owned manufacturer of frozen, cooked chicken products that has been operating in Westfield, Wis., since 1925, recently upgraded parts of its wastewater treatment system to accommodate increased production and, in the process, installed two continuous-tube oil skimmers. The recovered oil is pumped into a 5,000-gallon tanker and is sold to Sanimax, an international company that manufactures biodiesel from used cooking oil. (The solid waste is sent to a dairy farm, where it feeds an anaerobic digester that generates electricity for the farm and for sale to other consumers.)

Another company in Ohio – a snack-food manufacturer – also sells its skimmed oil to biofuel producers, thereby keeping about 8,000 gallons of discarded oil out of landfills each month. The underground tank in which the skimmer discharges oil is pumped out once a week.

BRAKEBUSH BROS.

Brakebush Brothers’ plant runs 24 hours a day on three shifts – two for production and one for cleaning. The company uses cooking oil during battering, breading, and deep-frying processes. After processing and cleaning, an oil/wastewater mix collects at two lift stations, and then is piped to an onsite wastewater treatment facility. The wastewater passes through a dissolved air filtration (DAF) system. Sludge removed during filtration is sent through a belt press to remove even more water, and the resulting solid waste is hauled away.



At Brakebush Brothers, the skimmers have eliminated the need for additional chemicals used to specifically treat the effects of oil in wastewater and have lowered the volume of solid waste removed from wastewater.

Prior to installing the oil skimmers, large slugs of oil would form in the wastewater, reducing efficiency and clogging the belt filter press. Managers added alum and lime to treat the slugs. Today, each skimmer removes 1,392 pounds of oil daily from the wastewater stream, and the slugs don't form. The solution has worked so well that the company is adding additional skimmers, said Bucky Walters, wastewater operator.

Small Investment, Dramatic Improvement

"We would recommend that anyone experiencing oil issues consider an oil skimmer . . . For a relatively small investment, our operations have been improved dramatically."

— Wastewater manager at Ohio snack-food manufacturer

The Ohio snack-food manufacturer also reduced chemical treatment costs and improved water-treatment efficiency with a continuous-tube oil skimmer. The skimmer removes 2,000 gallons of oil a week from water discarded after it is used for processing and equipment cleaning. "The filter press performance has increased, requiring less operator time cleaning the press," said the company's wastewater treatment facilitator.

Additionally, loading on bioreactors where the water is treated has been greatly reduced, improving efficiency. Also, hauling costs for sludge removed from the water have fallen 30% because the wastewater treatment produces less sludge, and the sludge cakes that are produced have a lower moisture content.

New Sources of Energy

The biodiesel industry could become a significant market for used cooking oil in the next decade. Biodiesel is considered an "alternative fuel" and can be used in existing diesel engines without modification. An increasing number of fleet managers and industrial consumers are using it. According to the National Biodiesel Board, 700 million gallons of biodiesel were produced in the United States in 2008, up from 500,000 gallons in 1999.³ Biodiesel is also listed as a renewable fuel in the U.S. Energy Independence and Security Act of 2007, which requires the amount of renewable fuel sold to consumers to increase each year through 2012.⁴

In addition to new revenue streams, resale of waste oil positions companies as good community citizens because they are helping to keep public water systems cleaner and are keeping waste out of landfills. (Depending upon local disposal fees and surcharges, companies can also save on waste-processing impact fees.) A wealth of research shows that consumers prefer to buy products from environmentally responsible companies, and food manufacturers know they must respond. In its annual survey of food-processing companies, Foodprocessing.com found that the number of processors stating that they are "very" or "extremely" concerned about the environment went up more than 5% to 70%.⁵

Conclusion

For a variety of reasons – as documented in the previous case studies – a continuous-tube skimmer is the best selection for prepackaged food companies. Users report very low maintenance and parts-replacement costs, and the skimmers last as long as 30 years. They are also compact and can run as needed, such as during a production shift, or can run continuously. The only action an operator needs to take is to turn the machine on or off.

Additionally, they can be installed without disruption to treatment systems. They can even be customized to fit awkward spaces, as in the case of the Ohio snack-food producer, which has a four-foot diameter retention pond in an area cramped with pipes and other equipment.

Charlie Parrish, a water-treatment specialist who works with Brakebush Brothers, said he has been recommending oil skimmers to clients for 30 years and will continue to do so. Says Parrish: "As far as machinery, they are ridiculously simple and ridiculously cost effective."

Contact Oil Skimmers Inc. For more information on the Model 6V oil-recovery system, Give us a call.

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1 "Moody's Sees Food Industry's Negative Outlook Getting Worse," <http://seekingalpha.com>, Feb. 3, 2009.

2 "2009 Manufacturing Trends Survey: Economy Ahead, Proceed with Caution!" David Feder, Foodprocessing.com, www.foodprocessing.com

3 National Biodiesel Board, www.biodiesel.org

4 U.S. Environmental Protection Agency, www.epa.gov/otaq/renewablefuels/420f07062.htm

5 "2009 Manufacturing Trends Survey: Economy Ahead, Proceed with Caution!" David Feder, Foodprocessing.com, www.foodprocessing.com