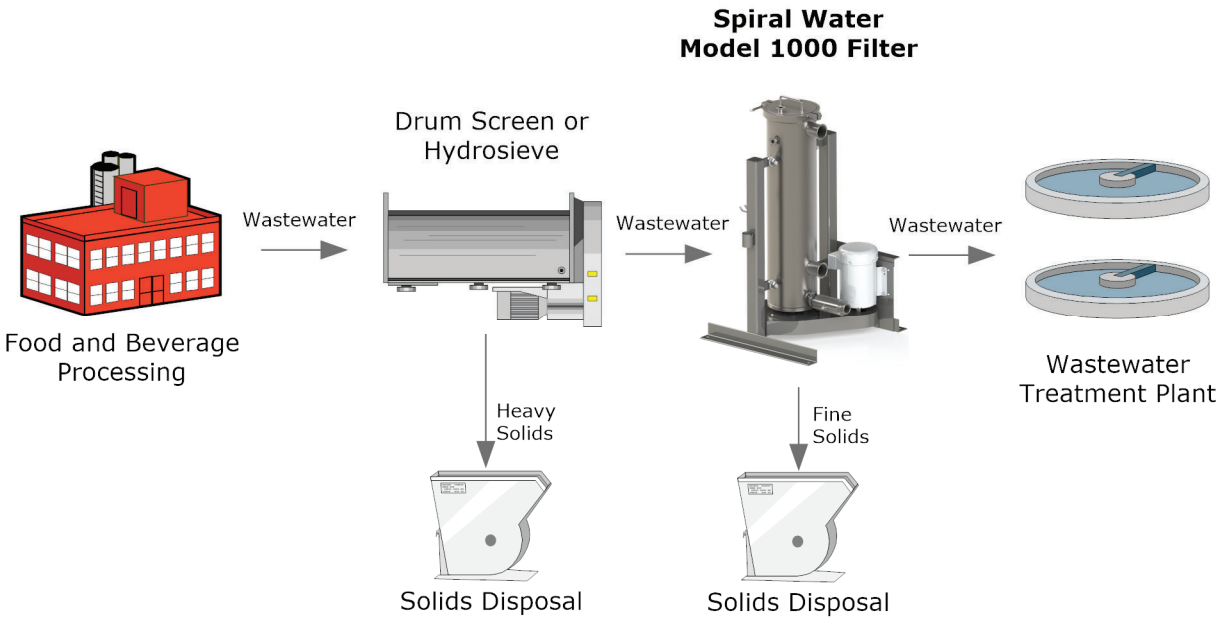
Spiral Water™
Technologies, Inc.

CASE STUDY

MARKET
Food and Beverage
APPLICATION
Wastewater Pretreatment

Pretreatment of TSS/BOD in Food and Beverage Wastewater



Wastewater generated by the Food and Beverage Industry presents special challenges to wastewater treatment plants. The high levels of Total Suspended Solids (TSS), Biological Oxygen Demand (BOD) and Fats, Oils and Grease (FOG) are costly to treat. Publicly owned treatment works (POTWs) are well suited to receive wastewater streams with TSS and BOD values less than 300 mg/L, whereas Food and Beverage Wastewater streams can have values in the thousands. Municipal treatment plants often pass the cost of treatment back to their industrial customers. These customers are categorized as "Significant Industrial Users" and the additional fees are called "Strength Charges." Pretreatment to remove TSS and BOD can reduce overall treatment costs to the Food Processing Plant, while also reducing conventional pollutant levels in municipal sewer systems and in the environment. Additionally there is an economic benefit to local communities which can grow without the costly increase of capacity to their Publicly Owned Treatment Works.

The ability to perform pretreatment at Food Processing Plants has been limited due to the difficulty of reducing TSS and BOD in a small footprint and at a low cost. Existing wastewater pretreatment systems are often undersized from the beginning or quickly outgrown. Though automatic filter technologies have been around for many decades, they have not been able to handle applications with high TSS loading nor FOG. Recent advances in automatic self-cleaning filters promise to overcome these challenges. Spiral

Water Technologies, a California company specializing in difficult-to-treat waters, has developed the next generation of automatic, self-cleaning filters. The Spiral Water Model 1000 Automatic Filter consists of a metal filter screen and a patented, spiral-shaped wiper which continuously cleans the screen without a backflush, crossflow or downtime. Whereas other automatic filters, are cleaned once every few minutes, the Spiral Water filter is cleaned over 500 times per minute. Solids are collected at the bottom of the housing, away from the filter, while filtered water flows continuously through the outlet. An automatic purge valve opens and ejects the concentrated solids with a minimal amount of water loss. The Spiral Water Filter works purely on the principles of mechanical screen filtration. It reduces TSS and BOD with absolutely no chemicals or other pollutants added to the wastewater stream. Collected solids are concentrated to the level of a sludge and can be further dewatered using a low-cost dewatering sack or screen-lined container. The remaining solids can be disposed of with other solid waste from the Food Processing Plant as fertilizer or landfill.

Del Rey Packing Company Prior to Spiral Water Installation

Shaker Table with 3/16 inch mesh

Drum Screen with 250µ mesh

Spiral Water's filter technology has been operating at a food processor in central California since August 2016. The company, Del Rey Packing Co, manufactures and packages high quality raisins to be distributed throughout the world. Del Rey is an established family owned business that's been handed down through three generations over 80 years. President and CEO, Gerald Chooljian, takes great pride in both his product and his contribution to the local economy. He's continually upgrading his technology both on the processing side and on his wastewater side. When the local wastewater district came to him with a problem, he was ready to help. The dehydration and packaging of raisins creates a continuous wastewater stream that can't be reused. The discharge from Del Rey Packing Co. contained TSS and BOD in the thousands. The Community Services District expected many more food-processing plants to open in the future. So the District built an industrial wastewater treatment plant in 2007 to accommodate the growing food processing industry in California's Central Valley. Del Rey Packing was the first rate payer to be connected to the plant, and as it turns out, is still the only rate payer discharging to the plant. Though this is a financial burden on Del Rey Packing Co., it provides a unique situation to study the effects of wastewater discharge on the operation of an industrial treatment plant.

The plant operators came to Chooljian with a request to lower TSS and BOD in his wastewater. Chooljian tried everything from filter screens to a Reverse Osmosis system. He was able to make marginal improvements by implementing a food processing shaker bed with a 5 mm mesh to remove the coarse solids, followed by a rotary drum screen with a 250 micron mesh to remove finer solids. But the drum

screen didn't provide the reductions in TSS he was looking for. Beyond that, traditional automatic filters plugged up and MF/UF/RO systems were orders of magnitude too expensive to operate.

Spiral Water Model 1000 Running Del Rey Packing Company

Spiral Water Model 1000 Filter System

Concentrated Solids from Spiral Water Filter

Spiral Water Technologies assessed the situation in Del Rey in the summer of 2016 and installed a Spiral Water Filter System with a 25 micron filter following the drum screen. At this level, TSS and BOD reductions are possible at a fraction of the cost of more expensive membrane technologies. Its ability to handle high solids loading even in the presence of fats, oils and grease, make the Spiral Water Filter a perfect fit for the food and beverage industry. Commissioning of the filter system took less than a day and didn't require anything other than a simple sump pump to operate. Del Rey Packing continues to be the only discharger to the industrial wastewater treatment plant. In the first month of Spiral Water operation at Del Rey, the Industrial Treatment Plant measured average influent TSS levels drop by 61% and BOD by 48% from the previous 5 months of operation.

	Before Spiral Water	After Spiral Water	Reduction
TSS (mg/l)	2,515	985	61%
BOD (mg/l)	16,900	8,750	48%

TSS/BOD Reductions from Pretreatment with Spiral Water Filter

Wastewater is generated in all areas of food processing. A few examples are dehydrating, washing, peeling, blanching, sorting and sanitizing. The reuse and recycling of wastewater onsite is the ultimate answer to the problems of food processing wastewater. Spiral Water encourages its customers to reuse

and recycle wastewater whenever possible. In the past, high levels of suspended solids in most food processing streams have made this uneconomical. Technologies like the Spiral Water Filter will help to make this a possibility. But when water must be discharged, Spiral Water's fine filtration provides a solution for TSS and BOD reduction that helps food processors reduce wastewater surcharges. Food processing companies can now capture, dewater and dry their waste on-site. This technology demonstrated real and effective TSS and BOD reductions are possible through the use of fine filtration. Key to that is the ability to filter high levels of suspended solids, even in the presence of fats, oils and grease. With increasing water usage in the food and beverage industries advanced water filtration will continue to be a source of innovation.

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