Gelita USA

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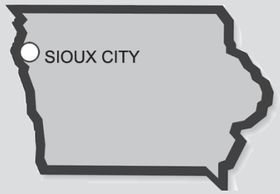


GELITA USA, Inc. of Sioux City manufactures gelatine from pork skins and bone chips. Gelatine is used in a variety of applications, including food, photographic paper, and pharmaceutical capsules. The GELITA Group produces nearly 28 percent of the world market of gelatine with nearly 75,000 tons. The Sioux City plant is the largest, single-site gelatine factory in the world and has about 270 employees. The GELITA Group has plants in North America, South America, Europe, Australia, Asia and Africa. Along with Sioux City, GELITA North America has two additional sites.

Project Background

GELITA formerly discharged treated wastewater to the Missouri River. However, due to increased production and stricter discharge limits, they are currently discharging to the Sioux City Wastewater Treatment Plant. GELITA would like to make improvements to be able to once again discharge to the Missouri River. The onsite water treatment lagoons have the potential, with a few improvements, to help GELITA reach their goal.

Incentives to Change

The gelatin process creates a large amount of wastewater. Water treatment costs are rising substantially. GELITA has several opportunities to minimize wastewater costs while preventing pollution. This can be accomplished in several ways including:

- Reducing the quantity of wastewater
- Improving the quality of wastewater before treatment, for example removing solids through product recovery
- Improving the operation of the wastewater treatment system
- Minimizing electrical use during wastewater treatment

Results

Surface Aerator Reduction

The aeration basin is the first in a series of wastewater treatment lagoons on site. The current aeration system in the basin was not operating properly, so an efficiency study was performed to determine the current effectiveness. It was determined that the surface aerators provided very little aeration to the basin. Because of these results, 5 of the 9 surface aerators were shut off. The 5 aerators combined have 125 HP of motor capacity, resulting in an energy reduction of 815,775 kWh per year.

Lagoon System Improvements

The lagoon system is used to treat the wastewater produced within the plant. A series of tests were done on the lagoon system, including the Dissolved Oxygen Uptake Rate (DOUR), a tank test, and an aerator fouling test. These tests determined the current treatability of this wastewater, along with the potential to replace the current coarse bubble aerators with fine bubble technology. After these tests, and an analysis performed by a wastewater consultant, it was determined that the current system could be modified to increase treatability and reduce energy use. The new system would eliminate the current surface aerators and supplement the current blowers with wind-powered pond mills. The new system could increase water quality making it acceptable for discharge to the Missouri River. The system would also decrease electrical usage in the lagoons by 1,957,860 kWh per year. The payback period for this project is 3.1 years.

Calcium Chloride Recovery

A significant amount of chlorides are wasted to the lagoons as a result of the bone gelatin process. If the chlorides were to be removed from the waste stream, the loading to the lagoons would be reduced, resulting in increased wastewater treatability. With the removal of chlorides, the potential to discharge wastewater to the Missouri River is improved. The chlorides could be recovered as calcium chloride, and sold as a by-product. Through the calcium chloride recovery process, proteins and suspended solids would also be recovered from the waste stream. After a 4.9 year payback period, the product value would be $2,973,000 per year after the operating costs are deducted. The project would save $538,500 per year in wastewater treatment costs. More research is needed on this project.

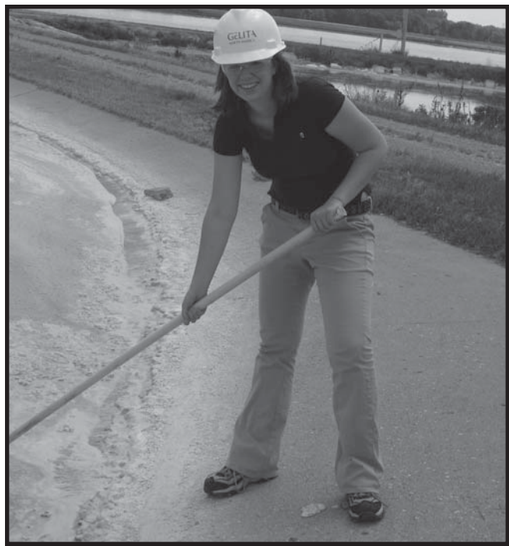
Project	Annual Cost Savings	Environmental Results	Status
SURFACE AERATOR REDUCTION	$28,552	815,775 kWh	Implemented
LAGOON SYSTEM IMPROVEMENTS	$607,000	1,957,860 kWh	Recommended
CALCIUM CHLORIDE RECOVERY	$538,500	22,840 tons product recovery	More research needed

Air Pollutants Diverted in Tons

	Total for all sectors
SO2	37.9
CO	3.9
NOX	18.0
VOC	0.63
LEAD	0.0
PM	0.91

Green House Gases Diverted in Tons (CO2 Equivalent)

	Total for all sectors
CO2	7,066.0
CH4	233.0
N2O	77.0
CFCS	86.0



GKN Armstrong Wheels, Inc.

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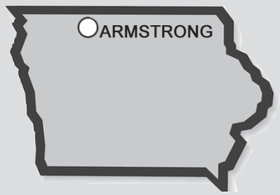

GKN Armstrong Wheels, Inc., a division of GKN Off Highway Systems, manufactures wheels for the North American agricultural and construction markets. Single piece drop center wheels are produced in the Armstrong plant. Multi-piece wheels and larger single piece drop center wheels are produced in the Estherville, Iowa, plant. Similar facilities operated by GKN are located in Denmark, Italy and the UK. Parent company GKN Plc. is committed to providing excellent products for the automotive, aerospace, and off highway industries.

Project Background

GKN Armstrong Wheels is ISO 9000 and 14001 certified and committed to preventing pollution and preserving resources. GKN Armstrong Wheels is expanding this commitment by lessening negative environmental impacts through investigating such things as oil use and air emissions. The company even has a prairie restoration project under implementation not only to beautify property but to also lower the amount of energy and water needed to maintain a large lawn.

Incentives to Change

Under GKN Armstrong Wheels' own commitment to reduce waste and preserve resources, several key areas have been identified where improvements are possible. Some opportunities are:

- Hydraulic system leaks
- Reclamation and reuse of oil waste
- Winter heating demand reduction
- Maximization of metal working fluid life

Many improvements can be realized with only basic changes to GKN Armstrong Wheels' process and waste handling arrangements.

Results

Hydraulic System Leaks

Fluid power systems drive much of GKN Armstrong Wheels' manufacturing process. Over time, these systems wear and begin to leak. Leaking hydraulic oil is expensive to clean up, dispose of and replace. As a result the company has been working to improve its preventative maintenance strategy in order to better control, repair and prevent leaks.

Waste Oil Reclamation

GKN Armstrong Wheels is concerned about the final destination of its waste oil. Oily waste was used as a fuel by an outside company. This was a positive use of a waste product but GKN was looking for an even better use of this material. The answer to this was oil reclamation. Spent oil can be reclaimed and reused at less than half the cost of disposing old oil and buying new oil to replace it.

Metal Working Fluid Life

In order to produce high quality steel wheels, GKN Armstrong Wheels must apply metal working fluids to its products to protect them during production. This fluid can become dirty and contaminated with tramp oil and eventually must be replaced before the lubricating and cooling properties of the fluid have been fully exhausted. The answer to this problem was skimming tramp oil off of the metal working fluid's surface and filtering out dirt and debris. This will also have the added benefit of lowering the frequency of washer fluid change outs and improving the air quality in the facilities.

Winter Heating Reduction

Being located in northwest Iowa can make heating an entire factory an energy intensive undertaking. Two ways of lowering the amount of energy needed to heat the facilities were investigated. One was the use of large ceiling mounted fans to break up the natural layering of hot and cold air, thereby bringing the warm air down to the workers on the floor. The second was a method of recycling warm waste air back into the building. Instead of discharging warm and dusty air captured in welder hoods to the outside, electrostatic precipitators could be used to clean this air and recycle it back into the building. This would have the added benefit of improving the air quality inside the plant, and eliminating an air emission point.

Air Pollutants Diverted in Tons

	Total for all sectors
SO2	0.11
CO	0.20
NOX	0.12
VOC	0.25
LEAD	0.0
PM	0.01

Green House Gases Diverted in Tons (CO2 Equivalent)

	Total for all sectors
CO2	340.0
CH4	64.0
N2O	26.0
CFCS	0.50

Project	Annual Cost Savings	Environmental Results	Status
HYDRAULIC OIL LEAK REDUCTION	$24,400	5,600 gallons of oil reduced	In Progress
WASTE OIL CAPTURE	$35,000	17,500 gallons of hydraulic oil reduced	Recommended
OIL ABSORBENT MATERIAL REDUCTION	$3,500	140 gallons reduced in absorbent material incineration	Implemented
WASTE OIL RECLAMATION	$9,600	4,800 gallons of oil reduced	In Progress
SOLUBLE OIL LIFE EXTENSION	$6,800	3,600 gallons reduced in waste metal working fluid	Recommended
HEATING DEMAND REDUCTION	$52,000	6 million CFM natural gas	Needs Further Research