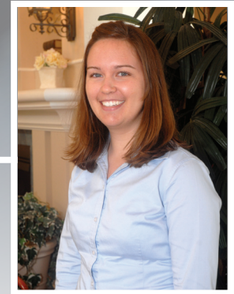
INFASTECH™

AMBER JOHNSON
CHEMICAL ENGINEERING, UNIVERSITY OF IOWA



COMPANY BACKGROUND

DECORAH

Infastech™ Decorah Operations is in its 41st year of operation. The 40-acre campus houses a manufacturing facility capable of producing a wide range of products for the commercial, industrial, distribution, construction and automotive industries. Capabilities include heading, threading, shaving, grinding, heat treating, painting, stripping, passivating and class 100 clean room cleaning and packaging. In the next year, a plating system will begin production, allowing Infastech™ Decorah Operations to produce zinc plated products for the first time in its history.

PROJECT BACKGROUND

Reducing water dependency with closed-loop processes and minimizing or eliminating flow were Infastech's™ goals for this year's Pollution Prevention intern. Several wash areas were considered, as well as cooling water for two of the facility's heat treat furnaces. In addition to water conservation, smaller energy-saving projects were evaluated, including compressed air and electropolish electricity use.

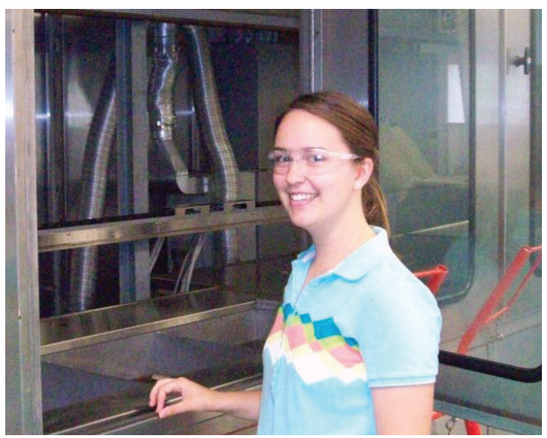
INCENTIVES TO CHANGE

Infastech™ Decorah Operations is an ISO 14001:2004 certified facility and the company maintains its certification through continuous improvement and pollution prevention. Water conservation has become increasingly important due to the implementation of new processes that consume large amounts of water. Water use and discharge regulations will only become more stringent, leading companies to decrease water consumption through process improvements. Reducing consumption has shown to result in cost savings, further proving that sustainability is necessary for growth.

RESULTS

Passivate Rinse Water Use: The current passivate system utilizes four rinse stations consisting of two soft water rinses and a two-stage deionized (DI) water rinse. The rinse water flows during all shifts, using 540,000 gallons annually. Water use could be reduced to one-third of the current usage by implementing reactive rinsing. Using DI water in a four-stage counterflow cascade would eliminate the two soft water rinses and save $10,800 annually. Using the neutralizer rinse as the acid rinse would provide the additional benefit of reactive rinsing, or initializing neutralization before reaching the neutralizer tank. With reactive rinsing, an additional $184 each year in extended neutralizer life could be realized.

Neutralizer Substitution: The neutralizer for nitric acid currently used in the passivate line acid is an expensive detergent meant for ultrasonic cleaning. Since the process no longer utilizes ultrasonics, alternative chemicals were investigated, taking cost, water use, disposal and annual usage into account. The two products analyzed will save more than $1,260 annually if used at 1 percent to 3 percent concentration. Testing was performed to ensure the new products maintained product quality. Testing is currently underway to determine if the new chemicals will negatively affect wastewater treatment. Implementation will show if the chemicals have a longer lifetime, which would save both water and chemical costs.



Heat Treat Bearings: As parts are carried through the heat treat furnaces on a belt, the bearings that support the belt need cooling. Currently, a total of 18 gallons per minute are used to cool these bearings and the belt itself. Heat treat operates 24 hours a day, seven days a week, consuming 9,072,000 gallons of water annually with an associated cost of more than $27,000 in water and sewer fees. Eliminating this water stream by converting the water-cooled bearings to air-cooled bearings is both environmentally and economically sound.

Blackstone Water Recycle: Ultrasonic cleaning in the Blackstone unit requires 8 gallons per minute of water for rinsing. Removing the contaminants from the rinse water and reusing it would decrease fresh DI water demand. For a 40-hour work week, the annual savings would be $21,838 and 864,000 gallons of water.

Electropolish Air Use: After parts have completed the electropolish cycle, they are rinsed in soft water that is agitated with compressed air spargers. Although the electropolish units are not utilized at all times, the compressed air is wide open 24 hours a day. A solenoid and a timer could be installed to ensure the air flows only when the electropolish unit is turned on. The timer would turn off the compressed air flow 30 minutes after the electropolish unit is turned off. Savings of 15,225 kWh and $762 would be realized each year by installing solenoids on the seven electropolish units.

Electropolish Maintenance: A material analysis was performed using an infrared camera to identify hot spots. Hot spots indicate difficulty carrying electrical current. By making changes to a material to improve conductivity, less power is required to send an electrical current through that material. Although no material changes were identified, a thorough cleaning would reduce the energy use by 20 percent. Including this cleaning in the maintenance procedure would save $24 and 396 kWh of electricity annually, while improving the function of the electropolish units.

CONVENTIONAL AIR POLLUTANTS AND GREEN HOUSE GASES DIVERTED IN STANDARD TONS

Total for all sectors					
CO_2	SO_2	CH_4	N_20	CFC	PM-10
53.38	0.97	328.13	171.60	0.59	0.01

PROJECT	ANNUAL COST SAVINGS	ENVIRONMENTAL RESULTS	STATUS
PASSIVATE RINSE WATER REUSE	$10,984	360,000 GALLONS WATER	RECOMMENDED
NEUTRALIZER SUBSTITUTION	$1,260+	UNKNOWN	IN TESTING
HEAT TREAT BEARINGS RETROFIT	$27,216	9,072,000 GALLONS WATER	RECOMMENDED
BLACKSTONE WATER RECYCLE*	$21,838	864,000 GALLONS WATER	RECOMMENDED
RESTRICT ELECTROPOLISH AIR USE	$762	15,225 KWH	RECOMMENDED
ELECTROPOLISH MAINTENANCE	$24	396 KWH	RECOMMENDED

*Savings and results based on 40 hours of use each week.