BRIDGESTONE AMERICAS TIRE OPERATIONS

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COMPANY PROFILE
Bridgestone is a premier tire manufacturer with business presence in more than 150 countries worldwide. Since the company's inception in 1931, Bridgestone has grown to become the world's largest tire and rubber manufacturer. In addition to tire production, Bridgestone also contributes diversified products to the market such as conveyor belts, hydraulic hoses, automotive components, and many more rubber based products. The Des Moines facility is a component of the agricultural division within the company and produces tires for industrialized agriculture. Currently, the Des Moines plant operates on three 8-hour shifts, making up a 24 hours a day, 5 days a week production schedule.

PROJECT BACKGROUND
The tire production process utilizes massive amounts of steam and water to meet heating, cooling, and energy needs. Throughout the plant, process issues and equipment degradation over time have caused inefficiencies, resulting in excessive consumption of these utilities. As a company, Bridgestone is currently pursuing a goal of cutting water usage by 35 percent per unit of production between 2005 and 2020. Although steps have been taken to significantly reduce water usage at the plant, opportunities exist for further reductions in water use, associated costs, and emissions.

INCENTIVES TO CHANGE
As a company, Bridgestone represents dedication to the environment in their mission statement by expressing the desire "to help ensure a healthy environment for current and future generations." Implementing more efficient systems for water utilization will aid the company in achieving its sustainability goals. Bridgestone is also moving towards using sustainable materials in production to reduce waste and emissions. Limiting water usage within the plant will reduce utility use, waste emissions, and ultimately reduce company expenses. Economic savings within the plant will free up funds for further production improvements.

RESULTS
Steam Reduction to Contact Heaters: The tire production process is heavily dependent on steam in order to heat and vulcanize tires into their final form. Of the equipment throughout the plant, the contact heaters are the largest steam consumers. Approximately 60 percent of the plant's overall steam production is sent to the contact heaters in order to heat water for use in the production process. Steam is directly injected into the heaters where it is mixed with feed water and return water from the tire curing lines. The current mixing process overflows the heaters and water is heated to a higher temperature than required for production use. Reducing the steam and feedwater flow rates would allow for appropriate heating and volume levels to be reached, while saving large amounts of steam. This steam reduction would save a significant amount of water, natural gas, and water treatment resources.

PROJECT	ANNUAL COST SAVINGS	ENVIRONMENTAL RESULTS	STATUS
STEAM REDUCTION TO CONTACT HEATERS	$275,192	4% annual water 5% annual natural gas	RECOMMENDED
CURING PIPE INSULATION	$61,535	1% annual water 1% annual natural gas	IN PROGRESS

To reduce the amount of steam required by the contact heaters, four options were explored and analyzed. The option that was selected best controls the level and reduces the amount of time the vessel is above operating level.

Curing Pipe Insulation: A series of pipes carrying water and steam at high temperatures traverse the curing basements on the south side of the plant. The piping carries the steam, curing supply and return water, and the fill water for the contact heaters. As the fluids flow through the pipes, the heat is trying to escape to the ambient air and reach an equilibrium temperature. The temperature differential between ambient and fluid temperatures is significant, creating potential for large amounts of heat loss in areas where the insulation has become damaged or missing over time. Replacing this insulation on the curing pipes will significantly reduce energy loss.