

# Project Overview



## Industrial Placement

**Intern:** Lauren Tietgen

**Major:** Industrial Engineering

**School:** University of Nebraska Lincoln

**Company:** Nucor Nebraska is a bar mill located in Norfolk, Nebraska. Norfolk's location was Nucor's second built minimill, opening in August 1972. The bar mill produces angles, channels, flats and rounds, of merchant bar quality and special bar quality and the steel is made almost exclusively from scrap metal. These products have a wide range of usage including automotive, construction, farm equipment, metal buildings, furniture, and recreational equipment. Because most of the angles and rounds produced are utilized by Nucor's Vulcraft divisions, including one in Norfolk.

**Projects and Pollution Prevention Benefits:** Nucor Nebraska and the Partners in Pollution Prevention (P3) program set up a partnership over the summer of 2007 to provide technical assistance in the form of an on-site intern for the mill. This intern focused on pollution prevention at the facility, both in the form of solid waste reduction and recycling and in energy efficiency.

First, Nucor typically purchases over 8,000 plastic water bottles/month to keep teammates hydrated. This creates a significant amount of solid waste in the form of empty plastic bottles. The P3 intern implemented a plastic and aluminum recycling program throughout the mill to encourage recycling. This program was implemented at virtually no cost to the company because of donations from Norfolk Recycling. The program is maintained by recycling volunteers throughout the mill.

The second focus was on energy consumption in Nucor's meltshop, where scrap metal is formed into billets. Nucor is the top energy user in the state of Nebraska, so the P3 intern researched opportunities to save energy. Areas of interest included the ladle wall and caster torches. The ladle wall uses a significant amount of natural gas to maintain the heat of the ladle when it is not in use in the production line. The P3 intern presented opportunities in utilizing the ladle's residual heat and minimizing the low level natural gas flowrate. These opportunities can save Nucor over \$100,000 each year in natural gas, with no initial investment. In addition, new technology was investigated to more accurately measure the temperature of the ladle and maintain the heat of the ladle using less energy. Caster torches are fired on at all times, with a low fire when it is not cutting and a ramp up to high fire to cut billets. The P3 intern investigated manually changing the valve settings at the torches as well as increasing the torch speed by one inch per minute at the caster. Each of these opportunities provides instant savings at no initial cost to Nucor.

Lastly, there are areas at the mill that have lights turned on even though they are unoccupied. The P3 intern presented two solutions for the areas. First, in areas where there is HID lighting that requires a significant re-strike time, fluorescent lighting should be added so that HID lighting can be turned off, and fluorescent lighting can be used for short periods of time. In community areas where no one person is responsible for turning off lights, occupancy sensors should be investigated.