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Company Background

Midwest Renewable Energy is a company that operates and maintains a dry-mill ethanol plant located in Sutherland, Nebraska. The production of fuel grade denatured ethanol is accomplished through fermentation of corn starches and subsequent distillation to yield a higher proof ethanol and increase the purity of the product. This facility produces approximately 24,000,000 gallons of denatured ethanol annually while also generating an assortment of byproducts such as wet distillers' grains and solubles (WDGS), corn syrup and corn oil. The ethanol is mixed with gasoline and other motor fuels. The WDGS is sold as a feed replacement to feed lots, the corn syrup is used as a feed additive to make the feed more nutritious, and the corn oil is used for common use in kitchens. The MRE facility has also undergone establishing a pilot plant prioritizing the development of grain neutral spirits (GNS) as another product to be sold for commercial use.

Project Description

Midwest Renewable Energy aims to become a more reliable and sustainable company with regards to their pollution prevention and energy efficient tactics. Over the course of the summer, four different projects were explored to help bring this sustainability vision to reality. These projects included the following: optimization of the evaporator, determining which yeast would provide the highest yield, the boiler economizer, and the beer feed preheat process. These projects were chosen with the intention of reducing CO_2 emissions and production costs for denatured ethanol.

Pollution Prevention Benefits

Throughout the course of the summer project, a series of data collection and analysis resulted in multiple recommendations for pollution prevention opportunities. These opportunities are listed out in Table 1-1 below as well as the benefits that would result from proper implementation.

Table 1-1. Pollution Prevention Opportunities Summary

P2 Opportunity	*Economic Benefits*	*Energy/Water Reduction*
Evaporator Optimization	Solids Content from 14.8 to 20%	29,600 tons Water/year
Yeast Optimization	600,000 more gallons ethanol/year	-
Economizer	$54,000/year	19,656 MMBTU/year