

# Midwest Ethanol Producer Achieves \$229,705 Revenue Increase with Nalco Water Evaporator Performance Monitoring and Evaporator Scale Inhibitor



## BACKGROUND

Ethanol producers use falling film evaporators to drive off water from thin stillage. Upon leaving the evaporator system, the syrup is sent to dryers and becomes part of the distiller's dried grains with solubles (DDGS), which is used for animal feed. As water is driven off and solids concentrate, the formation of mineral deposits often leads to organic fouling. The combination of mineral deposition and organic fouling frequently results in the evaporators becoming a production bottleneck.

This ethanol producer had previously tried several deposit-control products in the past with little success. They continued to push production rates higher to the point where the evaporators became a bottleneck requiring a high rate of CIPs and frequent hydroblasting.

## SOLUTION

Nalco Water analyzed and identified the components of the mineral deposits, then proposed a specially formulated chemistry to control deposition in the evaporator system. The team also recommended the Nalco Water Evaporator Performance Monitoring Program to help the plant evaluate the effectiveness of the chemistry. To gauge before-and-after performance of the program, baseline data was collected for five months prior to application of the Nalco Water product. Once the new program was implemented, it did not take long to determine that the product significantly reduced the rate of fouling. The improvement was so significant that the plant was able to push production rates higher and send more thin stillage to the evaporators. This resulted in multiple benefits to the plant.

### ANNUAL SAVINGS

#### PRODUCTIVITY

Increased ethanol production by  
**2,212 gallons**  
per day

#### ASSETS

Improved corn oil recovery by  
**600 lbs**  
per day

#### PROFITABILITY

Increased DDG production by  
**6.4 tons**  
per day

### VALUE DELIVERED

**\$229,705**  
**ANNUALLY**

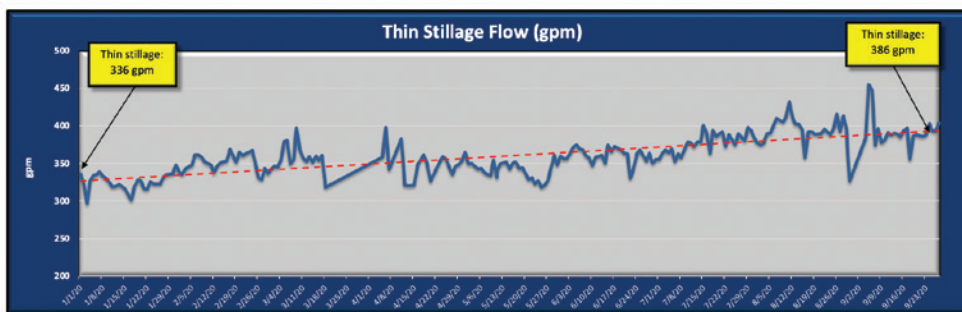
## RESULTS

Upon introduction of the new chemistry and the Evaporator Performance Monitoring Program, the rate of fouling was significantly reduced. The improvement enabled the plant to process an additional 50 gallons per minute (gpm) of thin stillage in the evaporators and achieve a 14% increase in flow, resulting in three main benefits:

### 1. Increased DDG Production

The additional thin stillage processed in the evaporators means that 42,000 lbs. per day of non-fermentable solids are not returned to the front of the process in the backset. An additional 750 bushels per day are required to make up the difference. At 17 lbs. of DDG production per bushel of corn, this results in an extra 6.4 tons/day of DDG. At an average of \$150/ton of DDG, the additional revenue is \$340,800/year.

The extra thin stillage that is processed results in an increase in syrup flow to the dryers of 10 gpm. The net increase in annual revenue gains equates to \$97,929 after consideration of the additional steam and energy requirements in the evaporators and dryers to drive off the additional water.



### 2. Increased Ethanol Revenue

The increase in thin stillage to the evaporators means less backset and less non-fermentable solids returning to the front of the process – a reduction of 42,000 lbs. per day. Additional fresh corn is added to replace the non-fermentable solids, which has led to a modest increase in ethanol production, resulting in a net gain of \$78,526 in ethanol revenue, based on a margin of \$0.10/gallon.

### 3. Improved Corn Oil Recovery

For every additional bushel of corn being ground, an additional 0.8 lbs. of corn oil was captured. This equates to 600 lbs. per day and an additional \$53,250 in annual revenue.

## CONCLUSION

By taking the time to thoroughly evaluate the customer's issues and establish a clear baseline of current performance, the Nalco Water team was able to respond with a two-pronged approach to help this ethanol producer. A specially formulated scale inhibitor chemistry, developed for the plant's specific scale, paired with our Evaporator Performance Monitoring Program, helped the plant significantly improve productivity and profitability. Through their increased production of ethanol and co-products, the customer realized a net revenue gain of \$229,705 per year.

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