CASE STUDY
INDUSTRY: **OIL & GAS**

CUSTOMER: Fox River Valley Ethanol

LOCATION: Oshkosh, WI, USA

BACKGROUND: Fox River Valley Ethanol processes locally grown corn to generate a renewable resource, securing energy independence while creating other useful products for agriculture and industry. Fox River Valley Ethanol's plant mainly produces 150,000 gallons (4,723.7 tons) of ethanol each day for a total of over fifty million gallons (1,574,569.78 tons) a year. Eighty percent is sold in the state of Wisconsin, primarily to terminals in the Green Bay-Madison-Milwaukee area. In addition, Fox River Valley Ethanol supplies wet distillers grains and solubles to local dairy operators and livestock producers as valuable high-protein resources as well as dry distillers grains and solubles to be exported.

SCOPE OF WORK: At Fox River Valley Ethanol, a closed-loop pump trap system was installed on a shell and tube heat exchanger. Every time the pump discharged, a severe water hammer event would take place destroying equipment up to and including a 3" (76.2mm) 150# flanged gate valve, the float and thermostatic trap downstream of the pump, and check valves. The return line from the pump discharged in to the top of a pressurized condensate return header. Each time the pump cycle ended (vent cycle), a slug of condensate (differential shock) was sent backwards towards the pump causing the devastating water hammer.

This type of issue is quite common in both closed loop and vented pump systems (both mechanical pump and electric). The sudden reversal of condensate flow when the pump shuts off combined with pressure back-feeding into the line from the main return header can cause water hammer.

A check valve was installed right at the point where the pump discharge line drops into the pressurized header. The check valve keeps the flash steam from back feeding towards the pump to prevent potential water hammer.

BENEFITS: Fox River Valley Ethanol's risk of water hammer has dramatically decreased thanks to the properly placed check valve. The customer no longer is experiencing maintenance issues due to destroyed equipment caused by water hammer.