

# **IOA/PAG FOOD/AG TREATMENT TASK FORCE**

## **CASE STUDY DATA REPORT**

**TITLE: MIDWESTERN FOOD PROCESSING PLANT CHILLER WATER TREATMENT FOR REUSE**

### **A. DESCRIPTION OF THE PROBLEM**

Foods (bean dip, salsa, and other related products) are cooked and packaged in 5-8 lb lots in plastic bags, which then are chilled in a 5,000 gallon chilling water loop and storage tank. Microbial contamination (from slight spillage on the bags during filling and/or occasional bag breakage) causes excessive drain and refill of the chiller water, requiring the chiller system to be drained and refilled anywhere from 1 day to 1 week. An ozone system was installed to treat the chiller water in an attempt to reduce the frequency of draining and refilling the chiller water loop. The goal is to keep water in chill water loop safe from microbial contamination for a longer period of time, thus saving on water consumption, labor, and reducing process down-time.

### **B. DESCRIPTION OF PLANT OR PROCESS**

The product is first cooked then packed into polyethylene bags at 180EF and sealed, then transferred into a chilled water bath at 35-40EF for approx. 2 hours until product has reached 60-65EF.

### **C. DETAILS OF OZONE SYSTEM AND APPLICATION**

This application used the HDO3-1 system from Clearwater Tech LLC. An independent side stream loop was created as not to interfere with the chiller and its hydraulics. 1.15 ppm of dissolved ozone is delivered to the 5000 gallon tank. System features include stainless steel construction, integrated dissolved ozone monitor, adjustable ozone output, and air-cooled, stainless steel ozone reaction chambers. The unit is skid-mounted and comes pre-plumbed and pre-wired.

### **D. CASE STUDY INFORMATION**

The chiller water prior to installation of the ozone system could only be kept for reuse anywhere from 1 day to 1 week, depending on organic loading, primarily spillage on the outside of bags during filling, before microbial contamination caused the need to drain the 5,000 gallon tank. Annual process water consumption prior to ozone was an estimated 1,123,000 gallon. After ozone system installation, the chiller water has been kept for reuse up to 6 months in some of the company's plants, reducing the annual process water consumption to 72,000 gallons.

#### **1. COST SAVINGS / ROI**

The company has installed the system on four plants total, which has resulted in a savings of 1,051,000 gallons of water annually at the four plants in total. Water savings results in cost savings of \$1,600 (total of the three plants).

As a result of the extended life of the process water, the three plants have been able to reduce maintenance costs associated with the cleaning and maintenance of the chiller water tanks. These maintenance cost savings are estimated at 9,000 annually (total of the three plants).

Total annual savings in water and maintenance at the three plants equals \$10,600.

Costs for the ozonation equipment and their installation in the three plants totaled \$70,000 (\$25,000 for plant one and \$45,000 for plants 2 and 3). This results in an apparent return on investment of 6.61 years.

However the local city water department offers grant funds for companies that are able to implement systems to reduce water usage. The city water department is monitoring water savings as a result of ozone system implementation, and projects that the company will receive an \$11,000 grant to offset the cost of ozonation system installation.

The \$11,000 grant thus would reduce the R-O-I from 6.61 years to 5.57 years.

#### **E. EMPLOYEE HEALTH & SAFETY ISSUES**

The only concern was the chilling water tank was directly in the middle of the cookers. Employees work 360E around the tank, so off-gassing of ozone from the open top tank was a concern. The skid system provided delivers the ozone completely dissolved in the chilled water. Because of this, and the cold water temperature (35-40EF), and the fact that employees are about 10-20 feet from the tank, no ozone can be measured in the air around the employee stations. Additionally, the plant air contains odors of cut onions and garlic, which quickly react with ambient ozone.

#### **F. ADDITIONAL COMMENTS**

The newest of the four company processing plants uses the HDO3-II ozone system from ClearWater Tech, and has two 10,000 gallon chilling tanks.

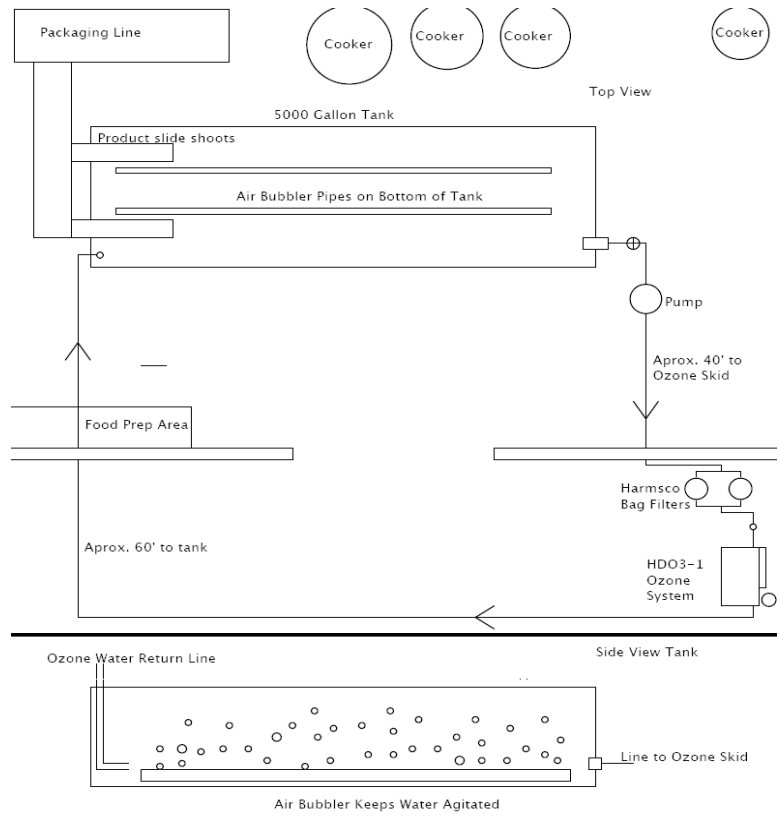
#### **G. SUBMITTER – JOB TITLE – CONTACT DETAILS**

Submitter: John Dittberner  
Job Title: Factory Representative, ClearWater Tech. LLC, San Luis Obispo, CA  
Contact Details: cell: 402-740-5639; fax: 402-454-3393 [jdittberner@cwtozone.com](mailto:jdittberner@cwtozone.com)

#### **H. REFERENCE(S) – ARTICLE(S) – IF APPROPRIATE**



HDO3-1 Ozone Generation system  
Schematic of  
chiller water treatment system



RGR 2/22/05