Tyson Foods, Inc.

COMPANY BACKGROUND

Tyson Foods, Inc. is the world's largest processor of chicken, beef, and pork and the second-largest food company in the Fortune 500. Tyson produces a wide variety of food products as well as rendered products and tanned hides to customers throughout the United States and more than 80 countries. The company employs 114,000 people at more than 300 facilities and offices in the United States and around the world, including eight facilities in Iowa.

HEATHER COPELAND
CHEMICAL ENGINEERING, IOWA STATE UNIVERSITY

PROJECT BACKGROUND

The purpose of the intern project was to develop a water use inventory and to create tracking tools that would allow personnel to better understand the water usage at various facilities. It was important that the tracking tools could easily be replicated at any Tyson facility. The tracking tools will allow the impact of future water conservation projects to be monitored.

INCENTIVES TO CHANGE

Food processing is a very water-intensive process. Source reduction is becoming an important focus as utility costs continue to increase and natural resources become more scarce. All utilities are impacted by a decrease in water usage. Energy bills are reduced when less electricity is required to pump the water throughout the facility and treat the water at the wastewater facility. Water utility bills drop due to a reduction in the amount of water required to operate. Wastewater treatment plants operate more efficiently with the decreased load.

RESULTS

Water Audit: An inventory of major water-consuming equipment was completed at two beef and two pork plants. Equipment flow rates and specifications were recorded in the inventory. Flow diagrams were created to illustrate how the equipment and water meters are connected in the water system. Equipment usage and water meter readings were also included. The flow diagrams will help with implementation of future water conservation projects and will allow for comparisons across different facilities.

Meter Installation: Several meters were recommended for installation at each facility visited by the intern. Water meters provide an opportunity to gather detailed water usage and track operating changes. It was recommended that Tyson Foods install meters on several of the large washes on the slaughter floor at all of the facilities that were visited by the intern. Installing several additional meters in areas common to each facility will allow the company to compare water use per head across all of its beef and pork plants.

Leak Detection Maintenance Program: Several water leaks of various sizes were observed in the facilities that the intern visited. It is recommended that a leak detection maintenance program be implemented at all Tyson facilities. The program would assign maintenance personnel to conduct daily walks around the facility to look for any leaks. The assigned personnel would be in charge of logging the location and severity of all leaks and scheduling repair. The main goal of this program would be to decrease water usage caused by unrepaired leaks and to create awareness of the occurrence of new leaks.

Pump Operating Conditions Modifications: Pumps that do not operate at the designed optimum-efficiency point consume excessive energy. Several

modifications to pump operating conditions are recommended for each plant that was visited. High-pressure pumps were targeted since they require large horsepower motors to operate. Small inefficiencies can turn into thousands of dollars of unnecessary electricity costs. It was recommended that impellers be replaced on two of the high-pressure pumps at one facility to increase efficiencies.

PROJECT	ANNUAL COST SAVINGS	ENVIRONMENTAL RESULTS	STATUS
LEAK DETECTION PROGRAM AND METER INSTALLATION	$90,000	452,000 KWH 69,200,000 GALLONS	RECOMMENDED
PUMP OPERATING CONDITIONS MODIFICATIONS	$70,000	1,622,000 KWH	RECOMMENDED

**** Calculations represent three of the four Tyson facilities visited (Storm Lake, IA, Perry, IA and Lexington, NE)***

AIR POLLUTANTS DIVERTED IN TONS

Total for all sectors	
SO2	5.42
CO	0.71
NOx	2.61
VOC	0.38
PM	0.14

GREEN HOUSE GASES DIVERTED IN TONS
(CO2 Equivalent)

Total for all sectors	
CO2	1038.86
CH4	400.44
N2O	190.80
CFC	12.64