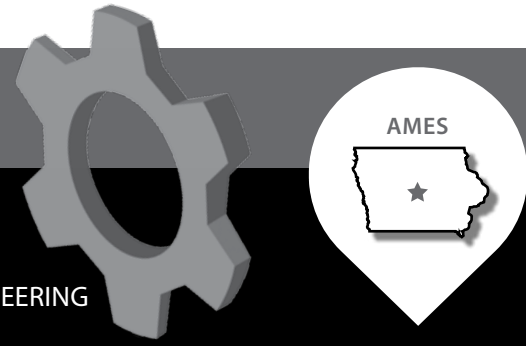


HACH COMPANY



ANDREW DAVIS
INDUSTRIAL ENGINEERING
MANUFACTURING SYSTEMS ENGINEERING
IOWA STATE UNIVERSITY

COMPANY PROFILE

Hach Company develops, manufactures, and distributes products and chemistry worldwide for water testing and analysis. Hach Company's mission is to make water analysis and treatment faster, simpler, greener, more informative, and easy-to-use. Hach accomplishes this by building strong customer relationships and providing superior service. In an industry where the results of analysis are extremely important, Hach takes pride in its ability to provide the correct analytical answer every time.

PROJECT BACKGROUND

The projects that have been targeted at Hach Company are two parts of one cohesive process. The first project was to develop Hach Company's Environmental Management System (EMS) with the ultimate goal of the company receiving ISO 14001 certification. The second project was to develop recommendations to reduce hazardous waste streams within the facility. Developing these recommendations also directly supports Hach Company's EMS certification to the ISO 14001 standard by making continuous improvement of environmental affairs a priority.

INCENTIVES TO CHANGE

The primary incentive for creating an EMS and obtaining ISO 14001 certification was to develop a tracking system for environmental impacts and establish parameters for measuring Hach's on-going progress towards environmental performance goals. This is a part of Hach Company's corporate initiative to enhance focus on operations related to the environment. The hazardous material handling process was identified as an area to reduce impacts and associated costs with process improvements in support of the EMS initiative.

RESULTS

ISO 14001 Project: The intern's work on this project was focused on providing resources to support Hach in meeting the requirements to obtain ISO 14001 certification in 2016. During the development of the EMS, Hach requested a Level One audit from a certification agency to evaluate its current state. This evaluation is a required step in the EMS certification process and is used

to develop an action plan containing process improvements to be established before the Level Two certification audit planned for later this year.

In their new EMS, Hach identified wastewater collection and discharge procedures as one of their significant environmental aspects. Wastewater procedures and the subsequent liquid hazardous waste streams make this a strong area of opportunity for pollution prevention.

Chemical Coagulation: Waste containing trace amounts of heavy metals must be collected in drums and disposed of as a hazardous waste. This accounts for a substantial portion of the overall waste management costs at Hach. Effective separation of heavy metals from this liquid waste could reduce the volume of this hazardous waste stream by as much as 90-95 percent.



| PROJECT | ANNUAL COST SAVINGS | ENVIRONMENTAL RESULTS |
|-------------------------------|---------------------|------------------------|
| ISO 14001 PROJECT | \$15,000 | Continuous Improvement |
| CHEMICAL COAGULATION | \$42,293 | 38.3 tons |
| ELECTROCOAGULATION | \$22,503 | 80.5 tons |
| WASTE TRACKING SYSTEM PROJECT | \$4,600 | 3.6 tons |



Chemical coagulation, the process of using a chemical agent to separate these heavy metals from the liquid waste, is a process that should be further investigated by the company as a potential improvement to their hazardous waste disposal process. If feasible, the company could see a reduction of their hazardous waste disposal costs and reduced environmental impacts, in addition to supporting their efforts of continuous environmental improvement.

Electrocoagulation: Analysis of current wastewater treatment procedures at Hach indicated an opportunity to expand their operations to facilitate future company growth and improve the environmental impacts of their treatment process. Electrocoagulation is a wastewater treatment process that uses electrical current to destabilize the charges of molecules in the wastewater stream, as the liquid flows between the electrodes. The addition of an electrocoagulation process to Hach's wastewater treatment procedures could significantly reduce costs and impacts of their wastewater process, and provide additional capacity

for treating wastewater that can continuously be discharged to the local POTW. The company should consider further research into electrocoagulation to determine if it meets their needs.

Waste Tracking System Project: In the Pollution Prevention hierarchy, source reduction is the target for reaching waste reduction and environmental performance goals. Hach's waste tracking system is a good tool for helping to achieve and maintain continuous improvement toward source reduction. The system is currently underutilized because of limitations in the options for inputting and characterizing data. With minor updates to the system and operator training on the input and reporting of data, the system would provide data and analysis for Hach to effectively target unnecessary generation of hazardous wastes and use waste reduction as a metric for continual improvement.

