

JOHN DEERE OTTUMWA WORKS

COMPANY BACKGROUND

Deere & Company, founded in 1837 (collectively called John Deere), has grown from a one-person blacksmith shop into a corporation that today conducts business worldwide and employs approximately 52,000 people. John Deere operates four major business segments: agricultural equipment, commercial & consumer equipment, construction & forestry and credit, along with support operations of parts and power systems. It is one of the oldest industrial companies in the United States, and was named one of the “100 Best Corporate Citizens” in 2007 by CRO (Corporate Responsibility Officer) magazine.

OTTUMWA



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PROJECT BACKGROUND

Integrity, quality, commitment and innovation are the core values John Deere holds highest. Motivated by these values, the environmental department at John Deere Ottumwa Works (JDOW) continually strives to improve processes and practices, and exceed government regulations. Specifically, reducing greenhouse gas emissions is a top priority at JDOW. Earlier this year, Deere & Company announced plans to further reduce its total greenhouse gas emissions by 25 percent per dollar of revenue from 2005 to 2014.

INCENTIVES TO CHANGE

On-site wastewater pretreatment has been under consideration at JDOW for many years. However, due to the time and expense required to install and maintain a reliable on-site treatment process, the facility has been using disposal methods that are convenient, yet costly. Process wastewater at JDOW is currently shipped to

another John Deere facility, over 100 miles away, for treatment. Annually, this system currently costs the company approximately \$151,000 in combined costs and emits over 1,000 tons of greenhouse gases.

RESULTS

Eliminate Wastewater Shipping & Off-site Treatment: The transportation and off-site treatment of metal finishing wastewater is a costly process for JDOW. Shipment from the Ottumwa factory to an off-site treatment location currently costs the company approximately \$30,000 annually. This transported waste, which totaled close to 400,000 nominal gallons in 2007, costs 24 cents per gallon, or roughly \$100,000, in off-site treatment fees. Combined, these activities cost nearly \$130,000 for one year’s wastewater shipping and treatment. With rising prices of both transportation fuel and treatment (which, for 2008, increased to 31 cents per gallon), these numbers are projected to reach \$151,000 or more for the current fiscal year, assuming stable wastewater generation.

Although the elimination of shipping and off-site treatment would result in significant annual savings, the wastewater that JDOW generates would still require pretreatment in

order to facilitate municipal disposal. The \$151,000 in savings is money that could be applied to on-site treatment costs. The goal of this project was to conduct a feasibility study to determine if on-site wastewater pretreatment is an economically viable solution for the Ottumwa factory, given current outsourcing costs. With the elimination of \$30,000 in shipping costs and associated emissions, the end goal of pollution prevention is achievable.

Determining the economic feasibility of a wastewater pretreatment system (in the form of chemical treatment reactors, a semi-permeable or ion-exchange membrane system, or an electrolytic precipitation system) has required the analysis of current and future process operations and associated materials chemistry. Should an on-site process be deemed practical, the estimated return on investment (ROI) would be approximately 2 to 4 years. This estimate considers the costs of capital investment, energy, labor, and chemical needs. Savings after the repayment period are anticipated to far exceed the initial transportation savings, and would later add additional value to JDOW operations.



Air Pollutants Diverted in Tons

| | Total for all sectors |
|-----|-----------------------|
| SO2 | 0.0363 |
| CO | 4.257 |
| NOX | 0.3278 |
| VOC | 0.3245 |
| PM | 0.0143 |

Green House Gases Diverted in Tons (CO2 Equivalent)

| | Total for all sectors |
|------|-----------------------|
| CO2 | 66.22 |
| CH4 | 2.574 |
| N2O | 0.9295 |
| CFCS | 0.1628 |

| PROJECT | ANNUAL COST SAVINGS | ENVIRONMENTAL RESULTS | STATUS |
|---|---------------------|-----------------------|-------------|
| ELIMINATE WASTEWATER SHIPPING & OFFSITE TREATMENT | \$151,000 | EMISSIONS REDUCTION | RECOMMENDED |

