

# Pollution Prevention Interns Contribute to Corporate Sustainability

***University program partners with industry to reduce pollution, saving millions and indirectly improving environmental health***

*Presented by*

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- K-State intern program
- Benefits to participating companies
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# BACKGROUND

- EPA grants
- Partnership with EPA, KDHE. and K-State Engineering Extension
- Sixth year of program (2006 pilot year)
- Pairs engineering and environmental sciences students with business and industry
- Collaborations focus on projects to reduce industrial emissions and wastes, while benefiting the state and community environment

# PROGRAM EVALUATION

	2006	2007	2008	2009	2010	2011
<u>Number of interns</u>	4	9	9	9	10	11
<u>Colleges</u>	KSU	KSU,ESU	KSU,KU,S WC	KSU,KU	KSU, KU, WSU	KSU, KU
<u>Company match</u>	\$3 (\$ 1,320)	\$7 (\$ 3,080)	\$ 10 (\$4,400)	\$12 (\$5,280)	\$12 (\$5,280)	\$12 (\$5,280)
Number of repeat companies	N/A	2	5	3	1	2



# REAL-WORLD INDUSTRY EXPERIENCE



# ENVIRONMENTAL IMPACTS

IMPACTS	2006	2007	2008	2009	2010	TOTAL
Water conservation	N/A	25.3 million gallons	187.1 million gallons	9.9 million gallons	22.2 million gallons	244.6 million gallons
Waste reduction	1,025 tons	5,506 tons	1,707 tons	480 tons	585 tons	9,303 tons
Energy conservation	1,533,201 KWh	706,611 KWh	260,191 KWh	8,705,859 KWh	615,853 KWh	49,482,904 KWh
Operating/disposal savings	\$0.4 million	\$1.5 million	\$3.5 million	\$0.7 million	\$1.2 million	\$7.4 million
Greenhouse Gases	1,089 MTCO <sub>2</sub> e	5,079 MTCO <sub>2</sub> e	18,921 MTCO <sub>2</sub> e	6,207 MTCO <sub>2</sub> e	7,015 MTCO <sub>2</sub> e	38,310 MTCO <sub>2</sub> e

- Implementation rate assessed in 2009 – 66%
- According to a study by NEP3 program, clients realized indirect savings of similar magnitude to their direct savings. <sup>1</sup>

<sup>1</sup> Youngblood, D.J., Dvorak, B.I., and Hawkey, S.A. 2007. Indirect Benefits of P2 Technical Assistance Estimated Using Fuzzy Set theory. *Journal of Cleaner Production* 16 (2008): 771-779.

# ENVIRONMENTAL IMPACTS

Based on the cumulative total from 2006-2010 , the intern program identified \$7.4 million savings in operating costs. Using this number in the Carnegie Mellon Economic Input-Output Life Cycle Analysis tool, <sup>2</sup> yields the following environmental health results:

<u>Criteria Pollutants</u>	<u>Reduction (metric tons)</u>
SO <sub>2</sub>	401
CO	41
NOX	190
VOC	6.6
Lead	0.004
PM10	9.93

<u>GHG</u>	<u>Amount in terms of MTCO2e</u>
CO <sub>2</sub>	74,100
CH <sub>4</sub>	2,780
N <sub>2</sub> O	37.1
CFCs	910

Total Global warming potential: 77,800 MTCO2e

<sup>2</sup> For the Carnegie Mellon input, the U.S. 1997(491) model, Industry – Mining and Utilities, Detailed Sector- Power Generation and Supply was used:

<http://www.eiolica.net/cgi-bin/dft/use.pl?newmatrix=US491IDOC1997>



# COMPANY EXAMPLES

## Haldex Brake:

- Second year of the intern program
- A brake manufacturing company
- Chemical finishing department used more than 1,793,405 gallons of water each year.
- Continuous supply of water was being used for the chrome rinse tank.



# HALDEX BRAKE

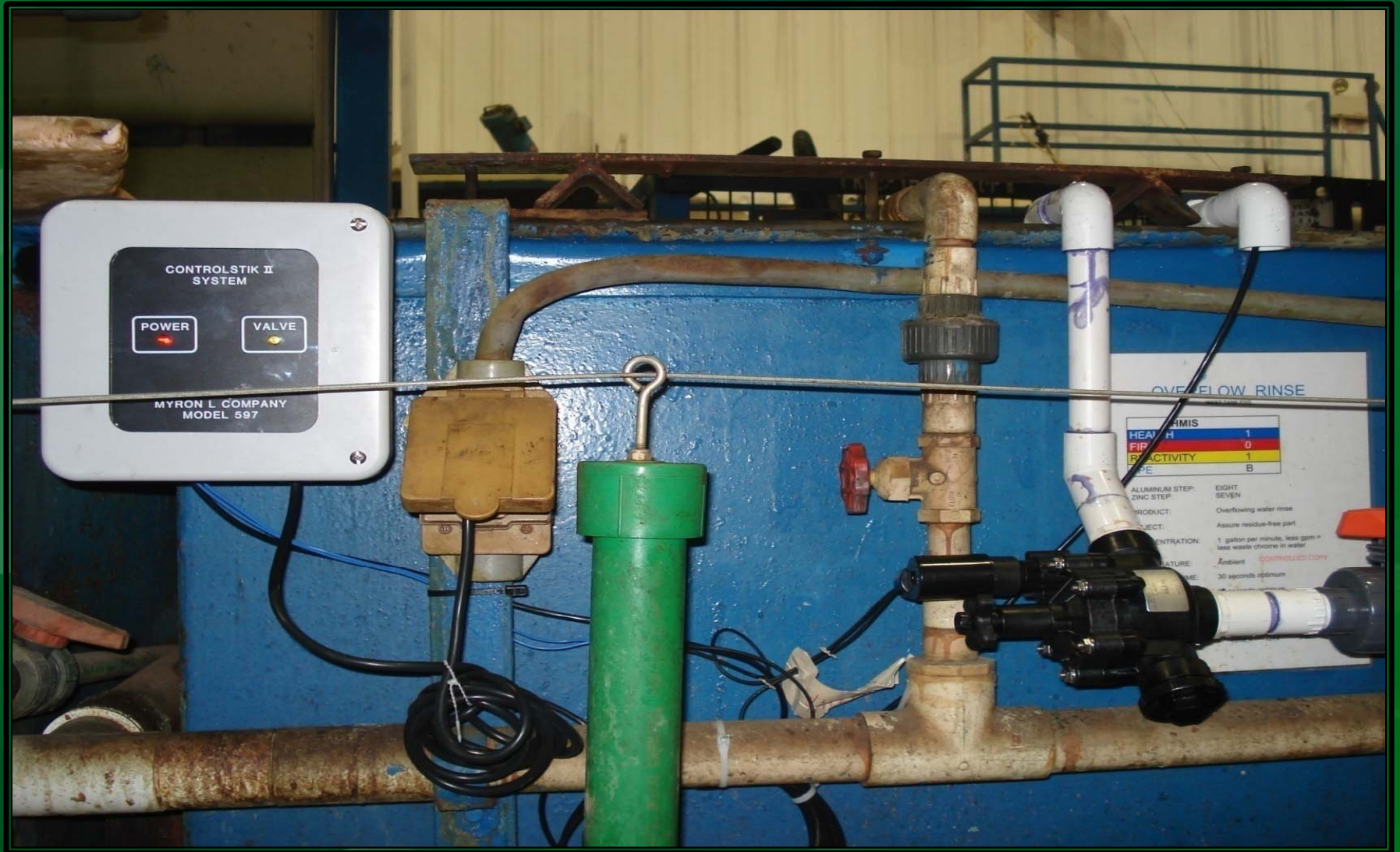


Fig. : Installation of a conductivity meter

# HALDEX BRAKE

- Implementation: Installation of a conductivity sensor
- Cost : Less than \$700
- Savings: 600,000 gallons of water/ year; \$14,600/year; 24,500 KWh
- Company investment in the intern program: \$3,300
- Other benefits as a result of the intern program:
  - Company A is on the city's lowest tier for water consumption. <sup>3</sup>
  - Opportunity to apply for an EPA water efficiency award

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<sup>3</sup> Willis, D. (Company A). Personal Communication. March 17, 2009.

# COMPANY EXAMPLES

## Haldux Brake:

- Third year of the program
- A repeated participating company (reluctant at first as they thought there were no additional savings to be found)
- Electric air dryer for industrial parts
  - Two 15-KW dryers
  - Operated 10 hours/day, but the intern, after research found that drying time could be reduced to 1 hour/day.



# HALDEX BRAKE



Fig.: Installation of a timer



# HALDEX BRAKE

- Implementation: Installation of a simple timer
- Cost : Less than \$50
- Savings: More than 60,000 KWh/year; \$5,000/year
- Total savings from the program: 342,715 KWh; 444,000 gallons of water;  
\$29,224/year
- Company investment in the intern program: \$4,800

# COMPANY EXAMPLES

## FRITO-LAY:

- Second year of the program
- A food manufacturing company
- Water conservation initiative to meet the corporate water-reduction goals

# FRITO-LAY



Fig.: The food manufacturing process



Fig.: A flow-restriction orifice

# FRITO-LAY

- **Implementation:** Installed in-line, flow-restriction orifices
- **Cost:** Less than \$500 for 20-30 of the orifices <sup>4</sup>
- **Savings:** 22,820,000 gallons of water; \$114,784/ year
- **Company investment in the intern program:** \$3,300

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<sup>4</sup> Robinson, J.(Company C). Personal communication. March 18, 2009.



# THE COLEMAN COMPANY

- Boiler project
- Current natural gas fired boiler 5% loaded
- 125 BHP rated boiler for 15 BHP process
- Recommended replacement with properly sized electric boiler



# THE COLEMAN COMPANY

- Purchased boiler \$90,000 (plus installation)
- Savings of 29,747 MSCF natural gas; \$166,419/year; one month payback
- Total – 10 million gallons of water; 1.2 million kWh; \$240,000
- Company investment - \$5,280

# OTHER INTERN PROGRAMS

- <http://www.epa.gov/p2/pubs/internships.htm>
- **Intern programs in each of the states in EPA region 7:**
  - **Iowa Department of Natural Resources**
    - Year 1, no industry match required (\$4K for repeat) <sup>5</sup>
    - 221.5 million KWh; 2.3 million therms; \$54 million
  - **Nebraska Partners in Pollution Prevention (P3)**
    - Industry match of \$3,300 <sup>6</sup>
    - 5.79 million KWh; 11.8 million gallons of water; \$0.9 million
  - **Missouri Environmental Assistance Center**
    - Industry pays 100% of the intern's minimum \$6600 salary<sup>7</sup>
    - 0.79 KWh; \$267,000

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<sup>5</sup> *Pollution Prevention Intern Program*. 2009. Accessed June 15, 2010; [www.iowadnr.gov/waste/p2/intern.html](http://www.iowadnr.gov/waste/p2/intern.html)

<sup>6</sup> *Partners in Pollution Prevention*. University of Nebraska-Lincoln (UNL). 2009. Accessed June 15, 2010; [www.p3.unl.edu](http://www.p3.unl.edu)

<sup>7</sup> *News: Summer Intern Program Helps Firms Cut Costs by Reducing Environmental Impact*. Missouri Environmental Assistance Center (MOEAC). 2009. Accessed June 15, 2009 ; [www.missouribusiness.net.eac/news/internships\\_summer\\_09.asp](http://www.missouribusiness.net.eac/news/internships_summer_09.asp)

# OTHER INTERN PROGRAMS

## -Intern programs in other regions:

### -New York

- Voluntary industry contribution of \$1,200 <sup>8</sup>
- 22 million gallons of water; \$1 million/year

### -New Hampshire

- Industry match of \$6,000 <sup>9</sup>

### -Minnesota

- Companies pay a cost share of \$2,500 <sup>10</sup>
- 43 million KWh; 4.9 million therms; \$4.3 million

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<sup>8</sup> Cruden, E. (New York State Department of Environmental Conservation). Personal Communication. March 18, 2009.

<sup>9</sup> *P2 Internship Program. New Hampshire Pollution Prevention Partnership (NHP2P), University of New Hampshire. Accessed March 2009; [www.unh.edu/p2/nhppp.p2intprgm.html](http://www.unh.edu/p2/nhppp.p2intprgm.html)*

<sup>10</sup> *Student Intern Program. Minnesota Technical Assistance Program, University of Minnesota. 2009. Accessed June 15, 2009; [www.mntap.umn.edu/intern/index.htm](http://www.mntap.umn.edu/intern/index.htm)*



# SUMMARY

## From Industry's perspective

- Low-cost investment, great benefits
- No need to hire a full-time employee to research the project

- P2 can reduce compliance burdens
- Preview future professional employees

- Reduced environmental emissions and impacts
- Improved environmental stewardship and favorable “green” community image

## From students' perspective

- Real-world professional perspective/ business ethics
- Practical implementation of concepts

- Skill development and confidence boost
  - Professional contacts
  - Earning opportunity

- Career boost
- Experience in a broader context, environmental related as well as economical

# CONTACT INFORMATION

Website: <http://www.sbeap.org/content/internships>

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