

## 2011 P2 Internship

**Freudenberg-NOK, Bristol Components division, Bristol, NH**  
**Rob Kirkpatrick, UNH - ISO 14001**

The Bristol Components division with Freudenberg-NOK manufactures rubber products for the automotive and other industries. Rob Kirkpatrick, a Chemical Engineering major, assisted the Bristol facility in self certification for the International Organization of Standardization (ISO) 14001 which are standards for environmental management. Part of the certification process involves setting up an Environmental Management System (EMS) to improve the organization's environmental performance. Rob drafted an initial EMS by reviewing the facility's production processes that create costly waste and developed plans to reduce that waste. These include reducing:



- Poly filter bags use by 4%
- Bore coat air filters by 20%
- Scrap Rubber by 15%
- Electricity usage in the boiler process by 30%
- Eliminate use of #6 fuel
- Carbon Monoxide emissions by 40%

**Hitchner® Manufacturing, Milford, NH**  
**Patrick Kilar, UNH – Waste Heat Recovery**

Patrick Kilar, a graduate student in Mechanical Engineering, worked with Hitchner® Manufacturing, a high volume producer of ferrous investment castings, to reduce heat waste during the production of metal castings. He focused on the heat loss from the ovens and boilers used to melt wax molds. Goals for his project included measuring the magnitude of waste heat and determining the most beneficial method to divert the waste heat to useful operations. Patrick monitored temperature, flow rate, and pressure of the six oven exhaust stacks for seven straight 24 hour day periods. Upon completion of monitoring, he compiled results and researched options for 2 of the stacks that would result in the most immediate impacts. When implemented, heat exchangers installed on the stacks would result in:

- Energy reduction - 110,400 therms
- Annual carbon emissions reduction - 553 metric tons
- Estimated annual savings - \$84,000

The return on investment with incentives would be an average of 1.8 years.

**Hitchner® Manufacturing, Milford, NH**  
**Travis Maser, UNH – Sand Reclamation**

Travis Maser, a Chemical Engineering major who also worked with Hitchner® Manufacturing, focused on improving the sand reclamation process and reducing disposal costs. The facility generates over 900 tons of waste sand per year. Some of the sand is cleaned and reused, while the excess sand is disposed of as a waste product. Modifications to the reclamation system will result in a return on investment within seven months. Travis also conducted tests on reclaimed sand to determine if it could be reused in production. His test results showed that a 50/50 blend of virgin and reclaimed sand was stronger than the sand currently being used. These results will help to further reduce purchase and disposal costs. Taking waste reduction one step further, Travis recommended that Hitchner® refurbish an old facility to grind and sieve the reclaimed casting waste, install a magnet to remove the metal from the waste and divert usable sand back to the manufacturing facility. The return on investment would be realized in 7 to 9 months depending on the system purchased.

- Waste reduction – 1900 tons waste sand and casting waste
- Savings - \$154,000

**Department of Environmental Service's Pollution Prevention Program, Concord, NH**  
**Brandon M Webb, Antioch University – Auto body, Ski Resorts & Hospitality**

Brandon Webb, a graduate student in Resource Management and Conservation at Antioch New England University, had three projects during his summer with the New Hampshire Department of Environmental Services' Pollution Prevention Program (NHPPP).

Brandon visited auto body shops throughout the state to ensure compliance with EPA air rules and DES hazardous waste rules. He also created an excel worksheet that compares the costs of using an on-site solvent/thinner recycler versus shipping the waste solvent off as hazardous waste. Auto body shop owners are able to enter their shop's solvent use, purchase and disposal costs into this worksheet to determine the cost effectiveness of an on-site solvent/thinner waste recycler purchase. For example, an auto body shop that produces 220 gallons of thinner waste a year could save \$13,000 and reduce the amount of solvent purchased by 2,090 gallons over a ten year period (the average life of a recycler) if they switched to on-site recycling.

Brandon developed an excel worksheet to compare diesel fuel to grid energy at ski resorts. This worksheet compares the costs and the amount of CO<sub>2</sub>, NO<sub>x</sub>, and SO<sub>2</sub> produced by each fuel source during the ski season (November – March). He also worked with NHPPP staff to facilitate sessions for the 2011 Green Slopes Conference.

Brandon worked with the hospitality industry to reduce waste generation, energy use and water consumption. He developed metrics that assist NHPPP in measuring the success of outreach efforts and conducted restaurant surveys to determine where more outreach is necessary. He also participated in certification visits to facilities applying for Environmental Champion status under the New Hampshire Sustainable Lodging and Restaurant Program.

For more information on any of these projects contact NHPPP at [nhppp@des.nh.gov](mailto:nhppp@des.nh.gov)