

Companies and Students Benefit from P5 Intern Program

Interns from universities around the state had an opportunity to experience pollution prevention first-hand this summer at five of Michigan's Pulp and Paper Pollution Prevention Partnership (P5) mills. Financed by a research provision in a pollution prevention for states grant, the Michigan Pulp and Paper Environmental Council (MPPEC) and the Environmental Assistance Division sought the services of the National Pollution Prevention Center (NPPC) in Ann Arbor to hire interns to explore P2 opportunities at volunteer mills. NPPC provided services including promotion of the internship program, P2 education, matching interns with a faculty advisor, and administering the program. The interns not only had an opportunity to spend the summer at the mills, but also participated in process engineering and pollution prevention teams established by the mills.

Below is a summary of the internship projects. For more information about the intern program or P5, contact **Wendy Fitzner**, EAD, at **517-373-8798**, the **NPPC** at **313-764-1412**, or the **NCASI Central-Lakes States Regional Center**.

1. Sara Cox of Western Michigan University had an opportunity to study options for wastewater treatment at Rock-Tenn Corporation, Battle Creek. The mill makes clay-coated boxboard from 100 percent recycled raw material. The water Rock-Tenn uses in its process is drawn directly from the local river, yet the majority of the wastewater generated is discharged into the local publicly owned treatment works for treatment. The mill pays for this treatment based on stream flow rate and the concentrations of total suspended solids (TSS) and biochemical oxygen demand (BOD) tested in the water. Sara evaluated cost savings and pollution reduction options from treating and reusing 90 percent of the wastewater at the mill instead. A sedimentation basin option was evaluated, along with options such as the use of thickeners, rotating drums, clarifiers, and direct reuse without treatment. Due to time constraints, the clarifier was the primary option evaluated. The clarifier would allow solids to settle and rake arms would rotate at the bottom of the tank to remove the sludge, resulting in a 90 percent removal efficiency. Dewatering the sludge through a screw press would be necessary to bring the solids content up from 4-7 percent solids to 50-55 percent solids. Through this system, the cost of sending the remaining 10 percent of the treated water to the publicly owned treatment works and sludge disposing would be decreased by almost \$30,000 per month. The payback cost of the clarified system was estimated to be 1.2 years. Additional benefits could be realized from seeking other uses of the sludge, such as land application or as fuel in the mill's boilers or incinerators.
2. A Best Management Practices (BMP) plan is a proactive approach to manage a process or waste stream. The plan is designed around the concepts: "prevention-recovery-collection." This system is required by new federal "Cluster Rules" focused on the paper industry for spent pulping liquor. Chris Evelyn, the Michigan Technological University intern at Mead Paper, developed a generic BMP manual that could be applied to any process or waste steam. The black liquor handling process at Mead Paper, Escanaba was used as a case study of the BMP development procedure.

There are four steps in preparing a BMP plan: planning, development, implementation, and reevaluation. The planning phase involves establishing a BMP committee and performing an engineering analysis. This analysis identifies and assesses potential releases, inventory operations, work practices, and spill control systems. In the development phase, existing structural and nonstructural controls are evaluated as to their adequacy and a schedule for implementing any needed improvements is set. Implementation includes training personnel and completing new control systems. As in any management plan, for the plan to be effective it must be periodically reevaluated and amended as necessary. The reevaluation looks at both the effectiveness of the plan in minimizing spills and in assuring plan objectives are consistent with those of the facility.

3. Material losses to the sewer and sewer treatment costs can result in substantial nonproduct costs to an industry. A mass balance evaluation was used by Champion International's intern, Nicole

Grossen of Michigan Technological University, to determine the accuracy of the current monitoring techniques and to locate where excessive sewer losses were occurring at the mill. The findings would be used to assist the mill in targeting pollution prevention projects and for future waste assessment studies. The costs of the sewer losses were evaluated by looking at fiber costs (waste material) and chemical costs to remove biochemical oxygen demand and total suspended solids from the various sewer locations in the mill. One process, the paper machine, was identified as contributing to approximately 47 percent of the total sewer loss costs. The study, however, concluded that an across-the-board reduction from all areas was preferred. A 10 percent sewer minimization project mill-wide was estimated to save the company \$200,000 per year in fiber loss and wastewater treatment.

4. As environmental concerns are identified, discharge limits are often established. The EPA has established copper discharge limits into waterways due to identified detriment to fish and humans. As a consequence, the E.B. Eddy Paper Mill in Port Huron has taken a proactive approach to reducing copper in its processes through material use replacement. Though their discharge is now well below the required limits, monitoring data has shown periodic copper concentration spikes in the wastewater. E.B. Eddy's intern, Stephanie Schultz of the University of Michigan, was assigned to investigate the source of this copper contaminate. Wastewater samples were collected from various sites within the mill and tested, raw materials were reviewed, and mill maintenance personnel were interviewed. It was discovered that the source of the copper was not from the raw materials, but from copper piping. A series of further tests evaluating the differences of the processes associated with the piping and corrosion testing resulted in a finding that the use of chlorine or sodium hypochlorite accelerated copper leaching by corroding any scale or oxidized surface present on the pipe. The study concluded with a short and long-term recommendation. The ultimate goal is to replace the copper piping as it degrades with stainless steel pipes. In the short-term, the equipment associated with the highest concentrations of copper, paper machines, will be modified and fitted with meters to decrease the flow of water and to limit the amount of chlorine and sodium hypochlorite used in the process.
5. The Environmental Management System (EMS) has become an attractive tool for businesses to use to address environmental responsibilities. The system's voluntary nature, individualized application, and integrated approach into the overall management system make it a worthwhile undertaking by businesses to maintain environmental stewardship and economic viability.

The task for intern Jeremy Chapman of Michigan Technological University, was to help develop an EMS for Stone Container, Ontonagon. The company was already in the process of developing the EMS and insuring all the procedures were in place. Jeremy's summer job was to review the EMS for completeness and help make the EMS available to personnel in the mill through an internal computerized network. This application needed to be one that could be used on a range of computer hardware and software and was user friendly. The system he developed used hypertext markup language (HTML) within Netscape Navigator. The elements of the electronic EMS system included: (1) a due-date calendar containing environmental duties and reporting deadlines; (2) copies of all environmental permits and licenses; (3) a 12-month monitoring and compliance record for the wastewater treatment plant; (4) a spill reporting form that can be e-mailed to the environmental supervisor once information on a particular incident is completed; and (5) a page of links to internet sites that have copies of state and federal environmental regulations. The computerized EMS is planned for expansion to include features such as the mill's P2 policy, standard operating procedures, and the Hazard Communication Program, including copies of material safety data sheets.