

Lean Energy and Environment Assessment at International Paper

International Paper (IP) is a leading global producer of packaging, paper, and pulp, with 55,000 employees operating in 24 countries. One location on Lake Champlain in Ticonderoga, New York is a 700,000+ square foot facility, with nearly 600 employees that manufactures 900 tons per day of uncoated free sheet white paper. This IP mill utilizes 6.2 billion gallons per year of water from the lake and discharges 5.2 billion gallons per year of wastewater back into the lake after treatment. IP is committed to being successful and respected by operating safely and in a sustainable manner, using resources responsibly.

CHALLENGE

In an industry where sustainable production is the goal, preserving natural resources is important to IP. Many pulp and paper manufacturers, like IP, are continuously working to reduce their environmental footprint and promote sustainability by ensuring responsible management of natural resources and improving all aspects of their value chain.

IP's primary areas of water use are the paper mill (3.1 billion gallons per year), evaporator condensers (1.5 billion gallons per year), and the pulp mill (910 millions of gallons per year). Between 10,000 and 20,000 gallons of sulfuric acid is utilized per month to regenerate ion exchange resin columns that are used to remove metal ions from the water being fed to the boiler, which is most likely affecting the pH of the waste water. The facility also produces on an annual basis nearly 22,400 tons of primary wastewater sludge and 30,800 tons of secondary wastewater sludge. It is also suggested that paper mills commonly recirculate seal water by including a strainer and a cooling tower in their loop.

The New York State Pollution Prevention Institute (NYSP2I), in partnership with CITEC, Inc. (The Regional Technology Development Center) and Clarkson University performed a Lean, Energy, and Environment (LE2) assessment project to evaluate the paper manufacturing operation at the IP Ticonderoga mill. The goals of this assessment included determining 1) opportunities for water usage reduction and recovery, 2) options for sulfuric acid use reduction, and 3) alternatives to solid waste disposal into landfills.

SOLUTION

To better understand water usage, NYSP2I developed a baseline water map for one of the paper making lines (Paper Machine 7 [PM7]). IP felt that the whitewater in this machine was not managed as efficiently as a recently upgraded machine. The primary objective of the water mapping exercise was to identify opportunities to reduce water use or recover water for use in the paper-making process. A preliminary review of the overall water balance and the inventory resulted in the identification of two possible opportunities for reuse of excess whitewater: 1) make up process solution from raw materials and 2) supply water for the wire cleaning showers. Industry best practice suggest

CHALLENGE

- Evaluate International Paper's manufacturing operation with a focus on identifying opportunities for water usage reduction and recovery, options for sulfuric acid use reduction, and alternatives to solid waste disposal

SOLUTION

- NYSP2I developed a baseline water map to better understand water usage for one of the paper making machines
- NYSP2I reached out to two vendors for quotes on cooling tower equipment
- CITEC, a partner of NYSP2I, served the role of helping to identify nearly 22,395 tons of primary waste sludge

RESULTS

- Raise the temperature set point of the Whitewater Silo during the summer season will require less cooling water
- Create a closed loop recirculation system for the vacuum pumps used on the machine
- Recirculate current overflow from the vacuum seal to the pit could resolute in water savings of approximately 727 million gallons of water per year
- Approximately 22,000 tons of primary sludge would be diverted from landfill annually, if contracts are set up with Syracuse Fiber and Pactiv

that the reuse of whitewater for wire cleaning showers would be an effective water reduction measure^{2,3}.

It was also anticipated that recovery of the overflow from the vacuum seal pit would significantly reduce water use in the PM7 line and its supporting systems. NYSP2I reached out to two vendors for quotes on the cooling tower equipment to help estimate the potential payback period for this type of project. CITEC, a partner of NYSP2I, served the role of helping to identify alternative beneficial use solutions for the nearly 44.8 million pounds of ton of primary wastewater sludge and 53,200 tons of secondary wastewater sludge generated annually by IP.

RESULTS

Two primary opportunities to reduce water use were identified as a result of the PM7 assessment. First, raising the temperature set point of the Whitewater Silo during the summer season which will require less cooling water and secondly, creating a closed loop recirculation system for the vacuum pumps used on the machine. Recirculation of the current overflow from the vacuum seal to the pit alone could result in water savings of approximately 727 million gallons of water per year. These water savings translate into a cost savings of \$1.5 million with a payback of less than one year.

Syracuse Fiber and Pactiv were two companies identified that had interest in using IP's sludge as feedstock for their manufacturing processes. Syracuse Fiber would convert the sludge into an animal bedding to be used by local farmers. Pactive would use the primary sludge as a feedstock in their own production process. If IP can set up contracts with either of these companies, approximately 22,000 tons of primary sludge would be diverted from landfill annually. IP is also investing several million dollars every 4-5 years in building and maintaining landfills on their company property.

²European Commission. *Reference Document on Best Available Techniques in the Pulp and Paper Industry*.

³TAPPI. *Paper Machine Energy Conservation. Technical Information Paper Tip 0404-63. 2011.*

TESTIMONIAL

“We view sustainability-related risks and opportunities as additional ways to strengthen our business and generate value for our stakeholders today and in the future. NYSP2I provided us with an in-depth assessment that focused on improving areas with water usage reduction and recovery opportunities, sulfuric acid use reduction and alternatives to solid waste disposal. NYSP2I's findings will continue to push our organization to improve our impact on people and the plant.”

– Minas Souris, Manager
Work Systems, International Paper

NYSP2I PARTNERS

R·I·T

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10 Regional Technology Development Centers

Funding provided by the New York State Department of Environmental Conservation.

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