DIRECT ASSISTANCE PROGRAM

CASE STUDY

New York Manufacturing Facility Evaluates Tool to Predict Carbon Performance

A New York facility that manufactures household cleaning supplies is constantly seeking to become more sustainable, as related to improving efficiencies and reducing waste.

Challenge
At this facility, activated carbon is used to recover an important process chemical for reuse in manufacturing. For years, the carbon beds would last approximately 6 months before inline regeneration was no longer effective. The cost to replace the carbon beds was $230,000 per event (including new carbon purchase, old carbon disposal, and labor), and 180,000 lbs/year of waste carbon was sent to landfill.

Several years ago, the carbon began to fail prematurely which resulted in carbon changeover every 3 months with increased costs and waste carbon disposal. One issue identified was that the carbon supplier could not guarantee activated carbon that was manufactured consistently, i.e., location and type of carbon raw material source. The company was seeking assistance to develop a screening tool that can predict carbon performance, thus avoiding shorter than desired cycles and reducing waste/costs.

Solution
The New York State Pollution Prevention Institute (NYSP2I) and the University at Buffalo (UB) worked with the company in an effort to develop a tool to identify reliable activated carbon for use in their process chemical recovery system. NYSP2I and UB performed various analyses on different carbons from both good production cycles and undesirably short cycles. Physical and chemical properties were analyzed including water adsorption capacity, surface area, elemental analysis, and pH at point of zero charge.

Results
After a myriad of analysis was completed that included analysis of physical/chemical properties along with water adsorption and chemical breakthrough tests, one possible approach was identified to provide the company with a diagnostic tool to screen new activated carbon prior to installation. The following results were obtained:

- The carbon that performed well at the facility emanated from a consistent manufacturing source (same location and raw materials to produce the carbon)
- A key finding among the physical/chemical properties analyzed was that the good carbon exhibited high pore volume and high specific surface area

CHALLENGE
- The company was seeking assistance to develop a screening tool that can predict carbon performance, thus avoiding shorter than desired cycles and reducing waste/costs.

SOLUTION
- NYSP2I and UB performed various analyses on different carbons from both good production cycles and undesirably short cycles.

RESULTS
- As a result of increasing carbon useful lifetime from 3 to 9 months, the projected annual cost savings for carbon replacement is expected to be $645,000/year, which includes $25,000/year savings in disposal costs.

- Another key finding that distinguished the good carbon from the poorer performing carbons was that it was most hydrophobic at the relative humidity levels typically found at the facility, an important factor since presence of water can hinder carbon performance

The new carbon is expected to last 9 months. As a result of increasing carbon useful lifetime from 3 to 9 months, the projected annual cost savings for carbon replacement is expected to be $645,000/year, which includes $25,000/year savings in disposal costs. Because the new supplier accepts spent carbon for reclamation, approximately 360,000 lbs/year of carbon waste (based on a 3 month production cycle) are no longer sent to landfill.

NYSP2I PARTNERS

New York Manufacturing Extension Partnership

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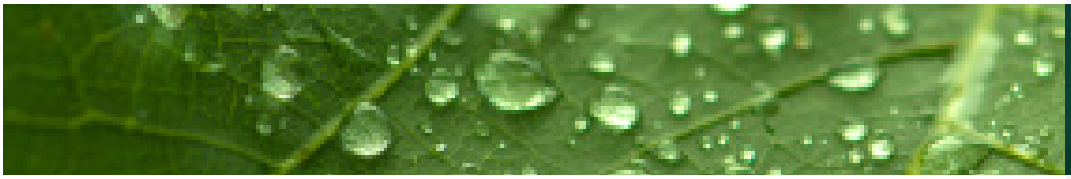

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