Dust-collection system improves recycling plant's air quality inside and out

Dust collection from melt and holding furnaces had been an issue for the Alcan, Inc., beverage-can-recycling plant in Berea, KY. But the air inside the facility is now clean after a installing a CECOaire Fabric Dust Collector System in December 2003. The dust collector system was manufacured by CECO Environmental, a Cincinnati, OH-based maker of large-scale dust- and mist-collection systems. The 176,000 ACFM system with four-module baghouse was designed, fabricated and installed as a turnkey project by a CECO division in four months.

Alcan's Berea recycling facility is the world's largest dedicated used beverage can (UBC) recycling operation. The plant will melt 14 billion UBCs, or close to 200,000 tons this year, representing almost 25% of the total UBCs recycled annually in the U.S. The UBCs form the melt stock for more than 250,000 tons of aluminum ingots the plant will cast this year, most of it shipped to a Russellville, KY, mill co-owned by Alcan, to be rolled again into canstock for beer and soft drinks.

The 500,000-sq.-ft. Berea facility was built in 1989 with a capacity of 120,000 tons of ingot. Expansions have more than doubled that output. However, the original dust-collection system with two baghouses had not been upgraded. "Our existing collection system was overmatched for dust collection at the main doors and charge wells on our four melt furnaces and two holding furnaces," says Steve Salt, Alcan engineering and maintenance manager.

Dust originates after the UBCs are shredded and processed to remove paint and lacquer. The shredded metal, heated above 200 degrees F from the processing, is then charged into the 100-ton capacity melt furnaces. But some remaining paint and lacquer generates ash, oxide and particulates.

"That's where our dust problem originated," says Salt. He adds that while air-pollution codes did not require control measures for the furnace stacks, "We felt the stack opacity was unacceptable from an environmental standpoint, so we decided to take in stack emissions while we were upgrading the furnace collection system."

Alcan's requirements included volume of 156,000 ACFM (actual cubic feet per minute) at 360 degrees F, the installation of four furnace hoods, and connecting the stack emissions into the system. The four-module baghouse was designed with more than 2,500 Arimid fiber filter bags and is insulated with 3 in. of mineral wool to prevent condensation on the inside walls. The dust-laden airstream from the furnaces enters the baghouse modules through a baffled inlet. The baffle causes heavier particles to fall into the hopper while the lighter particles are evenly distributed through the collector. As the air passes through the filter bags, the dust is collected on the outside while the clean air travels up through the inside of the bags to the clean air plenum before exiting the collector. When the filter bags are pulsed with compressed air, the dust falls into a screw conveyor, is carried to rotary discharge valves and falls into collection bags. Dust generated by two melt furnaces and both holding furnaces is collected in the new baghouse while the other two melt furnaces are each collected in one of the older baghouses.

"The amount of dust being collected from the furnaces is much higher than we

anticipated," says Salt. "The bags under the dust collector fill up in a couple of days," which is fine with him. "One of the best sights I see at this plant," he says, "are those full collection bags going to the dumpster twice a week." Filter replacement will not be required for three years, he says, and the changeover will require about two days for all four modules. The individual modules can be isolated for filter replacement so the entire system need not be shut down.

"The air hasn't been this clean in this plant in years," notes Salt. "And the EPA and OSHA are happy that we exceed their expectations, which was the whole point of this project."

CECO Environmental Corp., 3120 Forrer St., Cincinnati, OH 45209; 513-458-2600; www.cecoenviro.com