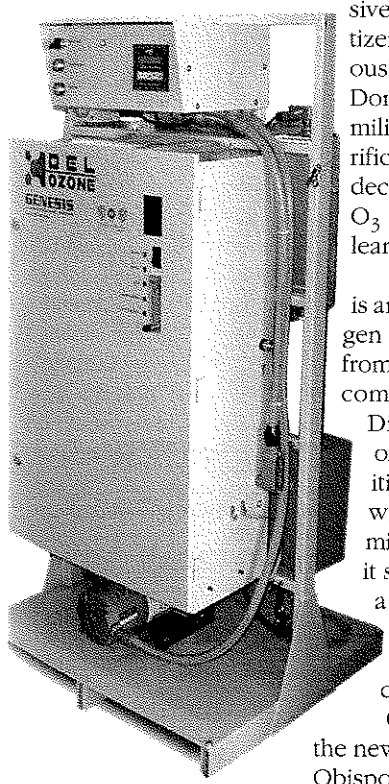
Double Duty

Silver Star Meats uses ozone as both a sanitizer and a post-lethality treatment.

Cross-pollination can be as productive in business as it is in nature. Taking an idea or technique from one industry segment and applying it to another often leads to serendipitous problem-solving, as Silver Star Meats of McKee Rocks, Pa., discovered when the company was exploring options to comply with USDA's FSIS Directive 10,240.4 on *Listeria monocytogenes* prevention in ready-to-eat (RTE) products.

The processor, which manufactures everything from fresh and smoked pork sausages to bacon, skinless and natural-casing wieners, lunch meat, and hams, had recently hired a new maintenance supervisor with a long history in the soft drink industry. With him came extensive knowledge of the use of ozone (O_3) as a sanitizer, a common practice where he worked previously, in a beverage plant, relates Silver Star COO Dominick "Buzz" Bovalina. Bolstered by his own familiarity with the antimicrobial agent as the final purification step in bottled water production, Bovalina decided to investigate the potential effectiveness of O_3 in the meat processing arena. The more he learned, the more impressed he was.



Silver Star's ozone system is accessible from every room in the processor's plant.

Ozone, sometimes referred to as "active oxygen," is an unstable compound that contains an extra oxygen atom. Created in nature by the ultraviolet light from the sun or by lightning, it can also be produced commercially, most often via electrical Corona Discharge (CD). The weak bond holding the third oxygen atom is what gives the compound its sanitizing capability: as an ozone molecule collides with a molecule of an oxidizable substance—a microorganism like *L. monocytogenes*, for example—it splits off and destroys it, leaving only oxygen as a by-product. The process makes ozone extremely effective at inactivating bacteria, viruses, molds, spores, yeast, mildew, and fungi—a welcome advance for meat processors.

One of the suppliers Silver Star talked to about the new sanitizing process was DEL Ozone, in San Luis Obispo, Calif. "The folks there were willing to bring in a portable ozone generator so we could do a trial run to find out what level of O_3 it takes to kill bacteria in our industry," recalls Bovalina. Testing by scientists at the University of Wisconsin-Madison confirmed that the DEL Ozone system produced significant reductions of *L. monocytogenes* on various RTE meat products.

"We were amazed at how effective it was on our equipment, so then we thought we'd look at it as a post-lethality treatment, too," Bovalina continues, pointing out that O_3 is approved for direct food contact as well as for surface sanitation.

In January 2004, Silver Star installed a DEL Ozone recirculating aqueous ozone system in its 40,000-square-foot plant. Application engineering provider Crown Solutions integrated the technology into the facility so the processor could deliver the new treatment without making significant changes to existing production lines.

"We put a piping loop around the whole plant, which gives us the ability to make a drop anywhere we need one," explains Bovalina, "so now we can tap into our ozonated water supply from every room."

Silver Star's DEL Ozone system does dual duty as both a sanitation tool and post-lethality treatment. For example, on the breakfast sausage line in the raw meat area, the tray packer now releases a spray of ozonated water (as opposed to tap water) as it deposits sausage links on styrofoam trays, killing bacteria on the conveyor belt and on the product surface. On the natural-casing pork sausage line, product undergoes an O_3 water rinse after stuffing just prior to the linker. In the packaging room, product coming out of the smokehouse undergoes a three-minute O_3 shower while on smoketrees before it is subsequently bagged and vacuum packed.

"We also ozonate the surface of the tables in our packaging area every 15 minutes, and product requiring additional cutting is sprayed with ozonated water on the band saw as it's being cut," Bovalina says.

The timing of the O_3 application is critical. "You can't just ozonate product and let it sit," he advises. "You need to move it into the package immediately." Nor does ozone treatment mean that other practices can be dispensed with. "It does not replace the step of using a quaternary sanitizer," he says. "The O_3 will give a complete kill but it's gone within a few minutes, leaving no residual protection, so you have to sanitize again before restarting operations."

The lack of residual is an advantage from the disposal perspective. The EPA has approved the direct discharge of ozonated water into the wastewater system, with no need for further treatment. "Many of our customers see a return on investment simply by eliminating the surcharges incurred for sending chemical-laden water down the drain," says Matt Lowe of DEL Ozone. **MP**