

The Annihilyzer solution, from Paradigm Convergence Technologies, leverages hydrochlorous acid to kill germs without toxins, while RFID tracks its 30-day shelf life to ensure it's being used properly.

By Claire Swedberg

Tags: Chemical, Health Care, NFC

Jun 12, 2018—As infection rates remain high at hospitals and other public facilities, some companies are offering a new kind of cleaning and disinfecting agent that eliminates the need for harsh chemicals. But it comes with its own challenge: a highly limited effective shelf life. The answer, for one firm, has been pairing radio frequency identification technology with this natural compound, known as hypochlorous (HOCL) acid, to enable a safe and controlled solution for cleaning a facility.

Technology company [Paradigm Convergence Technologies](#) (PCT) has a patent, as of June 2017, on a Near Field Communication (NFC) RFID-based system used with its electro-chemical activation (ECA)—electrolyzed—and synthesized disinfectants to enable a managed, non-toxic solution for cleaning, sanitizing and disinfecting spaces such as hospitals, dental offices and nursing homes. The [Annihilyzer](#) system consists of the chemical-free liquid to clean and disinfect surfaces, as well as a system to automatically prevent expiration, enabled by RFID.



Multiple hospitals are now trialing or deploying the system to provide non-toxic cleaning of surfaces at their facilities. The RFID system tracks such information as who filled a particular solution container with the product at any given time, where and when it was used, and whether cleaning and disinfecting protocols were followed. This data is then stored in a cloud-based system, so that management can easily retrieve it.

PCT, based in Little River, S.C., was formerly called Bingham Canyon Corp. Its solution centers around PCT's HOCL acid product, created through ECA synthesis. Hypochlorous is a substance produced by the human body's white blood cells to kill pathogens, says Marty Paris, PCT's chief business strategy officer. The acid kills viruses, bacteria and fungus, he says, without all the toxic fumes that bleach or ammonia might produce.

The shortcoming of HOCL acid is that it loses its effectiveness within about a month. Because the solution is naturally unstable, it reverts to saline over time. Therefore, Paris says, if it is to be used in highly sensitive and regulated places, such as hospitals, the date when it is prepared and then used must be closely monitored. The solution to that challenge, he adds, comes in the form of NFC RFID.

With the Annihilyzer system, the solution is produced onsite at a dedicated kiosk. The system includes two products: HOCL disinfectant, and sodium hydroxide cleaner and degreaser. In each case, users must be able to create an electronic expiration date. A built-in RFID reader and a tag on each solution bottle allows that to occur, by tracking not only the dispensing of the solution, but when that solution is used and finally disposed of (if it is expired).

First, a hospital employee creates a new bottle of the product at the kiosk. The kiosk produces and dispenses the solution into the reusable bottle, which has an NFC RFID tag embedded in its label. An NFC reader built into the kiosk reads the tag's ID number at the same time that the bottle is being filled, thereby creating a record of that event in the Annihilyzer software. The software can then track the expiration date and alert the hospital, as well as any users of the solution, once the date has been reached, in order to prevent its use after it is no longer effective.

The second feature of the technology is an app-based system to track how the solution is being utilized, along with the user's adherence to proper protocols. Individuals cleaning a room can employ either a dedicated handheld device or their own mobile phone or tablet to accomplish the process.

PCT provides [Juniper Systems'](#) Cedar and CT5 handheld devices for customers that request a ruggedized reader. However, the company notes, other NFC readers would also work with the system.

To identify the location at which cleaning is taking place, an NFC tag is affixed to a wall near each room. A user can tap the reader or a smartphone next to the tag to launch the app. He or she taps the Annihilyzer bottle with the phone or reader, and the software links the solution to that individual, as well as to the place, date and time. If the product is expiring, an alert is displayed in the app.

Otherwise, the user can follow the instructions in the app, which could consist of industry standards or customized steps input by the hospital to suit the needs of that location. He or she would then select "submit" when finished with the tasks for that room. The system enables management to verify what was done inside each room, Paris says, as well as when and by whom. Users can also set the system to track other events, such as electrostatic spraying of specific areas in the event of a flu outbreak, for instance.

The hospital can use the software to generate reports indicating which jobs have been completed, by whom, when this occurred and what the work consisted of. Management can then log into the cloud-based software to access those reports, or to share them with regulatory bodies. The information allows management to tailor training or to reduce liability issues as well.

PCT gained acceptance from the EPA to use the solution with the RFID technology as a cleaner, disinfectant and sterilizer in public spaces, provided that it is used within the 30-day shelf life. Paris has been working on the system since about 2010, he says, initially with an [Impinj](#) UHF RFID reader built into a kiosk. The benefit of NFC, he explains, is that "it requires a much smaller, less expensive reader," along with a very good read rate. By 2014, he filed for a patent using NFC technology.

According to Paris, the solution would be harder to use without the NFC RFID component, due to the shelf-life concerns. The solution not only benefits those who might suffer health problems from being around chemical cleaners, but also the surfaces the spray touches. Paris notes that cleaners alone can damage or destroy things like mattresses over time. He cites health-damaging materials such as asbestos and lead paint, which have been phased out of commercial use. Doctors have told Paris that the system signals one of the biggest advancements in hospital disinfection in decades. "Without RFID, though, it's hard to use the product effectively," he states.

The system is currently being used at multiple hospitals, including [Johnston Health](#), part of University of North Carolina (UNC) Health Care, and trialed at [SUNY Downstate Medical Center](#), in Brooklyn. The company is customizing its solution for specific end users, Paris says, adding, "We intend to be at the tip of the spear, always." When it comes to providing what he predicts will be a major shift away from chemicals, Paris says, "It's the right time and the right thing to do."