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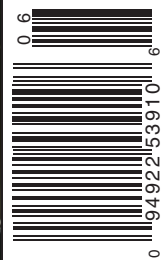
magazine

CLEANING UP THE MESS

Connecticut company devises a
“green” solution for a global
contamination issue



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Dr. John Collins, CEO and
president of Glastonbury-based
VeruTEK Technologies Inc.

Cleaning U



If you've ever tried to get tar or grease stains out of a pair of jeans, you know that a seemingly simple laundering task can prove to be virtually impossible.

Now imagine trying to remove coal tar and a chemical soup of other contaminants from a commercial or residential site—especially when those contaminants are hundreds of feet underground, and must be removed without disturbing the existing buildings or any other properties around them.

Impossible? Not anymore, says Dr. John Collins, CEO and president of Glastonbury-based VeruTEK Technologies Inc. VeruTEK's new, patented technology offers a less labor-intensive and more cost-effective way to break down contaminants at the molecular level, turn them into harmless by-products, and flush them away.

p the Mess

Glastonbury-based start-up firm uses revolutionary “washing” technology to remediate contaminated sites around the world.

By Carol Latter | Photography by Michael J. Fiedler

There are countless heavily contaminated government, commercial and even residential sites in countries around the world. In the U.S. alone, there are hundreds of thousands of abandoned manufacturing plants, commercial real estate properties and waterfront parcels that may pose a risk to human health and the environment.

According to data released by the Environmental Protection Agency (EPA) in 2006, an estimated 294,000 American waste sites require cleanup—at a staggering cost of roughly \$209 billion. In 2004, the EPA put the cost of cleaning up coal tar at utility-owned sites across the country at anywhere from \$26 billion to \$128 billion, and estimated that it would take 30 to 35 years to complete the work.

Traditional remediation methods (soil excavation and disposal, incineration and the pumping and treating of groundwater) have proven costly and ineffective, while

in situ (in-place) technologies like soil vapor extraction and chemical oxidation have had limited effectiveness, depending on the nature of the property and pollutants involved. As a result, most cleanup efforts to date have been aimed at containing the contamination rather than eliminating it, says Collins.

“There’s hundreds of thousands of sites—probably 10,000 in Connecticut—that are not remedied,” he says. “They do present a risk to human health and the environment, and it’s well-known that there hasn’t been a remedy. In the U.S., hundreds of billions of dollars have gone into trying to remedy it, but 70 to 80 percent of that has been spent on attorneys’ fees, for personal injury claims and corporate defense.”

Even worse, contamination that is “contained” in theory often isn’t contained in fact. “All of that stuff leaches into

the groundwater and the environment,” Collins says, noting that in addition to dense contaminants like coal tar that may remain onsite, carcinogens like pesticides and herbicides can be carried a significant distance from the original location by rivers, streams and groundwater to contaminate commercial properties, neighborhoods and schools. Soil gas and even indoor air can be polluted with organic contaminants. “It’s not a trivial problem,” he says.

For businesses and government agencies that may have inadvertently created the mess, it’s a huge problem. Not only do they have to come up with the millions or billions of dollars to try to remedy the contamination itself, but face millions more in potential litigation.

Despite the best efforts of many, the issue has remained intractable. Now, says Collins, all of that is about to change.

New Solutions for an Old Problem

VeruTEK’s principals have developed, patented and field-tested a new technology that will make cleaning up toxic sites almost as easy as pre-treating laundry stains and throwing soiled garments in a washing machine. The company has discovered how to successfully use earth-friendly surfactants

and oxidants (in layman’s terms, soap and bleach) to change the chemical composition of a contaminant and wash it away without leaving any harmful residue. In a nutshell, a made-to-order surfactant mixture is pumped into the ground in a targeted way. The surfactant, with a water soluble head and an oil-soluble tail, meets up with a contaminant—a dense non-aqueous phase liquid (DNAPL), for example—and makes it soluble. The addition of an oxidant (bleach) not only destroys the contaminant in a controlled manner but destroys the surfactant (soap) itself, leaving behind nothing but carbon dioxide, water and clean soil.

At VeruTEK’s private Connecticut-based R&D laboratory, scientists create what Collins describes as “designer solutions” for the particular mix of contaminants found on each job site. He says these specialty concoctions can eliminate or dramatically reduce the levels of petroleum, chlorinated hydrocarbons, PCBs, dioxins, pesticides and herbicides, whether the problem is contamination on the surface, in subsurface soil, in the groundwater or in soil gas.

“We are probably the only environmental technology in the U.S. that has its own private research and development laboratory, and we have four Ph.D.s working for

At a Glance

Company: VeruTEK Technologies, Inc.

Ticker symbol: VTKT.OB

Location: Glastonbury

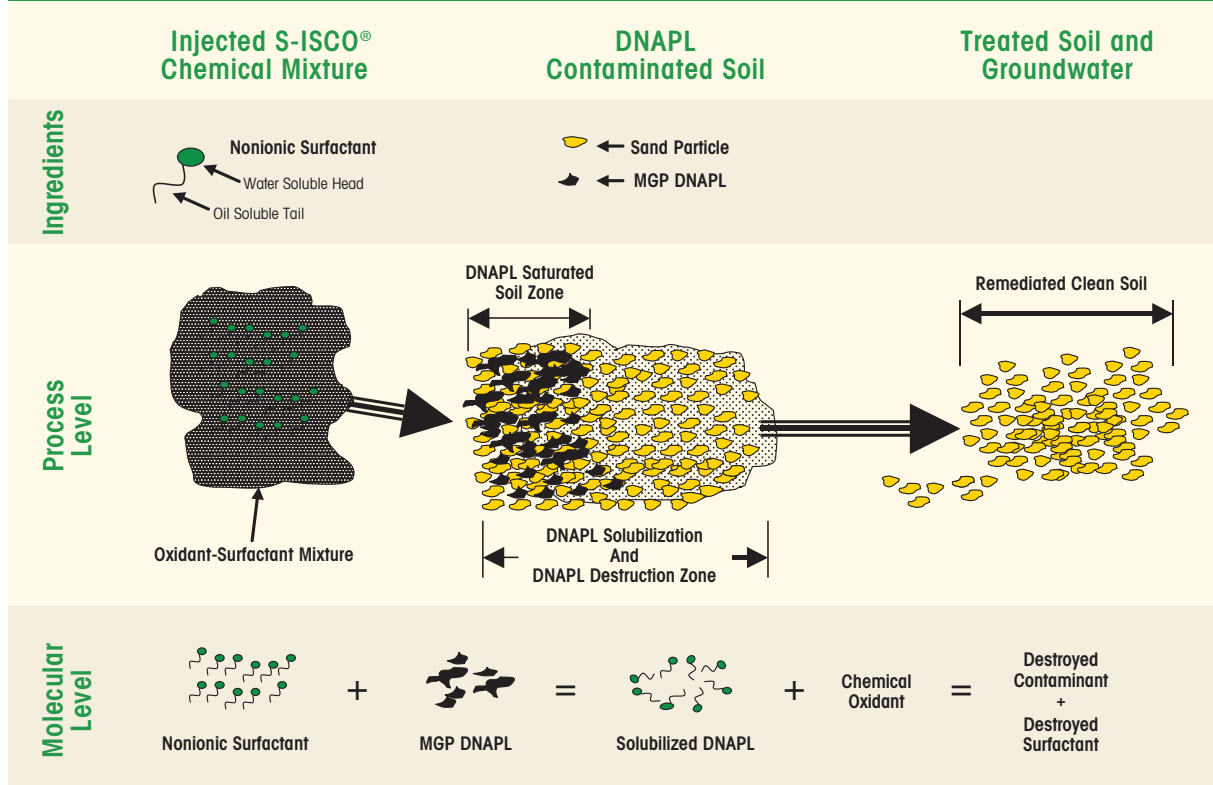
Industry: Environmental remediation

Market: U.S., Canada, Europe, Australia

Investment to date: almost \$2.5 million



S-ISCO Technology



John Collins, CEO and president of VeruTEK, examines a proprietary mixture used to remediate contaminated sites.



us. And what we're doing is developing ... specific, safe green chemical solutions," he says. Our first surfactant is a mixture of citrus, coconut oil and castor oil, and has been used as an air freshener." He adds, "We're the first company to do application of green surfactants anywhere in the world."

Up until now, the main solution has been to excavate to a maximum of 10 to 20 feet—digging deeper would be too costly—then treat the contaminants and truck the affected earth to landfills. "It's an onerous problem and an onerous task," Collins says. "It's a 19th century solution to dig things up and transfer them to another part of the country." That method only serves to move the problem somewhere else, he notes, and is not an option when the contamination is located under existing buildings.

VeruTEK's *in situ* approach is far more workable in virtually any situation, he believes.

"The technology is complex," Collins explains. "It's very difficult to get the oxidants and surfactants to work together in a

washing machine, let alone in the soil. But we felt if we could get the surfactants and oxidants to the contamination, we could have a safe and effective remedy for any kind of contamination, on any site, instead of excavating. We now can do that, and direct it. It could be underneath a school or a 50-story apartment building in New York City."

Although the company is just 18 months old (it was founded in December 2005), VeruTEK now has clients from as far away as Australia, who are embracing a new approach to their long-standing problems.

Clients include utilities, former manufactured gas plants, municipalities and land development companies. "We're working in a major U.S. city with major contamination in the downtown area that cannot be remediated except using our technology," Collins says. VeruTEK's services are also in demand by the Department of Defense and Department of Energy, which have contained "a tremendous amount of contamination." One such site, he says, is located near a pristine part of the Columbia River.

"We've also got a lot of business and contracts with large consulting firms, large chemical companies, *Fortune* 500 companies and *Fortune* 500 environmental firms," Collins adds. "We're extremely busy."

Big Plans

The company, which went public in May (ticker symbol: VTKT.OB) and will open a new Bloomfield facility containing two 12,000-square-foot laboratories in August, is clearly thinking big as it looks to the future. "Our revenue projections are fairly high and we think we're going to meet them," Collins says. VeruTEK is currently seeking international partners, investors and licensees as it works to bring its goals to life—not only to grow the company into an international green technology firm, but to undo the damage and risks caused by decades of toxic polluting, one job site at a time.

The company's principals plan to grow four distinct revenue streams: remediation of contaminated sites, green chemical

development for environmental cleanup; licensing of its technology to other companies; and remediation of distressed real estate whose value has been compromised by contamination.

Collins says the firm has already developed four “green” surfactants under the brand VeruSOL, which the company describes as “a proprietary mixture of a food-grade citrus-based cosolvent and surfactants made from organic plant oils.”

these properties [to permit] sale and resale,” he says. “A partnership or joint venture with real estate investment companies to clean up urban, contaminated properties is potentially VeruTEK’s most lucrative revenue stream.”

The U.S. real estate remediation market is huge, Collins says, noting that New York City alone has roughly 4,000 acres of brownfields sites and almost 3,000 waterfront acres that are essentially unusable.

A Strategic Partnership

Collins, 48, and his partner, Dr. George Hoag, 53, bring a wealth of background knowledge to the field. Mike Vagnini, VeruTEK’s CFO, who was a senior vice president and corporate comptroller at Chemtura Chemical (formerly Uniroyal), rounds out the executive team.

Collins, who grew up in Glastonbury, has a Ph.D. in soil physical chemistry from the University of California and spent 15 years as a consultant for the Department of Defense, the Department of Energy and the EPA, as well as *Fortune* 500 companies, on environmental risk, remediation, liability and insurance cost recovery. On one of the projects he was involved in, Collins served as an EPA representative tasked with deciding how to govern the cleanup of bomb production facilities.

Hoag, VeruTEK’s senior vice president and director of research and development, holds a Ph.D. in environmental engineering as well as four patents, and has written more than 200 peer-reviewed scientific papers.

The two men met several years ago, and quickly found they had much in common, including a burning desire to clean up the planet. Both had previously run and been involved in environmental remediation companies, and Hoag—an engineer who has been working in oxidation chemicals for 30 years—was the primary inventor of systems that earned the first two (and only two) patents for the use of persulfate in remediation.

It wasn’t long before an exchange of ideas translated into action.

“We both had this idea independently before we met. Then George and I got

The U.S. real estate remediation market is huge, Collins says, noting that New York City alone has roughly 4,000 acres of brownfields sites and almost 3,000 waterfront acres that are essentially unusable.

These and other products under development may be used by a variety of clients to clean up environmental contamination.

As well, he says, the firm’s technologies could have a significant effect on the brownfields real estate market, since its *in situ* solutions can safely remove contamination in cities and residential areas without having to destroy buildings or move residents. “VeruTEK technologies can be used to essentially eliminate the stigma of

“Contamination diminishes real estate,” he explains. “There are literally trillions of dollars’ worth of contaminated properties that people can’t live in. The solution should not only be a win for the client but a win for the community, so we really would like to help clean up these cities. These remedies aren’t expensive; they’re doable and they’re safe, so there is no reason we can’t help [the situation]. We think this is going to transform the environmental market.”

How does it work?

- A client with a contaminated site provides VeruTEK with information about the site and a sample of the most contaminated part of the property.
- VeruTEK designs a solution in its lab and develops a model for implementation, a process that takes two to three months.
- The firm examines the groundwater flow, locates the contaminants, and models how to best send the surfactant-oxidant mixture to the contamination source.
- Quiet, fully automated, state-of-the-art injection systems are used to regulate the flow of surfactants and oxidants into the ground.
- The surfactants and oxidants destroy the source material in the soil and groundwater, while managing, reducing or destroying the soil gas coming from it.
- VeruTEK verifies that the contamination has been eliminated to ensure complete remediation.
- The process generally takes about six months.

together and came up with an in-place remedy that involves natural surfactants, and is FDA approved,” Collins explains. A one-year, \$2 million bench scale laboratory test, which involved cleaning a large column impregnated with coal tar, followed.

The pair’s success in that task led them—along with additional partners, including Peter Perakos II, who now serves as corporate counsel—to take out hundreds of thousands of dollars in personal loans apiece to finance their early stage company. Soon after, VeruTEK landed a large pilot stage field test by a client looking to clean up a manufactured gas plant (MGP) site in New York state.

“Our part was about \$1.7 million. It was extensively monitored by us and overseen by a third-party consultant. There was much more coal tar than we thought, and the results were amazing—better than the bench scale tests. We had ‘before’ pictures, and when I looked at the ‘after’ pictures, I was astounded. It was an unbelievable moment,” he recalls.

“The third-party consultant said we could ‘completely or nearly completely’ destroy the organic contamination anywhere in the soil, deep or shallow, anywhere on the site. We were able to target the contamination, and it was the first green solution ever.”

The still-young company has had its share of successes since then, but a number of hurdles remain. One is attracting the scale of investment needed to put the company’s big plans into action. Venture capitalists are coming around slowly, he says, but Collins is not shy about saying that money is required to make VeruTEK’s dream a reality.

“Our biggest problem right now is there has been 30 years of trying and not doing, so there is a lot of cynicism in the market. We’re focusing on keeping a positive attitude and trying to change the market dynamics.”

He has no qualms whatsoever about the technology itself, or its potential for cleaning up the messes left behind by a hundred or more years of industrial waste generation. “We know we can do it. We can do it effectively and safely. This can be done, period.”

Until now, he says, businesses have been focusing on the magnitude of the problem, and many had given up on finding an effective solution. “Of the people we approached, one out a hundred supported us; the rest said, ‘It can’t be done.’ We’re saying, ‘It must happen.’ In 10 years, I’d like VeruTEK to be the best environmental technology company in the world, developing solutions for not only soil, water and soil gas, but also other environmental problems. We solved this problem that nobody else solved, using the right mindset. We think we can solve other environmental problems too.” 