

TERRATHERM ENJOYS RAPID GROWTH AS ISTR GAINS INDUSTRY ACCEPTANCE

For developers of innovative environmental technologies, it has to be a gratifying feeling when, after years of working hard to prove the technology and convince skeptical or cautious regulators and responsible parties to give it a chance, the technology finally gains acceptance in the marketplace. It must feel even better to win an expanding number of jobs calling for you to deploy the technology and to watch your revenue grow. At last, you're doing well by doing good.

TerraTherm, Inc. (Gardner, MA), a provider of in situ thermal remediation (ISTR) technologies for cleaning up contaminated properties, is now firmly in that position. The 15-year-old company won a 2014 EBJ Business Achievement Award for growing revenue nearly three-fold to \$30 million over the prior three years and for substantially diversifying its project portfolio. The firm is looking forward to continuing that level of success, as it has built a backlog and near-term project pipeline supporting a forecast of \$36 million in revenue for 2015.

TerraTherm is one of a very small cadre of ISTR technology providers, and it's the only firm that offers all three of the most commonly accepted techniques—electrical resistance heating (ERH), steam-enhanced extraction (SEE), and thermal conductive heating (TCH)—according to John Bierschenk, TerraTherm's president and CEO. "We're the only firm out there that can bring these technologies in combination," he tells EBJ. TCH and ERH work well in low-permeability settings, such as subsurface conditions with tight clay or silt where bioremediation and chemical oxidation won't be effective, while SEE "is excellent for highly permeable subsurface, like gravels."

The use of ISTR technologies for the treatment of source areas "has become much more widely accepted since they were first introduced in the 1980s," Bierschenk tells EBJ. "More ISTR projects have been awarded in recent years than ever before." Although the exact number of ISTR projects awarded in 2014 is not known, the 13th edition (2010) of the U.S. Environmental Protection Agency's (EPA) Superfund Remedy Report records that, from 1982 through 2004, only a total of 10 ISTR technologies were selected by the EPA to treat source zones, while from 2005 through 2008, 12 ISTR projects were chosen. "It is important to note that the Superfund Remedy Report only takes into account EPA Superfund sites, which represent but a small portion of the entire remediation market," Bierschenk points out.

There are many reasons why TerraTherm has been successful, he notes. "ISTR technologies provide thorough and effective treatment of organic contaminants in source zones. The cleanups are completed relatively quickly—in months as opposed to years or decades when compared with other 'traditional' passive subsurface technologies, including pump and treat and multi-phase extraction. There are multiple ways to monitor treatment when using ISTR, and creative designs can minimize the disruption of roadways and neighborhood settings."

These are the demonstrable virtues of ISTR; it still took some time to convince potential clients of those virtues. "Thermal remediation is like any other technology: there's a period during which people are skeptical, then there are early adopters who will take a chance, and then the technology is proven and accepted as a mainstream approach," says Bierschenk.

"After 15 years, we have done 40-plus projects, and our track record is good," he continues. "On every project, we've successfully achieved our cleanup goals." Getting to this point has meant publishing articles in as many journals and other venues as possible, to report on the performance of ISTR and to clearly describe the situations in which it is an appropriate remedial solution and those for which it isn't.

"We wouldn't use it to treat a groundwater plume that's a mile long, but you might use it to reduce the size of the plume by shrinking the source," says Bierschenk. "We're working on such a site now and producing a peer-reviewed paper to demonstrate our success in helping to shrink a source and get to the required cleanup levels.

"We've had some pushback about ISTR's impracticability, but we've changed that view over the years," he continues. For example, cleaning up chlorinated solvents in bedrock is now practical. "The technology has come quite a ways over the past 15 years."

Of late, TerraTherm has increasingly been called upon to deploy ISTR techniques on large-scale projects. In 2014, the firm completed its work on the largest TCH project ever, at a former aircraft manufacturing site in Teterboro, New Jersey. The company used TCH to treat a 3.2-acre area with more than 122,000 cubic yards of soil contaminated by chlorinated compounds such as tetrachloroethylene, trichloroethylene, vinyl chloride, and Freon-113. TerraTherm won another 2014 Business Achievement Award for the job, as did consulting and engineering firm O'Brien & Gere (Syracuse, NY) for its design of the remedial program strategy at the site.

Also in 2014, TerraTherm designed, constructed, and started up operations of the largest in situ thermal project ever attempted in the world, at the former Wil-

liams Air Force Base in Mesa, Arizona, under the Department of Defense's (DOD) Base Realignment and Closure Program (BRAC). The SEE system deployed at the base is treating a subsurface volume of 410,000 cubic yards, containing up to 2 million gallons of jet fuel, to a depth of 245 feet below ground surface.

TerraTherm's success has begun to spread to non-U.S. markets. A big job in Vietnam, using an above-ground, "in-pile" variant of thermal technology to clean up dioxin contamination, is ongoing and has been successful to date. The company has also won projects in the United Kingdom, Denmark, the Netherlands, Switzerland, Brazil, and Japan.

Looking at the company's "short-term" international pipeline—negotiations that could close in 2015 and 2016—Bierschenk sees about \$76 million in "high-probability" work on the horizon. Four prospective projects are in Brazil, which the company views as a major opportunity.

China is another. "We used to get calls for a one-off project, asking for a price," says Bierschenk. "Now, we've got three or four joint venture partnerships or multinational environmental consulting companies approaching us to partner with them and help bring our expertise to China. Our technologies would give them more tools in their toolbox, and thermal is naturally a fit for a number of sites.

"I think countries are placing a higher priority on dealing with contaminated

sites," he goes on to say. In Europe, for example, the principal approach to dealing with contaminated sites was "dig and dump." Essentially, "they would dig up contaminated soil and pretreat it and then landfill it. What we've seen in the last couple of years is a big shift towards adopting U.S. technology, and they see thermal as really working."

As successful as TerraTherm has been over the past three years, the company still has to deal with the fact that remediation remains a very "lumpy" business, according to Bierschenk. Although a number of projects are moving through the pipeline, he finds that it always seems to take longer than originally scheduled to close a deal or get the equipment to a site and start up operations. "You build your financial models around the designs in the works and their timeframes, and a lot of things along the way change or shift, so you are left with low spots where you thought you would have the business but don't. It's a matter of trying to deliver on schedules that you think are firm but are actually in flux."

To deal with that issue, TerraTherm in 2014 introduced a program of "Tier One" pricing for smaller-scale, commodity-type sites, like gas stations and dry-cleaners. For these kinds of sites, a more streamlined, standardized treatment package can be delivered quickly and effectively.

These jobs will "fill the gaps between the big projects that we're doing more and more of—the \$15 million to \$20 million projects," says Bierschenk. "We excel at

those jobs—and only TerraTherm has the broad engineering capability to deliver—but they require more planning and approvals, and clients are much more cautious about proceeding. These smaller jobs need to get done. We can get in and out quickly, with little disruption to the business." ■

*Excerpted from the Remediation 2015 edition of EBJ and reprinted with permission from Environmental Business International Inc. All rights reserved.
© 2015 EBI Inc., www.ebionline.org*

Environmental Business Journal ® (ISSN 0145-8611) is published by Environmental Business International, Inc., 4452 Park Blvd., #306, San Diego, CA 92116. © 2015 Environmental Business International, Inc. All rights reserved. This publication, or any part, may not be duplicated, reprinted, or republished without the written permission of the publisher.

To order a subscription, call 619-295-7685 ext. 15 or visit us online at www.environmentalbusinessjournal.com. The annual subscription rate for standard paper copy is \$995. A corporate electronic subscription with internal reproduction license starts at \$1,250.

Editor in Chief, **Grant Ferrier**
Senior Editor, **George Stubbs**
Research Analyst, **Jenny Christopher**

Federal Analyst, **Andrew Paterson**
Research Analyst, **Jim Hight**
Managing Editor, **Lyn Thwaites**

EDITORIAL ADVISORY BOARD

Andrew Paterson, Chairman; **Dr. Edgar Berkey**, Vice President, Concurrent Technologies; **Richard Fortuna**, President; Strategic Environmental Analysis; **Daniel Noble**, Founder, Resource Trends; **Paul Zofnass**, President, Environmental Financial Consulting Group