CASE STUDY

URS + willowstick

# URS FINDS CERTAINTY, BEATS DEADLINE WITH HELP FROM WILLOWSTICK

**ONE OF THE BIGGEST THREATS** to public health today is unsafe water. A billion people across the world don't have access to clean drinking water, in part because many subsurface aquifers have been poisoned.

Perhaps the most famous example of this was the Love Canal crisis of 1978. The Niagara Falls neighborhood experienced high rates of cancer, birth defects and other sicknesses due to buried waste. The cleanup and subsequent legal battles and reputation damage cost millions of dollars. More than anything it served as a wake-up call to the modern world that humanity can poison the very water that keeps it alive.

Thanks to government regulation and corporate responsibility, groundwater poisoning is on the decline, but lax environmental regulations in the past have to be dealt with now.

Finding which streams are toxic and identifying their overall threat is a steep task, but new technology can show where the water is heading and if it's a threat to the general population.

## THE CHALLENGE

URS Corporation is an internationally known provider of professional planning, engineering and architectural design, environmental, construction, and program and construction management services. Companies and governments worldwide turn to the San Francisco-based engineering firm to manage a variety of projects, including environmental and water management.

One of URS' most important clients is the United State Air Force. The Air Force owns over a million acres in the West Desert of Utah, where they run

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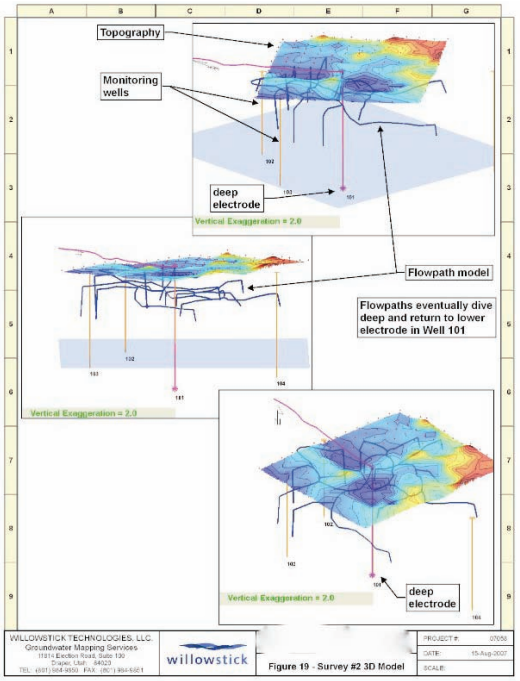


3D models for groundwater preferential flow paths depict how groundwater is moving through the study area in the subsurface.

countless tests and munitions testing, as well as trying out new combat tactics and techniques. Before the risks associated with groundwater contamination were well known and regulated, the Air Force regularly would expel chemicals onto the ground in this area, and over the ensuing years those chemicals have slowly pervaded the substrata.

Gabe Gabrielsen, a project manager with the Salt Lake City URS office, was asked to help identify and characterize locations on the range where waste dumped as long as 40 years ago could cause groundwater issues.

"The wastes are all unique in character, and many of the sites have high risk from unexploded ordinance," he said. "But there are other sites out there where other types of waste – chemical waste, solvent waste and so forth – have been disposed historically because it's so remote, and that was the way it was done."

Gabrielsen's job is to find those sites, investigate and characterize them, and to the best of his abilities recommend solutions. Overall, the Air Force has pledged to find remedial solutions for all such sites by the year 2012. The approaching deadline, complexity and potential risks associated with these sites meant that URS had to be efficient and cautious without sacrificing intelligence.

"That schedule is a pretty tight schedule when you consider all the reviews and the many agencies that have to get aboard and make comments," Gabrielsen said. ""We wanted to be sure we understood the stratigraphy and groundwater flow carefully and clearly. We wanted to make sure we left no stone unturned so we wouldn't get a comment a year or two later in the process that would send us back to the site and put the Air Force at risk of missing its goal."

The particular site Gabrielsen was tasked with examining is a gravel pit that was a former disposal site. The chemicals unloaded there were a "cocktail of petroleum, hydrocarbon-type materials, spent fuels, lubricants, and occasionally some spent solvents," according to Gabrielsen.

The task was to learn as much as possible about every square inch of space around the gravel pit and assess whether the waste and resulting runoff posed any threat to the outside world. One of the critical aspects of accomplishing that would be to find the path of contaminated groundwater and determine if it connected with collection points or other flow channels.

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(Top) Willowstick operator prepares electrode antenna wire prior to energizing the survey area. (Bottom) Willowstick operator collects magnetic field readings using the AquaTrack instrument. The instrument detects magnetic fields using specialized, highly sensitive magnetic coils

Considering the large size of the gravel pit and the complicated ground composition, finding an efficient yet accurate method of measurement was a challenge.

"When you drill you get a small hole in what may be acres and acres of space," Gabrielsen said. "You have this spot in time and space you're looking at and trying to gauge the characteristics of the subsurface. That's a difficult thing to do."

URS needed a way to positively identify the subsurface characteristics. The information pulled needed to be absolute, without having to extrapolate, and it needed to be efficient for time concerns. If the data pulled was faulty or even outright wrong, the consequence would be a blight on the relationship between the Air Force and URS, as well as the need for further examination—which could cause both entities to miss the 2012 deadline, with substantial financial assets endangered on each side.

Willowstick operators install electrode-antenna wire on the surface of the ground.

## THE SOLUTION

Through introduction efforts on Willowstick's behalf, some at URS were familiar with their technology, specifically AquaTrack(TM).

AquaTrack works by measuring magnetic fields generated by an AC current running through small electrodes in the area where the water is contained. After multiple unobtrusive readings taken by a Willowstick engineer, the data is applied to mathematical algorithms and used to create contoured maps of the subsurface water paths. There is no penetration involved, no large equipment and no extra personnel to manage.

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GABE GABRIELSON
SENIOR PROGRAM ENGINEER, URS

After agreeing to a proposal and budget, Willowstick was on site taking measurements within days. As the readings progressed, they were able to provide URS with early results to study. Finally Willowstick presented a full book of maps and data, showing precisely the wells and flow paths that URS had been looking for.

"Our main objective was to do the horizontal dipole approach, where we had an electrode in each of two wells," Gabrielsen said. "That was our most

valuable outcome of the study. When we looked at the data from that and mapped up the actual data against the no-anomaly, no-perturbation model, they were a close match which demonstrated to us that we did indeed have a very flat, very quiescent water table and no preferential pathways or collection points."

"What we found is what we hoped to find: no preferential channels. That figured very strongly into our remedial investigation report, where we were able to say we understand this site, we understand the groundwater, where it is, where it's going, how fast. Now our story is very, very strong."

## THE BUSINESS BENEFIT

For Gabrielsen, the information AquaTrack pulled meant confidence. The information matched his other resources and made it 100% clear that the contamination was isolated.

"It was a way for us to close out potential criticisms and critiques later in the process," he said. "It was data we procured, consciously, to protect us against the need to come back out later, having lost a couple years and hustle up another answer."

Willowstick stayed within the allotted budget, and completed their work in the narrow window URS had set. In turn URS was able to integrate the data into their reports in a timely manner. In total, the process from initial discussions to the final data book took just over four months.

"We've been happy with our relationship with Willowstick," Gabrielsen said. "The objectives we had coming into this project were met. I'm very confident we have a very strong story and I think our findings will flow more smoothly through the process because we were able to add this additional line of evidence."

Now that URS has wrapped up the majority of their work on the site, their findings are being circulated through the various government and regulatory bodies with plenty of wiggle room before the 2012 deadline. Thanks in part to Willowstick, URS was able to submit information unlikely to be second-guessed and not left open to interpretation, which means more beneficial work for them down the road.

For more information on Willowstick and AquaTrack, visit willowstick.com

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