LOCUS TECHNOLOGIES PURSUES INDUSTRY TRANSFORMATION THROUGH WEB-BASED INFORMATION MANAGEMENT

As a privately owned company, Locus Technologies (Walnut Creek; www.locustec.com) has been in business since April 1997. However, as the successor to Canonie Environmental Services, which was formed in 1948, Locus builds on a 50-year reputation. Locus's principal business is information management in support of compliance, consulting, and remediation activities at impaired sites and monitoring for the environmental and homeland defense industries. Locus's hosted software solution, LocusFocus, is a comprehensive package to manage information collected and developed as part of these environmental activities. As one of the first systems developed for the web, LocusFocus gives clients universal access to data previously stored in non-integrated and diverse silo systems. Locus has offices in San Francisco, Silicon Valley, Sacramento, Middletown and Los Angeles, California, as well as regional offices in Phoenix and Boston and international headquarters in Paris, France. Annual revenues are about $15 million, and the company has about 60 full-time and part-time employees. Neno Duplancic is the company's president and CEO.

EBJ: How has business been in general the past couple of years?

Duplancic: Business has been great. 2004 was our best year ever, and it appears that 2005 will be even better.

EBJ: What kinds of opportunities have arisen from hurrican response or domestic security?

Duplancic: Locus has offered to open up its web-based system for management of environmental information associated with the aftermath of Katrina to selected contractors. We are currently in discussions with two of them. We have been active on several fronts in domestic security. We have been selected by Arizona Department of Environmental Quality to perform a vulnerability assessment for water and wastewater treatment plants. We have also been developing our database technologies to be on the receiving end of sensors that are increasingly used in the homeland defense industry. We see sensor interfaces to our web-based databases as a growing segment of our business.

EBJ: What has been the principal aim of your strategy over the past couple years?

Duplancic: Locus's principal strategy has been to deeply penetrate markets for environmental information management and become the market leader with the largest share of the analytical information management market. We have succeeded. Our strategy centers on a simple question: How can we give customers better and better service for fewer and fewer dollars? The answer is, by applying innovative ideas to site closure strategies and automating the flow of site information from cradle to grave over the Internet.

We provided the answers to our customers with an altogether different kind of thinking about site closure, regulatory agency negotiation, and long-term operation and maintenance. Today, over 5,000 sites are already benefiting from Locus's state-of-the-art, web based, on-demand information management technologies.

Our technologies give new life to our customers' existing data and turn it into powerful information in ways never thought possible before. We come up with new, more effective closure at a lower cost of engineering, lower cost of implementation, and lower cost of long-term O&M. We believe in the power of simple ideas, and we help customers balance and optimize their remediation dollars. We engineer cost reductions of the overall program, not just one component. We understand the complexities of the site closure process and can therefore help deliver better solutions, customer satisfaction, and tangible return on investment.

Above all, we understand the flow and manipulation of environmental information. Two-thirds of billable hours in this industry are spent on searching for information and data, and only one-third to provide the solution. With rapidly evolving environmental information technology, mounting evidence of quality, safety and efficiency benefits, and a regulatory imperative, the market for environmental information management in the United States is on track to grow by two-thirds by 2009.

We've made so much progress so quickly, and I'm excited about what we will be bringing to market in the months ahead. Still, the work has just begun on what we regard as a long-term project that will take years to reach its full potential. Change will come, and we aim to accelerate it. Tipping points can be postponed, but they can't be stopped. Locus focuses on building technologies that can hasten tipping points and benefit from change. In new markets, disproportionate success comes to those who rapidly build momentum and aggressively strive to be the leader.

We are not a "one-stop-shop," nor do we strive to become one. We do not implement a portfolio strategy of placing bets on a lot of technologies and hoping a few will be successful. Instead, we attempt to do a few things big and well. After we developed our technologies and retooled everything to the web in late 1990s, our primary focus has been on educating customers about what they are missing by not deploying web-based technologies to manage environmental data and information. "If you cannot measure it, you cannot manage it" has become our key communication objective to our clients.

Many consultants are reluctant to suggest that their clients implement these systems, because automated systems will reduce the clients' dependence on them and reduce the amount of billable hours. In the long run, as the economics and the advantages of the Internet become more clear, we expect more companies to require their consultants to use the web-based technologies both as the repository and as the vehicle for data acquisition, storage, and delivery of all key project data and documents. Such a change in how companies manage their information only touches upon the vast potential of the technologies in existence today. The progressive companies such as Alstom, Honeywell, Chevron, ExxonMobil, and Raytheon are already doing it, and we are helping them. Others will follow soon.

EBJ: How has information technology changed the face of the environmental industry in the past decade or so?

Duplancic: It's changed the industry tremendously. We built a $15-million company in less than eight years by pioneering information management technologies in environmental markets. There is still an enormous amount of work to be done, but lots of progress has been made. Many industries

are on the brink of disruptive change, and we aim to bring such a change to the environmental industry's emerging opportunities. Customer needs are often not being met, usually because the incumbent vendors are risk-averse, looking to defend the status quo, and reluctant to embrace new approaches. Opportunities for innovative new ideas and breakthrough ways of doing things are thus left undiscovered, under-financed, or undone—and clients are left under-served.

The core of the information management problem in the environmental industry is this: The investigation and cleanup of contaminated waste sites produce enormous amounts of data on the nature and extent of contamination at a site. At larger, more complex sites, it is not uncommon to drill several thousand boreholes and wells, collect tens of thousands of samples, and then analyze each of these for several hundred contaminants. As detection technology improves and human exposure to low-level contamination is linked to more incurable diseases, more testing will be required for increasingly smaller and smaller concentration levels.

All this information, which may eventually include a million or more sampling and analytical records, is typically entered into a spreadsheet or some other electronic format. Beyond the raw data for on-site conditions, numerous documents are created, including technical drawings, legal contracts, purchase orders, permits, and project schedules—not to mention all the assorted reports that must be submitted to the appropriate agencies. These reports include sampling and QA/QC plans, investigative reports, remedial alternatives' analyses, and proposed cleanup plans. Most consulting companies are ill-equipped to deal with these avalanches of information.

Technologies that would lower the costs of data acquisition, storage, and retrieval, such as hand-held electronic devices, remote-control, and automation systems, more accessible web-based database management systems, and electronic data validation, are not often adopted by consulting firms. Many lack the resources to invest in research and development, or they don't want to risk losing billable hours while implementing new technologies. For consulting companies in the environmental business, having satisfied clients is important, but so is racking up billable hours.

Perhaps most telling is the level within client firms at which decisions about envi-

ronmental data management are made. Because clients do not perceive themselves to be in the information technology business, top-level management rarely gets involved. Instead, IT decisions are more often placed in the hands of environmental project managers. They often reject a new technology because the implementation costs are perceived to be too high to be borne by their project alone. Or they may permit a test run, but the review is placed in the hands of the very individuals whose workloads would be threatened by the new tool.

Clients of environmental firms cannot be depended upon to demand the use of better tools and more efficient work practices. On many occasions in recent years, I've met with clients that have many contaminated sites, and I've asked to hear more about the general condition of their sites, the monitoring and reporting commitments that exist at each, and the status of the records (both paper and electronic) that document site conditions. Invariably, the people I speak with are quite knowledgeable about current and past site conditions and remediation measures that have been undertaken, but are not well informed about anything pertaining to record-keeping or information management. There seems to be little correlation between a client's level of understanding of these matters and its business type, size or, most surprisingly, the sophistication of its IT infrastructure.

What accounts for such ignorance? Most records pertaining to a client's sites and all of its sampling and analytical data are kept by its environmental consultants. When given the opportunity to dig into these matters, I find that the client's data is stored in older systems or spreadsheets that are not accessible by either the client's employees or its other consultants. As a result, the client, who has already paid for the data once, is charged again whenever it makes a routine call to request information. Worse, when one consultant has a data set that another needs, the "owner" of the data charges the client to download it while the other consultant charges to upload it.

Clients don't need to accept this chaos. Technologies exist to deal with it, particularly those based on XML (eXtensible Markup Language). Clients should move their records from individual (and often incompatible) databases of their various consultants to a central web-based repository where they can be accessed by all parties in-

volved, thus eliminating data transfer costs, issues of data inaccessibility, and the endless need for synchronization that plagues so many projects. For a large corporation that currently spends $100 million per year on environmental monitoring, the savings could add up to 30% or more.

Many of the problems and inefficiencies that I have described can be eliminated or reduced by turning to Internet technologies. A single, easy-to-query Internet-based environmental database management system into which all consultants upload their field and analytical data eliminates the incompatibility and accessibility problems described above. There is no need to transfer data from one party to another, because all interested parties, including not only the various consultants, but the customer, and perhaps regulatory personnel as well, are able to query and, as needed, download information from the same database using their web browsers.

EBJ: What is the status of electronic reporting of environmental data or compliance information to regulators or agencies? Roughly what percentage are we at, where have we come from and how far can we go?

Duplancic: Many regulatory agencies already require electronic reporting. In California, for example, Electronic Data Deliverables (EDDs) that meet the state of California's Water Resources Control Board AB2886 reporting standards are now a requirement. Other states, such as New Jersey, Texas, and Colorado, also have various electronic reporting requirements.

I believe that, in next five years, all agency reporting will be in electronic format via the web. Currently, only about 5% of industry is doing electronic reporting, and less than 1% of companies (owners) maintain ownership of their data in centralized electronic systems. This will rapidly change in the years to come not only because of operational efficiencies and lower costs but also because of the Sarbanes-Oxley Act of 2002, which requires companies to report environmental liabilities in an auditable way on their balance sheet. Right now, the environmental liability assessments and disclosures are subject to unprecedented scrutiny, with new regulatory drivers for auditable reporting. At the same time, Sarbanes-Oxley increases the personal accountability of corporate officers and directors for inaccurate or misleading disclosures.

EBJ: What specific drivers do you see for the use of your technology or software or system?

Duplancic: Various components of our technology have different drivers. I've already mentioned the requirements in California and some other states for electronic reporting. Air management and compliance has different set of drivers, such as Title V reporting. Our waste management module, eWaste, is driven mostly by the demands imposed by departments of transportation and the requirements for electronic reporting. Probably the biggest driver of all for our clients, however, is the fact that they gain ownership of their data, which cost them lots of money to gather. Every multimillion-dollar cleanup decision is made on the quality of the data. How can any company afford not to own and control information that is so crucial for successful reduction of their environmental liability?

EBJ: Is IT enabling a new service, or is it for efficiency, or productivity, or to reduce costs in some way?

Duplancic: A BTI report titled *E-strategies for Environmental Management* estimates that for every dollar spent on environmental management, another $1.75 is spent on managing related information. Sooner or later, large businesses must attack and eliminate this inefficiency in managing their environmental liabilities, particularly now that the Sarbanes-Oxley Act of 2002 requires them to report environmental liabilities in an auditable way on their balance sheet. I mentioned Sarbanes-Oxley in the preceding answers as a big new driver, but there are many other drivers as well. Environmental compliance ranks high on the list of corporate responsibilities, and most large companies agree with the concept of environmental management. The global environmental technology and services market is now worth more than $550 billion. Companies operating environmental management systems (EMSs) make better use of resources and usually find it easier to comply with local and international regulations and laws, thereby saving money. Systematic structure, planning, and internal auditing allows for better monitoring and measuring of environmental compliance. Furthermore, companies that are able to prove they are being environmentally responsible are increasingly attractive to investors, particularly since the creation of the Dow Jones Sustainability Index.

EBJ: Where do you see your best growth opportunities in the short- and long-term in monitoring and information?

Duplancic: There are two more hurricanes of environmental information being formed and ready to hit the corporate environmental departments soon. First, non-point source (NPS) pollution impacts the quality of our air, surface water, and groundwater. It is also known to cause both short-term and chronic human heath problems and, in the case of such pollutants as diesel exhaust or pesticides, is believed to be capable of causing cancer. The requirements for monitoring those pollutants will dwarf requirements for monitoring any point source sites. Second, real-time monitoring of existing treatment plants or impacted media, such as air, water, groundwater, and soil at existing contaminated sites, will increase. This monitoring will in all likelihood occur via new technologies, such as distributed networks of embedded sensors feeding information via wireless connections to central databases. Locus's systems have been designed to address both of those trends.

How do companies deal with this large amount of information that is growing so dramatically? The short answer is, most of them don't. To minimize the possibility of inaccurate or misleading disclosure, companies with environmental problems increasingly rely on consultants to assist in evaluating internal controls and disclosure procedures, conduct due diligence, manage site cleanups and monitoring, analyze and document "material" environmental liabilities, and review existing environmental liability disclosures for compliance with applicable securities laws, including the Sarbanes-Oxley Act. Most consultants lack tools and technology to provide this level of service efficiently.

All of this indicates that technologies like ours will continue to play a pivotal role for keeping companies in compliance. Most consultants are ill-equipped to manage large sets of information in an effective way. After all, consultants are in the business of selling man-hours, not developing software. Consequently, Locus is developing partnership agreements with progressive consulting companies to help them and their clients manage and organize data and information over the web.

EBJ: What have been your most noteworthy projects or business accomplishments?

Duplancic: Locus operates the largest centralized web-based environmental management system in the world, as measured by number of analytical records stored in the system. We had the "first mover advantage" and we have capitalized on it. We opened our web portal in 1999, and we have been in business on the web longer than any competitor. Some of our customers include companies such as Alstom, Chevron, Honeywell, Raytheon, ExxonMobil, Schlumberger, Phillips Semiconductor, and governmental agencies like the Department of Energy. Our waste management module is used by companies like BASF, Merck, and ConocoPhillips. Two thirds of the ENR 200 largest environmental consultants by revenue use our systems because their customers require them to do so. That is a huge accomplishment for a company that opened for business in 1997. We continue to add sites to our system at an exponential rate.

Locus believes that besides offering a communication technology and the vehicle for the storage and delivery of information, the ultimate benefit of the Internet lies in its ability to optimize and streamline industrial processes. Systems alone will not save the day, however. Enron had a plethora of systems, yet their consultants became specialists at identifying loopholes in accounting systems as a way to hide problems. Conformance-based systems are a good starting point, but they are neither the endpoint nor the substitute for strategic environmental thinking and rigorous governance.

I observe many clients spending enormous amount of time managing consultants and processes around their services with a single focus on the billing-rate structure of the consultant. I see much less time spent on site solutions and creative and innovative ideas. It appears there is no mechanism to reward risk takers and "out-of-the-box" thinking. No wonder that many sites are not getting cleaned up, but rather are becoming nice annuities for consultants. Furthermore, execution of every strategic decision hinges on quality and accessibility of key information. The answer to good corporate environmental governance is "yes, a web-based EMS can provide tremendous business value, but only if it is focused on key business processes," and that is what Locus delivers to its customers.

EBJ: What growth do you forecast for your company?

Duplancic: We plan to continue growing our business at about 10 to 15% per year. In five years we will double the company size. We plan to exceed $50 million in sales by 2010.

EBJ: What policy initiatives would you advocate to stimulate more market growth in the environmental industry?

Duplancic: The government must mandate a broader use of electronic submittal of information to governmental agencies. Electronic submittals should expand not only to include analytical data, but also reporting and monitoring information. The government is also in a position to open contaminated sites to scrutiny by the public by making certain information about those sites available online. More self-monitoring through web-based automated monitoring of wireless networks is also something that government can mandate and that would ultimately save money and lives.

EBJ: How do you see climate change issues affecting your business?

Duplancic: A portion of our information management business deals with fugitive emissions monitoring. Bigger and bigger concerns about climate change issues require more and more monitoring. That is the reason that Locus has been investing heavily in real-time monitoring and partnering with sensor companies. There is a proliferation of start-ups in the sensor business. Part of the reason for this proliferation is the emergence of the homeland defense market; the other part is climate change and global warming. Again, the maxim "if you cannot measure it, you cannot manage it" holds true. Real-time monitoring of any media generates a huge amount of data that needs to be interpreted in real time. Locus operates web-based databases that are on the receiving side of these sensor-based data streams. Our intelligent databases bring instant value to otherwise meaningless data.

EBJ: How have the environmental problems you've been asked to solve changed over the years?

Duplancic: Many of our clients over the years have changed their closure strategy and want to pursue containment versus cleanup. We don't see any more large incineration projects, dig and haul, etc. It appears that the whole industry trend has shifted to a "button up, contain, and monitor" approach. Our sites are not getting cleaned up, which means only one thing—huge long-term monitoring and information management costs (e.g., stewardship, as used in DOE terminology). Instead of being a "surgeon" who could fix the patient's problem with a simple surgery, consultants are becoming more like pharmacists, prescribing a long-term medication that will never cure the problem. That's perhaps a nice position to be in from a business perspective, but terrible for the environment and clients. We are literally drowning in environmental data while starving for knowledge. Enter the Internet and you have a winning combination for a new business venture.

Many companies believe that containment and monitoring is less expensive than implementing a cleanup remedy; yet our experience shows that many times the long-term costs of monitoring at contaminated site dwarf the cleanup costs, particularly if inefficient data gathering, storage, and processing systems are utilized. If companies realized the true economic costs of the different alternatives available to them, one could depart from old practices and embrace new thinking. A similar analogy can be found in the health industry. Staggering savings, on the order of 45%, could be realized in the health industry if paperwork inefficiencies could be overcome by deployment of new web-based technologies.

An editorial in the April 1998 issue of *Ground Water* blames "misguided philosophy and procedures in site studies" for the misuse of billions of dollars in the past 15 years. The authors assert that a more efficient use of existing data and available information is necessary to gain a better understanding of hydrogeologic conditions. They suggest more emphasis on the use of abundant, fragmental, imprecise hydrogeologic information available over exclusive reliance on quantitative, mathematical, precision-oriented data. Locus now has technologies to bring value to old data and to maximize use of existing data through our various web-based technologies.

EBJ: How would you characterize the environmental industry's role in the overall economy, compared with the role it had, say, ten years ago?

Duplancic: The environmental industry

today is a mature business with all the characteristics of one. It is very wide and multi-disciplinary. As it was 10 years ago, funding for cleanups continues to be problematic. It appears that industry is on the verge of another major consolidation as more and more large contracts require large-size companies.

EBJ: How do you feel about the progress we have made on environmental issues in the past 40 years and the role the environmental industry has played?

Duplancic: We have made huge progress in identifying sites and making responsible parties pay for cleanup, but we could have done more if the processes were more streamlined. Many aspects of the process are still inefficient. The task of the regulator is made more difficult by the nature of the regulations themselves. Phrases and words such as "minimize," "permanent," "cost-effective," and "overall protection of human health and the environment" are not backed by any meaningful criteria. In most cases, regulators must rely on their own interpretations of these terms. To protect themselves, they often seek extreme solutions, treating words like "minimize" as synonymous with "eliminate," even though no environmental benefit may be gained by bringing contaminant levels to below detection limits.

On many occasions, the decision over which of several remedial alternatives ought to be implemented is delayed over extremely technical and complex issues to which there may be no single right answer. These may concern questions regarding the rate of migration of contaminants, or the relative efficacies of different types of containment systems. Resolving or reaching consensus on these issues can take years. Meanwhile, significant levels of contaminants may remain in the environment.

What is seemingly not well understood by those involved in the characterization and cleanup of hazardous waste sites, is the disastrous consequences of the current approach of dividing a cleanup program into an information-gathering phase, a decision-rendering phase, and an implementation phase. It is widely believed that a thorough understanding of the site is necessary before various remedial options can be evaluated. This belief inevitably leads to longer site investigations owing to the vagaries in the distribution of contaminants and the heterogeneous nature of subsurface conditions. What is ignored in this approach is the po-

tential usefulness of the implementation phase as a source of information about site conditions.

EBJ: What do you feel are the most pressing issues today?

Duplancic: Tens of thousands of sites across the country are known to contain hazardous substances. Many pose a threat to human health and the environment. The sites range in severity from Department of Energy, Department of Defense, and industrial facilities, where there have been substantial and widespread releases to the environment over many decades, to gas stations and homes with leaking underground tanks. Federal and state governments and the private sector have spent billions of dollars addressing these problems in the past decade, yet to date, few sites have been cleaned up. More sites continue to be identified every year, with the total cost of the cleanup of the nation's hazardous waste sites estimated to be in excess of one trillion dollars. The task is not expected to be accomplished until sometime in the late 21st century.

Having been employed in the hazardous waste industry since the early 1980s, I have had the opportunity to work on Superfund sites, RCRA sites, DOD and DOE sites, and many international sites. I believe that cleanups of individual sites are taking far too long. Remedial actions at Superfund sites, for example, now average 10 to 20 years. And as of the middle of 2004, only fraction of the sites on the Superfund roster had been cleaned up. The largest chunk of time in a typical cleanup is devoted to investigating the nature and extent of contamination. This phase may last up to ten years or more. Most of the time, the right tools are not used to store, interpret, and manage data stemming from this long process. During this period of study, interim cleanup actions are rarely undertaken, resulting in continued environmental degradation. Furthermore, once the cleanup begins, companies and the government are often required to implement remedial measures whose costs vastly exceed their benefits.

Why are investigations of hazardous waste sites so costly and time-consuming? And why have so few sites been cleaned up to date? Issues of liability are one key factor. The other ones are tools that clients and consultants use to analyze the data before they reach the final decision. The Superfund law allows the government to hold deep-

pocketed polluters responsible for the entire cleanup costs of a site that may have been used by thousands of firms. Firms are understandably reluctant to pay these costs. As a result, cleanups are often stalled until the relative liabilities of the various potentially responsible parties are resolved.

It is not just Superfund cleanups that take so long to complete. The problem is commonplace, irrespective of the funding party or the oversight agency. I believe that the crux of the problem is the process itself, and the inadequate information management technologies used in the past. Unlike other more established disciplines, engineers and scientists in the hazardous waste industry have been discouraged, or at times prohibited, from adopting the observational method as a basis for guiding site investigations and remediation projects. As a result, undue emphasis is placed on eliminating information gaps during the investigative phase of a project, and too little authority is given to field personnel to respond to unanticipated conditions during the implementation of a remedial action. Many times, the companies are not equipped with the right tools to manage these large quantities of data.

EBJ: What motivates you most in your work and how does that translate down to your employees and colleagues?

Duplancic: Doing the right thing is the most important element of my work. I believe in what Locus does, and I know it helps our customers tremendously in managing large environmental programs. I have yet to meet a new customer who has perfectly organized their records and is on top of all of their environmental information—not because they don't want to be, but because they simply haven't deployed tools that would allow them to do so.

We at Locus know what it takes to really make a difference—tremendous passion, relentless focus, and unwavering commitment. As a result, Locus takes a long-term view and adopts a "built to last" company-building approach. By contrast, most start-up competitors financed by venture capital funds and other financial investors have a shorter-term horizon and thus typically adopt a "tweak then flip" approach. Locus is about working closely with our clients and with progressive consultants to build a very significant company that can truly revolutionize environmental industry. We don't just aim for a return; we seek to make history. ■