



Message from the Leader of Golder's International Information Management Team



Our clients have identified Information Management as a strategic area of need. Since Golder Associates' inception, we have managed information. And as technology is introduced and continues to evolve, it has become much "easier" for us to

collect vast amounts of data. This allows for a greater variety of analyses to be undertaken. And so, the challenge: although technology allows for ease of data collection, it has become even more vital that we track, store, process, manipulate, understand and present these data in a way that our clients' value.

As I look back through my 30 years with Golder, a career dedicated to gathering and monitoring data, we have progressed from using pen and paper to record and plot data, to using spreadsheets, linked spreadsheets, Access databases, and enterprise databases, to the Web. With each incremental step, our ability to collect and report more and more data has been enhanced.

In recognition of the importance our Information Management skills have as a core component of our business, this issue of *Technically Speaking* is devoted to the theme "Simpler, Better, Faster." The articles featured in this publication are case studies in innovative Information Management, using tools that have been developed in-house in support of our consulting activities. Many of the projects featured in this issue were developed by members of our global Information Management team. We are pleased to share these projects with you.



John Gilby, P.Eng.

Principal and Leader of our Information Management Team

Better planning and management of landfills

WASTE DISPOSAL SITES IN MANY PARTS OF THE UNITED STATES ARE BETTER MANAGED AND ARE MORE EASILY ABLE TO COMPLY WITH A SOMETIMES DAUNTING LIST OF COMPLIANCE TASKS, THANKS TO AN ON-LINE MANAGEMENT INFORMATION TOOL.

Republic Services Inc., a major operator in the waste disposal industry, needed to integrate recently purchased sites into their existing operations. This required instituting a wide range of standard procedures and practices.

To help Republic meet this need, Golder developed a Web-based Facility Information System (FIS). This system tracks a wide range of waste management factors, including fees for disposal of different types of waste, expansion plans, aerial photos and permits. It records the wide range of tasks that must be completed, many on a regular basis, to keep the site compliant with municipal, state and federal laws. For each site, the FIS indicates which tasks have been finished, which are pending, and which, if any, are past due. Employees' access to the database depends on their role in the organization.

The FIS is a tool that is used by the local site management and their staff to help them meet all of their permit and regulatory requirements. Republic Services, Inc. corporate staff uses the FIS to remotely review how site management is maintaining compliance at their respective sites. Periodic audits are conducted on site to verify that the FIS contains all of the required information.

The FIS is now used at 175 facilities across the country, helping Republic operate in an efficient manner, and that helps to protect the environment and the public.





Site Investigation investment

The objective of this system is to provide AWE with a mechanism for ensuring that:

- ❶ site investigation data are not lost from corporate memory, and
- ❷ a permanent electronic record exists of geological and hydrogeological surveys and chemical analyses of groundwater, which can be used to support AWE's environmental stewardship of their facilities into the future.

The system has to track and monitor both

local and regional consultants' reports, geological, geotechnical, environmental data and any action where a soil/food/water/air sample is collected for regulatory or internal reporting purposes.

A second objective is to import historical data sets from earlier investigations and other AWE facilities — data originally stored in different formats to different standards and in many different locations.

To overcome this challenge, Golder supplied

a secure, web-based solution based on our eFacility web application combined with a desk-top Geographical Information System (GIS). It allows users to access data, view results and request more sophisticated analysis and reporting depending on their needs.

The resulting benefit is that analysts spend less time collecting and managing the data and more time using them to assist with the management of the AWE site.

Helping trains run safely in Italy

A Web-based monitoring information system is helping to keep train travel in and out of Bologna, Italy safe. This tool is monitoring work on new high speed rail tunnels being excavated underneath a major rail line, historical structures and urban development.

Stability is vital to safety in rail lines, particularly given the high speeds common in Europe. Even a slight subsidence in the rail bed can cause the rails to shift, a potential cause of derailments. So, during construction of 5.6-kilometer (3.5 mile) long twin rail tunnels (9.4 m or 30.8 feet diameter) through south and central Bologna, at depths of just ten to 20 meters (30 to 60 feet) beneath the base of the embankment supporting the main Milan to Naples line, it has been vital to make sure that subsidence does not occur.

Italian rail authorities and the contractor needed to know, promptly, if ground motion occurred during construction. Warning of any subsidence will come from many sensors (currently 1,150), which can detect minute displacements of the ground. Of these, some 300 sensors are being read at frequent intervals by means of Total Station instruments, which are relocated from time to time as tunneling progresses.

So that warnings can be acted upon promptly, Golder developed a way to gather input from each sensor once an hour or more frequently. This huge flow of data is then analyzed and displayed on a password-protected Web-based



monitoring system (GIDIE – Golder Instrumentation Data Interpretation and Evaluation), accessed from any Internet-connected computer. Users can select a variety of reports to help decision-making.

The result is easy access to current data that helps keep this important railroad project on track.

Towards more accurate cost projections

Highway planners and elected officials can now more accurately predict how much highway construction will cost, thanks to a risk-based analysis methodology.

Cost over-runs on highway construction projects have long been a problem, playing havoc with government spending plans and resulting in loss of credibility with the public. Why? Often, between the time the project was planned and actual construction, the world has

changed — environmental compliance may cost more, land values may rise and design standards may tighten. The all-too-common result: a scramble for more money to pay for the project, pulling resources from other spending priorities.

In support of the Washington State Department of Transportation, in the U.S. northwest, Golder built upon its long-standing reputation and expertise with risk management and decision analysis to develop a better approach.

Called Transportation Risk and Uncertainty Evaluation (TRUE), the assessment part of the process considers the risks the project faces, the likelihood of each problem occurring and the impact that may result. TRUE then shifts focus to managing the risks identified — determining the best way to either eliminate the risk or control it.

This methodology is now in use in several State departments of transportation, various municipalities and the U.S. federal government, as well as applications elsewhere in the world.

Accurate information about risks, properly analyzed, is leading to wiser decisions and planning that mirrors reality more closely.



Better communications improves relations between oil companies and landowners

FARMERS, RANCHERS AND OTHER STAKEHOLDERS IN WESTERN CANADA ARE REASSURED THAT THEY WILL BE PROMPTLY NOTIFIED IF THERE IS AN EMERGENCY RELATED TO PIPELINES RUNNING UNDER THEIR LAND THROUGH THE APPLICATION OF INNOVATIVE INFORMATION TECHNOLOGIES.



Oil companies operating in the Western Canadian Sedimentary Basin, centered in the province of Alberta, have a sometimes-uneasy relationship with the agriculture

sector and other land users. Having better relations with these stakeholders depends, in part, on having a way to alert them when there is a problem such as a pipeline break, or when work needs to be done on the pipeline. Keeping track of which stakeholders will be affected has always been a challenge for oil companies.

Now, a Golder-developed solution is being used by energy giant BP Canada Energy Company Ltd. to keep track of this information. It allows BP employees to call up a computerized map of the pipeline, select the relevant part of the pipeline and generate a list of stakeholders and full contact information.

This system is also useful for maintaining good ongoing relationships. Regulations require oil companies to communicate regularly with stakeholders, and the system can help employees determine which stakeholders need to be contacted through a visit, a phone call or a letter, and when. This way, BP representatives can stay in contact with stakeholders, possibly dealing with issues before they become serious. Having emergency contact information for each stakeholder in a central location means they can be notified faster in the event of a pipeline incident.

The result is better relationships between all users of the land — both on the surface and deep underground.

Protecting the AWE's

THE ATOMIC WEAPONS ESTABLISHMENT'S (AWE) ALDERMASTON FACILITY SUPPORTS THE UK'S NUCLEAR DETERRENT. GOLDER HAS BEEN CARRYING OUT SITE INVESTIGATIONS TO CHARACTERIZE GROUND CONDITIONS, ONE OF THE LARGEST SITE INVESTIGATIONS EVER IN THE UK. THESE INVESTIGATIONS GENERATE SIGNIFICANT VOLUMES OF ENVIRONMENTAL DATA, WHICH ARE NOW BEING MANAGED AND ANALYZED USING A NEW INFORMATION TECHNOLOGY SOLUTION BASED ON GOLDER'S eFACILITY.

New life for a New Zealand coalfield



WITH LIMITED OIL AND GAS RESOURCES AND LITTLE EXCESS ELECTRICAL GENERATION CAPACITY, NEW ZEALAND DEPENDS ON COAL TO HEAT AND POWER MANY INDUSTRIES, INSTITUTIONS AND HOMES. FORTUNATELY FOR AREA RESIDENTS, A NEW DATA MANAGEMENT SYSTEM IS HELPING TO EXTEND THE LIFESPAN OF A COALFIELD ON THE COUNTRY'S SOUTH ISLAND.

The Ohai field has been an important source of coal for nearly 100 years, partly because of its low, environmentally desirable, 0.2 percent sulphur and two percent ash content. Yet the remaining coal was increasingly impractical to extract using the current underground methods. The solution was open-cut mining from the surface — but the question was how to do this at a minimum cost, both financially and environmentally?

To make this happen, it was important to map the extent and nature of the coalfield, in part through drilling boreholes to provide geological and geotechnical data. Golder developed a database solution that would allow field personnel to use hand-held computers to

enter data in a consistent way so planners would have a more accurate and complete picture of the coalfield.

One benefit: faster data transfer, allowing much of the work to be done during the summer, when conditions are better than during the area's rainy winters.

As well as data from current boreholes, system users are taking logbook data from boreholes drilled up to a century ago, often recorded in flowing penmanship, and entering it into the system, providing new insights on the coalfield's nature and extent.

As a result of this work, an important energy source can continue to supply this country's needs.

Providing early warning on a Georgia river

A BETTER WAY TO STORE AND DISPLAY FIELD DATA IS PROVIDING INFORMATION ON THE HEALTH OF A RIVER IN GEORGIA, USA.

The Conasauga River is home to several endangered or threatened species of fish and mussels. The area is also home to many people and industries, with a strong demand for the river's water. The challenge: How to determine if the local utility company's water withdrawal and release was having an impact on the river's ecosystem?

Environmental regulations require regular studies of the river's fish and other freshwater populations. The sheer volume of data generated over almost ten years of specimen counting, weighing, measuring and other information was becoming difficult to manage. At the same time, there was the danger of missing out on the huge benefit provided by the wealth of year-by-year data – allowing early warning of trends that might indicate developing problems in the river's ecosystem.

To deal with this, Golder technologists took a database program originally used in the company's Australian offices for monitoring mining impacts, and modified it for use in monitoring the health of the Conasauga River.

The result has been a system that is easy to learn to use, in part because it meshes smoothly with a standard Microsoft Excel interface. This means that scientists can analyze the data faster and more easily explore subtle trends in the river environment, leading to a better understanding of the relationship between river health, utility operations, and other activities occurring in the river basin.



For more information about the projects featured in this newsletter please contact us at: solutions@golder.com. Electronic versions of the newsletter are available at www.golder.com. Just follow the links to our "Library" and "Newsletters".

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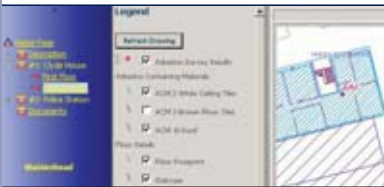
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Meeting rising global standards on workplace safety

COMPANIES WITH WORLDWIDE FACILITIES ARE ON TRACK TO BETTER WORKPLACE SAFETY IN BUILDINGS WITH ASBESTOS CONTAINING MATERIALS (ACM). USING eFACILITY, GOLDER'S FACILITY MANAGEMENT TOOL THAT COMBINES MANY KINDS OF DATA IN ONE CENTRAL WEB-BASED RESOURCE, ACM IN BUILDINGS CAN BE MORE EASILY MANAGED.

Many organizations struggle with the issue of asbestos, a material once widely praised for its fire-retardant properties, which found its way into a wide range of building materials, literally from flooring to ceiling tiles.

Recently there's been growing corporate and public concern for legal liability and health & safety issues associated with human exposure to asbestos fibers in the workplace. It's a worldwide challenge, and companies with far-flung operations are under pressure to deal

with the specter of asbestos in all of their locations.

Solving the problem starts with the development of a defensible, worldwide, audit standard for characterizing all occurrences of asbestos within a building. Based on the audit's risk assessment criteria, the next step is to select the most critical issues, such as damaged friable ACM, and deal with them first.

Systems are required to manage a facility's ACM: to keep track of vast amounts of data including photographs

of ACM, survey documents, interactive floor plans showing the spatial extent of ACM, laboratory results, management procedures and abatement work records. Golder provides eFacility's asbestos module to perform this task. This tool allows the facility's asbestos program managers to manage all their ACM issues through a secure Internet connection.

As a result, employee safety worldwide is improved because steps are being taken to deal with risks they may face in their workplaces.



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Technically Speaking is published for valued clients and employees of Golder Associates. This quarterly newsletter includes articles showcasing innovative and technically challenging projects that Golder professionals have worked on throughout the world. We value your opinions. Please contact **Gregory A. Beckstrom, Managing Editor**, at + 1 651 697 9737 or greg_beckstrom@golder.com if you have any questions or comments.