

Use of a Sustainability Evaluation Tool for the Evaluation of Remedial Scenarios

Jaime Graves, Robert Noël de Tilly and Benoit Bourque, Golder Associates Ltd

Forward-thinking companies are interested in embedding the principles of Sustainable Development into their organisations and their projects. This focus on the “triple bottom line” allows companies to achieve sustainable financial performance while promoting environmental integrity and social equity. With this in mind, Golder developed GoldSET[®]-SR¹; a sustainability decision support tool that has been developed to evaluate the strengths and weaknesses of remediation options with respect to the environmental, social and economical dimensions. It allows for an unbiased comparison of different options on the basis of sustainability principles. As such, it can help identify optimal solutions in a decision-making process based on the principles of sustainable development. The following case study indicates how this application can benefit companies requiring environmental site management and remediation.

Golder Associates Ltd. were mandated by a Railroad Company to provide environmental site management including the operation of a diesel recovery system at the Site which is located on the Prairies. The Site has a large diesel plume on the groundwater table at 20 metres depth. In 2006 it was discovered that the diesel plume extended further than was initially thought and delineation of the product plume did not follow the conceptual site model. The Railroad Company and Golder felt there was a risk of off-site migration of the plume and as such, some form of remediation/mitigation was to be undertaken. The question that remained was... what technology should be used?

Sustainability indicators to perform the evaluation were selected in collaboration with the Railroad Company based their corporate sustainability objectives and on the wisdom of authoritative source of references such as the Railway Association of Canada, the UK Office of Rail Regulation, the International Federation of Consulting Engineers' Project Sustainability Management Guidelines, Global Reporting Initiative's Sustainability Reporting Guidelines.

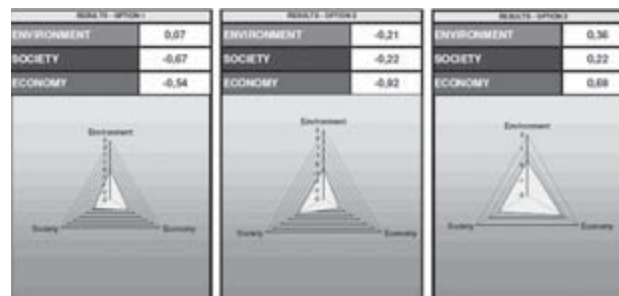
We came to a visual, site- and client-specific decision by scoring, evaluating and weighing each option concurrently on:

Environmental Aspects such as:

- Ecological impacts;
- Groundwater quality improvement;
- Surface water quality improvement;
- Greenhouse Gas Emissions
- Drinking Water supply conservation
- Energy consumption
- Waste management

Social Aspects such as:

- Health and Safety
- Corporate Image
- Impact on Community
- Economic Aspects such as:
- Economic Performance
- Environmental Liability
- Community Economic Growth



The output from the tool is presented by a ternary representation where the most sustainable option is represented by the largest, most balanced triangle with respect to the three axes of the graph (the environmental, social and economic performance of the options under consideration). Golder along with direct input from the Railroad Company evaluated the options with decision making influenced by sustainable values and have moved on to the construction phase in May, 2009.

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Jaime D. Graves, P. Eng. (AB, SK)

Ms. Graves is a geological engineer with Golder Associates' Calgary office. Ms. Graves holds a B.Sc. in Geological Engineering from the University of Saskatchewan. She is a professional member of both the Association of Professional Engineers, Geoscientists and Geophysicists of Alberta and the Association of Professional Engineers and Geoscientists of Saskatchewan.

Ms. Graves is currently managing environmental projects (Phase I, II and III environmental site assessments) for the Railroad Company on both the operations and real estate ends of the Company. Ms. Graves is the main Railroad Company client contact within Golder for the Prairie region.

Ms. Graves has been with Golder since 2002. In that time, she has been involved in the Tsuu T'ina Lands project which involved the investigation and remediation (Phase I, II and III) of approximately 940 acres of contaminated land in Western Canada formerly held by the military. Ms. Graves' experience includes fieldwork involving supervision of field programs at contaminated sites, development of remedial plans, report preparation, and indoor air quality sampling programs. Ms. Graves has developed strong communication skills by being responsible for representing Golder during project authority consultations both on- and off-site, and in project coordination meetings in projects with multiple stakeholders.

Ms. Graves spent approximately six months coordinating, conducting field work and reporting for the environmental setting report for the hydrogeology portion of an environmental impact assessment (EIA) for a major oil sands producer near Fort McMurray, Alberta. Ms. Graves has continued to develop her experience in the Fort McMurray area by conducting environmental and hydrogeological investigations for major oil sands producers.

Robert Noël de Tilly, Eng.

Robert Noël-de-Tilly received a Bachelor's Degree in Rural Engineering, with a specialty in environmental studies from McGill University in 1994. He has worked with Golder Associates since 1998, is a level V Engineer and an Associate. His field of expertise is principally related to Phase I, II, and III Environmental Site Assessments (ESAs) as well as projects related to sustainable development.

During his Phase I, II, and III ESAs, his role has included supervising projects, performing environmental monitoring, evaluating natural attenuation feasibility, and implementing mitigation measures for a multitude of petroleum hydrocarbon contaminated sites. He supervised, managed, conceived and monitored several remediation projects (excavation, vacuum extraction, natural attenuation, bioremediation systems, "pump & treat", etc.). He also provided supervision for train derailment emergency response.

In terms of his work in sustainable development, he created a tool (GolderSET) to help conduct engineering projects with a sustainable development approach which has been applied in many projects. He also participated in the elaboration of corporate sustainable development policies (benchmarking studies, carbon analysis, etc.) and has performed inventories of greenhouse gases (GHG) and contaminant air criteria (CAC) for different projects and companies.