

## Wednesday, May 12, 2010

### Stream G – Managing Environmental Projects

8:30 am – 9:00 am

#### Project Closure Procedure for Site Remediation and Risk Management Projects

Eric Wilson<sup>1</sup>, Gino Dalla Coletta<sup>1</sup> and Octavio Melo<sup>2</sup><sup>1</sup>CLAW Environmental Services Inc., in association with Golder Associates Ltd.<sup>2</sup>Indian and Northern Affairs Canada, Northern Contaminated Sites Program

Indian and Northern Affairs Canada (INAC) manages the environmental remediation and risk management of a large number of contaminated sites in the Canadian North, which are funded under the Federal Contaminated Sites Action Plan (FCSAP). As the remediation of several sites under its management neared completion, it was recognized that INAC needed to develop a closure procedure for contaminated-site remediation projects.

Based on discussions with stakeholders within the department, it was apparent that project closure documentation would have to focus on two distinct audiences: one comprised of external stakeholders such as the local community, aboriginal groups and licencing boards; the other comprised of internal stakeholders, including INAC and the Treasury Board of Canada, Secretariat.

The procedure focused on the creation of a Contaminated Site Remediation Project Closure Report (the Closure Report), which would meet the needs of both sets of stakeholders. The aim of this Closure Report is to document the history of a completed site remediation project by describing what was planned, what was actually completed at the site, and what remains outstanding.

The Closure Report also outlines ongoing monitoring and/or maintenance requirements for the site – including the operation of risk-management systems such as water treatment plants – which will need to be implemented after the remediation project itself is completed. The Report also identifies the internal INAC divisions or branches and/or external organizations that would assume responsibility for these ongoing requirements. In addition, the Report clearly identifies permanent site features such as tailings caps or solid waste landfills that will remain on the site following remediation. Such features require ongoing protection in order to safeguard the Crown's investment.

Finally, another aim of the Closure Report is to evaluate the overall performance of a given project at a high level, so that best practices and lessons learned can be identified and used by the organization for the purposes of continuous improvement.

9:00 am – 9:30 am

#### Document Management in the Twenty-First Century

Hilary Fitzgerald, Donna Steele, Devin Doane, Walter van Veen  
Conestoga-Rovers & Associates

The role of Conestoga-Rovers & Associates (CRA), acting as the Independent Engineer (IE) for the Sydney Tar Ponds Cleanup (the Project), is generally to protect the interests of the federal and Nova Scotia governments – as well as the people of Canada and Nova Scotia – by performing third-party, real-time due diligence monitoring of project health and safety, design, financial, and schedule.

This role requires the generation, receipt, and review of thousands of e-mails, letters, reports, tender documents, contracts and financial documents.

To maximize the efficiency of the IE role through the life of the Project, CRA developed a system of digital libraries and databases to manage the storage and retrieval of correspondence and documents. CRA also developed a detailed “Comment Database”, which enables the IE to track the status (open, closed, deferred) of individual IE questions, and responses to these questions. In addition, customized spreadsheets facilitate effective change-management tracking, providing contract managers with a direct link to change-order documents and current contract-commitment information.

Digital library systems are commercially available, and were considered for the document management role; however, our team elected to use a purely database system (Microsoft Access). While some of the alternatives offered a higher level of functionality, after evaluating document management needs for the Project, it was determined that Microsoft Access met these needs in terms of finding and providing access to documents within a single office setting.

The maturity of digital retrieval and storage systems is well advanced, yet CRA has observed that they are infrequently used, except on mega-projects. CRA understands that the development of these digital systems has upfront costs; however, in our experience, they pay off in terms of greater efficiency and lower costs. In the short and long terms, there are also possibilities for decreasing the space needed for storage of paper documents, and indeed reducing the need to print paper copies.

This paper reviews the evolution of document management – from filing cabinets to detailed spreadsheets and relational databases – with emphasis on a description of the tools used by the IE.

*All presentations will be delivered in English, unless noted otherwise.*



WEDNESDAY, MAY 12, 2010

9:30 am – 10:00 am

### Detailed Work Planning and Quarterly Reporting Procedures for Site Remediation and Risk Management Projects

Octavio Melo, P.Eng.

Indian and Northern Affairs Canada, Northern Contaminated Sites Program

Indian and Northern Affairs Canada (INAC) manages the environmental remediation and risk management of a large number of contaminated sites in the Canadian North, which are funded under the Federal Contaminated Sites Action Plan (FCSAP). After FCSAP was approved in 2005, and INAC's Northern Contaminated Sites Program (NCSP) was expanded, more formal project management processes were introduced to enhance and standardize the planning and execution of site remediation projects. Two of these processes involve the development of detailed work plans and quarterly reporting against these plans.

An initial detailed work plan (DWP) is prepared for newly approved projects that are estimated to cost over \$250K (i.e., most NCSP projects). The DWP documents site issues to be addressed by the project, then describes the project's objectives, scope, risks, plan, team, delivery strategy, controls, schedule, and resource requirements. The plan is peer-reviewed before being finalized and approved by NCSP Management. Once approved, the DWP becomes both a plan for executing the project, and a project charter between the Project Manager and NCSP Management. The DWP is updated annually – or more frequently, if planning assumptions change significantly during the year. The annual update provides an opportunity to:

- (1) add more detailed information on risk, plan, cost, schedule, etc. that may have become available (e.g., as the project progresses from remediation strategy development to design, procurement and implementation);
- (2) reconcile plan vs. actual achievements for the previous year; and,
- (3) document lessons learned.

Quarterly Reports (QRs) are produced to document and communicate progress during the quarter. QRs track the progress of the work, using a standardized work breakdown structure, against planned schedule and cost. These reports also document performance against a number of performance indicators (e.g., environment, health and safety, socio-economic benefits, stakeholder engagement). An executive summary allows the Project Manager to summarize, at a

high level, progress being made, any deviations from the plan and their reasons, measures for addressing these deviations, and any significant concerns that threaten the achievement of project objectives. QRs are addressed to and for the information of NCSP Management; a high-level summary (e.g., dashboard) is prepared at the program level to facilitate review and action by NCSP Management.

10:30 am – 11:00 am

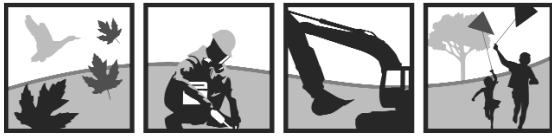
### Innovative Uses of GIS as a Project Management Tool

Alana Devanney and Belinda Campbell

Public Works and Government Services Canada

Since 1994, Public Works and Government Services Canada (PWGSC) Atlantic has continued to develop innovative ways of using web-based GIS management tools. From major Crown construction initiatives to complex remediation projects and nationwide business programs, web-based GIS software has provided PWGSC with an efficient and remote-access system that provides a single, secure, audit-ready repository of geographical and textual data with direct remote population, query, analysis, reporting and dissemination capabilities. The innovative use of this application with other off-the-shelf software has enabled multiple stakeholders, within both government and industry, to exchange information quickly and efficiently in a safe and secure web-based environment. Using Autodesk MapGuide, ESRI IMS, ESRI ArcServer, SQL Enterprise and Oracle database technologies, linked with other software such as Microsoft SharePoint, PWGSC Atlantic has managed complex projects such as the Confederation Bridge construction project, remediation projects such as the Sydney Tar Ponds and Coke Ovens Project, the Cape Breton Development Corporation (CBDC) Mine Closure Program, closure of U.S. Naval Base Argentia, and the national business structure of the Accelerated Infrastructure Program in the Atlantic region. GIS-based data management provides an ongoing project management tool in spatial organization and presentation that is efficient and easy for multi-level usage.

The projects demonstrate how GIS has been used to facilitate and manage major Crown projects.



WEDNESDAY, MAY 12, 2010

11:00 am – 11:30 am

### Enabling Remedial Solutions Through Innovative Procurement

M.E. Billowits<sup>1</sup>, H. Brillinger<sup>2</sup> and L. Warner<sup>3</sup><sup>1</sup>Quantum Murray LP<sup>2</sup>Public Works and Government Services Canada<sup>3</sup>Transport Canada

In October 2008, Quantum Murray LP was awarded a contract by Public Works and Government Services Canada (PWGSC) on behalf of Transport Canada to remediate a five-hectare surplus St. Lawrence Seaway property in St. Catharines, Ontario. The site contained approximately 26,000 tonnes of near-surface soil contaminated with hazardous concentrations of lead, as well as polycyclic aromatic hydrocarbons (PAHs), derived from the historical operations of a skeet-shooting range. The federal government is divesting itself of the surplus property for redevelopment purposes. A Request for Proposal approach with evaluation criteria was used by PWGSC and Transport Canada to choose a remediation approach from the environmental contracting community, and to maximize the benefits of available treatment methods. Details of the stabilization remediation approach used for the St. Catharines project will be provided, along with a description of how Quantum's remedial solution offered a 35% savings, while also satisfying schedule requirements and stakeholder objectives for the tendered project.

11:30 am – 12:00 pm

### The Role of Quality in Ensuring Value for Money on Environmental Remediation Projects

Alan Van Norman,<sup>1</sup> Walter van Veen,<sup>1</sup> Brandon Hurl,<sup>1</sup> Mike Nahir<sup>2</sup><sup>1</sup>Conestoga-Rovers & Associates<sup>2</sup>Indian and Northern Affairs Canada

An underlying objective of government spending is often described as the desire to receive value for money. Value is difficult to measure, and is frequently a matter of perception. Value does not have a unique metric that can be measured and reported. There are at least two major components of value that are related to government spending. The first opportunity to create value is strategic. Strategic value arises from the selection of projects that get funding, and their order of priority. Strategic value reflects the implementation of government policy. The second opportunity to create value for money comes at the implementation stage. Implementation value is created by ensuring that the funded project is efficiently completed. As managers and overseers of funded projects, it is our collective responsibility to ensure that this implementation value is realized.

Implementation value for an environmental remediation project is a function of cost, schedule, and quality of the end product. When a scope of work is defined, and the desired quality is specified, schedule and cost can be calculated. In most cases, specified quality, together with calculated costs and schedule, work in balance to produce the highest implementation value for a given scope of work. In a few special cases, budget and/or schedule may be fixed, and quality must be adjusted to achieve the desired implementation value. In every case, quality is a key input to defining and demonstrating implementation value and, in many cases, demonstration of quality is the function that does not receive an appropriate level of attention from implementers. This paper will define the importance of quality in achieving value for money, and will describe how the measurement and reporting of quality can be built into an environmental remedial action at the program level, and at the design, specification and construction implementation level. The role of quality in support of transparent accountability will also be discussed. Measurement and reporting of value for money will be supported with examples.

1:30 pm – 2:00 pm

### Guidance and Orientation for the Selection of Technologies (GOST)

Jennifer Holdner,<sup>1</sup> Martin Desilets,<sup>1</sup> David Juck,<sup>1</sup> Serge Delisle,<sup>1</sup> Charles Greer,<sup>1</sup> Paul-Olivier Trudeau,<sup>1</sup> Sebastien Yelle<sup>2</sup><sup>1</sup>Biotechnology Research Institute – National Research Council<sup>2</sup>Public Works and Government Services Canada

A new web-based tool is available to assist project managers in selecting potential remediation technologies for their sites. The Guidance and Orientation for the Selection of Technologies (GOST) website offers a list of site- and contaminant-appropriate technologies based on user-supplied data (Technology Selection Tool), detailed Fact Sheets covering over 60 remediation technologies, and links to additional resources.

The Technology Selection Tool will produce a list of technologies appropriate to the specific site, based on a questionnaire completed by the site manager. Information such as contaminant type, concentration and depth, hydrogeology, environmental matrix, etc. is entered, and a customized list of appropriate technologies is created. Details regarding each technology can then be accessed through individual Fact Sheets, currently numbering over 60, which provide information on technology application and limitations, target contaminants, complementary technologies, analyses required for detailed site characterization, case studies and references for that technology. GOST is the Canadian reference tool for project managers involved in site rehabilitation and remediation, providing invaluable information on technologies targeting contaminated-site cleanup in Canada.

All presentations will be delivered in English, unless noted otherwise.

**WEDNESDAY, MAY 12, 2010**

The online tool was developed for Public Works and Government Services Canada (PWGSC) by a multi-disciplinary team composed of experts from the Biotechnology Research Institute of the National Research Council of Canada, the Montreal Centre of Excellence in Brownfields Rehabilitation, and the private sector.

2:00 pm – 2:30 pm

### **On the Same Page: A Practical Tool for Inter-Agency Collaboration in Risk Communication**

Ronald W. Brecher<sup>1</sup> and Trevor Smith Diggins<sup>2</sup><sup>1</sup>GlobalTox, a Division of MTE Consultants Inc.<sup>2</sup>Independent Risk Communication Specialist

Government agencies often face the difficult task of communicating risk-based information to concerned stakeholders. As public awareness of environmental risk increases, so does the need for effective risk communication. Establishing and building credibility is critical to ensuring successful communication with a concerned public.

Risk communication can be much more challenging when two or more departments within an organization (for example, the Government of Canada) are jointly involved in responding to stakeholder concerns. Involved departments or programs are often responsible only for limited aspects of an issue, or differ in their priorities, goals, policies or precedents. Responses must therefore be co-ordinated, in order to avoid the delivery of inconsistent messages to external stakeholders. A successful multi-agency risk communication program will reduce the likelihood of stakeholder confusion and project delays, while also promoting credibility for the process and the organizations involved.

This paper describes a simple tool and process that multi-agency groups can use to identify their stakeholders' concerns and prepare co-ordinated responses. This tool, The Response Matrix, has been used effectively by the authors to assist clients in recent national risk controversies in Canada.

2:30 pm – 3:00 pm

### **Making Risk-Based Decisions to Address Federal Liabilities for Contaminated Sites in the Northwest Territories**

Julie Ward

Contaminants and Remediation Directorate,  
Indian and Northern Affairs Canada

As of March 31, 2009, the Northern Contaminated Sites Program of Indian and Northern Affairs Canada (INAC) had a reported \$1.43 billion in environmental liability associated with 85 sites which are in assessment, care and maintenance, or remediation (INAC, 2009). The Northwest

Territories alone contain approximately 40% of known reported liabilities. The aforementioned sum represents total anticipated costs for managing and remediating all known contaminated sites under federal responsibility, in accordance with the Treasury Board of Canada, Secretariat Policy on Accounting for Costs and Liabilities related to Contaminated Sites (INAC, 2009). At these sites, remedial methods are selected using a risk-based decision-making process. Other factors must also be considered, however, such as total costs, cost effectiveness, occupational hazards and effectiveness of remediation.

Remediation at sites such as abandoned mines usually requires addressing both physical and environmental risks. Physical risks ranging from dilapidated infrastructure to open shafts and unstable manmade features may be addressed by removing questionable infrastructure and equipment, capping and backfilling. Environmental risks ranging from ecological and human exposure to materials such as heavy metals, asbestos, irradiated waste rock and contaminated water can be addressed by capping, improving drainage, removing contaminated material, and monitoring programs.

This paper examines several factors which might be taken into consideration when determining the most appropriate and cost-effective approach to remediation for sites under federal jurisdiction.

3:30 pm – 4:00 pm

### **Sediment Liability Estimation Toolkit**

Andrew Mylly<sup>1</sup>, Pete Craig<sup>2</sup> and Tim Whalen<sup>2</sup><sup>1</sup>Public Works and Government Services Canada<sup>2</sup>Golder Associates Ltd.

Canada contains 20% of the world's freshwater resources, and has more marine coastline than any other country. Human and industrial development traditionally evolves in close proximity to water, and many Canadian sites under federal ownership and/or jurisdiction have contaminated sediments. It is expected that the number of sediment remediation projects will increase significantly in the coming years as the Federal Contaminated Sites Action Plan (FCSAP) continues. Federal project management and budgeting require early-stage cost estimates; yet sediment project-cost estimates are notorious for their inaccuracy and high variability.

By combining expert guidance, Microsoft Excel®, Visual Basic® for Applications (VBA) programming, and Oracle's off-the-shelf Monte Carlo (i.e., predictive-modeling) program Crystal Ball, Public Works and Government Services Canada (PWGSC) has demonstrated that user-friendly packages – requiring no previous experience with Monte Carlo methods or programming – can be developed for the initial estimation of sediment liability. A sample toolkit –

*All presentations will be delivered in English, unless noted otherwise.*

**WEDNESDAY, MAY 12, 2010**

the Sediment Liability Estimation Toolkit – has been assembled, using three levels of Excel® worksheets, which together produce liability estimates for sites where dredging remains the default or baseline remedial strategy.

The Toolkit includes a cost-estimate process for environmental dredging, as well as supporting information such as feasibility considerations for alternatives to dredging. When updated with regional information, the Toolkit can be used to evaluate environmental dredging programs throughout Canada.

VBA programming is used to guide the user through a Class D/Indicative Estimate, including a preliminary feasibility screen and an overview of design completeness. VBA is also used to pre-process data for Crystal Ball and to trigger a Crystal Ball simulation.

In traditional line-item estimates, estimators fill in unit costs using their understanding of the project, and of current prices. They do this knowing that each number may vary. Many estimators therefore produce a range of “best case” (low), “worst case” (high) and “most likely” (criteria often not defined) numbers, presenting the results to decision-makers as a form of sensitivity analysis.

Programs such as Crystal Ball take over the task of producing a range of cost estimates, and they do so thousands of times using predictive modeling to vary input values. If a given parameter has a 15% probability of being value “X”, the software, in the process of revising estimates over and over again, will use the value “X” for that parameter in about 15% of the runs.

Of the thousands of total costs calculated, most cluster around a “most probable cost”. The software provides the most probable cost, as well as variances in total cost.

Use of the Sediment Liability Estimation Toolkit for typical projects indicates that:

- (1) a relatively small number of project components – particularly those related to the handling and disposal of dredged material – are responsible for the greatest range of variability in project costs, and,
- (2) because of the compounding effect of “worst case” scenarios, the cost distribution function is skewed to the right (to higher values).

Use of the Toolkit as a planning, cost-estimation, and communication aid focuses remediation projects on those aspects that have the greatest influence on total cost. Additionally, uncertainty is quantifiably and reproducibly incorporated into costing, ensuring early-stage consideration of contingency and management reserve.

---

4:00 pm – 4:30 pm

**Financial Management of Contaminated Sites**

Valerie Chort and Francis Séguin  
Deloitte & Touche

The Government of Canada currently manages over 18,000 contaminated sites, ranging from relatively minor, simple sites to high-interest, complex locations. Given heightened interest around contaminated-site liability, senior management and regulators are placing greater emphasis on the ways in which public- and private-sector organizations monitor, account for, and disclose such liabilities. In addition, liability management of contaminated sites can be a complex undertaking, involving multiple stakeholders and requiring demonstration of compliance with legislation, regulations and accounting rules and guidelines.

---

4:30 pm – 5:00 pm

**Environmental Remediation Projects:  
Common Elements for Successful Clean-Up**

Steven Rose<sup>1</sup> and Rick McGregor<sup>2</sup>

<sup>1</sup>MALROZ Engineering Inc.

<sup>2</sup>Vertex Environmental Solutions Inc.

Experience with numerous contaminated sites has demonstrated the effectiveness of a fundamental system for employing the basic elements of environmental remediation. These components of site remediation have been known and understood for many years, but are often not followed, resulting in numerous projects that do not meet their remediation objectives.

Successful remediation depends first on adequate delineation of the site, including characterization of the extent of contamination, as well as the structural, geological and hydrogeological features of the subsurface. Where possible, the history of contaminant occurrence should be evaluated, in order to gain an understanding of the loading and transportation of contaminant mass. Once these preliminary data are gathered for a particular site and contaminant, a remediation program can be appropriately designed for optimal effect.

Following site and contaminant characterization, the remediation manager's objective is to undertake the most efficient program for removing the greatest mass of contaminant with the least expense and effort. A flowchart has been developed to illustrate the prioritization and sequencing of remediation activities. This flowchart can be used by remediation managers, guiding them through the sequencing of primary and secondary source removal, the management of dissolved phase contaminants, and the meeting of compliance criteria for the site.

