Tuesday, May 11, 2010
Stream C – Sustainability and Socio-economic Considerations in Remediation Projects

10:30 am – 11:00 am

Assessing the Potential Effects of Climatic Change to Support Adaptive Management of Contaminated Sites in Canada

Julian Hayward[1], Edward McBean[2], Kathy Kitagawa[3] and Jean-René Michaud[3]
[1]Conestoga-Rovers & Associates
[2]University of Guelph
[3]Environment Canada, Contaminated Sites Division

The Federal Contaminated Sites Action Plan (FCSAP) is a cost-shared program that allows federal custodians of contaminated sites to remediate or risk-manage eligible contaminated sites for which they are responsible. Stewardship of federal real property, including responsibility and accountability for managing contaminated sites, rests with the custodians. FCSAP complements and assists custodians with activities related to contaminated sites, with priority given to sites posing the greatest hazard and potential exposure of humans and the environment to contaminants.

Climate experts predict significant environmental impact due to climate change, which could potentially affect the management of contaminated sites. As a result, the Contaminated Sites Division of Environment Canada undertook an initial scoping exercise with three goals: 1) to assess whether climate change should be considered by custodians in their selection of remedial/risk-management strategies; 2) to identify the importance of climate change, given that areas of Canada would be affected differently; and 3) to determine the extent to which climate change should be considered.

For managers of contaminated sites, these studies are essential. The results of studies on climate change indicate that measurable effects from global warming are already evident over most of Canada, and that the impact of climate change on physical and natural ecosystems, as well as the built environment in Canada, may accelerate as concentrations of greenhouse gases continue to increase. The rate of climate change is predicted to be more severe over land and at most high northern latitudes. The impact of factors such as changes in ambient temperature, thawing of permafrost, changes in precipitation regimes, etc. could have a real effect on remediation/risk-management strategies, and could consequently affect the long-term effectiveness of actions taken to address contaminated sites in various parts of Canada.

This paper looks at the key elements that should be considered by managers of contaminated sites in the design and implementation of the contaminated-sites management process in Canada. It also proposes methods that will assist these managers in assessing the severity of the potential effect of climate change on the various remediation or risk management options that could be considered in addressing contaminated sites.

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

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TUESDAY, MAY 11, 2010

11:00 am – 11:30 am

Revitalization of the Lairet River at the Cartier-Brébeuf National Historic Site: Environmental Management and Restoration of a Protected Area in the Heart of Quebec City

Benoît Roberge and Denis Belleau
Parks Canada Agency, Quebec Field Unit

This presentation will be delivered in French.

The revitalization of the Lairet River at Cartier-Brébeuf National Historic Site of Canada offers a useful model for an integrated project, combining restoration and ecosystem reconstruction in one of Quebec's protected areas. This paper provides details on the issues encountered, the primary tasks completed and the project's expected benefits.

Created in 1972, Cartier-Brébeuf National Historic Site of Canada commemorates Jacques Cartier's first overwintering in North America, and the establishment of the first Jesuit residence in Quebec City. This 6.8-hectare park in the heart of the city includes an interpretation centre and extensive greenspace where the Lairet River is channelled into the St. Charles River.

Prior to creation of the National Historic Site, Cartier-Brébeuf Park, and the banks of the Lairet River that intersected it, had been used as a fill zone and dump site. The soil was contaminated with hydrocarbons, polycyclic aromatic hydrocarbons (PAHs), metals and sulphur from previous use of the site. There was also a steel pipeline (250 metres long and 4 metres in diameter), which had been installed around 1970 to channel the Lairet River. This required replacement, both because it presented a hazard to visitors, and because it posed a flood risk.

In 2007, Parks Canada launched a project to revitalize the Lairet River by removing the pipeline and estoring the river's original character.

The purpose of this integrated project was to restore and improve the natural features of the site, increase its historical integrity, and enhance the visitor experience.

Following a feasibility study, major work (Phases I and II) was undertaken in 2007 and 2008. The site was returned to the configuration it would have had at the time of Jacques Cartier, and soil was analyzed, and the contaminated portions removed, with funding from the Federal Contaminated Sites Action Plan (FCSAP). Parks Canada also commissioned an analysis of the ecological and toxicological risks, as well as an environmental assessment. In 2008 and 2009, a management plan was developed, and site cleanup began with the excavation and removal of nearly 3,000 cubic metres of contaminated soil to authorized sites.

In summer 2009, the park site and the banks of the Lairet River were naturalized (Phase III) with the planting of trees, shrubs and aquatic plants, which will improve the natural integrity of the site. Further work involved creating pedestrian trails and a bike path, installing benches and waste receptacles, and building a new interpretation pavilion.

The Lairet River revitalization project will result in a safe and better-managed site for visitors, with enhanced cultural components and a healthier natural environment.

11:30 am – 12:00 pm

Improving the Sustainability Performance of Abandoned Mine-Site Remediation Projects through the Reduction of Energy Consumption and GHG Emissions

Tracy Ma[1], Stefan Reinecke[2] and Michael Nahir[1]
[1]Indian and Northern Affairs Canada
[2]Stratos Inc.

The Northern Contaminated Sites Program (CSP) administered by Indian and Northern Affairs Canada is responsible for the management of a number of properties contaminated as a result of private-sector mining activities, oil and gas exploration, and government military activity. The CSP is looking to maximize the environmental sustainability of its remediation activities, with a focus on energy use and the associated emissions of greenhouse gases (GHGs).

Stratos Inc. was retained to conduct a study related to improved environmental sustainability at the Faro Mine near Faro, Yukon, and the Giant Mine in Yellowknife, Northwest Territories. This study involved conducting a greenhouse gas (GHG) and energy assessment of two major remediation projects being undertaken by the Northern Contaminated Sites Program. These projects – the Giant Mine Remediation Project (Giant) and the Faro Mine Closure Project (Faro) – are two of the largest contaminated-sites projects in Canada, and potentially present a number of opportunities for sustainable remediation.

The objectives of the assessment were to:

(1) identify opportunities for improving the environmental sustainability of these two projects by reducing energy use and greenhouse gas emissions; and,

(2) identify sustainable technologies, such as renewable energy technologies, that could be incorporated into the projects and be successfully implemented in northern climates.

This paper will provide a high-level overview of the GHG and Energy Assessment approach and methodology for two major remediation projects. The focus will be on maximizing the use of suitable energy sources and other sustainable technologies, and on management and technical approaches for incorporating reductiosn in GHG and energy consumption on large-scale remediation projects in the North.

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

TUESDAY, MAY 11, 2010

1:30 pm – 2:00 pm

Sustainability Decision-Support Tool for Site Remediation

Robert Noël-de-Tilly, Eng.,[1] Benoit Bourque, Eng.,[1] Sylvain Hains, Eng., M.Sc.,[1] Jean-René Michaud, Eng., A.M.Sc.,[2] Sébastien Yelle, M.Sc.,[3] Valérie Morin, M.Sc.[3]
[1]Golder Associates Ltd.
[2]Environment Canada
[3]Public Works and Government Services Canada

This presentation will be delivered in French.

Golder Associates has developed a decision support tool to embed sustainable development (SD) principles into remediation projects. The tool, called GoldSET©, has been used in Europe, Australia, the U.S. and Canada. Based on GoldSET©, Golder has been mandated by Public Works and Government Services Canada (PWGSC) and Environment Canada (EC) to develop a sustainability evaluation tool, designed to encourage federal ministries and governmental agencies to take into account the environmental, social and economic dimensions of their remedial project planning. The PWGSC/EC Sustainable Decision Support Tool (SDST) provides a framework for performing a "triple-bottom-line" assessment by focussing on economic, environmental and social considerations. The SDST offers an executable framework that supports pragmatic decision-making while taking these issues into account. Phase II in the development and testing of the SDST is currently under way.

2:00 pm – 2:30 pm

A Reflection on the Environmental Aspects of Site Remediation

Kathleen Béland, agr. M.Sc., Tony Hawke, geo., Jason Hawke, ing. Jr. and Rémy Jenkins, ing.
Terrapex Environnement Ltée

This presentation will be delivered in French.

As environmental industry professionals, we all have choices to make when it comes to managing remediation projects. The technologies, equipment, disposal methods, etc. that we use are all important, but do they support the principles of sustainable development? The purpose of this paper is to encourage reflection on the choices we make when managing environmental projects. It is important to remember that sustainable development blends issues related to the environment, the economy and social considerations.

2:30 pm – 3:00 pm

Back-Diffusion and Discount-Rate Implications for DNAPL Remediation Strategies

Grant R. Carey[1,2] and Edward A. McBean[2]
[1]Porewater Solutions
[2]University of Guelph

A qualitative evaluation of the influence that back-diffusion and discount rates can have on remedial decision-making at DNAPL sites is investigated. The hypothetical site source zone consists of 12 individual pools, with pool thicknesses ranging from 0.03 to 0.36 metre. A Tier 1 evaluation of five DNAPL source-remediation alternatives and two plume-containment alternatives is conducted. Enhanced pump-and-treat is shown to have a significant mass-removal benefit that is often ignored during remedial assessments. Thermal treatment appears to be the best alternative when long-term plume management (for decades or longer) is not required, and a low discount rate is used. When back-diffusion causes long-term groundwater exceedances of clean-up criteria, then enhanced in-situ bioremediation, enhanced pump-and-treat, and Monitored Natural Attenuation may be preferable, depending on the reliability of permeable reactive barriers for plume containment, and the need to reduce risks downgradient of the source zone. In the case of a high discount rate, enhanced pump-and-treat for source treatment is the most cost-effective alternative, when pump-and-treat is also used for plume containment, regardless of whether back-diffusion in the plume is sustained over the long term. This study demonstrates that decision-making for DNAPL site management is strongly influenced by the relative priority assigned to various decision-making metrics, and is also influenced by sustained back-diffusion and discount rates used for net present value analysis.

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