Tuesday, April 26, 2016
Stream 4A - Resource Conservation
Location: Level 2, Salons 4&5

9:00 am – 9:20 am

Improving the Efficiency of an Existing Groundwater Remediation System

LeeAnn Thomas[1], Aimee Zack[1], Heather Lin[2], Chris Munson[2], Steve Finn[2]
[1]Canadian Pacific
[2]Golder Associates Ltd.

The objective of the presentation is to provide a case study for implementing enhancements to a groundwater remediation system to reduce it's carbon footprint, reduce load on city infrastructure, reduce costs and maintain clean-up effectiveness.

Abstract

Looking beyond the existing remedy and taking advantage of site characteristics a groundwater recovery, pre-treatment and discharge system was enhanced to improve its resource conservation, improve its environmental sustainability and to reduce the overall costs of the system operation, while retaining the same clean-up effectiveness.

A portion of the rail yard (site), located in northeast Minneapolis, Minnesota, had been leased to wood-treating businesses that operated between 1926 and 1972, resulting in pentachlorophenol (PCP) releases. Corrective actions for soil at the site involved the excavation of approximately 18,000 cubic yards of PCP contaminated soil, including on-site treatment of 10,000 cubic yards in an on-site constructed biopile, followed by off-site disposal at a local non-hazardous landfill. The groundwater remediation system was completed in 2007 and includes groundwater recovery wells and an on-site pre-treatment system discharging under permit to the municipal sewage treatment plant. In-situ groundwater treatment options were evaluated, but determined to be ineffective for the site-specific conditions.

After several years of operation, the system was re-evaluated to look for innovative ways to take advantage of the treatment system effectiveness, site characteristics and regulatory incentives to enhance the remedy.

Groundwater extraction and ex-situ treatment, although effective, involved depletion of the groundwater resource, long-term utilization of municipal infrastructure, long-term energy usage and costly annual fees to support the municipal infrastructure. Monitoring of the remedial system demonstrated that the pre-treatment system is highly effective and was consistently discharging clean water to the municipal system. As a result, fees were imposed to discharge clean water to a system designed and operated to treat sanitary sewer water.

A more environmentally sustainable and cost-effective discharge option utilizing an on-site infiltration basin to provide aquifer recharge was evaluated and, with regulatory agency support, constructed on the site. To further improve the sustainability of the system, solar panels were installed to supply local and renewable energy to operate the system and to serve as the primary energy supply for the system.

The infiltration basin is functioning extremely well and has resulted in substantial operational cost savings. The solar arrays were installed in Fall 2013. The site conditions, design approach, and overall pay-back of the systems, and how these might be applied to other sites will be presented in terms of economic, environmental, and social benefits.

9:30 am – 9:50 am

Offsite Treatment and Re-use of Contaminated Soil in a Sustainable Development Context: Case Study of the Lac-Mégantic Disaster, Québec, Canada

Christian Bélanger, EnGlobe Corp.

The objective of the presentation is to discuss the recent innovation in sustainable development by the bio-treatment and reuse of contaminated and slightly contaminated soil in mine sites, with everything highlighted by the study of the Lac-Mégantic oil spill.

Abstract

On July 6, 2013, a train from the Montréal, Maine and Atlantic Railways (MMA) company derailed in downtown Lac-Mégantic, in Quebec. A convoy of 72 wagon cars containing light crude oil derailed in downtown Lac-Mégantic, causing an oil spill of approximately six million litres of oil, which also affected approximately 310,000 m^3 (558,000 metric tonnes) of soil that exceeded the regulatory criteria of the ministère du Développement durable, de l'Environnement et de la Lutte contre les changements climatiques (MDDELCC). Because of time constraints and limited space, part of the soils had to be treated and reused offsite.

This presentation will cover the environmental, social, and economic aspects of the contaminated soil treatment, technology of the treatment site as well as the off-site valorization of the contaminated soil.

First, the advantages and inconveniences of the various technological solutions foreseen in this project will be explained. More specifically, the advantages of sustainable remediation by biological pathways will be addressed by highlighting the fundamental principles that regulate bio restoration and their contribution to sustainable remediation principles, while highlighting the details inherent to the decontamination project of Lac Mégantic soils and their influence on the technical and administrative aspects (communication, nuisance management, etc.) of the project.

Afterwards, the choice of an offsite treatment solution will be addressed. The social, economic, and environmental gains of fixed and local soil treatment centres will be explained and compared and contrasted with the disadvantages relating to transportation.

Thirdly, the innovative approach of reuse of Lac Mégantic decontaminated soils, together with other municipal and industrial residual matter, in the construction of restoration topsoil used in the remediation of sterile mining residues will be explained. More specifically, the development of restoration topsoil in partnership with the governmental authorities as well as its large scale use, in partnership with the local authorities, at mining sites from the municipalities of Asbestos and Thetford Mines (Black Lake) will be explained under these environmental (technical), social (social acceptability, communication, benefits for the local community, etc.) and economic aspects.

In conclusion, a reflection and recommendation based on various approaches used internationally in a contaminated soils management context as "garbage" vs "resources to protect" will be discussed in a context of remediation approach sustainability.

10:30 am – 10:50 am

Sustainable Development of WM site, in Drummondville, Quebec

Jean Bernier[1] and Martin Dussault[2]
[1]WSP Canada Inc.
[2]Waste Management

The objective of the presentation is to showcase how Waste Management was able to use biogas to fuel an electricity generation plant, as well as capture the heat generated through these processes and use it in the Demers greenhouse heating system.

Abstract

Waste Management (WM), the North American leader in environmental services and waste management, designed a model project in Drummondville, inspired by numerous sustainable development principles. From its landfill, the company supplies energy to infrastructure as diverse as an electricity generation station, a tomato greenhouse and a school, all located within the Complexe environnemental et énergétique de Drummondville, established on WM's property.

Having acquired in 1997 the landfill in Saint-Nicéphore, a municipality that is now merged with Drummondville, WM had a colossal challenge ahead. Not only did the site need revamping and brought up to the company's operating standards, it was mainly facing a crisis of confidence from the host community, long kept in the dark regarding its activities. WM immediately embarked on the complete transformation of its landfill by integrating the best available technologies. At the same time, WM opened up to its community to share with it the improvements made and the projects that the company had in mind.

It is moreover with a view of meeting the expectations of the local stakeholders consulted and to fulfill public policies regarding the environment, energy and sustainable development that WM conceived, planned and implemented its development in Drummondville. WM is using its landfill as an energy deposit for the benefit of the community. WM uses the biogas captured on site to supply energy to both a large and diversified collection of infrastructure which has established itself on its property. Today, the site is a technology hub where activities connected to people's everyday lives, such as agriculture, energy production and reuse, as well as the recycling of computer hardware and education, can be found.

Unique in Canada: In Drummondville, WM has developed a project that is unique in Canada, where it uses the same energy twice. The landfill biogas is first used to fuel engines that, paired with generators, produce 7.6 megawats of electricity, enough to power the equivalent of around 6,500 homes. This electricity is purchased and subsequently distributed by Hydro-Québec.

Then, the heat produced by the motors generating the electricity is recovered and used in a heat-exchange process which heats a 3-hectare greenhouse complex which has established itself on WM's property to be able to benefit from this clean, reliable and cost-effective energy source. The use of this residual heat avoids the combustion of over two million litres of heating fuel annually. Replacing traditional fuels with biogas directly contributes to reducing greenhouse gases (GHG) in an amount equal to removing over 3,000 vehicles from circulation, making this agricultural producer an example of energy efficiency and circular economy.

WM has also established a school-factory on its property, a building specially-designed for students aged 15-18 with learning difficulties participating in an education program to help them integrate the job market. Through practical workshops, students learn work methods by recovering computer hardware, about 1,000 tonnes per year. The school-factory uses energy produced from biogas and the building received LEED Gold certification in 2015.

In recent years, WM has received many honours for its efforts in sound environmental management, energy efficiency and its community involvement. WM proceeded to completely transform its facilities by massively investing in the best technologies, while giving the greatest consideration to the social dimension, an integral part of sustainable development. Today, the results and recognition it has received clearly attest to the sustainable rehabilitation of the WM landfill in Drummondville.

11:00 am – 11:20 am

Risk Assessment for Intelligent Re-use of Contaminated Soil in the Future Champlain Bridge Project

Agnès Renoux, Sanexen Services Environnementaux Inc.

The objective of the presentation is to discuss the management plan recommendations relating to safe re-use of excavated soil as backfill material in the Champlain Bridge project.

Abstract

The development plans designed for the construction of the future Champlain Bridge project in Montreal (QC) highlighted that approximately 94,000 m^3 of contaminated soils in the bridge's corridor had to be properly excavated and managed. In order to optimize excavated material management in terms of economics and the environment, Public Works and Government Services Canada, on behalf of Infrastructure Canada, hired the services of Sanexen Services Environnementaux Inc. to complete a qualitative risk assessment to determine if this contaminated soil or at least a portion of it, could be re-used as backfill during construction.

To this end, excavated material re-use scenarios have been defined based on the projected development, taking into consideration the depth of backfill and the land vocation (for example, under impermeable surfaces such as asphalt or in vegetated areas surrounding a bike path). For each of these scenarios, potential receptors (human and ecological) and the relevant exposure paths have been identified, which made it possible to select soil quality criteria based on the risk according to the exposure paths to protect (criteria established by the CCME or other national or international agencies). For example, for surface soil, strict criteria (taking into account the direct contact organisms have with the soil) were considered, whereas for soil located underneath a paved surface, the criteria adopted (to protect construction workers or prevent odours or free state formation) were generally more permissive. Under certain conditions, the forecasted construction of a hydraulic barrier or the assessment of analytical results of underground water were also

considered in order to avoid potential contamination by a resurgence into the St. Lawrence River.

A set of specific criteria for each of the re-use scenarios for excavated material, as well as recommendations were formulated in a management plan (addressed to construction project bidders) for the safe re-use of excavated soil as backfill material in the infrastructures in the future bridge's corridor. The application of this management plan by reducing offsite disposal will lead to a decrease in the global environmental footprint left behind by the future bridge construction project.

11:30 am – 11:50 am

Discussion Session: Waste Re-use and Best Management Practices Concerning Sustainable Waste Management

Participants will have the opportunity to ask questions and discuss ways to manage waste more sustainably during remediation projects. This could mean reducing the amount of waste, such as contaminated soils, that must be managed off-site, as well as reducing the clean and/or raw materials which need to be imported to the site. Discussions may include subjects such as: soil reuse; recycling; procurement strategies or contractual terms which encourage sustainable waste management; technologies; case studies; etc.