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MGP Solutions

NEW STUDY YIELDS PROMISING ALTERNATIVE FOR MGP SITE CLEAN-UP

by Jaydeep Parikh, Senior Project Manager, XDD

XDD recently revealed the results of an extensive in-situ chemical oxidation (ISCO) evaluation study for manufactured gas plant (MGP) sites. The two-year study – sponsored by the **Electric Power Research Institute (EPRI)** – involved bench-scale testing and a field demonstration to determine the technical feasibility, economics and limitations of ISCO of MGP residuals (TPH, PAHs and BTEX).

One of XDD's specific objectives for this project was to develop some general principles to guide managers of MGP sites

Results show that ISCO can be a beneficial and cost-effective remedy.

Activated persulfate is a flexible oxidant as a result of the combination of its stability and aggressiveness in the subsurface. The stability and persistence of the oxidant dictates its ability to transport in the subsurface and to sustain concentrations that are needed to treat low solubility MGP constituents.



when considering ISCO application and specifically activated persulfate. The guidance principles are intended to aid managers in understanding what site-specific cleanup objective ISCO may achieve and under which site conditions may ISCO be considered applicable as a cost-effective remedial alternative at MGP sites.

The project report – soon to be published by EPRI – illustrates how ISCO can be applied safely and has the potential to treat soils contaminated with MGP residual in place while reaching a range of site-specific remedial goals.

Results of this study suggest that ISCO can be an efficient and cost-effective option for MGP sites. However, a site manager who seeks to use ISCO is urged to have a very good understanding of site subsurface (e.g., geology, lithology, soil/groundwater chemistry) and contamination (e.g., concentrations, phases and distribution) before applying ISCO as a remedial technology. ☺

To contact Jaydeep directly for more info on ISCO or the EPRI study, you can email him at parikh@xdd-llc.com.

Did You Know?

Vapor Intrusion

by Annette Lee

Senior Project Manager, XDD

Vapor intrusion, or the movement of vapor that has been contaminated by impacted soil and/or groundwater into buildings, may be a significant exposure risk at or near your site. This serious exposure pathway may require evaluation regardless of whether a building currently exists on the property or if future plans include development.

Although assessment of this risk potential can be challenging, vapor intrusion is an ever-developing topic within the regulatory and technical arenas, and methodologies continue to be refined and improved. Additionally, relatively straightforward mitigation and remediation techniques can be used to enable the use of current or future buildings.

For existing buildings, smart choices in evaluation approach and retrofitted mitigation systems (if needed) can result in a low-cost resolution of this potentially significant exposure pathway.

For properties in which future use includes a building or buildings, targeted remediation prior to and/or the inclusion of a contingency mitigation system during the design process is a cost-effective alternative.

Here are some useful links for learning more about the exposure risk of vapor intrusion and the options available to you:

http://www.itrcweb.org/teampublic_Vapor.asp

<http://www.epa.gov/correctiveaction/eis/vapor.htm>

Want to talk more about vapor intrusion issues? Drop me a line at lee@xdd-llc.com.

Contaminant Focus

7 KEY THINGS YOU SHOULD KNOW ABOUT CYANIDE IMPACTED SOILS

by Michael Marley, President, XDD

While coal tar residuals are the predominant problem for owners of former MGP sites, many of these sites also have cyanide issues which resulted from the placement of fill on site, derived from the spent oxide wastes from the gas processing.

To determine how best to deal with the cyanide issues it is important to have insight into how cyanides are regulated and also how the complex chemistry of cyanides relates to former MGP sites. A few of the key aspects of the regulations and chemistry of cyanide pertaining to MGP sites are provided below:

- Free Cyanide (HCN or CN⁻) is the only real toxic form of cyanide of concern, although state specific regulations do not always recognize this and many regulate based upon total cyanide.
- Not all laboratories are set up to perform appropriate sample pre-treatment and proper speciation of the cyanide at a site.
- At the vast majority of MGP sites, cyanide exists in both the aqueous and solid phase as Strong Acid Dissociable (SAD) metal complexes – typically Prussian or Turnbull's Blue.
- There can also be low amounts (< 10 %) of Weak Acid Dissociable complexes and even lower amounts (< 3%) of free cyanide.
- The speciation of the cyanide and the kinetics of dissolution and dissociation are sensitive to pH and Redox conditions; these are very important parameters to measure at the site.
- The SAD metal complexes are typically least soluble under neutral to acidic conditions but are relatively soluble under high pH conditions.
- Conversely, the metals complexes are stable under neutral to alkaline conditions but tend to dissociate into free cyanide under moderate to strong acidic conditions.

So once you understand the issue at a site – what can you do? There are quite a few options available, dependent on the site-specific risks determined. The following list provides a number of the available options:

- If no direct contact issues exist: risk it away / attenuation
 - ♦ In subsurface
 - ♦ In wetlands
- Adjust the pH – Redox conditions to control the risk
- Excavate or pretreat to non-hazardous levels and excavate
- In-Situ treatment potentials:
 - ♦ Phytoremediation
 - ♦ Chemical oxidation
 - ♦ Chemical reduction
 - ♦ Thermal treatment. ☺

FUN N' USELESS FACTOID!



According to James Bond lore, all "00" agents are issued cyanide capsules in the event they are captured. Bond, however, is described as having thrown his away. Let's hope 007 disposed of them in an environmentally-sound fashion.

Got a potential cyanide situation at your site? Get in touch with Mike Marley at marley@xdd-llc.com.

A Closer Look At...

IN-SITU STABILIZATION

Objective: Provide a cost-effective alternative for in-situ treatment of manufactured gas plant (MGP) residual impacted soils.

Technology: In-situ stabilization and solidification (ISS) is the mixing of a reagent or reagents with the impacted soils in-situ to create a stable matrix or monolith that will not leach contaminants above regulatory standards. Typically the reagents used consist of cements at varying percentages (~2-6%) with the addition of slag, silicates or organo-clays (~5-15%).

Bench-Scale testing is performed to estimate:

- Appropriate reagents and quantities for cost-effective application
- Test leachability of ISS product
- Test durability of ISS product

Field Implementation – key factors:

- Dry grout to water ratio
- Soil type
- Injection and mixing rates
- Number of passes
- QA on processes to overcome site specific variabilities and maintain consistency in quality

Benefits:

- In-situ option
- Can be as low as \$100 per yard treated; in some cases lower costs have been achieved
- Auger based mixers can treat to large depths in excess of 100 feet
- Produces less odor issues than excavation
- Improve site soils stability

Limitations:

- Consistency between bench and field testing is not high
- Accessibility for equipment
- Long term leachability / liability: Alternates to TCLP & SPLP testing are being assessed to understand the leachability better
- Swell creates excess soils that require management: Disturbance of swell or excess soils can cause loss of integrity of stabilized product.

Health & Safety

EHS EXPERT JOINS XDD

XDD kicked off 2007 by welcoming **Maureen Lein** as its new **Manager of Health and Safety Operations**. Maureen, who is based in XDD's Stratham, NH office, brings to her position more than 12 years of direct environmental, health and safety (EHS) experience and over 20 years of engineering experience in industrial settings.

"XDD is a progressive and innovative environmental consulting firm that's not bogged down by the bureaucracy or constraints you see at other companies," says Maureen. "XDD devotes time, resources, and energy towards planning for the future, especially

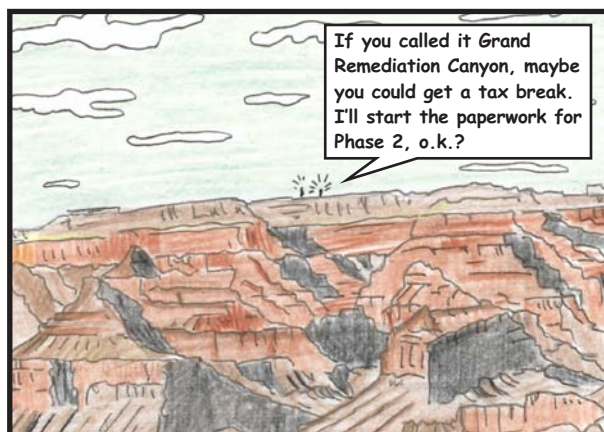
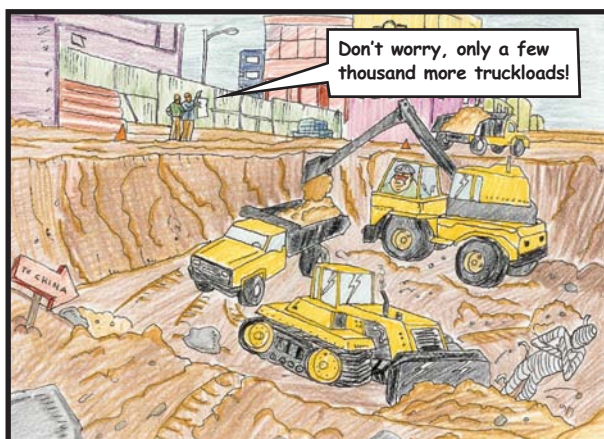
when it comes to new technologies and services. After my first meeting with folks here, I knew this was the place where I wanted to be."

With an M.S. in Resource Management and Administration from Antioch New England University, Maureen brings her experience and expertise to emergency response planning, hazardous materials management, OSHA and Department of Labor safety program development, EHS auditing, as well as environmental program development, implementation and training. Since arriving in January,

...continued on page 4

PLANET XDD

by R.W. Kane, Jr.



EHS Expert, continued from page 3

Maureen has already begun to develop EHS plans and conduct EHS compliance audits for current XDD clients.

Before joining XDD, Maureen spent three years managing EHS initiatives at Stahl USA, a chemical and coatings manufacturer in Peabody, MA. Prior to that, Maureen worked for 18 years with the Textron Automotive Company at their R&D center in Dover, NH. It was while working in Textron's plastics coating division that she developed her interest in environmental and pollution issues.

"Our technology made a great product but it also generated massive amounts of waste, which concerned me," she recalls. "I became increasingly focused on hazardous waste reduction and pollution prevention. I began by implementing the most effective environmentally-friendly technology and from there, I moved into an environmental management and policy-setting role."

A practitioner of "thinking globally and acting locally," Maureen serves on her town's conservation commission to help maximize property development while ensuring open spaces. And starting at XDD wasn't the only major change for her this year: Maureen has also recently returned from Hawaii where she exchanged surfside wedding vows with her husband Steve Chisholm. ☺



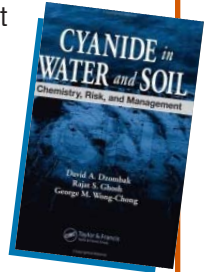
Maureen Lein, XDD's new Manager of Health & Safety Operations

To contact Maureen with any EHS concerns or questions – or even to talk about the logistics of planning a Hawaiian beach wedding – you can reach her directly at lein@xdd-llc.com.



Cyanide in Water and Soil: Chemistry, Risk and Management

(Dzombak, et al., CRC Press, 2006). This is the first book to present the state-of-the-art in managing cyanide across a wide range of industrial and environmental contexts, and explores how to control or remediate these releases.



Emerging Nanotechnologies for Site Remediation and Wastewater Treatment.

(K. Watlington, August 2005). The state of the science of nanotechnology, as well as available commercialized nanotechnology products and remedial capabilities, are discussed in this document prepared for the U.S. EPA. Also addressed: toxicity and safety concerns as well as the current state of regulation. Available at: <http://clu-in.org/techpubs.htm>.

EPA Engineering Issue Paper: In Situ Chemical Oxidation

(Huling & Pivetz, EPA 600-R-06-072, 2006). This issue paper, produced by the EPA Risk Management Research Laboratory and the Engineering Forum, provides an updated overview of ISCO remediation technology and fundamentals, and is developed based on peer-reviewed literature, EPA reports, current research, conference proceedings, and other pertinent sources. Available at: <http://www.epa.gov/ada/download/issue/600R06072.pdf>.



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