

What is Green and Sustainable Remediation?

In recent years, the term “green” has found its way into just about every aspect of our lives. The list of green terms is extensive and you’re probably familiar with many of them, such as green construction, green automobiles, green energy, and green products. However, some green terms may deal with things that are not so common place, and therefore, not well understood. Such is the case with green and/or sustainable remediation. These terms are often mentioned within regulatory entities, public and private sectors, and community activism, but what are they? You’re likely to get a different answer to this question depending on which one of these stakeholder groups you ask.

The Environmental Protection Agency (EPA) uses the term “Green Remediation” (GR) and defines it as “the practice of considering all environmental effects of remedy implementation and incorporating options to maximize net environmental benefit of cleanup actions”. Alternatively, the US Sustainable Remediation Forum (SURF) uses the term “Sustainable Remediation” (SR) and defines it as “a remedy or combination of remedies whose net benefit on human health and the environment is maximized through the judicious use of limited resources”.

While EPA’s view on GR appears to focus primarily on protection of human health and the environment, US SURF takes a more holistic approach to SR by also incorporating social and economic considerations. It would seem logical that when concepts of both GR and SR are integrated, the term would be called “Green and Sustainable Remediation” (GSR). Although some support this logic, there is currently no formal definition; as such, the Interstate Technical and Regulatory Council (ITRC) is working toward a consensus-based definition for GSR.

GSR concepts can be incorporated into all phases of a cleanup project, even when site-specific conditions limit available remedial alternative options. For example, GSR concepts that could be implemented include recycling demolition debris, transporting backfill to the site during return trips from the landfill during excavation with off-site disposal, utilizing cleaner burning fuel and developing an engine idling policy, reusing/retaining storm water on-site, purchasing carbon off-set credits, and/or maintaining and improving ecosystems during site restoration. Alternatively, if your site is faced with long-term operation and maintenance activities, some GSR improvements could include incorporat-

ing renewable energy sources, optimizing the operation efficiency and increasing the automation of the system, minimizing wastes, and/or selecting the optimal type of chemicals and process materials.

Based on our technical experience and interaction with the various stakeholder groups, it’s clear that the GSR initiative is here to stay and will continue to become better defined and implemented with time. We believe the concepts of GSR should be considered an important component of any cleanup project. In an effort to better educate and inform those interested, Cox-Colvin has begun to periodically publish a *Green & Sustainable Remediation Bulletin* which will provide updates and discussions related to various GSR topics. This document represents the first in our *Green & Sustainable Remediation Bulletin* series.



EPA Region 5 Releases Greener Cleanup Interim Policy

EPA currently cannot enforce the use of GR practices. However, GR Policies released by EPA regional offices provide a legitimate stance to strongly encourage/guide cleanup projects in the direction of GR. We may soon begin to see GR requirements in new orders and permit renewals.

EPA regional offices recently began developing their own GR policies to support the GR initiative in federal cleanup programs. EPA Region 5 (Illinois, Indiana, Michigan, Minnesota, Ohio, and Wisconsin) released their GR policy in November 2009, entitled *Region 5*

Greener Cleanup Interim Policy. In an effort to promote implementation of this Interim Policy, EPA Region 5 hosted a Greener Cleanups Workshop on February 9, 2010 at their Chicago, Illinois headquarters for all interested regulators, consultants, and facility owners/representatives. The workshop also was broadcast over the internet for the public and any other interested parties.

The goal of the Interim Policy is to enhance the environmental benefits of federal cleanup programs by promoting technologies and practices that are sustainable. The objectives of the Interim

Policy are to protect human health and the environment by achieving remedial action goals; reduce air pollutant emissions and greenhouse gas production; minimize impacts to water quality and water resources; support sustainable human and ecological use and reuse of remediated land; minimize material use and waste production; and conserve natural resources and energy. The first objective (protect human health and the environment by achieving remedial action goals) demonstrates that EPA’s primary purpose of protecting human

(cont’d on page 2)

EPA Region 5 Releases Greener Cleanup Interim Policy (cont'd from p1)

health and the environment still takes precedence over all other GR objectives/concepts. In other words, GR does not override regulations, standards, goals, and risk potential; therefore, a green cleanup cannot be used as an excuse for a poor cleanup (i.e., green washing).

The Interim Policy encourages and lists several GR practices that can be em-

ployed throughout a cleanup project, regardless of whether the projects are Superfund, RCRA, LUST, or Brownfields. The Interim Policy states that the use of the listed GR practices and other GR technologies are “the point of departure” (i.e., the starting point), and should be considered standard unless a site-specific evaluation demonstrates impracticability or favors an alternative GR approach. Finally,

the Interim Policy discusses long-term goals of developing a Region 5 Greener Cleanup Strategy that will promote the Interim Policy for inclusion in state-authorized and other state-lead cleanup projects and describes data collection and evaluation efforts needed to develop a Final Greener Cleanup Policy.



Green and Sustainable Remediation Status at the Federal & State Levels & Other Organizations

One of the first significant contributions in the evolution of the GSR initiative was EPA's April 2008 *Green Remediation Primer* (EPA 542-R-08-002). The Primer outlined six core elements of air, water, land and ecosystems, materials and waste, energy, and stewardship. In an effort to identify opportunities to advance GSR across cleanup programs, EPA's Office of Superfund Remediation and Technology Innovation currently is working with the Office of Brownfields and Land Revitalization and other offices to develop a series of quick-reference fact sheets. These fact sheets describe GR best management practices for frequently used cleanup remedies, various field stages, and other cleanup aspects posing significant opportunities to reduce cleanup “footprints”. Fact sheets already released include site investigation, excavation and surface restoration, and pump and treat technologies. Six additional fact sheets are anticipated to be periodically released throughout 2010. Other noteworthy GR-related documents from EPA include *Principles of Greener Cleanups* (Office of Solid Waste and Emergency Response), *Smart Energy Resources Guide* (EPA/600/R-08/049), *Energy Consumption and Carbon Dioxide Emissions at Superfund Cleanups* (Draft), and *Superfund Green Remediation Strategy* (Public Review Version). All EPA GSR-related documents, fact sheets, and regional policies can be viewed at www.clu-in.org/greenremediation.

It's clear that EPA is contributing significant resources toward furthering the development, awareness, and education of the GSR initiative. But what

about the state level agencies? During the EPA Region 5 Greener Cleanups Workshop, agency representatives from the associated states (Illinois, Indiana, Michigan, Minnesota, Ohio, and Wisconsin) provided progress updates regarding GSR at the state level. Some state updates were very promising, while others suggested limited GSR initiative and a wait-and-see attitude. Illinois, Minnesota, and Wisconsin have demonstrated significant GSR progress through policies, documents, and/or internet-based tools. In addition, these states have established clear goals and objectives for furthering their GSR contributions. Although Indiana, Michigan, and Ohio all verbally indicated that they support EPA's GSR initiative, they are well behind the independent initiatives shown by Illinois, Minnesota, and Wisconsin.

A joint project currently in development between EPA, several state agencies, and ASTM International is the creation of a Green Cleanup Standard. Critical to this effort will be developing transparent verifiable methods and metrics to evaluate the pros and cons of the individual GSR components. In addition, the US Air Force, US Army Corps of Engineers, and a number of workgroups are contributing to the GSR initiative. For example, US SURF has published an extensive white paper in a special addition of the Summer 2009 Remediation Journal. Also noteworthy is ITRC's Green and Sustainable Remediation team, which completed a draft version of a GSR document. Both the US SURF and ITRC documents provide a thorough overview of the current status of GSR and will likely serve

as key foundation documents in the continuing evolution of the GSR initiative. For brevity, other examples are not provided here; however, the reader is encouraged to visit the website's of these respective groups to become more familiar with their GSR contributions. A few of these websites include:

US Air Force Center for Engineering and the Environment - (www.afcee.af.mil, search for sustainable remediation program),

US Army Corps of Engineers Environmental and Munitions Center of Expertise (www.environmental.usace.army.mil),

ITRC (www.itrcweb.org),

US SURF (www.sustainableremediation.org), and

Association of State and Territorial Solid Waste Management Officials (www.astswmo.org).



US EPA (www.clu-in.org)

Improvements Needed for Green and Sustainable Remediation

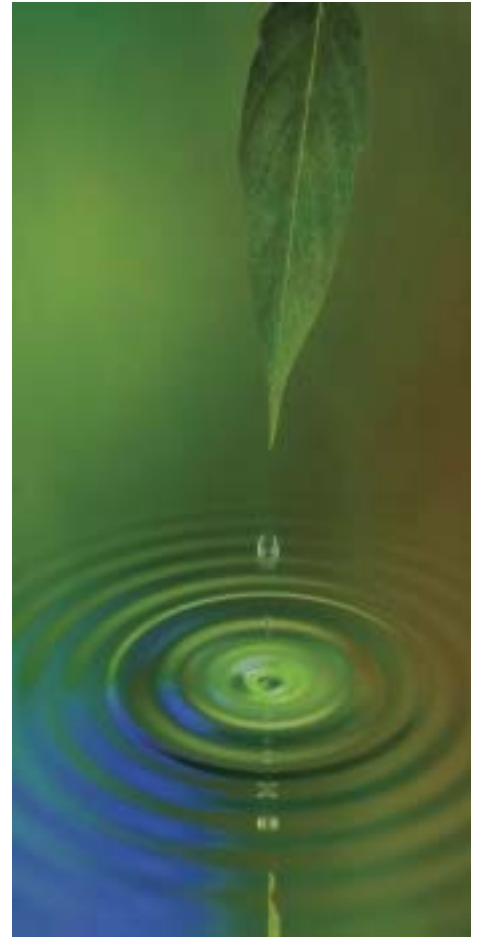
The GSR initiative continues to evolve rapidly, primarily from contributions by various stakeholder groups, many of which have been discussed throughout this bulletin. However, many improvements are still needed. Based on a review of available documents related to the GSR initiative, discussions and interactions with federal and state agencies, and first-hand experience with interpretation and implementation of GSR principles and practices, some of the more significant improvements that are needed include:

- Establishing versatile qualitative and quantitative GSR metrics - this will allow a consistent approach in the identification, evaluation, and implementation of GSR principles and practices, while still providing the ability to accommodate various regulatory structures and site-specific conditions.
- Providing incentives for GSR implementation - unless required to do so by regulation, many companies may

be hesitant to implement GSR principles and practices unless clear benefits (including cost) can be easily demonstrated. In addition, formal recognition should be provided to those who do implement GSR in a cleanup project.

- Empowering regulators who are proactive and demonstrate GSR support - it's important that the agency with regulatory authority over a cleanup project (including state agencies) has the ability to provide GSR support through policies, tools, and/or guidance when necessary.

With time and effort, these needed improvements hopefully will be addressed and the full benefits of the GSR initiative can be realized.



Cox-Colvin & Associates, Inc. is an active member in the Interstate Technical and Regulatory Council's Green and Sustainable Remediation team. We evaluate and recommend GSR practices to our clients throughout all phases of a cleanup project.

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