The Sustainable Remediation Forum

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Regulators seem to currently be focusing on green remediation and not sustainable remediation. How can the industry change this perception so that a more holistic approach is followed?

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The Sustainable Remediation Forum (SURF) survey, conducted in October 2008, indicated that, while most survey respondents agreed that sustainability should be evaluated during the remedy selection and implementation, regulators represented a minority of those respondents. As explained in the White Paper published in the Summer 2009 issue of *Remediation* ("Sustainable Remediation White Paper—Integrating Sustainable Principles, Practices, and Metrics Into Remediation Projects"), some regulators expressed concerns that sustainability might be used to argue against the application of more effective remediation technologies. Increasing acceptance of a more holistic approach may be aided by *opening the dialogue about "green" remediation and "sustainable" remediation with stakeholders*. *Sustainable remediation* means different things to different stakeholders depending on the application and, often, the circumstance. Both should play a significant role in the remediation process. The U.S. Environmental Protection Agency defines *green remediation* as the practice of considering all environmental effects of a cleanup during each phase of the process, and incorporating strategies to maximize the net environmental benefit of the cleanup. The US EPA's vision of green remediation, which has a narrower focus than sustainability, is to optimize the environmental results through more best management practices and optimizing activities to reduce waste, use less energy, recycle/reuse, and use less virgin materials. Sustainable remediation is broadly defined by the Sustainable Remediation Forum 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 and provides the best combined solution when considering environmental, social, and economic considerations.

The onus is on the regulated community (problem owners) to increase the comfort level of the regulators in understanding that consideration of sustainability should make an appreciable difference in remedy selection and implementation but should not dominate the decision process. SURF members feel that a balance between sustainability and other criteria should be, and will be, maintained. Looking at the selection of remediation alternatives through a sustainability framework is an inclusive method to consider all off-site, on-site, and global impacts in decision making so that decisions on trade-offs are

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made in a deliberate, informed, and thoughtful manner. Industry can most effectively broaden the regulatory community's perception of sustainable remediation by working together and communicating more effectively to reach a common ground.

Changing regulators' perception that sustainability is a way to do less effective remediation may be accelerated by *moving toward all parties embracing a more evolved definition of sustainable remediation, such as addressing remediation activities as an integrated partnership of environmental stewardship, social responsibility, and economic viability*. We all want site remediation, restoration, and revitalization but we all need to recognize that means understanding, and accepting, the environmental ramifications of achieving that goal. Excavation of affected soil and transportation off-site has a large carbon footprint associated with it and does not truly get rid of the impacts but moves them somewhere else. There are certainly situations when that alternative is the most feasible option to address contamination, but *in situ* treatment, capping in place, and institutional controls are also viable alternatives that can have much smaller carbon footprints and be equally protective of human health and the environment. The alternatives may involve a longer time frame or come with deed restrictions for future use but are viable sustainable remediation approaches and should be considered. Considering sustainable factors in remedy selection and implementation provides an avenue to inform the community, industry, and government on the environmental trade-offs of alternative processes.

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One of the concerns of regulators could be that they are charged with protecting the public, and all their decisions are made with the public's best interests in the forefront. Sustainability is all about understanding what actions are in the best interests of the local and global community. We can *work together to educate stakeholders so they understand the consequences of whatever remediation technology is implemented*. If stakeholders understood the positives and negatives around specific technologies, they could make more informed decisions that both inform and support their agency decisions. There is a strong and vocal public concern for future generations, and understanding how remediation activities can be sustainable, or not as sustainable, or wholly unsustainable, is critical to effective decision making. With regard to sustainability, the public's role has expanded, at least at Superfund sites, to include participation in discussions regarding the remedy's impacts on community livability and vitality, end uses of remediated areas, and residual environmental impacts and their effects on property valuations and quality of life. Enhanced public acceptance will flow from improved public understanding of the potential benefits of both green and sustainable remediation.

Problem owners should work hand in hand with their regulatory agencies to increase the comfort levels of the regulators in that (1) the actions proposed will be protective of human health and the environment and, therefore, they have fulfilled their obligation to the community they serve; (2) the responsible party will not be disappearing but will fulfill their environmental stewardship requirements; (3) the institutional controls and deed restrictions will be stringent enough to prevent unexpected or unacceptable exposures and can be adequately monitored over time to ensure their protectiveness; and (4) together we can educate the community on the benefits and consequences of the actions. Risk assessment was not warmly embraced in 1989 when the first comprehensive human health risk assessment guidance was issued, but over time, and with repeated use, practitioners understood the value of risk assessment and felt more comfortable with the protectiveness and implementation of the results. That can be realized for sustainable remediation also.

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The practice of *green remediation* generally focuses on the environmental effects of remedy implementation, maximizing the net environmental benefit of remediation and the use of green technologies: those that generate less waste, emit fewer greenhouses gases, and are considered less disruptive to the environment. While these practices are compatible with sustainable remediation, the singular focus on only one of the three tenets of sustainability (environment) can impede or derail a remediation project if the community's expectations and the responsible party's willingness and ability to fund the project cannot be met. All three elements of sustainability—social, economic, and environmental—are needed for a balanced and viable solution, and, in reality, are inextricably linked.

The sustainable remediation industry should create definable goals and measurable results that can be clearly presented to support a long-term vision for site restoration and use or reuse. A sustainable remediation strategy should emphasize the net environmental benefit, but also be fiscally prudent and benefit the impacted community. The risks and opportunities related to climate change, which provides the underlying initiative to perform sustainable remediation, are driven by economics; therefore, regulators should view this economic driver as an opportunity for incentives and innovation. The vision for site restoration should encompass upstream and downstream (including off-site) perspectives, thereby providing regulators enough data to make rational remedy decisions that have the potential to vary vastly if social and economic factors are considered.

Responsible parties must routinely and sincerely engage with regulators and impacted communities to build and strengthen trust. Because sustainability and cost are often inversely proportional, there is an inherent skepticism from regulators, environmental groups, and the public. Trust will be built through stakeholder relationships that must include representatives from nonenvironmental and nontechnical sectors. The community's tangible and emotional connections to the land are the foundation of long-term environmental stewardship and deserve to be valued and considered in remedy selection.

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DAVID S. WOODWARD

The acceptance of change and new paradigms are never without controversy and can be polarizing. Most, if not all stakeholders with interest or involvement in remediation generally agree that the selected remedy should be conducted in a green and environmentally friendly manner (i.e., green remediation). As such, green remediation has generally not been viewed as a controversial topic and has increased in popularity very rapidly. On the other hand, sustainable remediation is more controversial and has to some degree become associated with doing less cleanup or as being proposed as "one more excuse not to clean up the site" (i.e., "green-washing"). This controversy also exists because sustainable remediation may influence not only how to remediate, but also the broader topics of how much to remediate or even whether to remediate. There are also practical barriers to sustainable remediation, including current environmental policy, a lack of associated regulatory infrastructure, and a lack of case studies (i.e., data) to support and justify significant change. Another significant barrier to sustainable remediation is that it is difficult to equate results in a consistent metric, and many of the

factors that influence the outcome can only be assessed qualitatively. There is also no standard, recognized methodology for conducting a sustainable remediation assessment or evaluation. The bottom line is that there are *potentially* relevant additional criteria that we should be looking at and evaluating to determine the degree to which sustainable remediation (vs. green remediation) should be applied and the associated site characteristics (to define applicable sites).

There are a number of things that the environmental industry can do to change current perceptions and ensure that sustainable remediation is further considered and evaluated. First and foremost, these include viewing the lack of regulations and guidance as an opportunity rather than as a barrier. We should be proposing to regulators to expand the traditional feasibility study criteria or re-evaluate current criteria to include nontraditional metrics (e.g., greenhouse gas emissions, energy use, natural resource service, worker/risk of remedy safety, etc.). The demands required to address climate change and our diminishing natural resources should cause us to challenge the status quo. Sustainable remediation evaluations are generally not costly or time-consuming and may have a significant impact on how a site should be managed (i.e., sustainable risk-based corrective action). We should also be reporting on the outcome of these analyses via conferences, presentations, and meetings with regulators. As more evaluations are completed and data are generated, the role of sustainable remediation should become clearer, and the site-specific characteristics where it is most important and applicable will

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become more obvious earlier in the life cycle of a project. Likewise, we need to better coordinate our efforts as an industry at the guidance, regulatory, and policy levels so that we can meet the unprecedented demands of our rapidly changing environment.

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