

Sustainable Remediation Forum
February 8, 2007
Wilmington, Delaware

This meeting marked the second time that various stakeholders in remediation—industry, government agencies, environmental groups, consultants, and academia—came together to develop the ability to use sustainability concepts in remedial decision-making. Those individuals that participated in the meeting are listed below (teleconference attendees are noted by asterisks and appear at the end of the listing). Participant contact information is provided in Attachment 1. At the end of the meeting, participants agreed to name the group and effort the “Sustainable Remediation Forum.”

Dave Ellis (meeting host), DuPont
Mike Rominger (meeting facilitator), DuPont
Kathy Adams (meeting recorder), Writing Unlimited

Brian Ashby, Delaware Department of Natural Resources and Environmental Control (DNREC)
Brandt Butler, URS Corporation
Stephanie Fiorenza, British Petroleum (BP)
Rich Galloway, Honeywell
Frank Gavas, (DNREC)
Deborah Goldblum, U.S. Environmental Protection Agency (USEPA)
Bob Greaves, USEPA
Mike Houlihan, GeoSyntec Consultants
Stella Karnis, Canadian National Rail
Dick Raymond, Terra Systems
David Reinke, Shell Global Systems
Sheryl Telford, DuPont
Dan Watts, New Jersey Institute of Technology
Izzy Zankos, DuPont
Peter Zeeb, GeoSyntec Consultants

Janice Barber*, Dow Chemical Company
Bob Boughton*, California EPA
Frank Evans*, National Grid Property, Ltd.
Jon Greaves*, UK Environment Agency
Paul Hadley*, California EPA
Mark Harkness*, General Electric
Nicola Harries*, CL:AIRE
Jo Jolly*, ESI Limited
Mike Kavanaugh*, Malcolm Pirnie
Janine MacGregor*, New Jersey Department of Environmental Protection
Dave Major*, GeoSyntec Consultants
Gary Wealthall*, British Geological Survey

Meeting Opening

The meeting began with Mike Rominger (DuPont meeting facilitator) reading an anti-trust statement and discussing meeting logistics. Prior to the meeting, export control compliance was verified. Introductions were made, with each meeting participant giving their name, affiliation, expectations of the meeting, and reflections on the last meeting (if attended). Mike distributed the notes from the November 13th meeting (which were previously distributed via e-mail) and asked for reflections and comments.

Sharing Perspectives

After the roll call, meeting participants were asked to share their perspectives and experiences with applying sustainability concepts to remedial projects. A variety of perspectives were shared and a few specific projects were discussed. Stella Karnis (Canadian National Rail) described a project in which her company performed partial dredging at a DNAPL site that had affected a river. The project description spurred participants to discuss a broad range of topics, including how to determine the full range of environmental costs for a remedy, how to weigh regional and global impacts and compare them, and how to identify the parties responsible if and when a remedy fails years after implementation. Stephanie Fiorenza (BP) shared the following new 12 environmental requirements for all projects at her company:

- Air quality
- Community disturbance
- Cultural perspectives
- Drilling impacts
- Energy efficiency
- Environmental liability protection
- Flaring and venting
- Marine mammals
- Ozone depletion
- Physical and ecological impacts
- Waste management
- Water management

As an example of the challenges associated with integrating sustainability into the decision-making process, Mike Kavanaugh (Malcolm Pirnie) discussed a site that used steam as a remedy. Bob Greaves (USEPA) noted that sustainable remedies involve the balance of other issues as well—sustainability is just one factor in the consideration.

Developing a Mission Statement

After sharing perspectives, participants were given a draft mission statement that was developed by some participants and circulated via e-mail before the meeting. Meeting participants responded to the mission statement and made suggestions. Participants agreed that the term “sustainability” needed to be defined and that the draft mission statement developed may very well change over time. The draft mission statement is as follows:

To establish a framework that incorporates sustainable concepts throughout the remedial action process that provides long-term protection of human health and the environment and achieves public and regulatory acceptance.

Sustainable concepts were further defined as those that balance economic viability, conservation of natural resources and biodiversity, and enhancement of the quality of life in the surrounding community. In an effort to further define sustainable approaches, the group was referred to the

last meeting minutes, which showed DuPont's definition as those that achieve at least one of the following:

- Minimize or eliminate energy consumption or the consumption of other natural resources.
- Reduce or eliminate releases to the environment, especially to the air.
- Harness or mimic a natural process.
- Result in the reuse or recycling of land or otherwise undesirable materials.

Dick Raymond (Terra Systems) provided a definition from the University of Cambridge¹, which detailed sustainable remediation technologies as those where:

- Future benefits outweigh remediation costs.
- The environmental impact of the implementation process is less than the impact of leaving the land untreated.
- The environmental impact of the remediation process is minimal and measurable.
- The time-scale over which the environmental consequences occur and, hence, intergenerational risk, is part of the decision-making process.
- The decision-making process includes the proper engagement of all stakeholders.

Participants liked these points, but noted that the challenge is how to balance among the above criteria.

Providing Perspectives and Brainstorming

Questions were posed to the group, and responses and ideas were recorded on chart pads. Regulatory and corporate participants were polled for their perspectives. Meeting participants were also asked to brainstorm ideas about how to open dialogs with regulatory agencies and nongovernmental organizations (NGOs) so as to better understand their perspectives and gain participation from these groups. More detailed descriptions of the discussions in these areas are presented in the subsections below.

Regulatory Agencies

Participants from regulatory agencies were asked to share their perspectives about sustainability in remediation. The following are their responses:

- This sustainability effort is coming at a good time—the “sooner the better” for getting it underway. By the Year 2020, the USEPA is charged with meeting a goal of cleaning up 95% of Resource Conservation and Recovery Act (RCRA) sites.
- Incorporating sustainability into the regulatory process may be challenging, but perhaps it could be included in the RCRA and Superfund remedy selection criteria that already exists. Sustainability concepts could also be integrated into the state regulatory process in programs such as the 41 indicators in New Jersey and municipal indicators in various cities across the U.S.
- The involvement of policy makers from USEPA Headquarters would help to integrate sustainability into the current regulatory structure in a meaningful way.

¹ Harbottle, et al., *Technical Sustainability of Brownfield Land Remediation*, Paper presented to the SUBR:IM Conference, March 1, 2005.

- ❑ Sustainability is not solely about cost avoidance. It is important to remember to include items such as environmental costs and lifecycle costs when discussing cost.
- ❑ It is important to balance all impacts (e.g., not only carbon dioxide but also impacts to land, water, air, etc.) when considering sustainable remedial options.
- ❑ Regulatory personnel will need education regarding the tools and metrics for sustainability in remediation. It would be helpful to have a simple way for personnel to evaluate the trade-offs and impacts of using vs. not using a sustainable remedy.
- ❑ Current regulations may not be considering all aspects of sustainability because of how the USEPA is structured (i.e., divided into areas that focus on specific media such as air and water).

Meeting participants were encouraged to brainstorm ideas of how to better understand the regulatory perspective and how to obtain regulatory agency participation as we move toward implementing sustainability concepts and practices in remediation. The following action items were discussed as a way of furthering and enhancing the discussion of sustainability in remediation:

- ❑ Obtain buy-in by policy makers in the USEPA Technology Innovation Office. Explore the idea of integrating sustainability into the current regulatory process by way of a memorandum or guidance vs. statutory changes.
- ❑ Invite regulatory agency personnel to a presentation of the various aspects of sustainability in remediation (e.g., estimation tool, case studies).
- ❑ Educate regulatory personnel at the project manager level about sustainability concepts in remediation (e.g., through ITRC, web training, annual state and regulator meetings, OSHA training, Land Revitalization Office in the USEPA).
- ❑ Share ideas through concrete examples and describe thought processes (perhaps through a web site).
- ❑ Conduct pilot-scale projects both overseas and in the U.S.
- ❑ Perform impact analyses to determine broad impacts of project.
- ❑ Perform awareness training of international regulators by leveraging current international relationships (e.g., DuPont's work in China, Japan, and Brazil and international representatives that visit USEPA).
- ❑ List goals and objectives of the project, then determine the most sustainable way to get to the goal. This approach allows the regulatory agency reviewing the effort to more clearly see how the sustainable effort can achieve the project goal.

Corporations

Participants from corporations were asked to share their perspectives about sustainability in remediation. Participants focused on potential metrics that may be useful when evaluating sustainable practices in remediation. The following potential metrics were discussed:

- ❑ Greenhouse gases
- ❑ Energy use

- Resource use (e.g., landfill space, water, air)
- Safety
- Local issues
- Required stewardship over time
- Weighting factors (i.e., the items that drive local issues)

NGOs

Meeting participants were encouraged to brainstorm ideas of how to better understand the NGO perspective and how to bring NGOs to the table to talk about sustainability in remediation. The ideas from this brainstorm were categorized after the meeting and are included in Attachment 2.

Meeting participants were asked to suggest possible criteria that might help the forum decide which of the above efforts to pursue further. The following were the responses, which were not refined or evaluated against the ideas listed above:

- Size of audience (membership numbers)
- Link/relevance to their interest
- Willingness to work cooperatively and openly
- Already educated about sustainability
- Speed of feedback (delivery and response)
- Organizational credibility
- Accessibility (how easy it is to enter)

Path Forward

The following path forward items were identified at the meeting:

1. Meeting participants agreed that a Meeting Design Team would plan the next meeting. Members on the design team are as follows: Dave Ellis (DuPont), Bob Greaves (USEPA), Stephanie Fiorenza (BP), Mike Rominger (DuPont), Sheryl Telford (DuPont), and Izzy Zankos (DuPont). Additional members are welcome. The goal for the next meeting is to use real-world sites to apply the draft metrics developed in the meeting and determine the validity of the metrics. The identified issues will be discussed at the next meeting, focusing on specific discussion points to allow for comparative analysis.
2. The next meeting will be held in Baltimore, Maryland, in May 2007. The tentative meeting date will be before or after the Battelle conference to streamline traveling plans for participants. A draft agenda will be developed by the Meeting Design Team and will be circulated via e-mail. Active feedback and suggestions are encouraged.

Attachment 1
February 8, 2007
Participant Contact Information

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Name	Organization
Dave Ellis	DuPont
Mike Rominger	DuPont
Kathy Adams	Writing Unlimited
Bryan Ashby	Delaware Dept. of Natural Resources and Environmental Control
Brandt Butler	URS Corporation
Stephanie Fiorenza	British Petroleum
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Deborah Goldblum	U.S. Environmental Protection Agency
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Attachment 2
Ideas on How to Better Understand
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Ideas on How to Better Understand the NGO Perspective

- Approaches
 - Establish a dialog with NGOs to understand perspectives.
 - Call personal contacts (e.g., Lenny Siegal in California).
 - Present case studies of sustainable remedy examples.
 - Present sustainable benefits in a context in which people can identify.
 - Focus on local projects impacted.
 - Present papers at professional meetings (e.g., Battelle, AGU, AIChE, NARPM, ASTSWAMO).
 - Target conferences that municipalities (C&MA) attend.
 - Use web sites (e.g., EcoEarth.info) to provide links to people who could lend ideas.

- Contacts within organizations
 - Habitat for Humanity
 - Ducks Unlimited
 - Trout Unlimited
 - Walton League
 - Natural Brownfields Association
 - National Rifle Association
 - Riverkeeper.org
 - Friends of the Earth
 - ITRC
 - Nature Conservancy and Urban Land Trusts
 - ASTM
 - Green Highways Partnership

- Professional outlets
 - Builder associations and architect societies
 - Clemson Restoration Institute
 - EPA web forums
 - Green Building certified/LID center/LEED certification

- Media
 - TV, radio, news media, pod casts
 - Blog web site
 - CL:AIRE newsletter
 - Magazines (National Geographic, Smithsonian)

- Events
 - Home shows
 - NASCAR tent show and ads on car
 - Schools (e.g., Eco-mod solar house, typical campus activities)
 - Scouts

- Financial interests
 - Developer organizations
 - Venture capitalists

Attachment 2
Ideas on How to Better Understand the NGO Perspective

- Insurance industry
 - Disney and other theme parks (remediation during construction?)
- Movements
- Recycling initiatives
 - Organic movement (e.g., Whole Foods)
 - Urban art/artist