

Sustainable Remediation Forum (SURF)
SURF 10: June 16 and 17, 2009
Chicago, Illinois

Sponsors:
Baker & McKenzie, LLP
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SURF 10 was held in Chicago, Illinois, on June 16 and 17, 2009, at the office of Baker & McKenzie. The meeting was generously sponsored by Baker & McKenzie, ENTRIX, and ENVIRON International. These companies provided financial and logistical support for SURF 10. Companies interested in sponsoring future meetings should contact the meeting facilitator, Mike Rominger (see Attachment 1 for contact information).

Those individuals that participated in the two-day meeting are listed in Attachment 1 along with their contact information. The meeting marked the 10th 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. Previous meeting minutes are available at www.sustainableremediation.org.

Meeting Opening

The meeting began with Dave Ellis (DuPont) welcoming all participants and thanking Baker & McKenzie, ENTRIX, and ENVIRON for sponsoring the meeting. Dave gave participants his thoughts on the momentum that is building for sustainable remediation and noted that the publication of the white paper will add to this momentum.

Mike Rominger (meeting facilitator) discussed meeting logistics and ground rules (e.g., expectation that attendees will be active participants, show respect for others, appreciate and encourage divergent opinions, refrain from marketing, and be familiar with previous meeting minutes so the meeting can focus on new information). He also stated that it was assumed that nothing discussed or presented contained confidential information. Mike explained that export control laws that pertain to the transfer of technology to non-U.S. citizens and their countries do not appear to apply, but advised participants to act appropriately for their organizations. Mike read the following antitrust statement:

“It is not the purpose of this meeting to discuss an existing or planned situation involving any party, whether a participant here today or not, concerning the price, customer base, volume, market, quality, design or cost structure of any commercial product or service, or to plan any course of action having an exclusionary or discriminatory effect.”

Mike thanked the Meeting Design Team for their work in planning the meeting agenda. SURF 10 Meeting Design Team members were as follows: Kathy Adams (Writing Unlimited), Mohit Bhargava (Battelle Environmental Restoration), Carol Dona [U.S. Army Corps of Engineers (USACE) Environmental and Munitions Center of Expertise (EM-CX)], Dave Ellis (DuPont), Elie Haddad (Haley & Aldrich), Tim Havranek (ENTRIX), Mary Hereford (National

Brownfields Association), Steve Koenigsburg (ENVIRON), Mike Miller (CDM), Ann Rosecrance (Conestoga-Rovers & Associates), Mark Travers (ENVIRON), Rick Wice (Shaw Environmental & Infrastructure Group), Mike Rominger (DuPont retiree), Jake Torrens (AMEC Geomatrix), and Dave Woodward (AECOM Environment).

The draft mission statement from the February 2007 meeting was read 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.” Revising the mission statement was discussed at SURF 10; the discussion is summarized on page 11.

Efforts to achieve “sustainable neutral environmental behavior” continued at this meeting. Many participants brought their own coffee mugs and water bottles and used public transportation to travel to the meeting location. Efforts to achieve sustainable neutral behavior are ongoing and will continue at future meetings.

News Items

Participants discussed the news items below at the beginning of the meeting. These news items are highlighted on SURF’s web site (www.sustainableremediation.org). E-mail addresses and phone numbers for news item contacts are provided in Attachment 1.

- ❑ Mike Miller (CDM) reminded participants of the sustainability session at the “25th Annual International Conference on Soils, Sediments, Water, and Energy.” The conference will be held October 19-22, 2009, at the University of Massachusetts at Amherst. Many SURF members are presenting at the conference, and Mike promised an interesting mix of presentations. For more information, contact Mike directly or visit the conference web site at <http://www.umasssoils.com/papers.htm>.
- ❑ Deb Goldblum [United States Environmental Protection Agency (USEPA) Region 3] updated participants on the USEPA’s Green Cleanup Standard Initiative. The initiative is aimed at developing, through a consensus process, a green cleanup standard and verification system. The USEPA has developed a framework, and the ASTM is developing the standard within the framework. The goal of the standard is to establish a uniform approach (with incentives) to encourage property owners, regulators, responsible parties, developers, and communities to use green cleanup practices during project planning and implementation. Deb encouraged participants to join ASTM and be part of the process. The next meeting about the standard for green cleanups will be held the week of October 19th in Atlanta, Georgia. For more information, contact Deb Goldblum.
- ❑ Participants mentioned the “Seventh International Conference on the Remediation of Chlorinated and Recalcitrant Compounds” presented by Battelle. The conference will be held May 24-27, 2010, in Monterey, California. A track at the conference will be devoted to green and sustainable remediation, and SURF members are serving as chairs of the various sessions. Abstracts are due by August 31, 2009. For more information, contact Mohit Bhargava (Battelle Environmental Restoration) or visit the conference web site at <http://www.battelle.org/conferences/chlorinated/>.

- ❑ Ralph Baker (TerraTherm) told participants about the “GreenRemediation Conference” that will be held on November 9 and 10, 2009, in Copenhagen, Denmark. The conference focuses on incorporating sustainable approaches in site remediation, with an emphasis on policy drivers, decision support tools, and sustainable remediation technologies. For more information, visit the conference web site at <http://www.polytec.dk/greenremediation/default.asp?page=Home>.
- ❑ Dave Woodward (AECOM Environment) mentioned the following three news items:
 - The Montana Department of Environmental Quality (DEQ) launched a new initiative to work “greener” when doing environmental remediation or hazardous and mine waste cleanup. The Remediation Division of the DEQ will consider cost-effective green options when selecting a remedy or cleanup plan, choosing energy use, and conducting on-site activities.
 - The National Science Foundation is currently requesting proposals for their Environmental Sustainability Program. The program supports engineering research that seeks to balance society’s need to provide ecological protection and maintain stable economic conditions. There are four principal general research areas which are supported: industrial ecology, green engineering, ecological engineering, and earth systems engineering. More details about these topics and the deadlines for submitting proposals are provided at http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=501027.
 - The Sustainable Remediation Tool that has been discussed at prior SURF meetings is now available for free at <http://www.afcee.af.mil/resources/technologytransfer/programsandinitiatives/sustainableremediation/srt/index.asp>. Four technologies are included in this first launch of the tool. The team that developed the tool (which includes many SURF members) plans to include additional technologies as part of a second launch of the tool in September.
- ❑ Carol Dona (USACE EM-CX) updated the group on the progress of the tool for incorporating sustainable practices into the Army's environmental remediation program. The tool has received a complete internal EM-CX review and comments are currently being incorporated. The revision of the decision framework is expected to be completed by August 2009 and then will be reviewed by USACE Headquarters and Districts and Army Headquarters. The end use of the decision framework is expected to be the technical and procedural basis for Army Headquarter guidance. Carol also mentioned that she and others in the Army and Air Force provided input to a pending green remediation policy within the Department of Defense.
- ❑ Dave Ellis (DuPont) briefly updated participants on SURF organizations abroad. SURF UK published a report with the goal of determining the range of factors considered by different sets of sustainability indicators and identifying an existing data set or developing a new data set to integrate sustainability into remediation projects. A PDF of the report is located at http://www.claire.co.uk/index.php?option=com_docman&task=doc_download&gid=398. In addition, SURF UK continues to work on a framework for sustainable remediation in

cooperation with the Environment Agency. Dave also mentioned that members Lowell Kessel (EnviroLogek) and Curt Stanley (Shell Global Solutions) have seen great interest in sustainable remediation in Australia. Dick Raymond (Terra Systems), participating via teleconference from Japan, indicated that there is interest in forming SURF Japan.

Presentations

SURF 10 presentations addressed the various aspects of the triple bottom line of sustainable remediation. Presentations and subsequent discussions are summarized in the subsections below.

The New Green Economy: Opportunities for Connecting Green to Brown

Robert Colangelo (National Brownfields Association) provided evidence of the green economy that is emerging in the U.S. and his organization's efforts to connect green build, clean energy, and transportation to brownfield sites. Robert gave examples of the momentum that is building for sustainability in general. He cited the book *Cradle to Cradle* by William McDonough and Michael Braungart in which the authors state three main ideas: (1) the promotion of good design negates the need for regulations, (2) regulations are a function of bad design, and (3) good design regulates itself. Robert then summarized the new administration's emphasis on green initiatives and the new opportunities available as a result of the economic stimulus package.

Robert told participants that his goal was to identify ways in which SURF and the National Brownfields Association can work together, focusing on the development of a brownfield carbon reduction calculation. The calculation would quantify reduced greenhouse gas emissions and the reduced carbon footprint using international standards, involve training and certifying professionals to generate site-specific carbon offset credits, and include an accreditation program to ultimately create a market-based incentive for attracting investment to brownfield sites. Presentation slides are provided in Attachment 2.

Discussions focused on the importance of incentives to achieve success. Robert stressed that his organization's near-term goal is to quantify the reduced greenhouse gas emissions and the reduced carbon footprint. He stressed that the team working on the project is multidisciplinary and is working closely with the USEPA. For additional information about this effort or if you want to volunteer to help, contact Ken Kastman (URS Corporation). (Contact information is provided in Attachment 1.)

Sustainability: Transforming Traditional Ideas about Remediation

Steve Murawski (Baker & McKenzie) provided an overview of the developing meaning of sustainability, a discussion of how the concept of sustainability could impact historic and future remediation obligations, and a description of the obstacles to employing sustainability tools in the remediation context. Steve listed the following considerations as sustainability evaluation inputs for a project: energy use, water use, transportation/mobile sources, remediation materials and supply chain, and future land use and restrictions. In addition, he discussed the following inputs for an impact analysis: transportation hazards, effect on workers and residents, change in biodiversity or ecosystem, releases and potential releases, waste generated and disposed, and noise. Presentation slides are provided in Attachment 3.

Participants debated the need for a definition of sustainable remediation. Steve thought that defining the term would stymie our own innovation, but noted that some sort of list of criteria or elements of sustainable remediation criteria should be outlined. Additional discussions focused on the need for a clearinghouse of projects to increase communication among practitioners and publish success stories.

SURF UK: Update of Work

Dave Ellis (DuPont) presented Nicola Harries' [Contaminated Land: Applications in Real Environments (CL:AIRE)] presentation on the recent work of SURF UK. SURF UK has been working on its mission: "to develop a framework in order to embed balanced decision making in the selection of the remediation strategy to address land contamination as an integral part of sustainable development." The development of the framework is largely complete, and the general framework was presented. The framework, entitled *A Framework for Assessing the Sustainability of Soil and Groundwater Remediation*, will provide a platform on which to build further work on how the use of sustainability metrics and the many available tools can be used to deliver sustainable remediation decision making. Presentation slides are provided in Attachment 4.

Discussions focused on the differences between sustainable remediation and green remediation. One participant reiterated Steve Murawski's comments after his presentation and recommended that participants avoid focusing too much on the definition of terms.

Integrating Net Environmental and Community Benefits Analysis and CERCLA Nine Criteria

Tim Havranek (ENTRIX) presented an overview of net environmental and community benefit analysis (NECBA). NECBA is a form of multi-criteria decision analysis that provides a transparent, systematic process for evaluating alternative strategies that have multiple costs and benefits (i.e., environmental, economic, and social). Tim presented the process for determining evaluation criteria and their relative importance and discussed the alignment of the NECBA criteria with the nine criteria of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). Tim also discussed the results of the survey taken by SURF members about identifying and weighing evaluation criteria and posed discussion questions to participants. Presentation slides are provided in Attachment 5.

Discussions focused on the following questions that Tim posed to participants:

- ☐ Should SURF develop the list of criteria and standard definitions?
Participants seemed to agree that there is a need to identify and standardize various criteria. Moreover, the criteria should be defined and guidance should be provided so that users can measure parameters appropriately. One participant mentioned that the white paper addresses this issue. Another participant mentioned two concerns: (1) an overemphasis on CERCLA sites when the goal should be to develop an approach that is applicable to all regulatory programs and (2) the need for SURF to contribute to the standard development process underway at ASTM rather than creating a separate list of criteria.
- ☐ Will the regulatory agencies find a quantitative process desirable?
Although direct responses to this question were not discussed, some participants

expressed concern regarding the repeatability of a number resulting from the analysis presented. Tim told participants that sometimes the analysis is sensitive to certain weights and values, but when sensitivity is not an issue, repeatability should not be a concern. In response to another participant's question, Tim acknowledged that current events can change the basis of the analysis.

- ❑ Should the regulatory agencies and the public be involved in identifying and weighting criteria at a particular site? If so, when should they be involved? Some participants seemed to agree that regulatory agencies and the public should be involved in identifying and weighting criteria at a particular site at the planning stages of a project. One participant asked if the analysis Tim presented is too technical for community members. Tim responded that, in his experience, community members like being involved in the process instead of being told of plans after the fact.
- ❑ What is the best way to share the results of a quantitative remedy selection process? Participants did not discuss this question.

Photo-Elicitation to Involve Stakeholders in Land Use Re-Development

Bill Stewart (University of Illinois Urbana-Champaign) presented a new technique called photo-elicitation to involve stakeholders in land use re-development. The photo-elicitation technique shifts dialogue from stakeholder-planner to stakeholder-stakeholder and, in doing so, empowers stakeholders. The process provides a structure for conversations to imagine a landscape different than the status quo and begin formulation of new public values for places.

Bill told participants that the re-development of land requires reframing of the land's identity and a community's relationship to it. He stressed that developing a positive stakeholder dialogue is important as a starting point for land use re-development. Bill then presented a six-step process wherein photo-elicitation improves the capacity for stakeholders to represent their place meanings and provides a forum to construct new public values for a landscape. The six steps of the technique are as follows: recruit stakeholders, distribute cameras and ask them to take pictures of special places, interview stakeholders to discuss the pictures, reflect on the interview to ensure it represents viewpoints, share place meanings with other stakeholders, and begin formal aspects of planning. Bill presented the advantages of the technique, including the focus on emotional attachments to landscapes, capacity to move beyond traditional points of conflict in land disputes, humanization of stakeholders to each other, education of others to interpret landscape history, and the increase of stakeholder ownership in decision making. Two limitations of the technique are that it focuses on process rather than outcomes and that the process becomes cumbersome with more than 20 stakeholders. Presentation slides are provided in Attachment 6.

Discussions focused on clarifying the photo-elicitation technique and the use of this technique in polarized settings and situations where it seems there is no hope to build bridges. Bill responded that the technique does work better when integrated early in the land re-development process, but emphasized that the technique would still bring stakeholders together and that the process looks for compatibility around disagreements. He said that because stakeholders are focusing on a picture, not a person, there is a level of depersonalization that allows the dialog to start in a positive manner.

Additional discussion focused on how the technique can be coupled with other techniques and serves as a starting point to build trust and social capital between the stakeholders. Bill told participants that boundaries can remain between stakeholders, but the process of implementing the photo-elicitation technique begins to break down the barriers, increases trust, and allows stakeholders to connect and work with each other in an environment of mutual respect and understanding.

Participants seemed to have value for including presentations from the social sciences field at future meetings to ensure the inclusion of all three elements of the triple bottom line (i.e., economic, environmental, social) of sustainable remediation.

Applying Sustainable Design and Development Principles to Remediation Sites

Annette Stumpf (USACE Engineer Research and Development Center) presented her organization's approach to applying sustainable design and development principles to remediation sites. Annette began her presentation by providing participants with definitions of sustainable design and development, as well as sustainability. She highlighted research activities at the Center for the Advancement of Sustainability Innovations and the Army's application of the U.S. Green Building Council's (Leadership in Energy and Environmental Design) LEED rating tool. Finally, Annette presented examples of sustainable technologies and strategies that might be applied to remediation projects. Presentation slides are provided in Attachment 7.

Status of Greener Cleanup Activities in USEPA Region 5

Brad Bradley (USEPA Region 5) categorized the focus of his organization into three main activities: assisting USEPA Headquarters with greener cleanup efforts, working with the six states in Region 5 to coordinate and assist with their greener cleanup efforts, and addressing any issues of regional significance that are not specifically included in the efforts of the various USEPA or other work groups or committees. To that end, Brad told participants that USEPA Region 5 representatives are currently participating in the Superfund Green Remediation Work Group, Interstate Technology and Regulatory Council (ITRC), SURF, Engineering Forum Green Remediation Subcommittee, and the Green Cleanup Standard Work Group. As part of this participation, Region 5 representatives are exploring several activities and tools, including life-cycle analysis, presumptive greener remedies, pilot projects, and greener cleanup language in Brownfields grant guidelines, that will collectively help improve efforts toward implementing greener cleanups.

Discussions focused on the high level of interest and activity related to sustainability in Region 5. One participant noted that three of the six states in Region 5 (i.e., Minnesota, Wisconsin, and Illinois) have sustainability programs. Brad said that with no guidance from USEPA Headquarters, Region 5 is moving forward where it can. Brad mentioned that Region 5 will be having a meeting on August 6, 2009, to discuss greener cleanup status, streamlining, and support issues with the Region 5 states.

Greener Cleanups in Illinois and Other States

Heather Nifong (Illinois EPA) presented the states' approach and perspectives on incentives and barriers to greener cleanups. Past and ongoing work at the Illinois EPA was also discussed. Specifically, Heather told participants about the on-line survey of state regulators by the Greener

Cleanups Task Force of the Association of State and Territorial Solid Waste Management Officials (ASTSWMO). The survey asked respondents about incentives and barriers to green remediation. Twenty-seven states responded, representing all of the cleanup programs: CERCLA, Resource Conservation and Recovery Act (RCRA), federal facilities, voluntary cleanups, Brownfields, and tanks. Heather reported that state regulators who completed the survey considered the best incentive to be loans and grants, followed by publicity/recognition, then contract incentives. She noted that, fortunately, the incentive regarded as easiest to implement is also publicity/recognition. According to state regulators, the four biggest barriers are lack of knowledge/awareness, economics/upfront costs, no regulations/lack of authority, and lack of incentives. The barrier considered easiest to overcome is lack of knowledge/awareness. To help remove this barrier, the Greener Cleanups Task Force is developing a series of strategy papers and fact sheets that will be posted on the ASTSWMO web site and will be accessible to the public. Presentation slides are provided in Attachment 8.

Discussions focused on operations and maintenance as a new dimension of remedy selection and on the potential to waive oversight fees for certified sustainable projects.

SURF Web Site Update

Maile Smith (Northgate Environmental Management) updated members about the SURF web site located at www.sustainableremediation.org. Maile presented the new web site platform and functionalities, which include a blog, discussion forum, and the ability to upload and download files. She proposed additional potential web site pages to the group, discussed their advantages and disadvantages, and posed discussion questions around specific topics for participants to discuss. Maile told participants that the web site is averaging approximately 150 hits per day. Presentation slides are provided in Attachment 9.

Discussions focused on the following topics that Maile presented:

- ☐ **Library Issues and Concerns**

The current web site has a page named “library” and contains subpages for case studies, issue papers (where the white paper will be posted), and meeting minutes. Maile mentioned that the scope of the “case study” page, which is currently empty, could vary widely depending on what members want. It could contain a reference list, SURF-authored documents, general sustainable remediation documents, or something in between. Copyright issues were discussed, but no final decision was made on the contents of this page. Additional discussions focused on the “meeting minutes” page, with participants approving the use of their contact information in meeting notes and agreeing that PDFs of presentations were sufficient (vs. the original PowerPoint file) in the notes.

- ☐ **Links to/from SURF**

The proposal to post links on the SURF web site to member organization web sites was supported by participants. Participants seemed to agree that it would be necessary to have some type of language on the web page stating that no endorsement of any of the companies was implied. As a starting point, Maile is gathering links from white paper authors. Then, Maile will gather links from SURF members who have attended a minimum of two meetings.

❑ **Member-Only Access**

Maile told participants that the current web site plan accepts up to four unique audience type or permission levels. For example, one audience could have only viewing privileges, one could have partial editing privileges, one could have full editing privileges, and one could have administrator privileges. Maile mentioned that member identifications could be used in the future to allow access to restricted pages such as working groups, meeting planning, and other behind-the-scenes activities or discussions that SURF members would not want the entire internet-viewing public to view. Maile also told participants that pages could be created similar to the current “contact” page, which allows SURF to conduct surveys among its members. No action plan was decided for this topic.

❑ **Timing of White Paper Rollout**

Remediation published the white paper days before the meeting. Participants discussed the timing of the white paper rollout and the role of the web site in distributing the white paper. Participants agreed that the white paper should be posted to the SURF web site on June 30, 2009, and that all press releases and communication should point interested parties to the web site. Participants also agreed that, given the new functionalities of the web site, the site should serve as the portal for all SURF activities and communications.

❑ **Annual Costs**

Northgate Environmental Management has paid the fees associated with the web site. A fee of \$30 per month will need to be paid in mid-2010. A 10% discount is available if a full year is paid at once upfront. Participants agreed that as SURF moves forward into a more formal structure, this expense will need to be integrated into the organization’s budget.

Implementing the USEPA’s Six Core Elements of Green Remediation

Leah Pabst (Conestoga-Rovers & Associates) and Karin Holland (Haley & Aldrich) presented example case studies that demonstrate the successful implementation of the USEPA *Draft Framework for Green Cleanup Standards at Contaminated Sites* (April 1, 2009) and associated six core elements of green remediation at a variety of sites at different stages of remediation. Project sites that encompass one or more of the core elements outlined in the standard were discussed, namely energy, air, water, land and ecosystems, materials and waste, and stewardship. Leah and Karin detailed the benefits of implementing the core elements, including lower carbon footprints, ecosystem conservation and restoration, sustainable re-development, and functional reuse options. The combination of environmental stewardship with social and economic considerations led to the provision of greater value to both clients and other stakeholders in some cases throughout the lifecycle of the remedial project. Presentation slides are provided in Attachment 10. Discussions focused on clarifying some of the technical points associated with the case studies.

Risk Issues at Green Cleanups

Deb Goldblum and Betty Ann Quinn (USEPA Region 3) addressed an ongoing theme at SURF meetings: worker safety. As presented at previous SURF meetings, quantitative tools are being developed to help individuals evaluate the sustainability of remedy options. These tools

generally include components of the USEPA's core elements used to define the environmental footprint of a cleanup as well as another factor called worker safety. The tools typically evaluate worker safety by calculating the exposure hours and miles traveled for remedy options. Deb and Betty Ann clarified how the USEPA cleanup programs already incorporate worker safety into remedy decisions and discussed concerns on merging the two considerations in a sustainability evaluation. Presentation slides are provided in Attachment 11.

During the discussion, some participants expressed the need to put the actuarial numbers of fatalities during a remediation project into the context of an incremental lifetime cancer risk. Betty Ann responded that this comparison isn't appropriate because individuals choose to work at a remediation site, derive benefits from such employment, and are subject to potential risks that are generally less than lifetime in duration. Individuals in the surrounding community do not choose to subject themselves to potential lifetime cancer and noncancer risks and derive no benefit from exposure to site-related contamination. In addition, ecologic risk has no apparent place in the industry comparison of worker risk to site risk. Another participant noted that threshold criteria would still be applicable, so the surrounding community would be protected.

One participant asked Betty Ann if a site-specific comprehensive risk analysis addressing this issue could be considered by the USEPA during remedy selection. Betty Ann answered yes because worker risk is considered as a balancing and/or modifying criterion in RCRA/Superfund cleanup programs. Betty Ann encouraged project managers to tell USEPA remedial program managers that language addressing worker safety is already included in the regulations. Other participants suggested that Betty Ann make this presentation to others within the USEPA to spur more discussion about the topic within the remediation field. One participant thought that a perception exists within the USEPA that considerations of worker safety are just an excuse by industry to "do nothing."

Green/Sustainable Remediation Track at Battelle Conference

Russ Sirabian (Battelle Memorial Institute) showed participants the proposed sessions for the Green/Sustainable Remediation track at the "Seventh International Conference: Remediation of Chlorinated and Recalcitrant Compounds" presented by Battelle. The conference will be held on May 24-27, 2010, in Monterey, California, and many SURF members are making presentations. Russ presented a description of the sessions and the potential panel discussions. A timeline of activities and deadlines was also presented. Russ reminded participants that abstracts are due by August 31, 2009. Russ ended his presentation by asking participants if the proposed sessions are sufficient or if a particular topic had been overlooked. Presentation slides are provided in Attachment 12.

Discussions focused on participants' ideas for the green/sustainable remediation track. These ideas are summarized as follows:

- ☐ Add a panel discussion about the white paper.
- ☐ Address the triple bottom line in all sessions.
- ☐ Hold a panel debate on green vs. sustainable remediation and show the differences by performing a green remediation evaluation and a sustainable remediation evaluation on the same case study.
- ☐ Add a session for international sustainability efforts.

The following group was proposed to work with Russ to further define the sessions proposed and resolve any issues: Carol Baker (Chevron Energy Technology Company), Carol Dona (USACE EM-CX), Dave Ellis (DuPont), Paul Favara (CH2M Hill), Rick Wice (Shaw Environmental & Infrastructure Group), and Dave Woodward (AECOM Environment). Participants agreed that the formation of a group to work with Russ was a good idea. Participants were told to send their recommendations for session chairs to Dave Ellis and/or Russ Sirabian as soon as possible (see Attachment 1 for contact information). The group set up a conference call later in the week and will update members on their progress at SURF 11.

SURF Organizational Structure Discussion

Participants divided into three groups to upgrade the mission statement, capture thoughts regarding proposed membership categories, and identify ways to structure the new organization to enable and encourage strong links with other groups. A complete summary of each breakout session, as well as a list of participants for each group, is provided in Attachment 13. A brief summary of the discussions and resulting action items are as follows:

❑ Mission Statement

Although specific revisions to the mission statement were recommended, the group wanted more time to discuss potential additional revisions. A long discussion ensued about whether the definition of “sustainable remediation” was needed within the mission statement. Opinions varied and no consensus was reached. An option was to list the characteristics of sustainable remediation. In addition, some people thought the draft mission statement was too specific and others believed it was not specific enough.

Dan Watts (New Jersey Institute of Technology) will reconvene this group via conference call to discuss these issues and additional upgrades to the mission statement. A revised mission statement will be presented at the next meeting.

❑ Membership Categories

The group agreed that the membership structure and fees will depend on the benefits and privileges of membership and noted that those benefits and privileges are not currently well defined. The group recommended that the benefits be defined as specifically as possible so that members can understand the basis of the categories and related fees. Specifically, membership criteria should include some form of commitment to supporting the mission, financial support, and commitment to participate in the activities of the organization. The group agreed that a key goal is to avoid, to the degree possible, membership requirements that are barriers to groups currently contributing to SURF, especially government members.

The group agreed that a wide range of membership categories should be available and that the range should be broad enough to encourage specific targeted segments of the profession (e.g., students and young professionals), but not so broad as to have categories that are not needed or are not tied to specific benefits or responsibilities. The group proposed membership categories along with rough order-of-magnitude fees as an initial starting point (see Attachment 13). The SURF Organizational Work Group will review the group’s recommendations and determine a path forward.

❑ **Strong Links with Other Groups**

The group discussed that the role of a professional society is to be aware of all efforts within the field of sustainable remediation to influence the direction of the field. If the activities of others in the field are not known, then no influence can be achieved. As such, the group agreed that SURF members should belong to other organizations to ensure that potential overlap between the groups is minimized. The group recommended that the common goals of the groups be identified and that SURF serve as the liaison between the groups to achieve the common goals and avoid potential overlaps. As a starting point, the group recommended developing a list of organizations, assigning at least one SURF member to participate in each organization to ensure dialogue, and identifying at least one SURF member to track state green/sustainable remediation activities.

Although the group agreed that SURF needs to share its knowledge to external groups and organizations, it recognized that SURF needs a better way of communicating internally first before it can bring other organizations into the conversation. The group discussed the web site as one solution to this problem. Upgrades to the web site will be crucial to internal communication and, ultimately, external communication and outreach.

The group also agreed that although SURF is focused on the United States currently, the ultimate goal should be an international umbrella organization for SURF organizations in other countries. The group recommended that research be conducted to determine the scope of international expansion and noted that the process will likely be complicated, but worthwhile.

Next Big “Stake in the Ground” Discussion

At SURF 9, participants divided into three groups to address three questions to move SURF forward after the white paper. A summary of each group’s discussion, including action items, is provided in the SURF 9 meeting notes. A continuation of the discussion was scheduled at SURF 10, but time was limited. Instead of breakout discussion groups, participants were assigned to think about the questions as homework after the first meeting day. The questions and potential action items offered by participants are listed in the table below.

Question	Potential Action Item
How will SURF communicate what we have learned and what we will learn?	Organize a short course at Battelle on implementing sustainable remediation projects. Develop an announcement for National Public Radio or another far-reaching media outlet. Write a list of talking points and back it up with examples. Form a committee with the purpose of reaching out to other organizations, including universities. Between now and the next meeting, contact a professor and tell him/her about SURF. Use SURF web site as the funnel for all communications.

Question	Potential Action Item
How will SURF participate in developing and implementing appropriate standards and metrics across our industry?	<p>Serve as clearinghouse for best management practices.</p> <p>Consider vetting the life-cycle analysis parameters used in calculations to ensure transparency in the process.</p> <p>Recruit remediation contractors (i.e., the people doing the field work) to gain insight into their practices and ensure that correct assumptions are being made.</p> <p>Foster financial incentives.</p> <p>Use LEED process as a model to help structure metrics.</p> <p>Explore business case for advantages of “going green.”</p>
How will SURF help society develop a consensus on the value of sustainability relative to the other values used for making remedial decisions?	<p>Fund research in the area of sustainable remediation as a way of providing a firmer basis for ideas.</p> <p>Explore grant opportunities for implementing sustainable remediation.</p> <p>Raise awareness through the publication of case studies in peer-reviewed journals.</p>

These topics will be a major focus of the next meeting.

White Paper Rollout and Response Plan Discussion

At SURF 9, a group of individuals volunteered to help develop and/or implement an action plan for the white paper rollout. Dave Ellis (DuPont) updated participants as to the group’s progress and commended the group on its work preparing documents for the Battelle conference in Baltimore in May. The group created a one-page summary of the white paper and its conclusions and presented a poster at the conference. The one-page summary document is intended for broad distribution and is available on SURF’s web site. Dave also mentioned that some individuals from the group are crafting a press release intended for remediation- and science-specific media outlets. The overall strategy of the press release is to first release the information to industry trade publications and then to use the interest generated to tap general interest media outlets.

Discussions focused on how to link the press release to the web site effectively and when to post the white paper on the web site. Participants agreed that the white paper would be posted to the web site for free download on June 30, 2009. One participant suggested that SURF obtain a point person for the media to generate more interviews and interest. Participants agreed and Jessica Furey (The Whitman Strategy Group) committed to contacting former USEPA Administrator and New Jersey Governor Christie Todd Whitman as a potential point person. Participants agreed that if the former Administrator and Governor could serve as a point person, the strategy of the press release would change and focus on general media outlets.

Participants seemed to agree that chapter facilitators should respond to any questions arising from the white paper publication. Another participant suggested that questions could be posed via the discussion forum on SURF’s web site.

Participants agreed that the white paper rollout team will address the ideas discussed. As a reminder, the individuals on the team are as follows: Carol Baker (Chevron Energy Technology Company), John Ryan (AECOM Environment), Tiffany Swann (GSI Environmental), Elisabeth

Hawley (Malcolm Pirnie), Karin Holland (Haley & Aldrich), Tim Havranek (ENTRIX), Mohit Bhargava (Battelle Environmental Restoration), and Rick Wice (Shaw Environmental & Infrastructure Group).

Reflections

Participants shared their reflections after each day of the meeting. These reflections can be categorized into general reflections, potential path forward items, and potential topics for SURF 11, as summarized below. Reflections were not discussed to clarify or gain consensus on a potential path forward item, they were merely shared with meeting participants.

☐ General Reflections

- Sustainable remediation indicates a larger picture of which green remediation is a subset.
- A benefit of SURF membership could be discounts on magazine subscriptions.

☐ Potential Path Forward Items

- Need action items from breakout groups.
- Need cost examples to prove that sustainable remediation saves money.
- Bring photograph as ice breaker to next meeting (see Bill Stewart's presentation in Attachment 6).
- Recruit other resources outside of the environmental industry so that we are considering all aspects of sustainability (i.e., economic and social).
- Expand outreach to universities to incorporate sustainability concepts into curriculum.

☐ Potential Topics for SURF 11

- Revised mission statement
- Proposed by-laws
- Solid proposal for organizational structure

Path Forward

The following path forward items were identified:

1. K&L Gates, LLC, will host the next meeting, which will be held September 22 and 23, 2009, in Newark, New Jersey. The address is as follows: One Newark Center, Newark, New Jersey, 07102. Meeting logistics will be forwarded as they become available. A draft agenda will be developed by the Meeting Design Team and will be circulated via e-mail. Active feedback and suggestions are encouraged.
2. Based on feedback at the meeting, volunteers for the design team are as follows: Carol Baker (Chevron Energy Technology Company), Brandt Butler (URS Corporation), Carol Dona (USACE EM-CX), Dave Ellis (DuPont), Lisa Hamilton (GE Corporate Environmental Programs), Tim Havranek (ENTRIX), Karin Holland (Haley & Aldrich),

Mike Miller (CDM), Leah Pabst (Conestoga-Rovers & Associates), Erik Petrovskis or David Major (Geosyntec Consultants), Karina Tipton (Brown and Caldwell), Dan Watts (New Jersey Institute of Technology), and Dave Woodward (AECOM Environment). Additional members are welcome. Meeting Design Team members should expect to spend about eight hours on the effort between now and the next meeting.

3. The action items and/or decisions below were agreed upon for the web site.
 - The white paper will be posted on the SURF web site on June 30, 2009. All press releases and communication regarding the white paper will point interested parties to the web site.
 - Given the new functionalities of the web site, the site will serve as the portal for all SURF activities and communications.
 - By mid-2010, the annual expense of the web site (\$360) will need to be integrated into the organization's budget.
4. The work of the breakout discussion groups will continue as follows:
 - Dan Watts (New Jersey Institute of Technology) will reconvene his group via conference call to address the discussed issues and provide additional upgrades to the mission statement. A revised mission statement will be presented at the next meeting.
 - The SURF Organizational Work Group will review the outputs of the membership and stronger links breakout groups and their recommendations.
5. The following action items were agreed upon for the white paper rollout:
 - Jessica Furey (The Whitman Strategy Group) committed to contacting former USEPA Administrator and New Jersey Governor Christie Todd Whitman as a potential point person for the media to generate more interviews and interest.
 - The white paper rollout team will address the ideas discussed in the meeting. As a reminder, the individuals on the team are as follows: Carol Baker (Chevron Energy Technology Company), John Ryan (AECOM Environment), Tiffany Swann (GSI Environmental), Elisabeth Hawley (Malcolm Pirnie), Karin Holland (Haley & Aldrich), Tim Havranek (ENTRIX), Mohit Bhargava (Battelle Environmental Restoration), and Rick Wice (Shaw Environmental & Infrastructure Group).
6. The following group was proposed to work with Russ Sirabian (Battelle Memorial Institute) on the proposed sessions for the Green/Sustainable Remediation track: Carol Baker (Chevron Energy Technology Company), Carol Dona (USACE EM-CX), Dave Ellis (DuPont), Paul Favara (CH2M Hill), Rick Wice (Shaw Environmental & Infrastructure Group), and Dave Woodward (AECOM Environment). The group will update members on their progress at SURF 11.

Attachment 1
SURF 10 Participant Contact Information

SURF 10 Participant Contact Information

Participant	Affiliation
Abrams, Stewart	Langan Engineering & Environmental Services
Adams, Kathy	Writing Unlimited
Baker, Carol	Chevron Energy Technology Company
Baker, Ralph	TerraTherm
Bhargava, Mohit	Battelle Environmental Restoration
Bradley, Brad	U.S. EPA Region 5
Broderick, Bill	WRS Compass
Bull, Louis	Waste Management
Butler, Brandt	URS Corporation
Chambers, Deni	Northgate Environmental Management
Colangelo, Robert	National Brownfield Association
Dona, Carol	U.S. Army Corps of Engineers Environmental and Munitions Center of Expertise
Duplancic, Neno	Locus Technologies
Ellis, Dave	DuPont
Favara, Paul	CH2M Hill
Feng, Wei Lin	ARCADIS
Fisher, Angela	GE Global Research
Foster, Ben	LFR
Furey, Jessica	The Whitman Strategy Group
Goldblum, Deb	U.S. EPA Region 3
Haddad, Elie	Haley & Aldrich
Hamilton, Lisa	GE Corporate Environmental Programs
Harvey, Phil	Conestoga-Rovers & Associates, Inc.
Havranek, Tim	ENTRIX
Holland, Karin	Haley & Aldrich
Houlihan, Mike	GeoSyntec Consultants
Kastman, Ken	URS Corporation
Kupar, John	WRS Compass
Markey, John	ERM
Miller, Mike	CDM
Nifong, Heather	Illinois EPA
Pabst, Leah	Conestoga-Rovers & Associates
Petrovskis, Erik	Geosyntec
Quinn, Betty Ann	USEPA Region 3
Rominger, Mike	DuPont Retiree
Ryan, John	AECOM Environment
Schlott, Dave	ENVIRON International Corporation
Seagrist, BJ	ENTRIX
Smith, Maile	Northgate Environmental Management
Steen, Alexis	ExxonMobil Environmental Services Company
Stewart, Bill	University of Illinois-Champaign
Stumpf, Annette	U.S. Army Corps of Engineers Engineer Research and Development Center
Swann, Tiffany	GSI Environmental

SURF 10 Participant Contact Information

Participant	Affiliation
Tipton, Karina	Brown and Caldwell
Torrens, Jake	AMEC Geomatrix
Victorine, Gary	U.S. EPA Region 5
Watts, Dan	New Jersey Institute of Technology
Wice, Rick	Shaw Environmental & Infrastructure Group
Woodward, Dave	AECOM Environment
<i>Remote Attendees</i>	
Fabersunne, Mikos	California DTSC
Hadley, Paul	California DTSC
Raymond, Dick	Terra Systems
Reackhof, Sharron	PG&E Environmental Remediation
Rivadineyra, Issis	Naval Facilities Engineering Service Center
Sirabian, Russ	Battelle Memorial Institute

Attachment 2
The New Green Economy:
Opportunities for Connecting Green to Brown

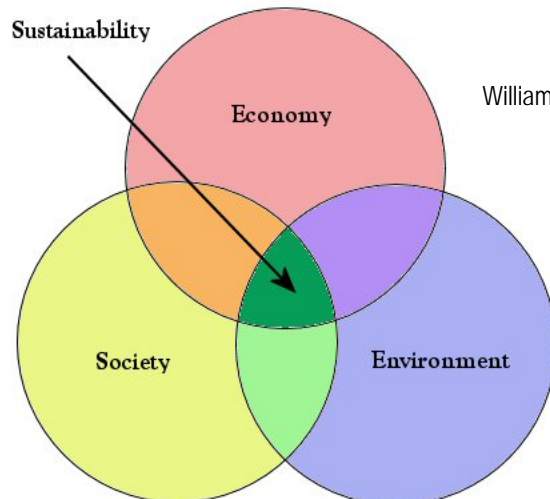
Connecting Green to Brown

The New Green Economy ?

Robert Colangelo

CEO, National Brownfield Associations

Sustainability



Cradle to Cradle,

William McDonough & Michael Braungart

Why Being "Less Bad", Is No Good?

Make 100% Good Decisions

"Regulations are a function of bad design"



White House Offices In the New Green Economy

- White House Office on Energy and Climate Change
 - Carol Browner, Assistant to the President
- White House Council on Environmental Quality
 - Nancy Sutley, Chairwoman of the council
 - Van Jones, senior adviser heading up green jobs initiatives *Strategies for a New Green Economy*
- White House Office of Urban Affairs
 - Adolfo Carrión Jr., Director

Key Federal Agencies

- USDOE, Steven Chu, Secretary
- US DOT, Ray La Hood, Secretary
- USHUD, Mel Martinez, Secretary
- USEPA, Lisa Jackson, Administrator



Legislative - Senate

- Committee on Environment & Public Works
 - Barbara Boxer (D-CA), Chair
 - Subcommittee on Superfund, Toxics & Environment Health
 - Frank Lautenberg (D-NJ), Chair
 - Subcommittee on Green Jobs & New Economy
 - Bernard Sanders (I-VT), Chair
- Appropriations
 - Daniel Inouye (D-HI), Chair
 - Subcommittee on Interior & Environment
 - Dianne Feinstein (D-CA), Chair
- Committee on Banking, Housing & Urban Affairs
 - Chris Dodd (D-CT), Chair
 - Subcommittee on Housing, Transportation & Community Development
 - Robert Menendez (D-NJ), Chair

Legislative - House

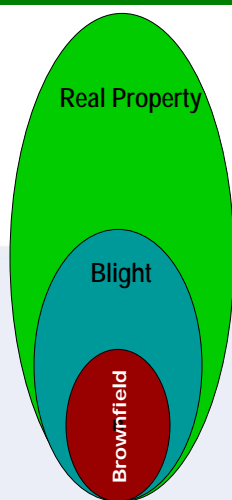
- Energy & Commerce
 - Henry Waxman (D-CA), Chair
 - Subcommittee on Energy & Environment
 - Ed Markey (D-MA), Chair*
- Transportation & Infrastructure
 - James Oberstar (D-MN), Chair
 - Subcommittee on Economic Development
 - Eleanor Holmes Norton (D-DC), Chair
 - Subcommittee on Water Resources & Environment
 - Eddie Bernice Johnson (D-TX), Chair
- Ways & Means
 - Charles Rangel (D-NY), Chair

Legislative - House

- Appropriations
 - David Obey (D-WI), Chair
 - Subcommittee on Interior, Environment & Related Agencies
 - Norm Dicks (D-WA), Chair
 - Subcommittee on Transportation, HUD & Related Agencies
 - John Olver (D-MA), Chair
- Financial Services
 - Barney Frank (D-MA), Chair
 - Subcommittee on Capital Markets, Insurance & Government
 - Paul Kanjorski (D-PA), Chair
 - Subcommittee on Housing & Community Opportunities
 - Maxine Waters (D-CA), Chair

Real Property

The surface of the earth is a finite resource



Real Property a legal term encompassing real estate and ownership interests in real immovable property (includes vacant land, developed and new developments).

Blight is a "condition of property in parts of a city, town, or neighborhood that are detrimental to the physical, social, and/or economic well-being of a community". It can include abandoned buildings or those severely neglected by their owners, vacant lots full of rubble and garbage

Brownfield vacant or underutilized properties where the perceived presence or existence of contamination impedes its productive use.

The New Green Economy

12% of the stimulus package is for clean energy and environmental initiatives

Stimulus \$	Existing Structures & Infrastructure	Redevelopment Blight & Brownfields	New Development Structures & Infrastructure
Energy	\$22 bil/mixed		\$3.9 bil/Smart Grid
Transportation			\$47 bil/Rail +
Water	\$6 bil /Water Infrastructure \$85 mil/Watershed protection		
Waste	\$6 bil/Weapon Sites	\$600mil/SUPERFUND \$200 mil/LUST	
Green Building			
Land Management	\$750 mil/National Parks	\$100 mil/Brownfields	
IT			
Finance			

The 2008 bailout TARP TALF– What could be applied to brownfield efforts?

- New Markets Tax Credits -- new \$3.5 billion allocation *
- Brownfield cleanup expensing extension (to 12/31/09)
- Energy efficiency incentives
 - \$800 million in clean renewable energy bonds (CREBs) *
 - \$800 million in energy conservation bonds *
 - Renewable energy tax credit (thru 1/1/11)
 - Green building and sustainable design project incentives

* ***Increased by stimulus***

New opportunities from the stimulus

Brownfields -- \$100 million

For assessment; cleanup (RLFs) with cost-share waived, sub-grant authority expanded

- \$45 million added to current competition amount
- \$40 million in funding targeted to existing "high performing" RLFs for
- \$8 million in additional TBA funding
- \$5 million for a new round of job training grants (apps due 4/20)



New opportunities from the stimulus

Superfund -- \$600 million

- additional funding, limited to Superfund sites
 - * projects in pipeline
 - * projects underway in need of additional funding
- links to revitalization strategies?

LUST -- \$200 million

- for petroleum leaks, state match waived; brownfield/redev. links?



New opportunities from the stimulus

Transportation

- \$27.5 billion for highways and bridges
- \$ 8.4 billion for transit
- \$ 9.3 billion for intercity and high speed rail
- \$ 1.5 billion for supplemental grants for national surface transportation system

Energy

- \$ 3.2 billion for energy efficiency/ conservation block grants
- \$4.5 billion for Smart Grid



New opportunities from the stimulus

Clean Water RLFs -- \$4 billion

Drinking Water RLFs -- 2 billion

- state matching waived; priority for "green" projects
- states can identify brownfield needs

Rural water/waste disposal -- \$1.38 billion

- for loans and grants -- \$968 million in grants, funds to support \$2.82 billion in loans; potential BF linkages

NSP -- \$2 billion

- additional funding



What's a Brownfield?

"A real estate transaction with environmental personality"



National Definition (HR 2869) -

The term "Brownfield Site" means real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant or contaminant.

****This includes "low risk" petroleum sites, mine scarred land as well as properties impaired by controlled substances (i.e. meth labs).*

Challenge: Connect Green to Brown

Why Develop Brownfields?

- Reduce blight
- Clean up the environment
- Increase municipal property taxes
- Marry economic development with environmental protection
- Improve quality of life
- Connect green build; clean energy, and transportation, to brownfield sites.

"Do well by doing good"

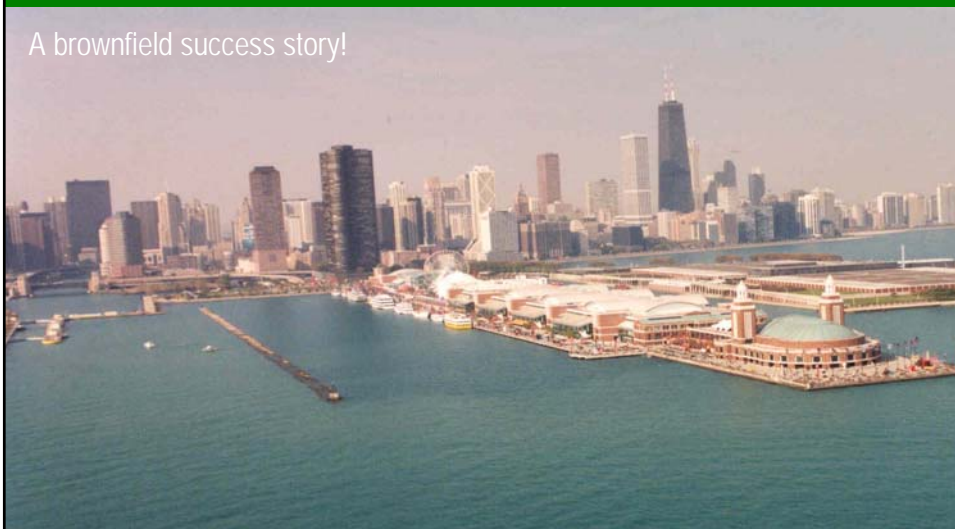
Navy Pier, Chicago



Built in the early 1900s
Navy Pier had many uses
until the 1980's when it
became dilapidated
and underused.

After

A brownfield success story!



Beyond

Clean Energy & Transportation, Water & Waste Management, Green Building & Land Management?

"When is the best time to plant a tree?"

How will you shape the future to make "100% good decisions" based on social, environmental and economic needs?



How can NBA and SURF work together?

- Brownfield carbon reduction calculation
 - A transparent calculation that quantifies reduced greenhouse gas emissions and the reduced carbon footprint from a brownfield redevelopment using international standards
 - Train and certify professionals to use the calculation at brownfield redevelopment sites to generate a carbon offset credit
 - Create an accreditation program to certify calculations and generate an NBA approved carbon offset credit that can be sold on carbon trading exchanges thus creating a market based incentive for attracting investment to brownfields

Carbon Credit Calculation

- Proposed carbon credit calculation considerations
 - Recycling of land and infrastructure
 - Transportation and preservation of green space
 - Site remediation
 - Green clean up standards
 - Improvements/Buildings
 - LEED (Green design, clean energy, transportation)

How can we work together

- Have NBA members be involved with the creation of the green cleanup standard?
- Coordinate the green cleanup standard with the NBA brownfield carbon reduction calculation
- Have NBA certify green cleanups

Energy

- Renewable Energy
 - Solar Energy
 - Wind Energy
 - Geothermal Energy
 - Wave Energy
- Build on Brownfields
- Bio Gas & Fuel Cells
- Clean Coal Technology



Transportation

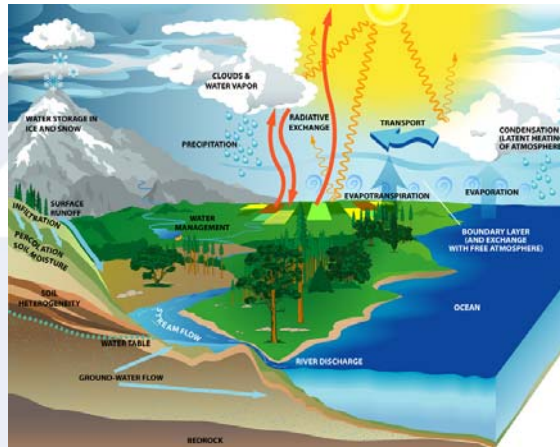
- Design, engineering & construction
 - Planning
 - Public Transportation
 - Light rail
 - Ride Share & Flex Programs
- Transit oriented developments

- New Vehicles
 - PEV's (personal electronic vehicles)
 - Electric & Hybrid Cars
 - Fuels of the Future



Water Management

- Engineering, design and planning
- Water recycling
 - Grey & Rainwater Systems
- Water purification and treatment
- Storm water planning and management
 - Low-water landscaping



Waste Management

- Recycling
 - Waste minimization
 - Sustainable Products - Packaging
 - Municipal waste management
 - Salvage
- Brownfield assessment, identification remediation



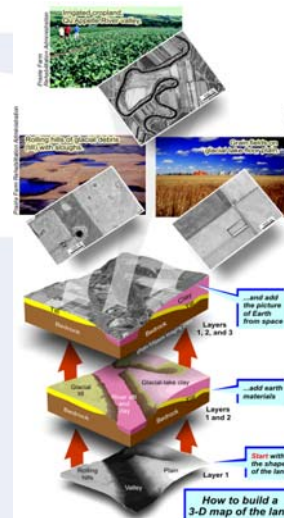
Green Buildings

- LEED
 - The Leadership in Energy and Environmental Design (LEED) Green Building Rating System, provides standards for environmentally sustainable construction.
- Architecture, Engineering & Construction
- Green Products & Materials
- Energy Efficiency Retrofits
- Water Efficiency Retrofits

NBA Working with LEED to get a brownfield worth more points

Land Management

- Planning, design, engineering
- Agriculture
 - Organic
- Habitat conservation/restoration
- Urban forestry/parks/farming
- Brownfield redevelopment
 - Carbon Credits B-CAP



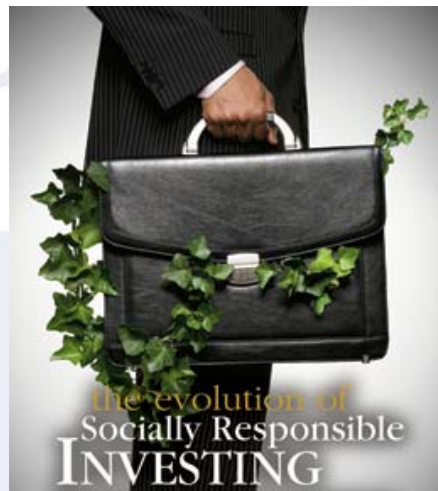
Information Technology

- Green computing is the practice of using computing resources efficiently that reduce the use of hazardous materials, minimize power consumption, maximize energy efficiency during the product's lifetime, and promote recyclability or biodegradability of defunct products and factory waste.



Finance

- Socially responsible investing
- Management of green funds
- Financing green projects
- Al Gore, John Doerr
 - Kleiner Perkins Caufield & Byers
 - Green technology innovation and policy entrepreneurs to help fight global warming



Attachment 3
Sustainability: Transforming Traditional Ideas about
Remediation

Sustainability – Transforming Traditional Ideas About Remediation

SURF 10

June 16, 2009

Chicago, Illinois

Steven Murawski, Partner
Chicago

Baker & McKenzie International is a Swiss Verein with member law firms around the world. In accordance with the common terminology used in professional service organizations, reference to a "partner" means a person who is a partner, or equivalent, in such a law firm. Similarly, reference to an "office" means an office of any such law firm.

Transforming Traditional Ideas About Remediation

Defining Sustainability - Sources

- 1972 U.N. Conference on Human Environment
- 1987 Brundtland Commission Report
- 1992 Rio Declaration
- 1999 Draft Sustainability Reporting Guidelines - GRI
- 2006 ISO Working Group on Social Responsibility
- Coming Soon – ASTM International

Defining Sustainability – Common Link

- Triple Bottom Line
 - People – Social Responsibility
 - Planet – Environmental Responsibility
 - Profits – Economic Well-Being of the Company

Sustainability - Drivers

- Environmental Requirements
- Contractual Obligations
- Shareholder Demands
- Public Expectations
- Economics and Economic Fluctuations
- Climate Change Risks and Opportunities

Sustainability - Business Case

- Remediation Context
 - Demonstrate innovation
 - Increase efficiency
 - Enhance relationships with stakeholders
 - Improve reputation, brand strength and market share
 - Manage liability and risk

Sustainability Project – Effective Elements

- Obtain buy-in from senior management
- Coordinate a cross-functional team/Work across silos
- Incorporate stakeholder insight
- Create definable goals and measurable/reportable results

Sustainability Project - Considerations

- Where to start
 - New Project
 - Historic Project
- Who to engage
 - In-house
 - Outside consultant(s)
- What to include in project evaluation
 - Four corners of site
 - Four corners of site +

Sustainability Project - Considerations

- Inputs into Project Evaluation
 - Energy use
 - Water use
 - Transportation/mobile sources
 - Remediation materials and supply chain
 - Future land use and restrictions

Sustainability Project - Considerations

- Inputs into Impact Analysis (cont.)
 - Transportation hazards
 - Effect on workers and residents
 - Change in biodiversity or ecosystem
 - Releases and potential releases
 - Waste generated and disposed
 - Noise

Sustainability Project - Impediments

- Law (i.e., laws, regulations, consent decrees)
- Policies
- Government Official(s) (e.g., OSC/RPM)
- Potentially Responsible Party/Responsible Party

Sustainability Project - Success

- Determine whether legally required
- Clearly define goals and measurable/reportable milestones
- Assess economic feasibility
 - Project cost
 - Tangible and intangible benefits

Sustainability Project - Success

- Confirm technical soundness
- Leave sufficient time to develop and implement
- Ensure contractors and subcontractors are capable and compatible
- Actively manage contractors and subcontractors

Thank you

Steven Murawski

Partner, Chicago

(312) 861-3738

steven.j.murawski@bakernet.com

Attachment 4
SURF UK: Update of Work

SuRF UK Update of Work

Nicola Harries – CL:AIRE

1



GOOD AFTERNOON
FROM LONDON

Thank you for the
opportunity to speak at
SuRF 10 meeting

2



Acknowledgements

Steering Group

- Nicola Harries (CL:AIRE)
- Brian Bone (Environment Agency)
- Richard Boyle (Homes & Communities Agency)
- Paul Bardos (r3 Environmental Technology Ltd)
- Frank Evans (National Grid Property & SAGTA)
- Jonathan Smith (Shell Global Solutions & SAGTA)
- David Ellis (DuPont & SURF US)

- Numerous other professionals (UK and beyond)

3



Outline of Presentation

- ♦ **Background to SuRF UK**
- ♦ **Definitions**
- ♦ **Proposed Framework**
- ♦ **Underpinning Principles**
- ♦ **Current outputs and next steps**

4



SuRF UK: Background

- ♦ **Follow-up to US SuRF initiative**
- ♦ **Started in June 2007 meeting in London.**
 - ♦ Initial Open Forum meeting
 - ♦ Establishment of a steering group
- ♦ **Development of a working mission statement and a definition for Sustainable Remediation**
- ♦ **3 x open forum meetings**
- ♦ **Launch of SuRF UK web-site**
- ♦ **Written consultation**

5



SURF-UK Web-site

- ♦ **CL:AIRE web-site (www.claire.co.uk/surfuk)**
- ♦ **What is Sustainable Remediation?
What are objectives of SURF UK?**
- ♦ **UK policy context**
- ♦ **Copies of slides and notes from four meetings**
- ♦ **Outline brief for framework**
- ♦ **Work plan (March 09) and links to relevant documents**
- ♦ **Written consultation**

6



What is Sustainable Remediation?

SuRF-UK (Working) Definition:

...the practise of demonstrating, in terms of environmental, economic and social indicators, that an **acceptable balance** exists between the effects of undertaking the remediation activities and the benefits the same activities will deliver.

7



SuRF UK – Working Mission Statement

To develop a framework in order to embed balanced decision making in the selection of the remediation strategy to address land contamination as an integral part of sustainable development

8



SuRF UK – Working Mission Statement

To develop a framework Notes:

in order to embed
balanced decision
making in the selection
of the remediation
strategy to address
land contamination as an
integral part of
sustainable
development

‘framework’ not Tool

**‘balanced’ means consider social,
environmental and economic factors**

**‘strategy’ includes design and
implementation**

**‘land contamination’ includes
groundwater issues**

**‘development’ in context of
sustainable development not just
building schemes**



9

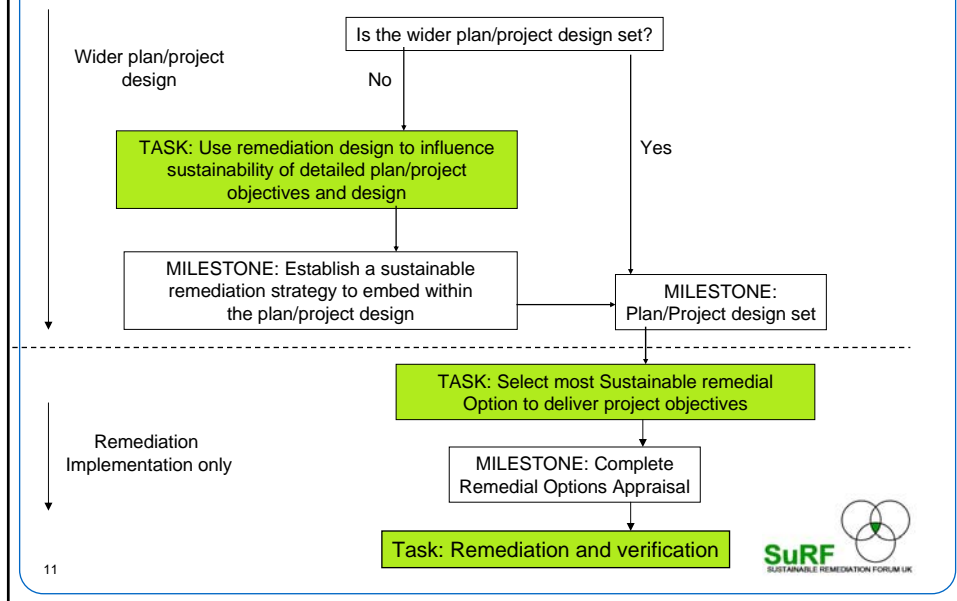
Proposed Framework

- **Process with stages and decision points**
- **Recognises two main stages**
 - Project/Plan Design phase – embed sustainability in design
 - Remediation implementation – selecting technique
- **Flexible**
 - Different stages of property lifecycle
 - Different types of remediation activity
- **Overlaps to UK regulatory guidance framework (CLR11)**

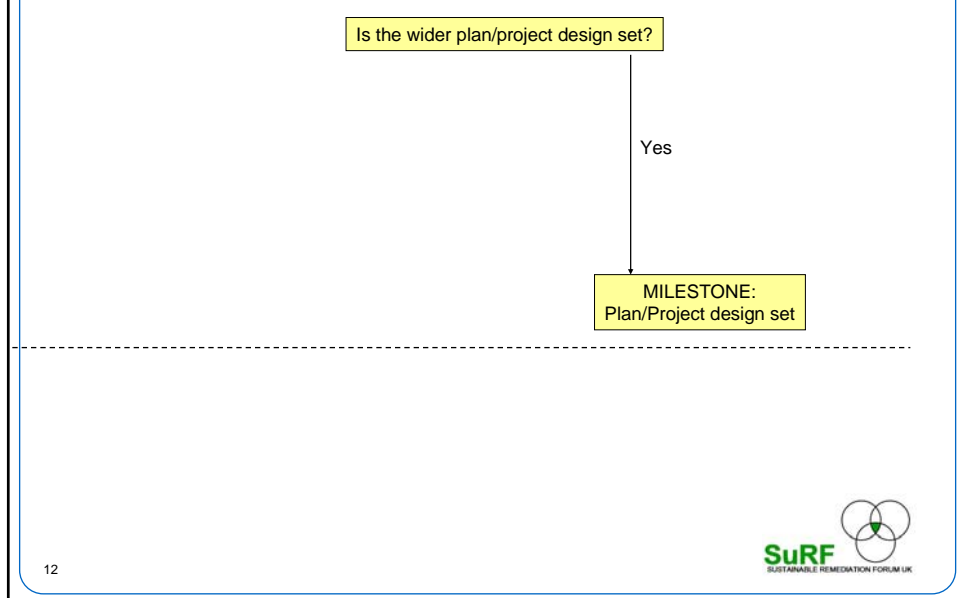


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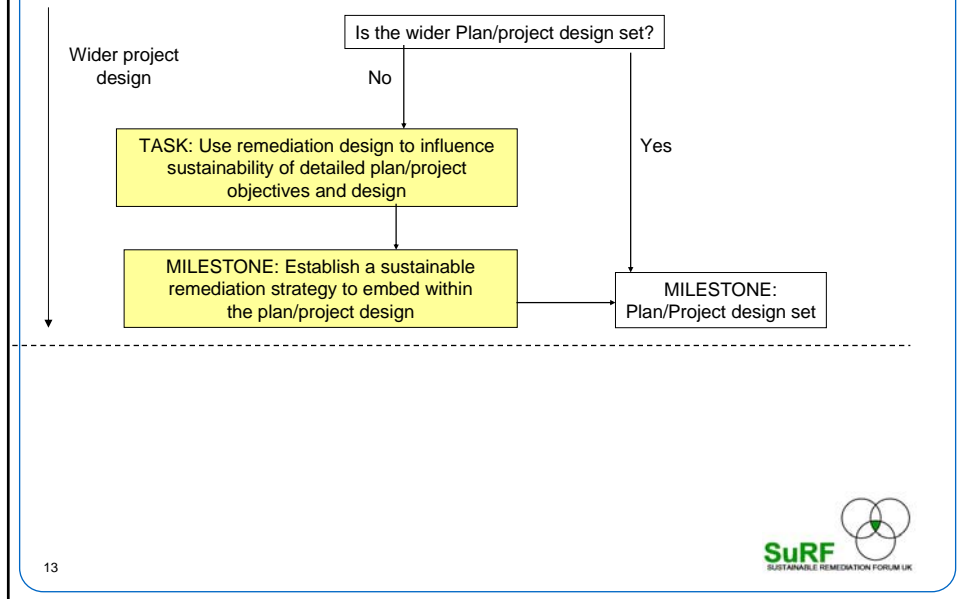
Generic SuRF-UK Framework



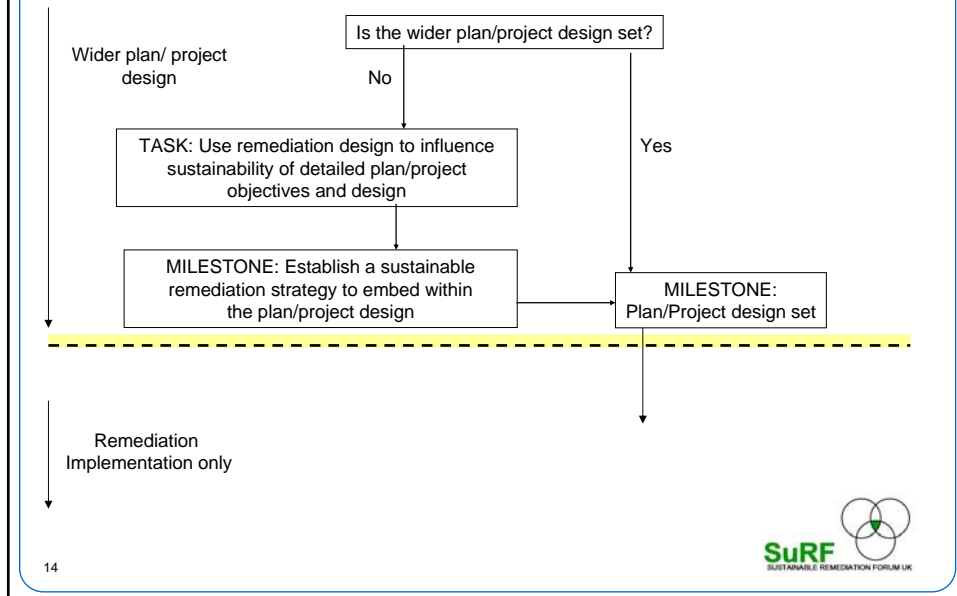
Generic SuRF-UK Framework



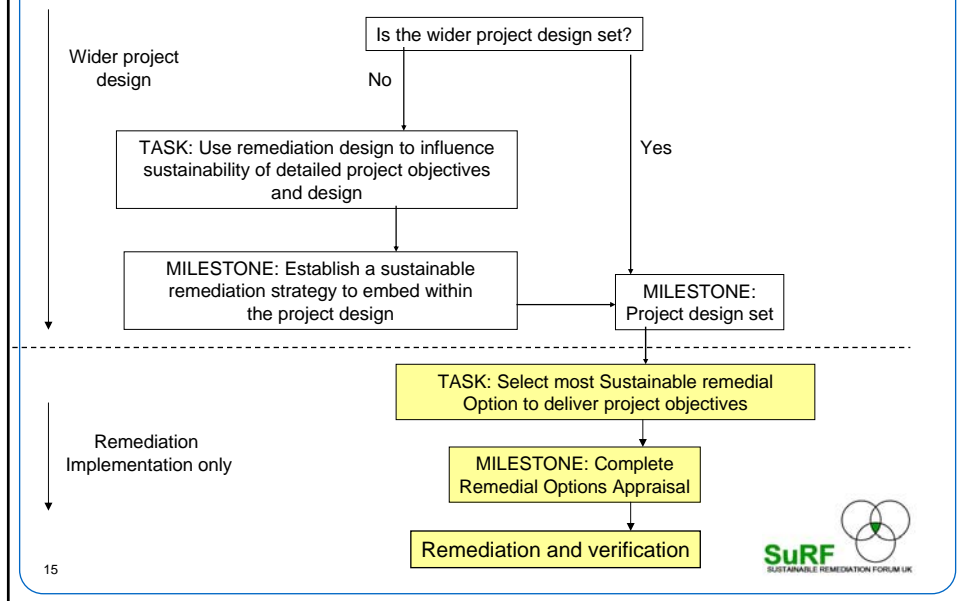
Generic SuRF-UK Framework



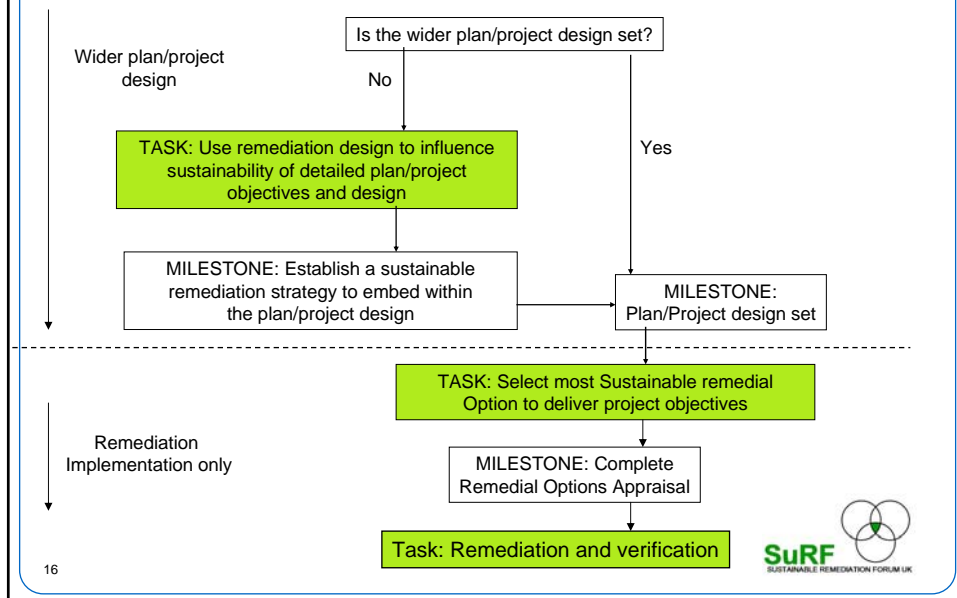
Generic SuRF-UK Framework



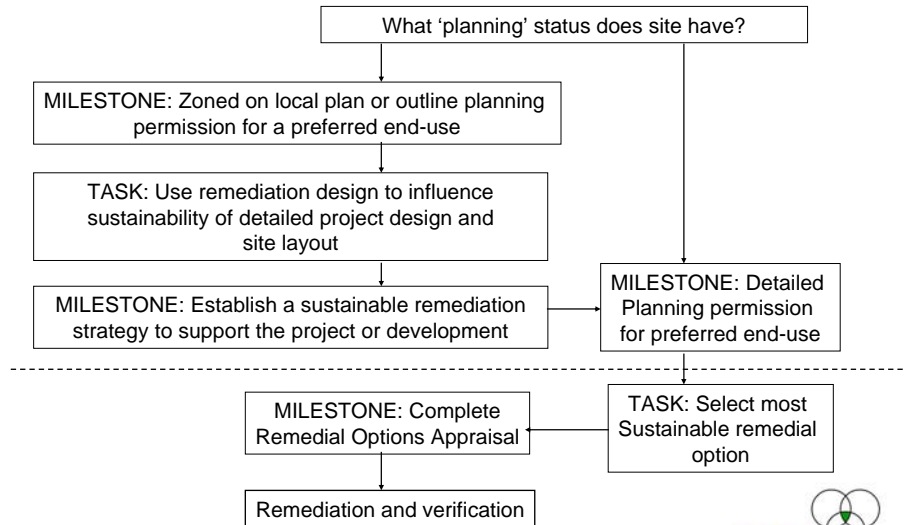
Generic SuRF-UK Framework



Generic SuRF-UK Framework



Brownfield Redevelopment



17



Type of Remediation Project

Brownfield Redevelopment

- ◆ Remedial strategy is only part of wider project-design
- ◆ Given lifetime impacts of the project, the remediation stage is only likely to represent a small portion of sustainability benefits and impacts
- ◆ Unsustainable remediation schemes may progress due to wider project benefits. Need to record decisions and reasoning

Operational land

Large restoration schemes

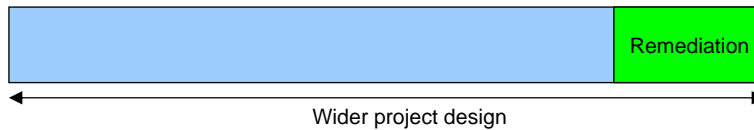
- ◆ The need to remediate is the project driver
- ◆ The remedial strategy is the wider project design
- ◆ Lifetime impacts are limited to the remediation stage and represent majority of the sustainability benefits and impacts

18

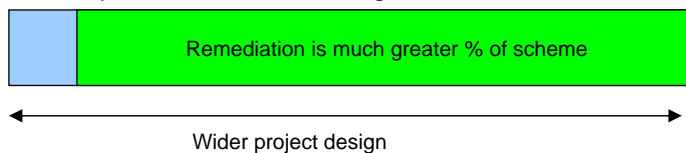


Type of Remediation Project

Brownfield Redevelopment

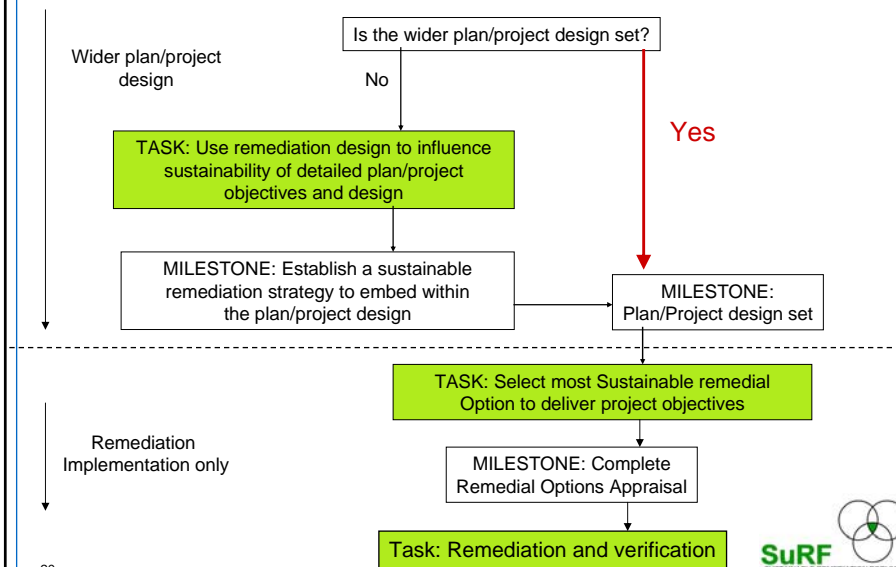


Operational land and Large restoration schemes



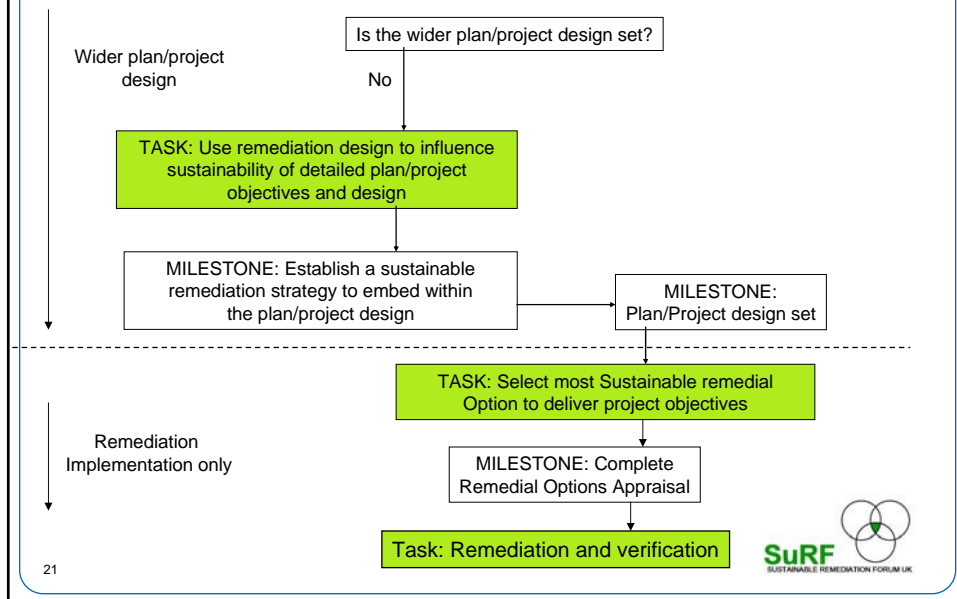
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Operational Land



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Operational Land



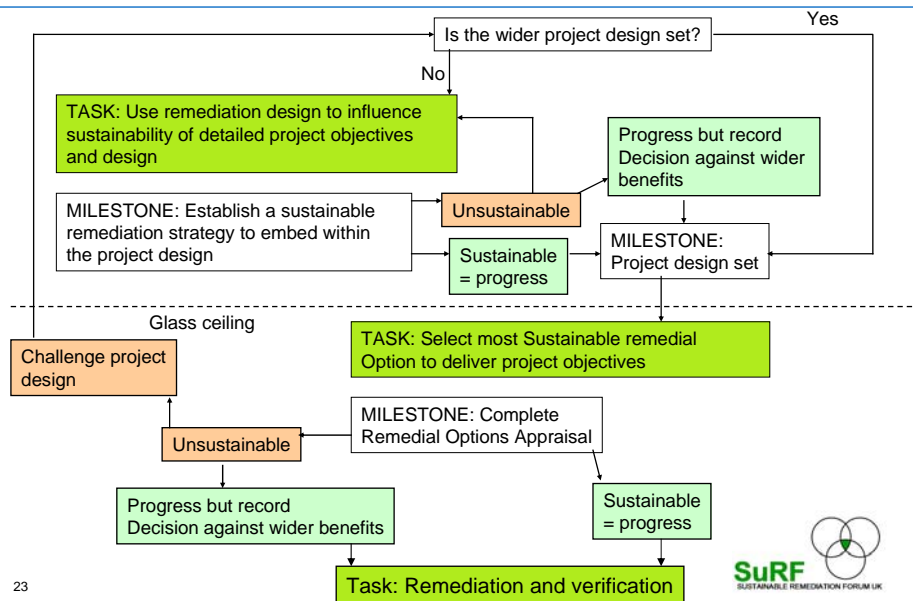
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Underpinning principles

- Principle 1:** Protection of human health and the wider environment.
- Principle 2:** Safe working practices.
- Principle 3:** Consistent, clear and reproducible evidence-based decision-making.
- Principle 4:** Record keeping and transparent reporting..
- Principle 5:** Good governance and stakeholder involvement.
- Principle 6:** Sound science.

22

SuRF-UK: Unsustainable decisions



23



Current Outputs – Framework Document

Drafting complete

Under review by UK regulatory agencies

To be followed by wider UK consultation

Freely available as PDF download



24



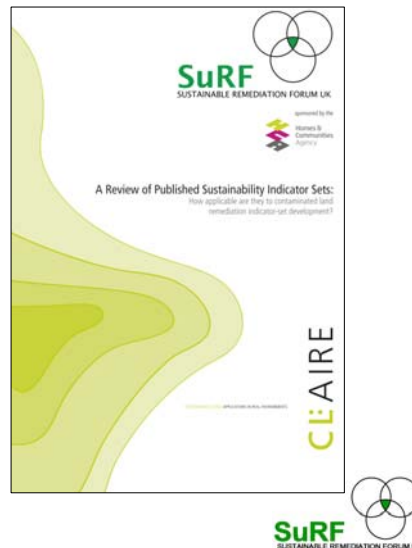
Current Outputs – Indicator Review

Review of 100 published Sustainable Remediation indicator sets

Mapped to 18 proposed headline indicators

Platform for next stage of SuRF-UK

Freely available as PDF download



25

Future Work

- **Framework represents a platform on which to build next stages**
 - **Represents 18 months of knowledge transfer within UK**
 - **What sustainability indicators/metrics to use?**
 - **How existing tool box helps?**

26

Contacts/More information

nicola.harries@claire.co.uk

www.claire.co.uk/surfuk

Thank you for your attention

Attachment 5
Integrating Net Environmental and Community Benefits
Analysis and CERCLA Nine Criteria

Integrating Net Environmental and Community Benefits Analysis and CERCLA Nine Criteria

Tim Havranek, MBA

Doug MacNair, Ph.D.

June 16, 2009



Agenda

- Survey Results
- Criteria Identification and Weighting
- NECBA Process Overview
- Case Study
- Integrating with CERCLA Nine Criteria
- Discussion Questions

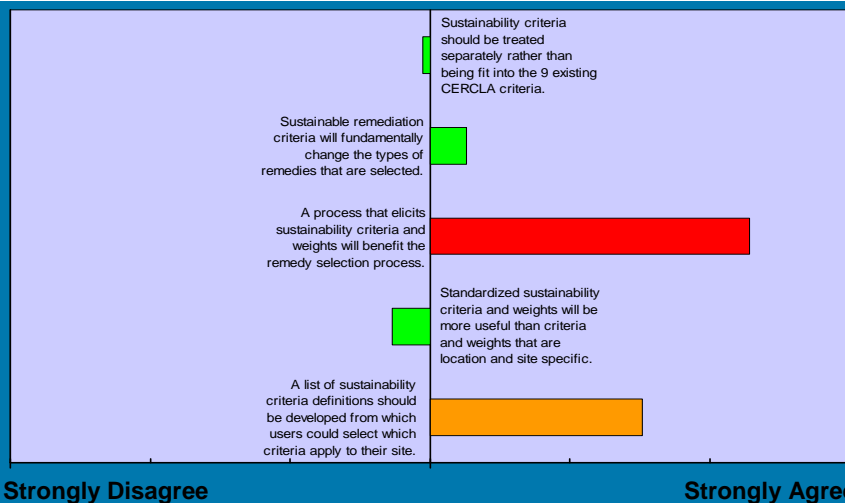


Purpose of Survey

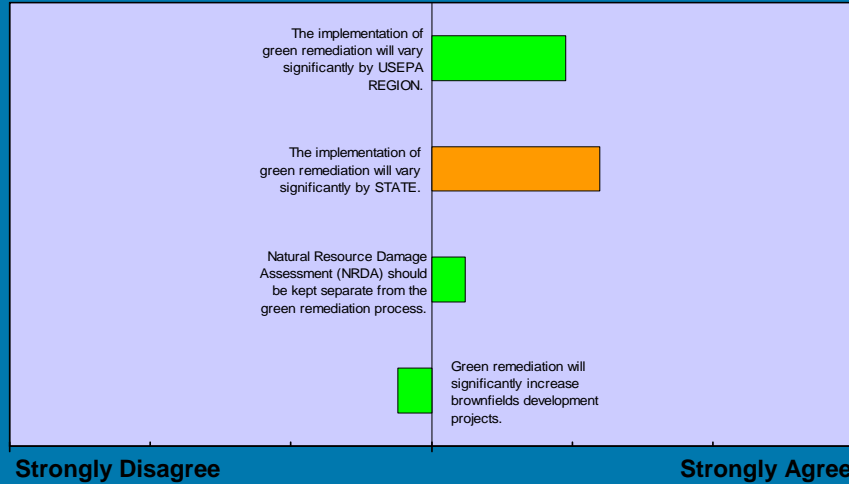
- Collect opinions regarding the importance of standardization of criteria
- Demonstrate a process for identifying and weighting evaluation criteria
- Emphasize trade-offs are important
 - They are not easy
 - Indicate our preferences



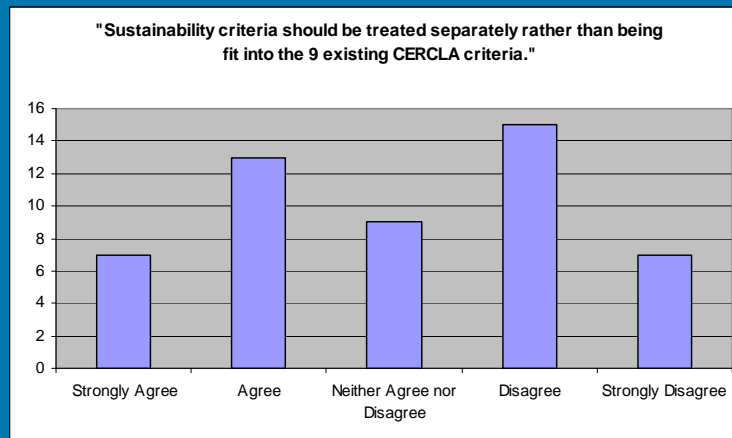
Incorporating Sustainability into Remediation



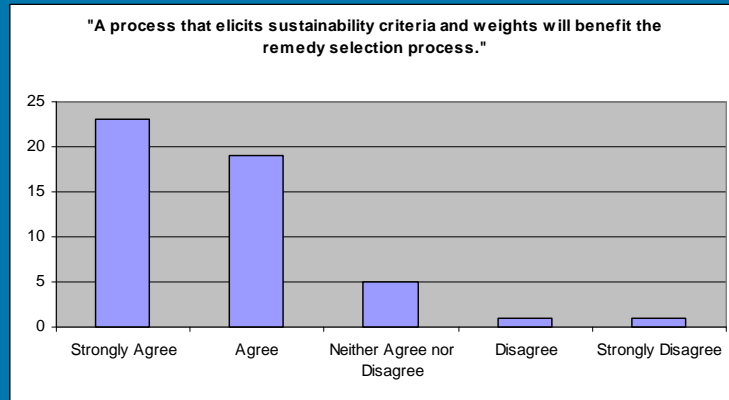
Incorporating Sustainability into Remediation



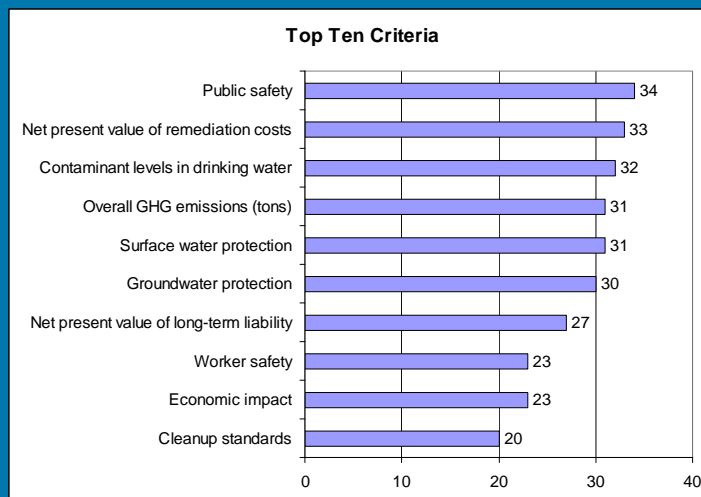
Respondents evenly split regarding whether sustainability criteria should be treated separately



Near universal agreement that a process that elicits and weights criteria will benefit remedy selection



Select the ten criteria you feel are most important to evaluating the sustainability of remedial alternatives



Other Suggested Criteria

- Water Usage
- Waste Generation
- Material Usage During Capping
- Habitat Impacts
- Land Use Potential
- Institution Controls
- Community Involvement in Planning Process
- Remediation Success
- Removal and Management of Human Health Risk



Favorite Survey Comment

In response to trade-off question

"This is hard. They are all important"



Integrating Sustainability Criteria and CERCLA Nine Criteria – Survey Results

	Long-term effectiveness and Performance	Reduction of Toxicity, Mobility, or Volume	Short-term effectiveness	Implementability	Cost	State Acceptance	Community Acceptance	Row Total
Remediation cost	3	2	0	2	34	0	1	42
Completion time	6	2	12	15	2	3	2	42
Increased employment	3	0	1	2	4	0	30	40
GHG emissions	15	11	6	6	1	3	0	42
Piping plover habitat impacts	24	7	0	3	1	3	4	42



Issues Identified by Survey Comments

- “No criteria scheme can address interdependency issues”
- “The specific concerns of the stakeholders should be weighted and then the criteria determined”
- “The social criteria seemed to be focused on the process and not the product of remediation.”

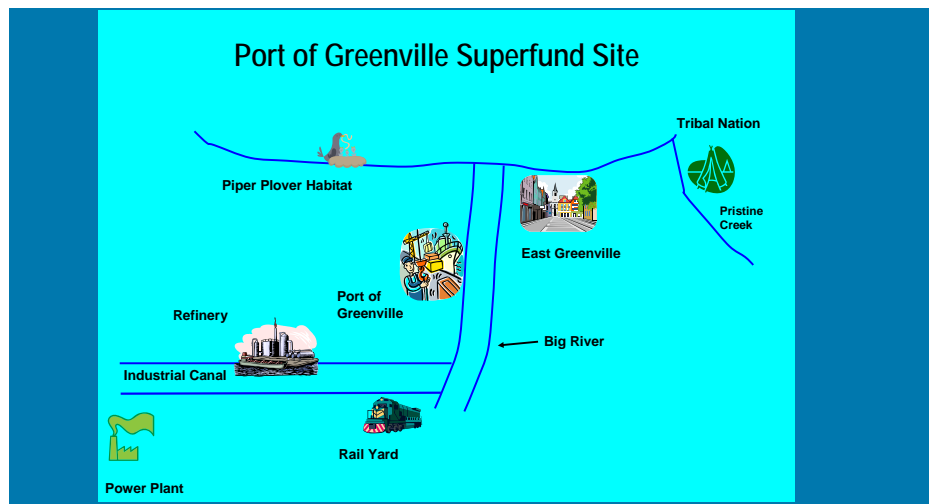


Characteristics of Good Criteria

- Specific
- Quantifiable
- Consensus on definition
- Independent of other criteria
- Representative of major effects that are important
- No high/medium/low



The Port Greenville Site



Survey Site Alternatives

- Dredging, Transportation, Disposal
- Hotspot, Dredging, Transportation and Disposal
- Capping
- Monitored Natural Attenuation
- Confined Disposal Facility



Value of the Trade-off Approach

- Organizes stakeholder intuition
 - The process provides value
- Sharpens focus on critical issues
 - Fewer elements included in the model
- Identifies areas of consensus and disagreement
- “Holistic ranking” is easier and more reliable than other techniques
- Forces people to make decisions



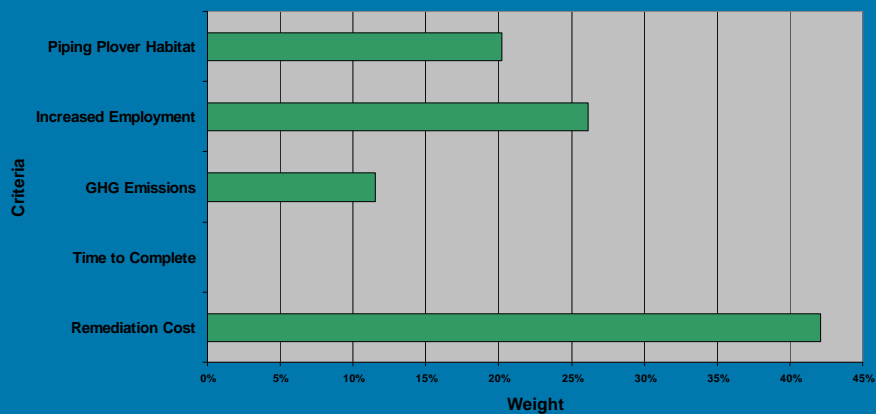
Example Trade-off Question

	Option A	Option B
Piping Plover Habitat	50 Acres Remaining	400 Acres Remaining
Increased Employment	500 Full Time Jobs	500 Full Time Jobs
GHG Emissions	1000 Standard Household Years	200 Standard Household Years
Time to Complete Remediation	27 Months	18 Months
Remediation Cost (Present Value)	\$ 8 Million	\$ 90 Million

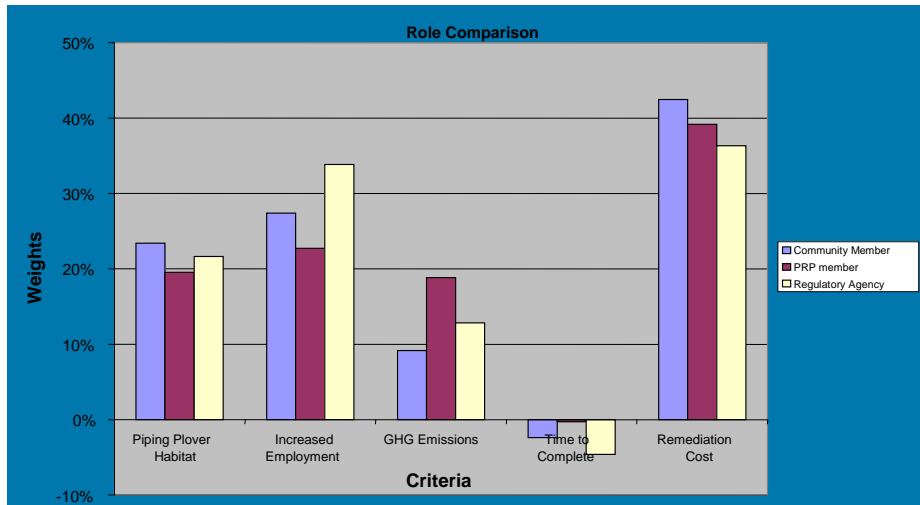


Criteria Weights

Average All Stakeholders



Comparison of Weights by Role Group



Forecasted Criteria Outcomes

Criteria	Dredging Transportation Disposal	Hotspot Dredging Transportation Disposal	Capping	Monitored Natural Attenuation	Confined Disposal Facility
Piping Plover Habitat (Acres Rem.)	400	500	450	500	0
Empoyment (FTE)	100	120	25	0	180
GHG Emissions (SHY)	1300	184	400	0	1500
Time to Complete (Months)	27	9	18	0	36
Cost (NPV \$ M)	93	14	23	2	75



Preferred Alternative by Stakeholder Group

Stakeholders	Dredging Transportation Disposal	Hotspot Dredging Transportation Disposal	Capping	Monitored Natural Attenuation	Confined Disposal Facility
Group Average	-82	105	42	100	-158
Community Member	-37	127	66	116	-119
PRP Member	-180	85	9	97	-271
Reg Agency Member	-79	121	47	107	-157



NECBA Process



What is NECBA

- Process for evaluating alternative strategies that have multiple costs and benefits
- Form of Multi-Criteria Decision Analysis
- Includes techniques for determining evaluation criteria and their relative importance
- Helps make sure that the analysis of remedial alternatives fully reflects the risks, benefits and **trade-offs** of alternative strategies



Multi-Criteria Decision Analysis

Situations Where MCDA Provides Value

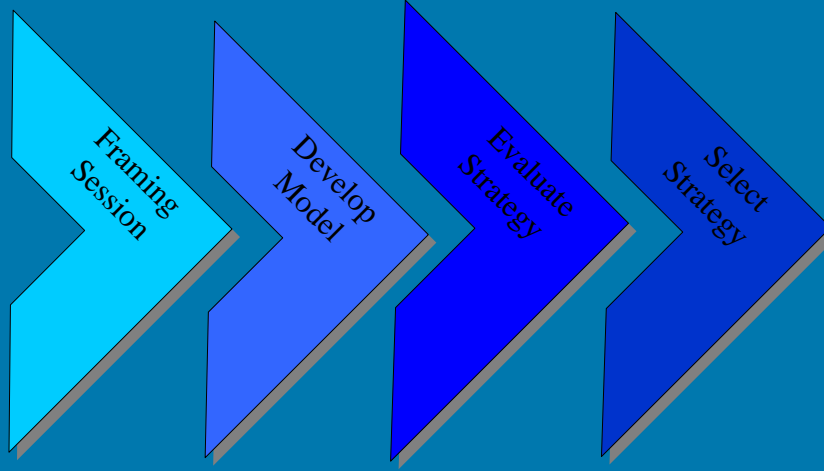
- Complex projects with significant uncertainties
- Numerous potential strategies with multiple decisions
- Multiple stakeholders with competing objectives and different definitions of success
- Potential risks to human health and safety, environment, and reputation
- Significant project costs

Benefits of MCDA

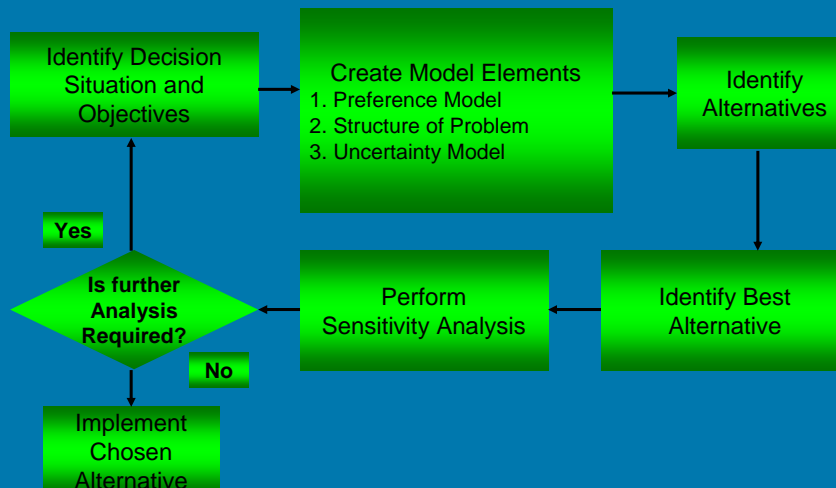
- Organizes stakeholder intuition
- Reveals insights about trade-offs and cost drivers
- Provides a systematic, transparent, decision-making process
- Helps identify the strategy that best meets stakeholder goals
- Provides bottom-line cost savings



NECBA Overall Process



Model Development Process



Confidential Remediation and Restoration Project

- Project Goals
 - Identify preferred remedial alternative using NECBA approach
 - Incorporate Green Remediation Criteria into CERCLA FS Process
 - Provide transparent results for communicating with regulatory agencies and community

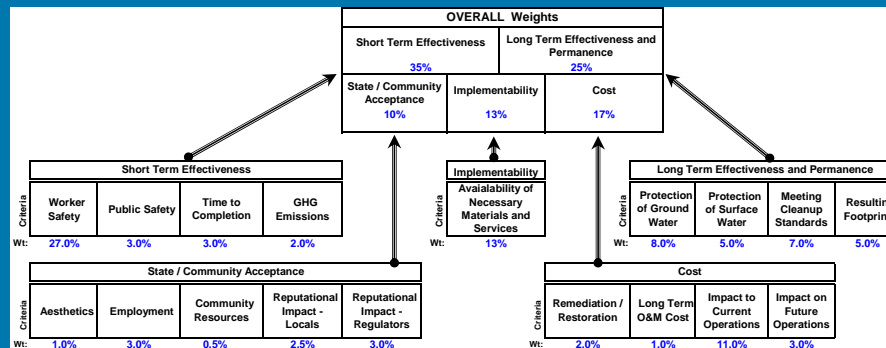


Alternatives

- Partial Removal and Capping
- Excavation and On-Site Disposal Facility
- Soil Excavation and Off-Site Disposal



Confidential Project Results of Weighting Process



Confidential Project Status

- The results of the NECBA process have been incorporated into the FS
- Results indicate that partial removal and capping are most sustainable alternative
- Site management wrestling with:
 - Whether or not to share NECBA results with regulators and community
 - Whether or not to conduct NECBA with regulatory agencies and community



Integrating NECBA and Nine Criteria

- Survey Summary
 - Agreement that a process that elicits criteria and weights will benefit the remedy selection process
 - Criteria definitions should be standardized
 - Different sites should have different criteria and weights
- A quantitative approach can help advance green remediation by:
 - Encouraging a holistic analysis
 - Emphasizing the need to make trade-offs
 - Facilitating stakeholder involvement and communication
 - Increasing transparency in the remedy selection process



Straw man Process for Integrating NECBA Into CERCLA Criteria

- Develop Master List of Criteria
- Create Standard Criteria Definitions
- Achieve Consensus on Where NECBA Criteria fit Into CERCLA Criteria
- Develop Suite of Tools for Performing Analysis



Discussion Questions

- Should SURF develop the list of criteria and standard definitions?
- Will the regulatory agencies find a quantitative process desirable?
- Should the regulatory agencies and public be involved in identifying and weighting criteria at a particular site: if so, when should they be involved?
- What is the best way to share the results of a quantitative remedy selection process?



Attachment 6
Photo-Elicitation to Involve Stakeholders in Land Use
Re-Development

Photo-elicitation as a new technique to involve stakeholders in land-use re-development

Bill Stewart, University of Illinois Urbana-Champaign
Presentation at SURF 10
June 16-17, 2009

Re-development is re-framing the land's identity



- Former industrial sites, agricultural fields, abandoned and derelict land
- Natural and cultural features overshadowed by negative stigma
- How do we create a positive relationship between the local community and this landscape?

Creating a positive narrative of community and land

- Stakeholders are property owners, adjacent land and watershed interests, public agencies, and local community
- Imagining *“what could be”*
- Contrasted with maintaining *“what is”*



Planning is complicated by dominant narratives about community and land

- Progressive
 - Original state of land as barren
 - People as heroes who make land productive
- Tragic (or Eden-in-decline)
 - Original state of land as pristine
 - People and community as villains who disrupt pristine land



Example of progressive narrative of American dustbowl



Fall plowing, G. Wood, 1931

- Transformation of a wasteland into a bountiful breadbasket
- Well-ordered landscape due to human ingenuity, persistence, and hard work

Example of tragic narrative of American dustbowl

Fragile ecosystem
pillaged by
commercial
agriculture



Mother Earth Laid Bare, A. Hogue, 1938

Re-development needs to elicit a community's sense of self



The Oxbow, T. Cole, 1836

- Narratives about community and land are situated in local culture and constructed by community as truths
- Challenge for stakeholder dialogue is to move beyond embattled cultural narratives

Facilitating stakeholder dialogue to create a positive narrative

- Public forums adversarial and not usually structured for dialogue or learning
- Need strategy to identify local meanings of place and community
- Process for stakeholders to imagine appropriate narratives for site



Facilitating stakeholder dialogue through photo-elicitation



- Technique appropriate at pre-planning phase (or pre-NEPA)
- Stakeholders need to humanize each other
- Process reveals an ethic of caring about the land

Technique requires individuals interested in site and committed to its re-development

Ways to recruit:

- standing committee already in place
- public hearing participants
- agency-identified stakeholders

Agency staff should be included as stakeholders

Step 1. Recruit stakeholders



Step 2. Take pictures



Distribute cameras to stakeholders

Ask to take pictures of local places special to them and important to everyday life

Let them know expectations – pictures will differ, ordinary landscapes, it's about your life

Step 3. Interview

- Print pictures and hold one-on-one conversations about importance of places
- Question asked of each picture: Why is this place special to you?



Step 4. Reflect on interview



- Transcribe interview
- Send to respective stakeholders
- Ask to review and modify to better represent their viewpoint – or viewpoint of their organization

Step 5. Coordinate “learning circle”

- Sharing place meanings
- Invite stakeholders
- Arrange for food and beverage
- Ask each stakeholder to discuss ~3 places



Step 5. Coordinate “learning circle” (cont.)



- Projector screen at front of room, seats in semi-circle
- Moderate discussion, allow for dialogue and ideas to grow
- Notepad for each stakeholder, and at end ask “What have you learned?”
- Collect completed notepads, compile, and distribute to stakeholders

Step 6. Begin planning public planning process

- Planning begins at point where new public values for land are being initiated
- Values likely viewed as compatible with each other – additional layers of meaning rather than inconsistent
- Still disagreement, but situated in larger context of ethic of care about land



Advantages of photo-elicitation technique

Attention on
landscape not people

Emotional knowledge
represented

Emotions are shown
rather than told



Advantages of photo-elicitation technique

- Place meanings address community history and help others to read a landscape
- Differences are not threatening nor personalized
- Dialogue leads to civic discovery



Limitations of technique



- Focused on process not outcomes
- More than 20 stakeholders will be cumbersome
- Need to go further in democratizing decisions (?)
- Connections to planning process need tighter fit

Conclusions

- Involved stakeholders in ways that shift dialogue from stakeholder-planner to stakeholder-stakeholder
- Place meanings create visions for remediation
- Builds ownership in decision-making
- Provides ground work to legitimize collective imagination of *“what could be”*





Thanks to stakeholders at Midewin National Tallgrass Prairie, Grand Canyon, and Urbana Park District who provided photographs for this presentation. Thanks also to Troy Glover, Derek Leibert, Katerie Gladdys and James Barkley who played important roles in adapting this technique.

Attachment 7
Applying Sustainable Design and Development Principles to
Remediation Sites



Applying Sustainable Design & Development Principles to Remediation Sites

Sustainable Remediation Forum (SURF)
Chicago, IL
16 June 2009



US Army Corps
of Engineers

Annette Stumpf, LEED-AP ERDC-CERL

2902 Farber Drive . P.O. Box 9005 . Champaign, Illinois 61826-9005
217-373-4492 . Facsimile: 217-373-6724 . Email: Annette.Stumpf@us.army.mil

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Definition of Sustainable Design and Development

- Meets the needs of the present without compromising the quality of life of future generations.
- Maintains economic growth while producing an absolute minimum of pollution, repairing environmental damages of the past, producing less waste, and extending opportunities to live in a pleasant and healthy environment.
- Meets human needs by maintaining a balance between development, social equality, ecology, and economics.
- Demands systematic considerations of environmental impact, energy use, natural resources, economy, and quality of life.
- Has optimal benefit only when addressed at the inception of a project, and throughout the entire life cycle of a project -- from concept to planning, to programming, design, construction, and ownership.



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Engineer Research and Development Center

Army Definition of Sustainability

Sustainability

“a sustainable Army simultaneously meets current as well as future mission requirements worldwide, safeguards human health, improves quality of life, and enhances the natural environment.”

<http://www.sustainability.army.mil/>

Army Strategy for the Environment, 2004



US Army Corps
of Engineers

Engineer Research and Development Center

OVERVIEW

The Triple Bottom Line.

Reduced Environmental Impact.
Peak Efficiency.
Improved Capitalization Rates.
Increased Marketability.
Higher Lease Rates.
Improved Productivity.
Reduced Absenteeism.
Build Green.
Everyone Profits.

<http://www.usqbc.org/>





- Foster a sustainability ethic
- Strengthen Army operations
- Meet test, training, and mission requirements
- Minimize impacts and total ownership costs
- Enhance well-being
- Drive Innovation

Closing the
Circle Award
2007



US Army Corps
of Engineers

Engineer Research and Development Center



Center for the Advancement of Sustainability Innovations
Engineer Research and Development Center (ERDC)

Update for SURF Conference
16 June 2009

Established October 2006

Director: William D. Goran

Associate Director: Michelle Hanson

Website: <https://casi.erdc.usace.army.mil/>

2902 Farber Drive . P.O. Box 9005 . Champaign, Illinois 61826-9005
217-373-6735 . Facsimile: 217-373-7222 . Email: william.d.goran@us.army.mil



US Army Corps
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Engineer Research and Development Center

CASI Technology Focus Areas

- **Forecasting & Analysis of Future Sustainability Challenges** (William Goran and Dr. Michael Case, ERDC-CERL, Karen Baker, IMCOM Futures Center, John Fittipaldi, Senior Fellow, AEPI)
- **Sustainability Approaches, Education and Knowledge Management** (Michelle Hanson & Dr. Chris Rewerts, ERDC-CERL)
- **Sustainable Facilities and Infrastructure** (Rich Schneider and Annette Stumpf, ERDC-CERL, Judith Milton, USACE SAD)
- **Sustainable Regional Planning** (Dr. James Westervelt & Elisabeth Jenicek, ERDC-CERL, & Dr. Brian Deal, University of Illinois)
- **Sustainable Energy Solutions** (Frank Holcomb and Kurt Kinnevan, ERDC-CERL)
- **Sustainable Forward Military Operations** (Kurt Kinnevan, and Deb Curtin, ERDC-CERL and Dr. Kurt Preston, Army Research Office)
- **Sustainable Water Resources** (Dr. Kathleen White, Institute for Water Resources & Elisabeth Jenicek, ERDC-CERL)
- **Sustainable Natural Infrastructure** (Dr. Tim Hayden and Alan Anderson, ERDC-CERL, Elizabeth Keysar, Concurrent Technologies Corporation and Kelly Burks-Copes, ERDC-EL)
- **Climate Change Impacts** (Sam Higuchi, NASA, William Goran & Dr. Tim Hayden, ERDC-CERL, Jon Zufelt, ERDC-CRREL)
- **Green Remediation and Reuse*** (Carol Dona, U.S. Army Corps of Engineers, Huntsville Engineering and Support Center, Environmental and Munitions Center of Expertise, and Elizabeth Ferguson, ERDC-EL)



* New in 2009, as is a draft OSD policy memo on this topic

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Forecasting & Analysis of Future Sustainability Challenges

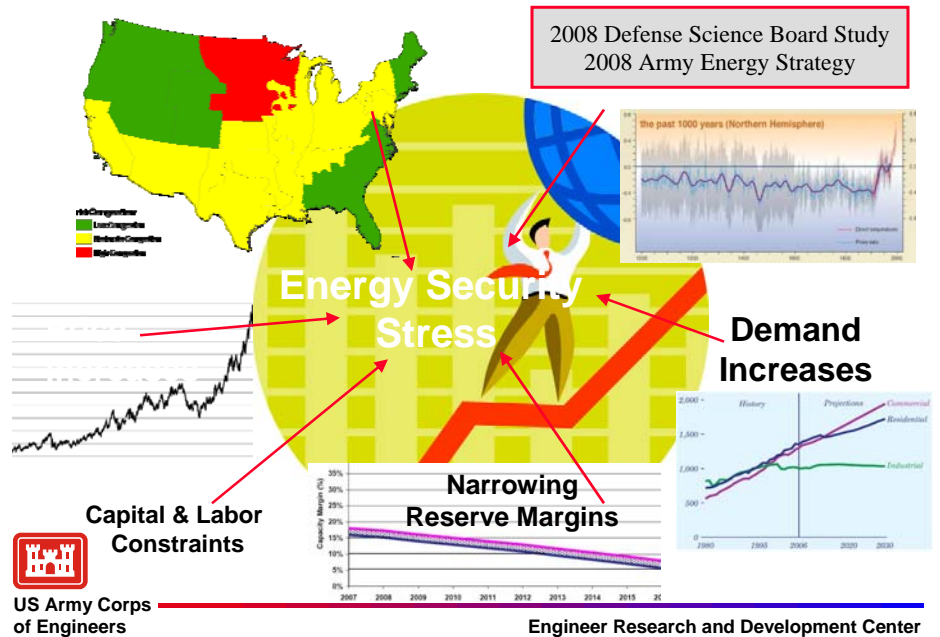
- **Army Environmental Policy Institute - Foresight Bulletins**
 - Environmental Issues in Stability Operations (2006)
 - Ecosystem Services (2007)
 - Military Land Strategy (in progress)
- **IMCOM Center for Future Installation Strategy – Emerging Challenges Reports (2009)**
 - Evolving Ground Vehicle (commercial fleet)
 - Energy Security for Military Bases (Defense Science Board 2008 report)
 - Building Information (Building Information Model Standard for USACE-2008)
- **CASI White Paper Series**
 - Ecosystem Services (2006)
 - Sustainable Water Resources (2007)
 - Ecological and Mission Impacts of Large Renewable Energy Projects (2009)



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Emerging Energy Security Issues



2009 CASI White Paper

Ecosystem Considerations for Large Scale Renewable Energy Projects

- Schedule: draft July 1, 2009
- Authors: Dr. Tom Smith (range ecologist) and Mr. Roch Ducey (renewable energy engineer)
- Purpose: Encourage necessary planning and investments for informed decisions about renewable energy projects and the potential ecosystem and mission consequences of these projects

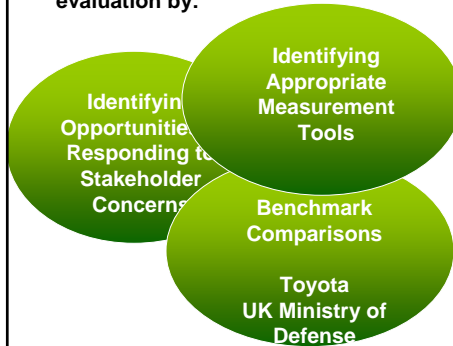


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Sustainability Approaches, Education and Knowledge Management

Helping Army stakeholders advance sustainability goal-setting and evaluation by:



- Analysis of sustainability measures for Installations Command (ISP forum – 23 April)
- Advise/Review Army 2008 Sustainability Report Using GRI
- **Developing Sustainapedia Concept (AEPI)**
- **Evolving Military Community Project (IMCOM Futures Center)**



US Army Corps of Engineers

Leads – Michelle Hanson, Chris Rewerts

Engineer Research and Development Center

Sustainable Facilities & Infrastructure



- Sustainable Design Directory of Expertise: Savannah District & CASI
- Demonstrations: ESTCP Project: Bragg Fire Station & Early Design Energy Analysis Using BIM
- **LEED Validation/Certification Study (Ft. Carson Training –April 2009)**
- LEED-Homes Army Pilot Rpt

Providing evaluations, guidance, training and demonstrations related to implementation of sustainable design approaches

POCs: Annette Stumpf and Rich Schneider



US Army Corps of Engineers

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Sustainable Forward Military Operations

POC – Kurt Kinnevan

- Developing framework for forward basing science and technology investments.
- Workshops in 07 and 08 (ARO, SERDP, RDECOM and NASA) to catalogue issues
- Effort is supporting TRADOC's Basecamp Integrated Capabilities Development Team (ICDT) **now completing CCP**
- Submitting Army Studies on basecamps (water, energy, planning)
- Current phase to include all services and allied nations (NATO -June 2009 Stockholm)

TRADOC Integrated Capabilities Development Team (ICDT)

Sustainable CONOPS Project

- Provides Framework
- To connect existing efforts
- To coordinate expertise
- For roadmap strategies

Technology Shortfall Analysis Method
S&T Roadmap

New S&T Programs

Forward Basing Issues



Sustainable Water Resources

- Army Installation Water Supply Studies (3 studies underway)
- Water resources decision support (for Corps of Engineers Civil Works resource allocations)

POC's – Elisabeth Jenicek and Kathleen White



Lake Mead, 2003
(Las Vegas Valley Water District)



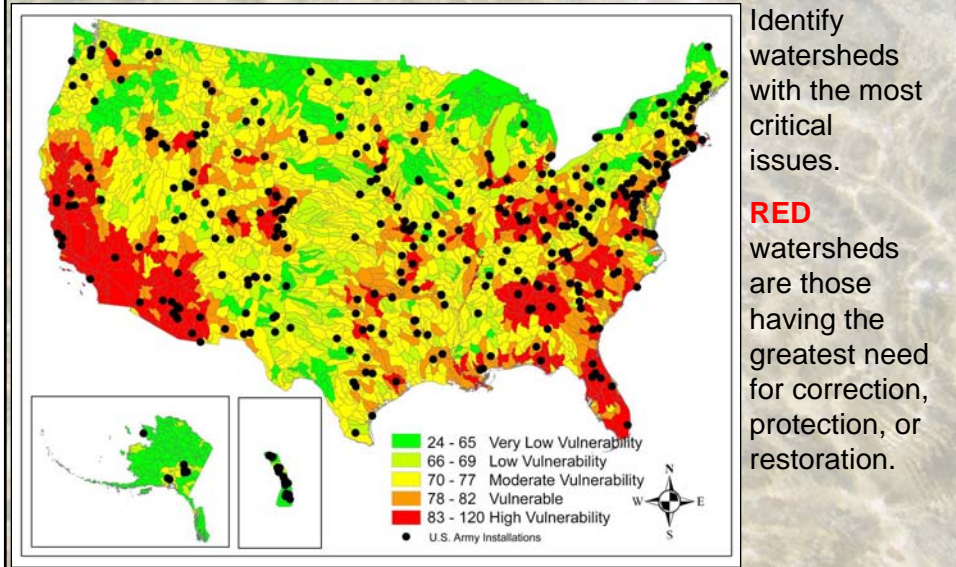
US Army Corps of Engineers



John Moore, Getty Images
With orders not to drink the local tap water, the 10,000 soldiers and support staff at Kandahar Airfield go through nearly 22 million bottles of water a year.

Engineer Research and Development Center

Watershed “Health”



Upcoming CASI Events

- June 2-4 Stockholm – NATO Workshop (sustainable forward basing)
- June 16-17 SURF 10 (Green Remediation), Chicago, IL
- July 7-9: Climate Change Impacts on Defense Assets in Alaska, Anchorage, AK
- July 6-8 NATO Ecosystem Services, RI
- Aug, Sustainable Ranges Symposium, Phoenix, AZ
- 18 Aug: Inter-Agency Forum on Climate Change Impacts and Adaptations – NASA HQ, Washington DC



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CASI Reporting

- Annual Work Plan – Upcoming Fiscal Year (plans start in August)
- Annual Report – Recently Completed Fiscal Year (November)
- Semi-Annual Newsletters
- Frequent reports to Army Sustainability Committee and Corps of Engineers sustainability coordinator

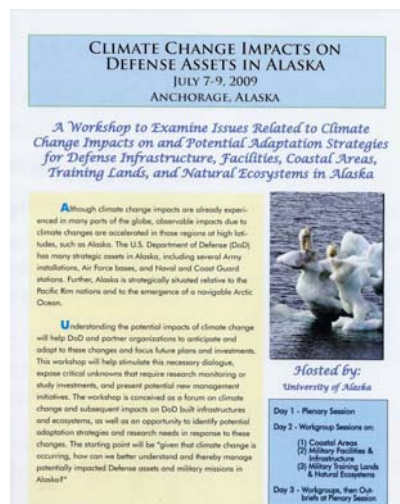


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Backup Information



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CASI Website



US Army Corps
of Engineers

<https://casi.erdc.usace.army.mil>

Engineer Research and Development Center

Examples of Sustainable Technologies & Strategies that Might Be Applied to Remediation Projects

LEED-NC (New Construction) v. 2.2
by the US Green Building Council

<http://www.usgbc.org>

* The Army is a member of USGBC – eligible for member discounts



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WHY BUILD GREEN?

IMPACTS OF U.S. BUILDINGS ON RESOURCES

40% primary energy use*

72% electricity consumption*

39% CO₂ emissions*

13.6% potable water consumption**

Sources:
*Environmental Information Administration (2008). EIA Annual Energy Outlook.
** U.S. Geological Survey (2000). 2000 data.

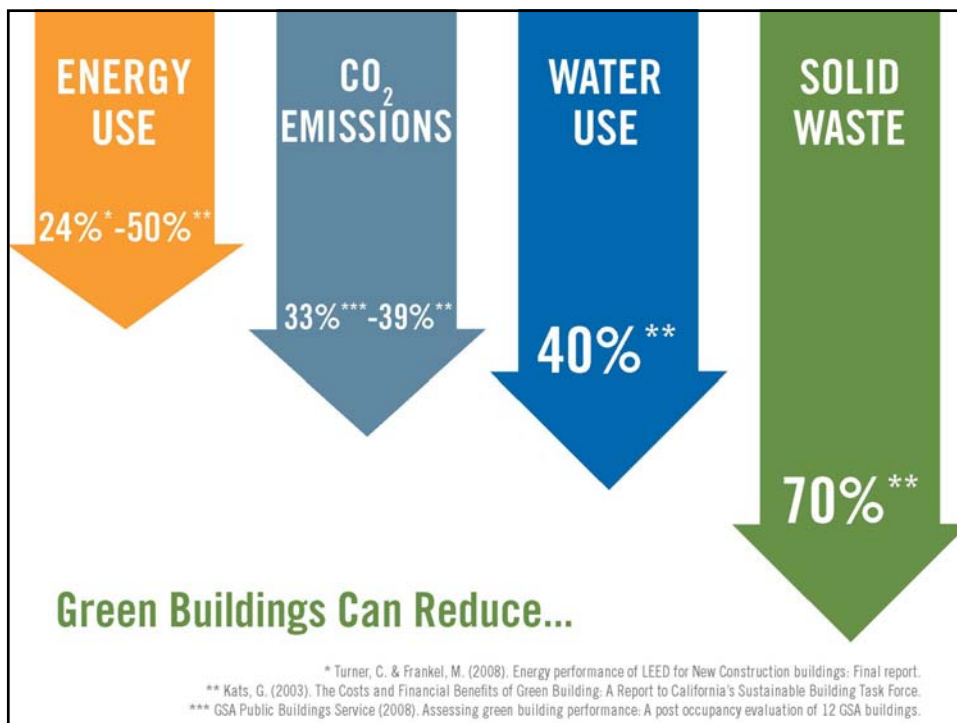
Global CO₂ Emissions by Sector

#1. Buildings

#2. Transportation

#3. Industry

Source: Energy Information Administration (2006). Emissions of Greenhouse Gases in the United States.



Green Building Occupants Are Healthier & More Productive

- In the U.S., people spend, on average, 90% or more of their time indoors*
- Green buildings typically have better indoor air quality and lighting
- LEED certified project case studies illustrate 2-16% increased worker and student productivity**

* Source: The Total Exposure Assessment Methodology (TEAM) Study, EPA 600/S6-87/002, U.S. Environmental Protection Agency, 1987.

** Source: LEED project data, USGBC

What Is Green Building?



© U.S. Green Building Council, 2008



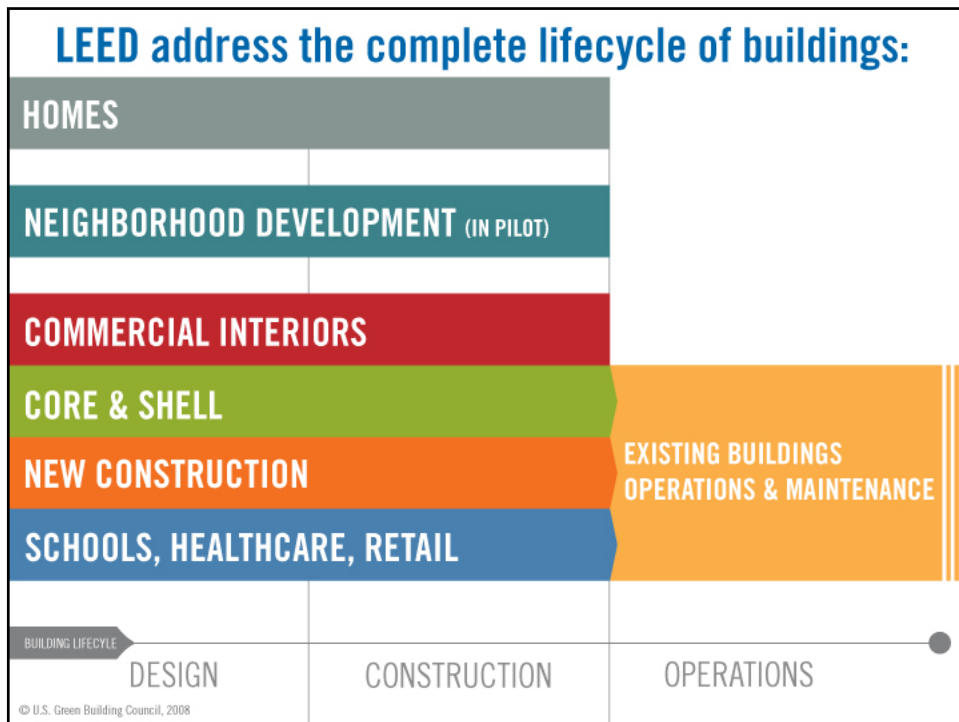
© U.S. Green Building Council, 2008

Leadership in Energy and Environmental Design

A leading-edge system
for certifying the
greenest performing
buildings in the world

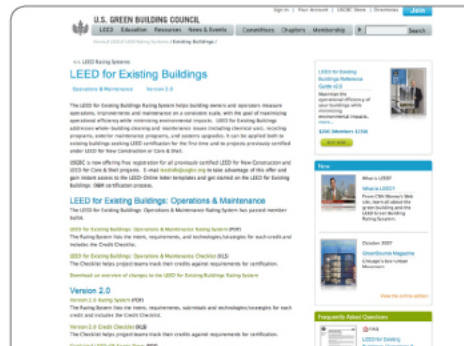
LEED Facts
Building size 12,500 square ft
Type of building
LEED for Core & Shell Development
Certification awarded July 27, 2009
Platinum
Sustainable Sites 13/13
Water Efficiency 13/15
Energy & Atmosphere 69
Materials & Resources 10/13
Indoor Environmental Quality 30
Innovation & Design
*Out of a possible 69 points

© U.S. Green Building Council, 2008



Getting Started: Tools

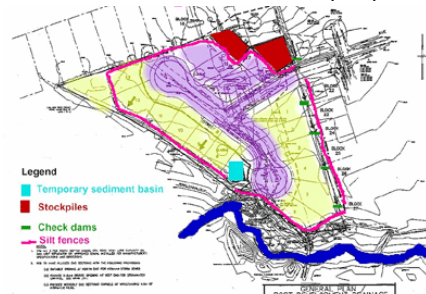
- Rating systems
- Reference guide
- Project checklist
- Credit Interpretation Requests (CIRs)
- LEED Online
- Educational workshops
- Project case studies
- www.usgbc.org



© U.S. Green Building Council, 2008

SS Prerequisite 1: Construction Activity Pollution Prevention

Erosion and Sedimentation Control (ESC) Plan



Mulching & Erosion Control Materials



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of Engineers

Engineer Research and Development Center

SS Prerequisite 1: Construction Activity Pollution Prevention

Temporary and Permanent Seeding, and Sodding



US Army Corps
of Engineers



Engin

SS Prerequisite 1: Construction Activity Pollution Prevention

Earth Dikes, Sediment Traps and Sediment Basins.



Sediment traps are used to collect sediment-laden runoff from disturbed areas on construction sites

of Engineers

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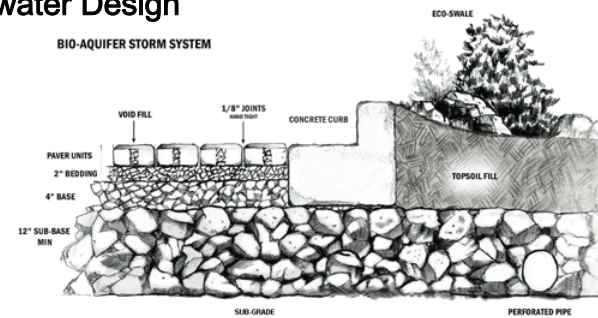
SS Prerequisite 1: Construction Activity Pollution Prevention

Silt Fencing, and Sediment Traps



SS Credit 6: Stormwater Design

BIO-AQUIFER STORM SYSTEM



Drivable Grass



Soil Retention Products, Inc.
<http://www.soilretention.com/index.htm>

US Army Corps
of Engineers



Permeable Paver



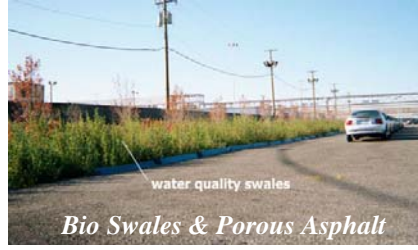
Filled Voids and Joints

Engineer Research and Development Center

SS Credit 6: Stormwater Design



Recharge Garden
Courtesy Cahill & Associates



Bio Swales & Porous Asphalt
Ford River Rouge Courtesy Cahill & Associates



Porous Asphalt
Courtesy Cahill & Associates



Constructed Wetland
Courtesy Cahill & Associates

Filter Strips and Swales

US Army Corps
of Engineers

Engineer Research and Development Center

SS Credit 6: Stormwater Design

Permeable Paving



Permeable Asphalt



EcoGrid

Eco-stone



Turfstone



Uni-Lock



US Army Corps
of Engineers

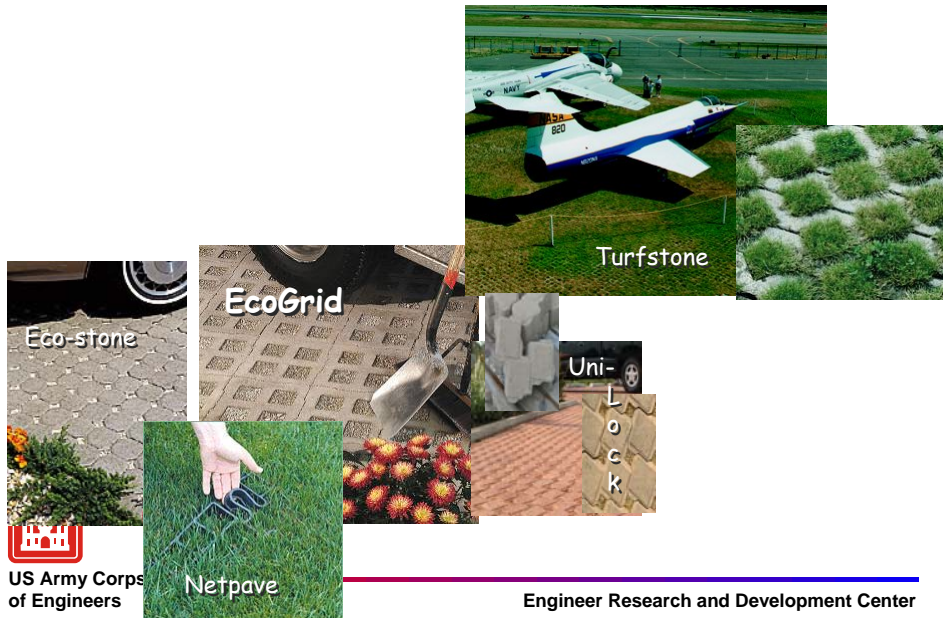


Netpave

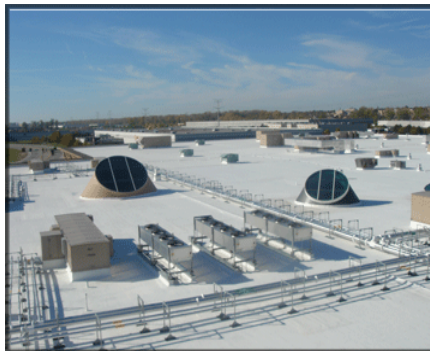
Engineer Research and Development Center

SS Credit 7.1: Heat Island Effect: Non-Roof

Permeable Paving



SS Credit 7.2: Heat Island Effect: Roof



Environmental Liquid Membrane System®

<http://www.greenproducts.net/products/products.html>



US Army Corps
of Engineers

Engineer Research and Development Center



American Hydrotech, Inc.
phone 800.877.6125
www.hydrotechusa.com



(Local Sales Representative)
Rediger Associates
phone 947.695.1295
ronrediger@aol.com




Garden Roof® Assembly Extensive Design






Vegetation
LiteTop® - Engineered Soil
System Filter SF®
FLORADRAIN® - Retention/Drainage
Moisture Mat SSM45®
STYROFOAM® - Insulation
WSF40® - Root Barrier
HYDROFLEX® - Protection Course
MM6125® - Rubberized Asphalt
Surface Conditioner
Substrate

Saturated Weight 24#-30#/Sq ft
 Total Installed Cost* \$12-\$20/Sq ft
(*roof membrane thru vegetation, cost will vary per project)



Green Roofs

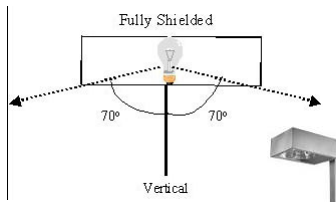


SS Credit 7.2: Heat Island Effect: Roof

Photographs © International Dark-Sky Association








Fully Shielded

70° 70°

Vertical



**US Army Corps
of Engineers**



Engineer Research and Development Center

WE Credit 1.1: Water Efficient Landscaping:

Reduce by 50%

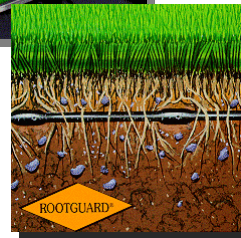
**WE Credit 1.2: Water Efficient Landscaping: No
Potable Water Use or No Irrigation**



Xeriscape garden at Denver Water



Subsurface
Irrigation
Systems



US Army Corps
of Engineers

Engineer Research and Development Center

WE Credit 1: Water Efficient Landscaping

Efficient Irrigation



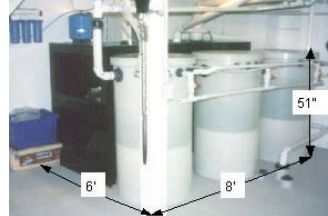
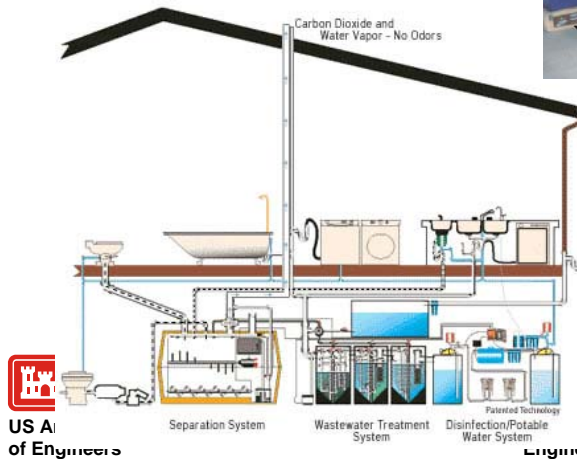
U
of Engineers

Engineer Research and Development Center

WE Credit 2: Innovative Wastewater Technologies

Equaris Total Household Water Recycling and Wastewater Treatment Systems

<http://www.equaris.com/>



Engineer Research and Development Center

WE Credit 2: Innovative Wastewater Technologies

The Ecoplay System

<http://www.ecoplay.nl/>

Ecoplay is a unique water management system, which collects bath and shower water and re-uses it for toilet flushing. Ecoplay reduces mains water consumption and drainage in a typical household by up to 30%.

Living System Wastewater Treatment System



US Army Corps of Engineers



Engineer Research and Development Center

WE Credit 2: Innovative Wastewater Technologies

Envireau Rainwater Harvesting

<http://www.envireau.co.uk/index.htm>



US Army Corps
of Engineers

Engineer Research and Development Center

WE Credit 3.1: Water Use Reduction

Cambria Office Building



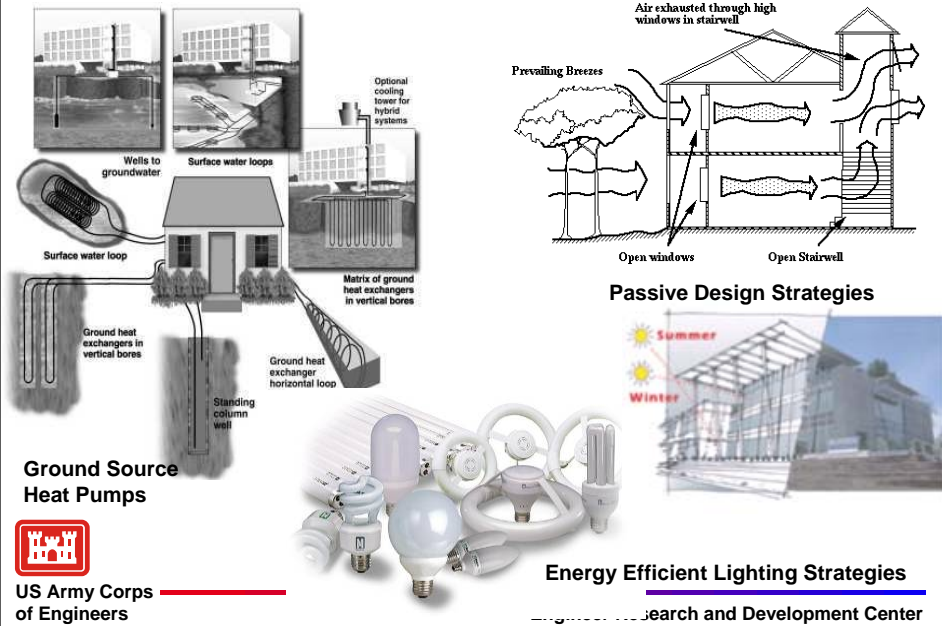
Push-rod automatic faucet controls, reduce water consumption by over 40% and minimize piping redundancies by mixing hot and cold water into single pipe supply lines.



US Army Corps
of Engineers

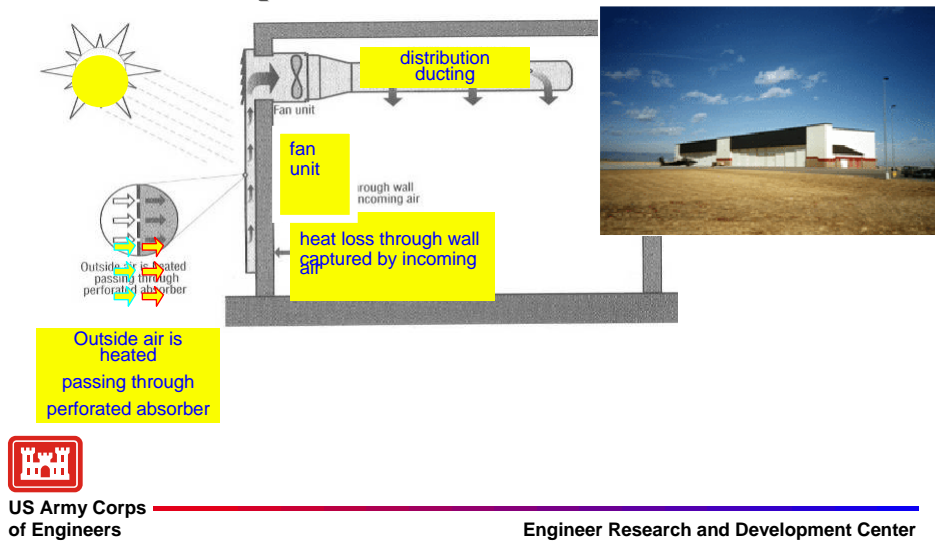
Engineer Research and Development Center

EA Credit 1: Optimize Energy Performance



EA Credit 1: Optimize Energy Performance


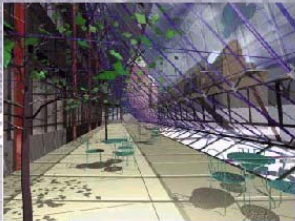
Transpired Collectors






EA Credit 2: On-Site Renewable Energy

**Building-Integrated Photovoltaic
Designs for Commercial and
Institutional Structures**
A Sourcebook for Architects
Patrina Eilfert, Ph.D.
Gregory J. Kline



**Building integrated
photovoltaics**



En er

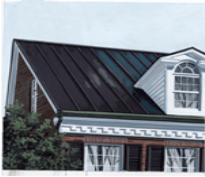
EA Credit 2: On-Site Renewable Energy

Thin Film Solar PV

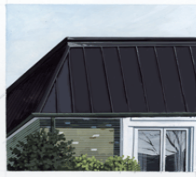
**Rack Mounted
Systems**



**Field Applied
Systems**



**Standing Seam
Metal Systems**



**Shingle
Systems**



UNI-SOLAR thin-film technology is available in a variety of styles. Rack-mounted. Standing seam. Even in shingle form. You don't have to compromise the aesthetics of your home to get the energy independence you want. The shingles and standing seam panels are true building-integrated, UL-Listed photovoltaic roofing products. And they're easy to install. You'll be up and running in less than a day.



US Army Corps
of Engineers

<http://www.uni-solar.com>

Engineer Research and Development Center

EA Credit 2: On-Site Renewable Energy

Commercial Building Integrated Photovoltaics (BIPV)

**Field Applied
Roofing
Laminate (PVL)**



Brisbane, Australia
30 kW of UNI-
SOLAR® PVL
bonded on BHP
Color Bond

**Standing Seam
Metal Systems
(SSR)**



Santa Monica, CA,
SolarPort generates
44,000kW/hours of
electricity from the sun
each year

**Standard Rigid
Module With
Durable Frame**



**Roehampton-Vale,
United Kingdom**
10.5 kW system
using rack-
mounted US-64s



US Army Corps
of Engineers

Engineer Research and Development Center

EA Credit 6: Green Power



US Army Corps
of Engineers

Engineer Research and Development Center

EA Credit 6: Green Power



US Army Corps
of Engineers

Engineer Research and Development Center

MR Credit 1: Building Reuse

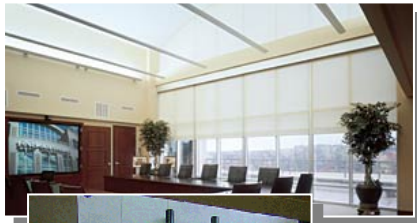
Adaptive Reuse Fort Riley Kansas



US Army Corps
of Engineers

Engineer Research and Development Center

EQ Credit 8.2: Daylight & Views



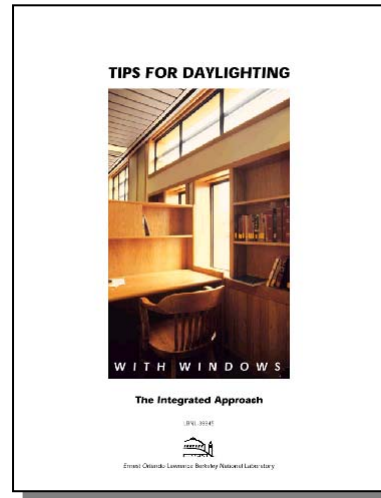
US Army Corps
of Engineers

Engineer Research and Development Center

EQ Credit 8.2: Daylight & Views



US Army Corps
of Engineers



Engineer Research and Development Center



Center for the Advancement of Sustainability Innovations
<https://casi.erd.c.usace.army.mil/>
Sustainable Design and Development
<https://eko.usace.army.mil/fa/sdd/>

Attachment 8
Greener Cleanups in Illinois and Other States

Greener Cleanups in Illinois and Other States

Heather Nifong

Illinois Environmental Protection Agency

June 17, 2009

General Approach to Greener Cleanups Taken by State Regulators

- Consider the larger protection mission of the agency.
- Embrace state sustainability and climate efforts (many small actions in aggregate can make a difference)
- Consider the goals of other programs in the agency (Air, Water, Fish and Wildlife)
- Raise awareness among staff

Greener Cleanups in Illinois

- The Matrix
- 5 Guiding Principles
- Strategy Mind Map for all sites
- Decision Tree & Mind Map for LUST sites
- Illinois EPA RCRA Pilot Study with USEPA Region 9

Illinois EPA - Bureau of Land- Greener Cleanups - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Address <http://www.epa.state.il.us/land/greener-cleanups/index.html> Go Links » Google Search Sign In

Illinois Environmental Protection Agency www.epa.state.il.us

Pat Quinn, Governor

Greener Cleanups

Greener Cleanups are less polluting, more efficient cleanup activities and technologies designed to increase the environmental benefits of remediation. By performing greener cleanups, you can:

- Reduce carbon emissions and other greenhouse gases,
- Conserve natural resources,
- Improve energy efficiencies (and decrease costs), and
- Reduce waste material requiring off-site disposal.

Illinois EPA has developed a series of tools to help site owners, developers and their consultants in incorporating greener cleanup practices. This effort applies to every cleanup program in the Bureau of Land, though specific tools have been created for LUST sites.

Five Guiding Principles for Greener Cleanups in Illinois

1. Ensure every cleanup protects human health and the environment.
2. Integrate site reuse plans into the cleanup strategy.
 - a. Sequence work to improve efficiency.
 - b. Make use of engineered barriers and institutional controls that are compatible with future site development.
3. Conserve raw materials such as soil and water; salvage building materials and other resources.
 - a. Reduce waste disposal.
 - b. Reduce the need for new materials, including clean fill and potable water.
 - c. Use existing infrastructure.
4. Conserve energy.
 - a. Reduce energy consumption.
 - b. Use renewable energy sources to power cleanup activities where possible.
5. Consider the environmental effects of treatment technologies when choosing a site remedy.

Agency Links

- Air
- Land
- Water
- Offices & Projects »
- About the IEPA »
- Site Fact Sheets
- Calendar of Events
- Rules & Regulations
- Forms & Publications »
- Vehicle Testing
- Internships »
- Kids & Education
- USEPA's TRI
- FOIA Requests
- Right-to-Know
- Contact IEPA
- Quick Answer
- Directory
- Info Centers
- Agriculture
- Citizens
- Local Government
- Program Fees
- Small Business

State Links

Search

Go

☒ Illinois EPA

☐ All Illinois Gov't

To report

Done

Local intranet

Start Illinois EPA - Bureau ... 8:22 AM

Land Menu

- « About the Bureau
- « Citizen Involvement
- « Cleanup Programs
- Community Relations
- « Databases
- Electronic Waste Recycling
- « Forms
- Frequently Asked Questions
- SIS Data
- Industrial Material Exchange Service (IMES)
- Information Request (FOIA)
- Publications
- Regional Information
- Regulations
- Tiered Approach to Corrective Action Objectives (TACO)
- Waste Management Programs

The Matrix

General Overview: How to Maximize the Environmental Benefits of Site Remediation



Category	Item	Priority	Impact	Notes
Site Assessment	1. Conduct a thorough site assessment	High	Positive	Identify all potential contaminants and their sources.
	2. Use a variety of assessment methods	Medium	Positive	Combine visual inspection, sampling, and modeling.
	3. Engage stakeholders in the assessment process	Medium	Positive	Involve local residents, businesses, and government agencies.
	4. Document findings and share them with stakeholders	Low	Positive	Keep records of all assessment activities and results.
Remediation Planning	1. Develop a remediation plan	High	Positive	Outline the goals, objectives, and methods of the remediation project.
	2. Consider the needs of all stakeholders	Medium	Positive	Take into account the interests and concerns of all affected parties.
	3. Choose the most effective and efficient remediation methods	Medium	Positive	Compare different remediation technologies and select the best one.
	4. Implement the remediation plan	Low	Positive	Follow the plan closely and make adjustments as needed.
Monitoring and Evaluation	1. Monitor the progress of the remediation	High	Positive	Track the effectiveness of the remediation methods over time.
	2. Evaluate the results of the remediation	Medium	Positive	Assess whether the remediation goals have been achieved.
	3. Report on the results of the remediation	Medium	Positive	Provide regular updates to stakeholders on the progress of the project.
	4. Learn from the experience	Low	Positive	Identify lessons learned and apply them to future projects.

General Overview: How to Maximize the Environmental Benefits of Site Remediation



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5

Ongoing Work at the Illinois EPA

- Evaluate usefulness of the matrix, mind maps and decision tree when applied to specific sites
- Identify the most important actions to improve cleanup efficiency/sustainability
- Cultivate pilot projects and prepare case studies
- Educate consultants, site owners and developers
- Contribute to national efforts at establishing green remediation guiding principles, metrics, and protocols

6

Association of State and Territorial Solid Waste Management Officials (ASTSWMO)

Greener Cleanups Task Force (GCTF)

- Illinois (chair)
- California
- Colorado
- Delaware
- Georgia
- Massachusetts
- Missouri
- New York
- Oklahoma
- Oregon

Mission

Facilitate cleanup decisions that increase the net environmental benefits of remediation, and in doing so, contribute to site sustainability.

GCTF is a cross-program task force representing CERCLA, RCRA, Tanks, Brownfields and Federal Facilities.

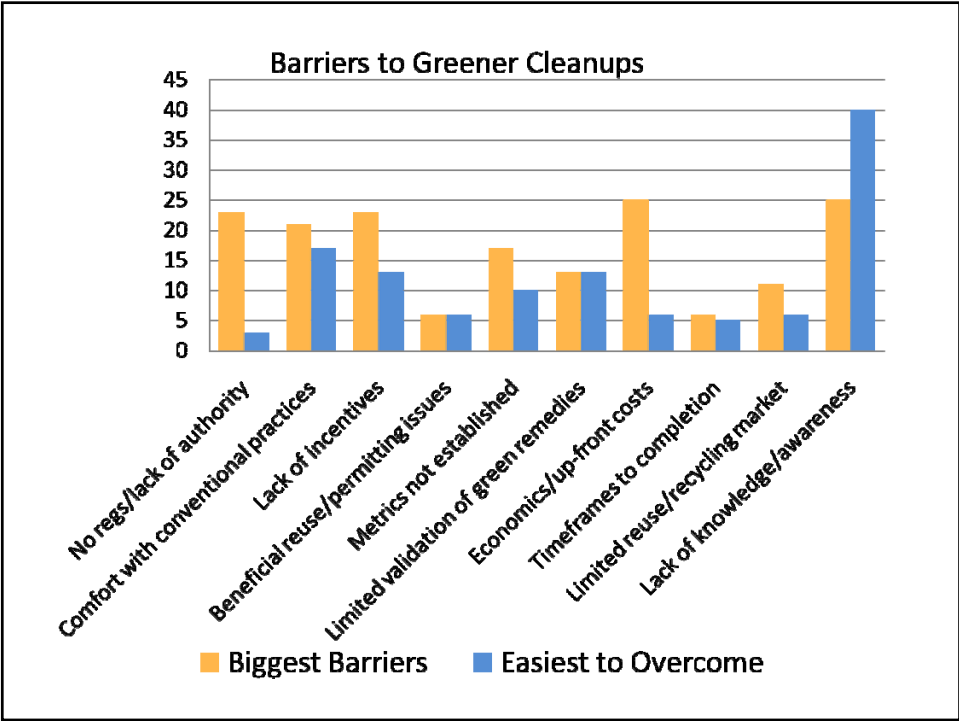
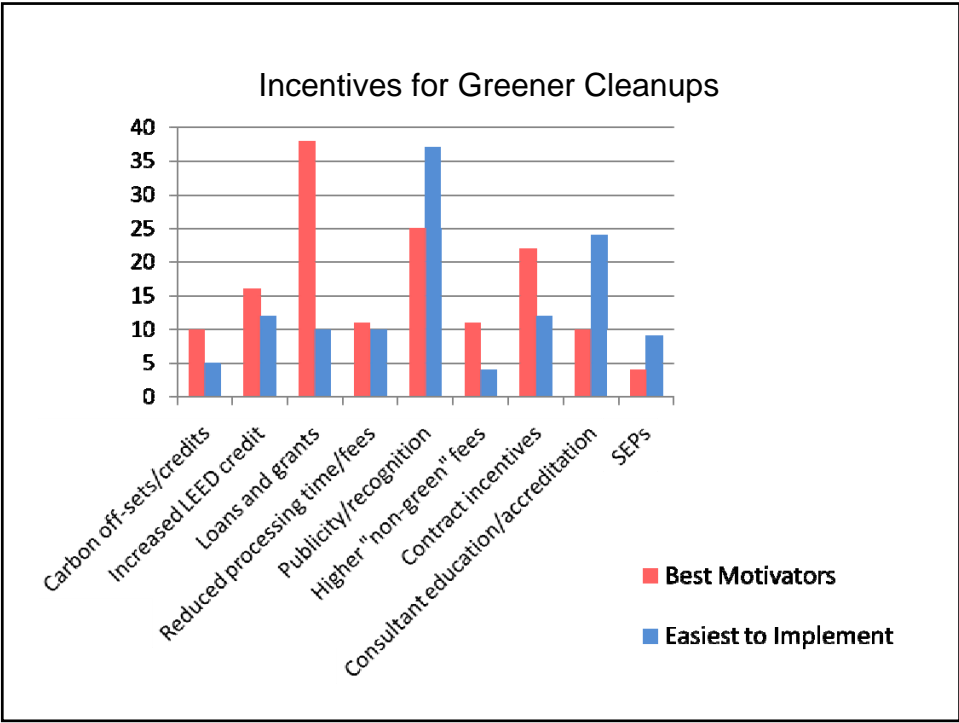
GCTF Goals

- Identify best practices and incentives for greener cleanups;
- Support State programs in their efforts to integrate these approaches into State remedy selection and implementation processes;
- Strengthen partnerships between the States and U.S. EPA to improve greener cleanup capacities; and
- Operate as a technical resource for other ASTSWMO task forces and sub-committees.

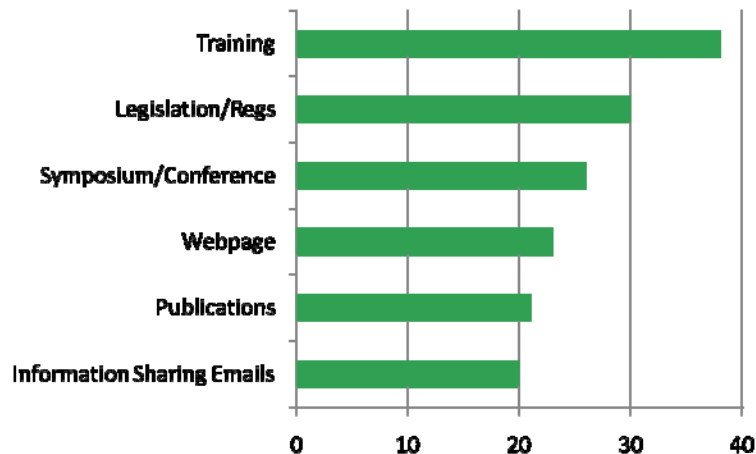
GCTF States Survey

- Short on-line survey of ASTSWMO members in March 2009 specific to greener cleanups
- Used to help develop content of task force strategy papers
- 44 responses from 27 states
- All regulatory programs represented (CERCLA, RCRA, Federal Facilities, Voluntary Cleanups, Brownfields and Tanks)
- The survey email contained a background paper introducing greener cleanups and its relevance to state regulators





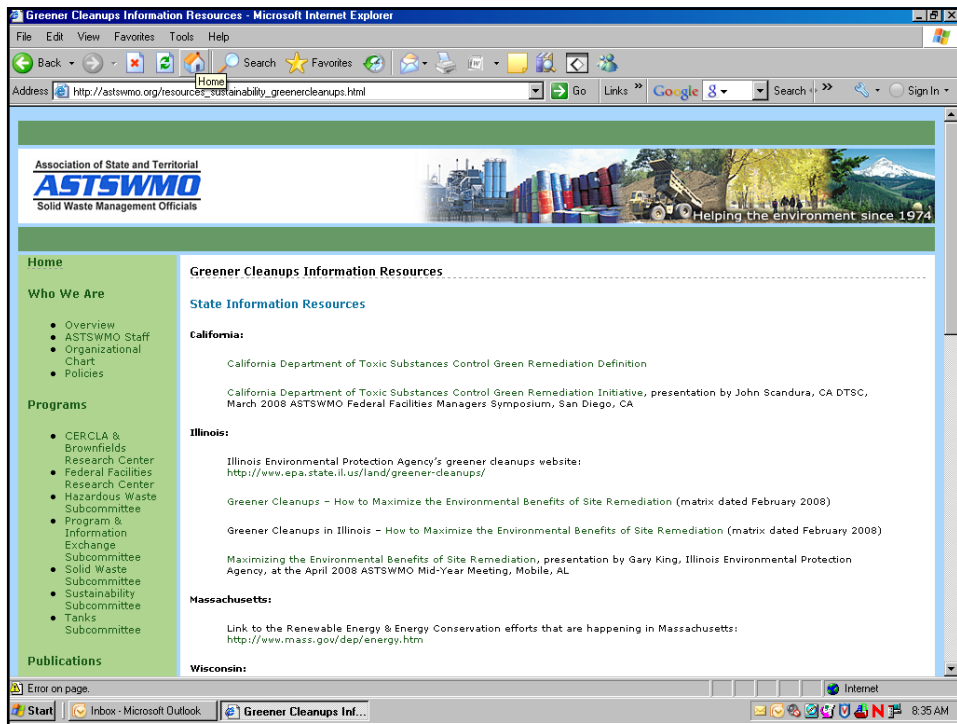
What Resources Are Needed to Encourage Greener Cleanups



Overcoming Barriers through Education of Regulators, Consultants, Industry and the Public

Documents in development by the GCTF –

- Implementing Greener Cleanups in the States
- Incentives for Greener Cleanups
- Barriers to Greener Cleanups
- Incorporating Greener Cleanups into Post-Remedy Reviews
- Getting Started with Greener Cleanups by Debunking Some Myths



Challenges for State Regulators

- Implementation across multiple cleanup programs
- Focus on remedy selection v. optimization
- Approval of alternative remedies and approaches
- Acceptance of institutional controls and engineered barriers
- Unknown state agency budget impacts
- Advocacy for greener practices on a site-specific basis by project managers – especially for high volume programs like state voluntary cleanups




For more information



heather.nifong@illinois.gov

www.epa.state.il.us/land/greener-cleanups

[www.astswmo.org/programs_sustainability.
htm](http://www.astswmo.org/programs_sustainability.htm)






Attachment 9
SURF Web Site Update



SURF WEBSITE UPDATE



***SURF 10
Chicago, Illinois
June 17, 2009***

**L. Maile Smith, PG
Northgate Environmental Management, Inc.**



overview

- same website domain
 - www.sustainableremediation.org
- new website platform
 - squarespace – publishing and hosting
- new functionalities
 - blog, discussion forum, upload/download files, submission forms
 - member accounts
 - variable permission levels





active pages

- home
- about
- news (*blog or journal format*)
- library (*downloads only*)
- discussion forum
- contact (*submission form*)
- links (*affiliates and resources*)
- gallery




inactive &/or potential pages

- member login
 - IDs and passwords assigned by administrator
- case studies, issue papers (*clearinghouse?*)
- participants
 - links to participants' websites
- surveys or other submission forms
- other: search, map, guest book, drop box (for file uploads), FAQs




home page

[HOME](#) [ABOUT](#) [NEWS](#) [LIBRARY](#) [DISCUSSION FORUM](#) [CONTACT SURF](#)



SURF

SUSTAINABLE REMEDIATION FORUM



The Sustainable Remediation Forum (SURF) promotes the use of sustainable practices during implementation of remedial action activities with the objective of balancing economic viability, conservation of natural resources and biodiversity, and the enhancement of the quality of life in surrounding communities.


SURF has authored a White Paper on sustainable remediation that will be published in a special edition of the June 2009 Remediation Journal. The White Paper communicates SURF members' thoughts on incorporating sustainability principles into environmental remediation. Site owners and local communities are increasingly knowledgeable about sustainability issues. In this paper, sustainable remediation is broadly defined as a remedy or a combination of remedies whose net benefit on human health and the environment is maximized through the judicious use of limited resources. A summary of the White Paper is currently available in our [library](#).

OTHER RESOURCES

- [member login](#)
- [links](#)
- [gallery](#)

NEXT MEETING:
SURF will hold its next meeting June 16 and 17, 2009, in Chicago, Illinois.

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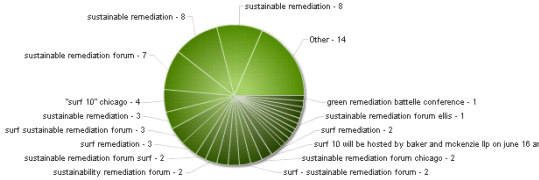


statistics

Search Engine Queries Summary



By filtering your site's referrer lists, it is possible to obtain a list of the search engine queries that were used to find your website. The following list allows you to see how people are locating pages on your site, as well as who located your site using a particular search.

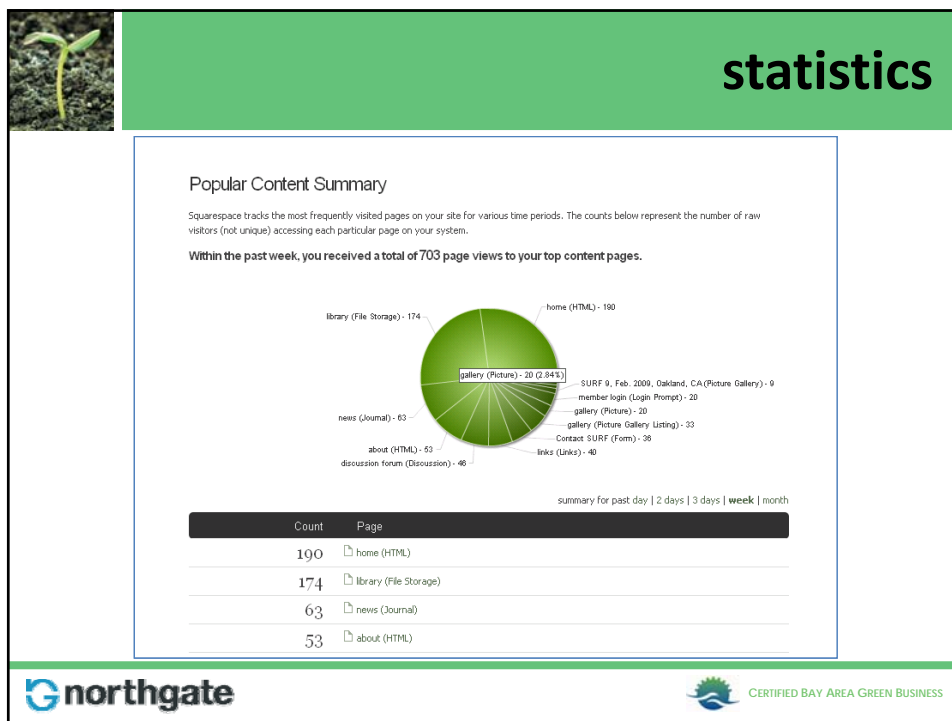
Within the past week, you received a total of 76 page views from your top keyword searches.



most recent queries | summary for past day | 2 days | 3 days | **week** | month

Count	Search Query	Search Engine
8	Q_sustainable remediation	www.google.co.uk
8	Q_sustainable remediation	www.google.com
7	Q_sustainable remediation forum	www.google.com
4	Q_surf 10' chicago	www.google.com





-
- ### discussion
- library issues/concerns
 - reference list, SURF-authored documents, complete clearinghouse for sustainable remediation documents, or something in between
 - links to/from SURF
 - links to participant's websites (parity?)
 - member-only access
 - current plan accepts up to 4 unique permission levels
 - timing of white paper rollout
 - annual costs
- northgate** CERTIFIED BAY AREA GREEN BUSINESS



contact

www.sustainableremediation.org

L. Maile Smith, P.G.

Northgate Environmental Management, Inc.

300 Frank H. Ogawa Plaza, Suite 510

Oakland, California 94612

510.839.0688, ext. 223

maile.smith@ngem.com



Attachment 10
Implementing the USEPA's Six Core Elements of
Green Remediation

Implementing EPA's 6 Core Elements of Green Remediation

Ann Rosecrance¹, Karin Holland² and Leah Pabst¹

¹ Conestoga-Rovers & Associates; ² Haley & Aldrich

Sustainable Remediation Forum

Chicago, IL, June 17, 2009

Overview

- EPA's 6 Core Elements of Green Remediation
- Case Studies for Each Core Element



Green Remediation: EPA Draft Framework Standard



Six Core Elements

1. Minimize total energy use and maximize use of renewable energy
2. Minimize air pollutants and greenhouse gas emissions
3. Minimize water use and impacts to water resources
4. Optimize future land use and enhance ecosystem
5. Reduce, reuse and recycle materials and waste
6. Optimize sustainable management practices during stewardship

Source: EPA Draft Framework for Green Cleanup Standards at Contaminated Sites, April 1, 2009
<http://www.clu-in.org/greenremediation/docs/GCS%20Draft%20Framework%20040109.pdf>

Refer to Appendix for additional information on each of the core elements.

Core Element 1

Minimize Total Energy Use and Maximize Use of
Renewable Energy



Case Study 1: Hydrocarbon Remediation Sites in Alaska and California



Solar Energy for Groundwater Remediation

- **Goal:** Using solar energy for remediation of hydrocarbon impacted groundwater
- **Outcome:** Solar powered groundwater remediation systems using CRA's Ozone Emitter System (patent pending) and direct current (DC) power; comparable performance to traditionally powered systems
- **Benefits:** Saves > 500 kWh/month of traditional power per unit; positive PR



Conestoga-Rovers & Associates

Case Study 2: Hydrocarbon Remediation Site in Texas



Solar & Wind Energy for Groundwater Remediation

- **Goal:** Use solar and wind energy to remediate groundwater in area without traditional power source
- **Outcome:** CRA installed a skimmer pump recovery system powered by a hybrid of solar and wind power
- **Benefits:**
 - System runs completely on solar and wind energy
 - In 18 months, the system has recovered more than 300 barrels of crude oil condensate
 - Reduced O&M due to problem free operation of solar and wind powered system



Conestoga-Rovers & Associates

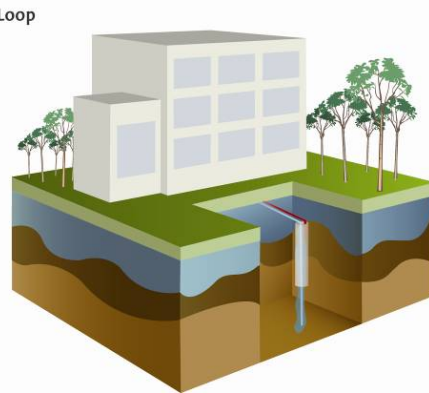
Case Study 3: Haley & Aldrich University Client, East Coast



Geothermal Heat and Cooling Pumps

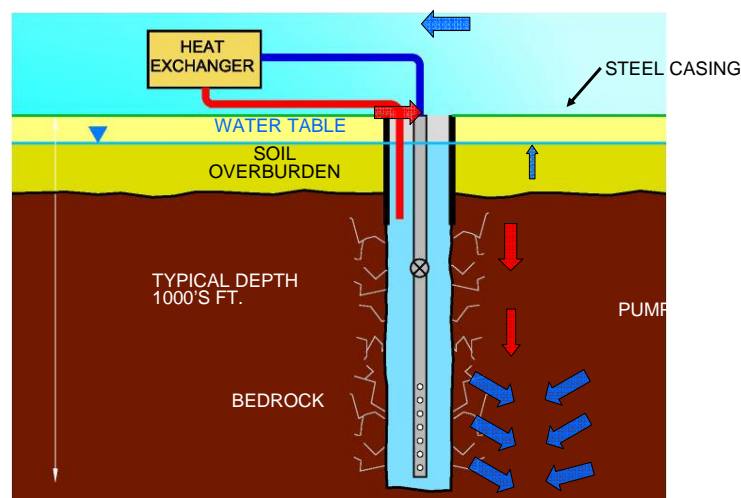
- **Goal:** Provide renewable energy source at a brownfield site
- **Outcome:** Installation of first of its kind geothermal standing column well
- **Benefits:**
 - Collaboration with regulator to achieve permitting
 - Low carbon footprint for heating and cooling building
 - Building may exceed LEED Platinum rating

Open Loop



Haley & Aldrich

Case Study 3: Haley & Aldrich University Client, East Coast



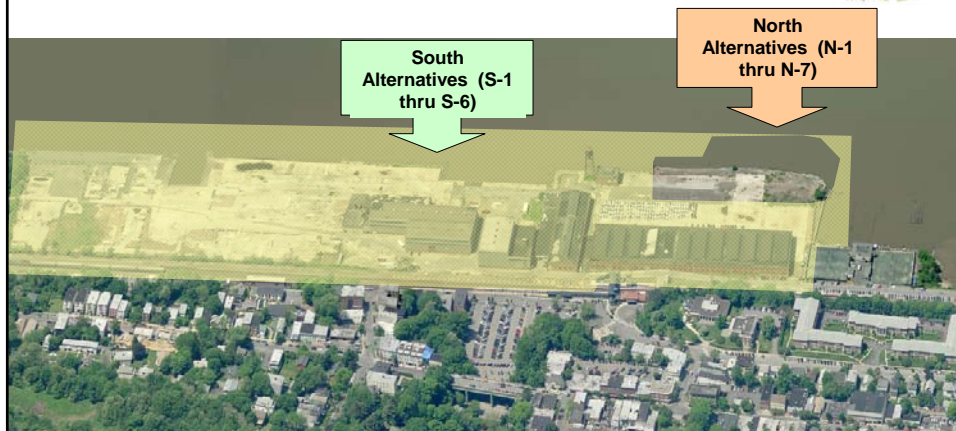
Haley & Aldrich

Core Element 2

Minimize Air Pollutants and
Greenhouse Gas Emissions



Case Study 1: Major Oil Company, NY



Goal: Perform a carbon footprint analysis of combinations of remedial alternatives

Case Study 1: Major Oil Company, NY



Carbon Footprint Comparison

Greenhouse Gas Emissions								
	ALT:	N-1	N-2	N-3	N-4	N-5	N-6	N-7
ALT:	Est. Metric Tons	8,500	8,600	11,400	11,400	15,900	9,800	15,700
S-1	15,100	23,600	23,700	26,500	26,500	31,000	24,900	30,800
S-2	15,200	23,700	23,800	26,600	26,600	31,100	25,000	30,900
S-3	15,900	24,400	24,500	27,300	27,300	31,800	25,700	31,600
S-4	15,500	24,000	24,100	26,900	26,900	31,400	25,300	31,200
S-5	15,500	24,000	24,100	26,900	26,900	31,400	25,300	31,200
S-6	16,200	24,700	24,800	27,600	27,600	32,100	26,000	31,900



Outcome: Carbon footprint evaluation supported the selected remedy

Haley & Aldrich

Case Study 1: Major Oil Company, NY



Opportunities for Building Reuse

Haley & Aldrich

Case Study 2: Remediation Site in Texas



GHG emissions reduction during truck use

- **Goal:** Reduce GHG emissions during site work from idling diesel truck engines which can consume up to 1 gallon of fuel per hour*
- **Outcome:** Truck engines turned off while soil is loaded
- **Benefit:**
 - Not idling engines reduces GHG emissions by 10 kg CO₂ per hour*

**Based on USEPA Climate Leaders CO₂ emission factors*



Conestoga-Rovers & Associates

Case Study 3: Landfill site in Ontario, Canada



Landfill gas to energy and GHG reduction

- **Goal:** Generate electricity generation from landfill gas (LFG)
- **Outcome:** LFG-to-energy facility designed by CRA which generates 6 MWh of power connected to the grid
- **Benefits:**
 - GHG emissions reduction of CH₄ to CO₂ (21 to 1 reduction)
 - Energy can be used by community as a normal electricity source



Conestoga-Rovers & Associates

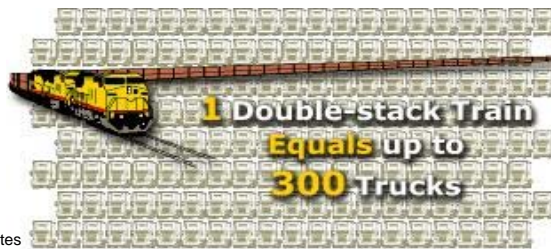
Example: Using trains instead of trucks for material transport



GHG reduction in transport

- Using trains instead of trucks for material transport can reduce GHG emissions by approximately 90%
 - Trucks 0.297 kg CO₂/tonne-mile
 - Trains 0.0252 kg CO₂/tonne-mile

Source: USEPA Climate Leaders CO₂ emission factors for material transport



Core Element 3

Minimize Water Use and Impacts to Water Resources



Case Study 1: Groundwater Remediation Site in Nebraska



Recover usable water

- **Goal:** Cleanup chlorinated hydrocarbons in groundwater and offer treated water for beneficial non-potable use
- **Outcome:** 350 million gallons of contaminated groundwater remediated since Fall 2004 via a groundwater remediation system installed by CRA
- **Benefit:** Portion of treated water made available to local farmers for use with irrigation or livestock



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Case Study 2: Bioremediation Site in EPA Region 4



Reinject extracted water for in-situ bioremediation

- **Goal:** Use extracted groundwater as media for food source for in-situ bioremediation
- **Outcome:** CRA used recovered groundwater to transport food source for bioremediation, as allowed by EPA memo of 12/27/00
- **Benefits:**
 - Save 50,000 gallons of potable or process water per year
 - Avoid need to treat 50,000 gallons per year of recovered groundwater ex-situ



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OFFICE OF
SOLID WASTE AND EMERGENCY
RESPONSE

December 27, 2000

MEMORANDUM

SUBJECT: Applicability of RCRA Section 3020 to In-Situ Treatment of Ground Water

FROM: Elizabeth Cotsworth, Director /S/
Office of Solid Waste

TO: RCRA Senior Policy Advisors
RCRA Enforcement Managers
Superfund Regional Policy Managers

We have recently received several questions on how the Resource Conservation and

Source: <http://www.itrcweb.org/Documents/RCRA3020andLTR.pdf>

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Case Study 3: Active Aerospace Facility on West Coast



Re-Use of Water in Cooling Towers

- Cooling towers on Site for facility operations
- Groundwater pump and treat system currently treats impacted groundwater
- Facility purchases water for use in cooling towers and pays for extracted groundwater

Goal: Can both systems be integrated?

Outcome: Remedial design system integrates groundwater treatment and reuse in cooling towers



Haley & Aldrich

Case Study 3: Active Aerospace Facility on West Coast



Sustainability Benefits

Potential Environmental Successes

- Conservation of potable water resources through re-use
- ~100% reduction in reliance on municipal water supply

Social Success

- Reduce further depletion of water during current drought conditions

Economic Success

- Proactively implemented water conservation measures prior to regulatory requirements
- Approximately \$50,000 costs savings per year
- Municipal programs available to pay for infrastructure improvements (design and engineering)
- Cost savings could be reached in less than 2 years



Haley & Aldrich

Core Element 4

Optimize Future Land Use and Enhance Ecosystems



Case Study 1: Sun Harbor Marina

LEED Marina on Brownfield Site

- **Goal:** Sustainably redevelop a brownfield site
- **Outcome:**
 - First LEED certified marina in the world
 - "Clean Marina" designation
- **Annual savings:**
 - 65,337 kWh electricity
 - 228 therms natural gas
 - 88,571 gallons water



Case Study 2: Former Waste Site in Nebraska



Restore native habitat

- **Goal:** Cleanup 40 acre site that was abandoned and which had received miscellaneous debris dumping
- **Outcome:** CRA cleaned up site and planted with native prairie grass
- **Benefits:**
 - Restored 40 acres of habitat
 - Native prairie grass acts as a vegetative cover for runoff control and habitat development
 - Grass cover acts as a riparian buffer and prevents discharges to nearby water bodies



Conestoga-Rovers & Associates

Case Study 3: Wetlands and Stream Restoration Site in Midwest



Restore wetlands habitat

- **Goal:** Restoration of 10 acres of PCB affected sediment in wetlands, riparian zone and stream site area
- **Outcome:** Hot spot sediments removed to 1.0 mg/kg PCBs and used on-site natural materials to create habitat features
- **Benefits (1 year later):**
 - Increased flood storage capacity
 - Increased habitat diversity
 - Increased wildlife diversity
 - Doubled number of fish species
 - Also, minimized need for 5000 cubic yds imported backfill
 - Also, minimized truck traffic and associated GHG emissions (CE-2)



Conestoga-Rovers & Associates

Core Element 5

Reduce, Reuse and Recycle Material and Waste



Case Study 1: Remediation Site in Oklahoma

Soil reuse for backfill

- **Goal:** Reuse 3,000 tons of hydrocarbon affected soil from residential area that was planned for disposal at landfill (200 miles from site)
- **Outcome:** Regulator approved use of soil for fill in former excavated waste pit in nearby industrial area of site
- **Benefits:**
 - Reused 3,000 tons of soil
 - Avoided need for 3,000 tons of backfill
 - Prevented approx. 57 metric tons CO₂ emissions from transport (CE-2)
(57 tons CO₂ = 165 tractor trailers x 1.72 kg CO₂/mile x 200 miles/tractor trailer)

* EPA Climate Leaders



Conestoga-Rovers & Associates

Case Study 2: Remediation Site in Texas



Treatment of soil in mixing cell

- **Goal:** Recycle 40,000 tons of remaining soil in former crude oil storage area and prevent disposal at landfill (100 miles away)
- **Outcome:** 40,000 tons of hydrocarbon affected soil was excavated, and taken to a mixing cell and treated, and then returned to original location
- **Benefits:**

- Recycled 40,000 tons of soil
- Prevented transport of 2100 tractor trailers to landfill
- Prevented approx. 360 metric tons CO₂ emissions from transport (CE-2)

(360 tons CO₂ = 2100 tractor trailers x 1.72 kg CO₂/mile* x 100 miles/tractor trailer)

* EPA Climate Leaders



Excavation of hydrocarbon affected soil



Area after mixing and recycling of soil back to site

Conestoga-Rovers & Associates

Case Study 3: Wall 119, Riverside, CA



Tire re-use in freeway

- **Goal:** Reuse waste materials for freeway widening natural resource
 - **Outcome:** total of 215,000 passenger tire equivalents used
 - **Benefit:**
- Reused 2,150 tons of tires
 - Significantly reduces quantities of concrete and steel required
 - Diverts used tires from disposal as special waste



Haley & Aldrich

Case Study 3: Wall 119, Riverside, CA



Why use Tire Derived Aggregate?

- Many beneficial properties:
 - ❑ Low unit weight (50 pounds per cubic foot)
 - ❑ Free draining ($k > 1$ cm/s)
 - ❑ Good thermal insulation (8 x better than soil)
 - ❑ 75 tires per YD³!



Haley & Aldrich

Core Element 6

Optimize Sustainable Management Practices
during Stewardship



Case Study 1: Tesoro North Hollywood Site



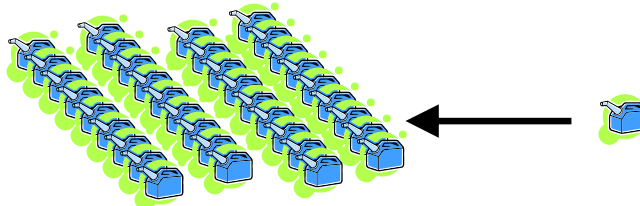
Is continued SVE beneficial?

Haley & Aldrich

Case Study 1: Carbon Footprint Analysis



- Over the 10 months of small unit SVE operation:
 - ❑ Expended **25** gallons of gasoline (equivalent) for every **1** gallon of gasoline extracted, or
 - ❑ Released **77.2** pounds of CO₂ for every 1 lb of CO₂ (equivalent) extracted
- During the last few months:
 - ❑ Expending **32** gallons of gasoline (equivalent) for every **1** gallon of gasoline extracted, or
 - ❑ Releasing **98** pounds of CO₂ for every 1 lb of CO₂ (equivalent) extracted



Haley & Aldrich

Case Study 1: Carbon Footprint Analysis



- The SVE system annual carbon footprint is 69 metric tons CO₂e, equivalent to:
 - Annual GHG emissions of 13 passenger vehicles
 - Consumption of 7,832 gallons of gasoline/160 barrels of oil
 - CO₂ sequestered by 16 acres of pine forest



Haley & Aldrich

Example Ways to Optimize Sustainable Management Practices

- Checklists to ensure consideration and application of core elements 1-5
- Consideration of core elements 1-5 in remedial alternatives evaluation, and during and post-remediation activities
- Life cycle assessment
- Environmental footprint calculations
- LAND Code <http://environment.yale.edu/topics/962>
- Consider other factors (socioeconomic, safety, etc.)



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Example: Evaluate, Quantify & Rank Remedial Options for Negative & Positive Impacts

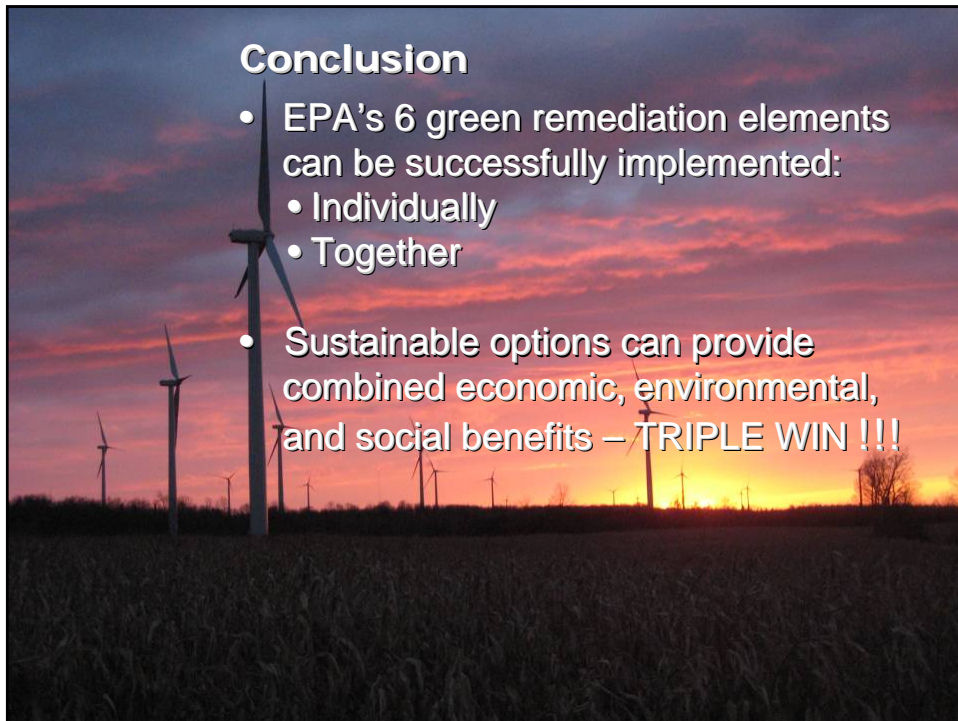


Core Element	Evaluate negatives	Evaluate positives
1. Energy	Total energy use: natural gas (BTU), electricity (kWh), fuel (gallons)	Renewable energy applied (KWh saved by solar, wind, geothermal, biomass energy)
2. Air	Total air pollutants, GHG emissions (CO ₂ e), dust	GHG emission reductions (CH ₄ to CO ₂)
3. Water	Total water use (gallons or liters)	Water recovery (gallons or liters)
4. Land	Total land disturbed (acres/tons); noise and lighting disturbances	Land reuse (acres/tons); ecosystems enhanced
5. Materials & Waste	Waste generated (tons)	Materials reused (tons)

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Conclusion

- EPA's 6 green remediation elements can be successfully implemented:
 - Individually
 - Together
- Sustainable options can provide combined economic, environmental, and social benefits – TRIPLE WIN !!!



Contact Information

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Leah Pabst

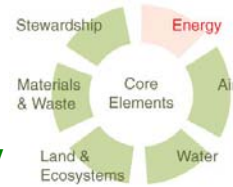
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Appendix

Additional Details on EPA Recommendations for Core Elements

Core Element 1

Minimize Total Energy Use and Maximize Use of Renewable Energy



- Minimize energy consumption (e.g., use energy efficient equipment)
- Power cleanup equipment through on-site renewable energy sources
- Purchase commercial energy from renewable resources

Core Element 2

Minimize Air Pollutants and Greenhouse Gas Emissions



- Minimize dust generation and airborne transport of contaminants
- Minimize use of heavy equipment
- Maximize use of machinery equipped with advanced emissions controls
- Use alternative, cleaner fuels to power machinery and auxiliary equipment
- Sequester carbon dioxide on site (e.g., soil amendments, revegetation)

Core Element 3

Minimize Water Use and Impacts to Water Resources



- Minimize fresh water use and depletion of natural water resources
- Capture clean and treated water for reuse (e.g., aquifer recharge, irrigation)
- Minimize water demand for revegetation (e.g., native species)
- Employ best management practices for stormwater

Core Element 4

Optimize Future Land Use and Enhance Ecosystems



- Integrate anticipated site use or reuse plans into the cleanup strategy
- Minimize areas requiring activity or use limitations (e.g., destroy or remove contaminant sources)
- Minimize unnecessary soil and habitat disturbance or destruction
- Restore or create habitat using native species and local materials
- Minimize noise and lighting disturbance

Core Element 5

Reduce, Reuse and Recycle Material and Waste

- Minimize consumption of virgin materials
- Minimize waste generation
- Use recycled products
- Segregate and reuse or recycle materials, products and infrastructure (e.g., soil, construction and demolition debris, buildings)



Core Element 6

Optimize Sustainable Management Practices during Stewardship

- Maximize long-term system performance through periodic evaluation, maintenance and optimization
- Minimize energy use, material consumption and waste generation from sampling and monitoring procedures
- Ensure clear responsibility and implementation processes for monitoring and maintaining all engineered and institutional controls



Attachment 11
Risk Issues at Green Cleanups

Risk Issues at Green Cleanups

Betty Ann Quinn & Deb Goldblum
EPA Region 3 RCRA Corrective Action



SURF 10 – Chicago
June 17, 2009

U.S. Environmental
Protection Agency

EPA's Core Elements

- Minimizes Energy Use & Maximizes Use of Renewable Energy
- Minimizes Air Pollutants and Greenhouse Gas Emissions
- Minimizes Water Use and Impacts to Water Resources
- Optimizes Future Land Uses and Enhance Ecosystems
- Reduces, Reuses and Recycles Material and Waste
- Monitors and Optimizes During Long-Term Stewardship



EPA's Green Cleanup Core Elements: Focus on Environmental Outcomes

- Worker safety is already part of remedy evaluation and implementation
- Inappropriate to compare community/eco risk to worker risk

-
- Worker risk should be evaluated comprehensively



Occupational Safety is Part of Remedy Selection

Short-term Effectiveness

- RCRA (balancing factor)
 - Subpart S (1990)
 - ANPR (1996)
 - Groundwater Handbook (2001)
- CERCLA (balancing criteria and expectations)
 - NCP
 - A Guide to Selecting SF Remedial Actions (1990)
 - A Guide to Principal Threat and Low Level Threat Wastes (1991)
 - Rules of Thumb for SF Remedy Selection (1997)



OSHA - 29CFR1910.120

- NPL sites
- Sites recommended for NPL
- RCRA sites
- State sites
- VCP sites
- Contractors on those sites
- Government employees



Elements of 1910.120

- Safety and health program
- Site characterization and analysis
- Site control
- Training
- Medical surveillance
- Engineering controls, work practices, PPE
- Monitoring
- Handling drums and containers
- Decontamination
- Emergency response



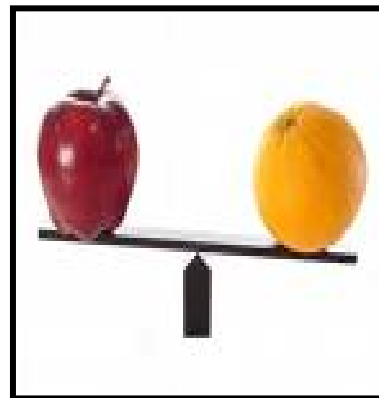
Remedy Selection – Tiered Evaluation

- Threshold - Baseline risk assessment determines need for cleanup
- Balancing - Worker risk associated with remedy options considered in short term effectiveness
- Balancing/Modifying - Community acceptance



Affected Community/Ecologic Risks vs. Worker Risks

- Voluntary vs. involuntary
- Chronic vs. short term exposures
- Risk benefit for workers vs. community
- Uncertainty



Voluntary vs Involuntary

- Voluntary
 - Knowledge
 - Choice
 - Less likely a target of regulation
- Involuntary
 - Ignorance
 - Coercion
 - More likely to be regulated



Modifying Criterion

Community Acceptance----Risk Perception

Unfamiliar, unknown, involuntary, inequitable, dangerous to future generations, irreversible, man-made, &/or catastrophic



Higher Risk

Familiar, controllable, voluntary, equitable, dangerous only to present generation, reversible, natural, &/or diffusely harmful



Lower Risk

Risk is Multidimensional; Size is Only One of the Relevant Dimensions



Industry Quantitative Metric for Worker Safety

Worker Hours
+ Miles Traveled

Worker Risk

Not Comprehensive



"He's wearing a life jacket just in case this brings back a flood of memories."

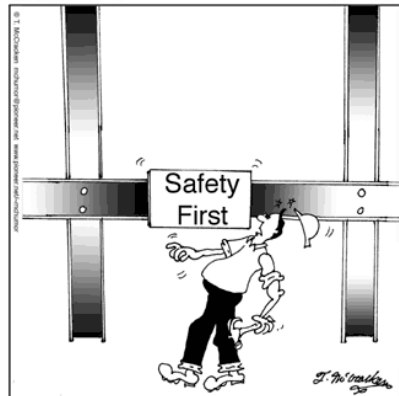


11

Worker Hours Metric Longer Time = Higher Risk

Needs to Consider:

- Type of contaminants
- Type of activities being performed
- Time associated with each activity
- Major vs minor incidents
- Risk "control"



12

Miles Traveled Metric Longer Distance = Higher Risk

Needs to Consider:

- Risks for transportation are baseline risks for driver
 - Associated with occupation of truck driving, not with company
 - Benefits to driver (employment)
- Comparing transportation rates to cancer risk from waste
 - Short term vs. chronic
 - Voluntary vs. involuntary



13

Summary

- Occupational safety already included as part of remedy selection
- Workers covered by OSHA; receive training, risk communication
- Worker risk and community/eco risk are not equivalent
- Community acceptance, fairness, and risk perception also considerations
- Industry metric for worker risks limited



14

Green Cleanups Designed to Support and Enhance Cleanup Thought Process



The Last Slide

Deb Goldblum, RCRA Revitalization Coordinator
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215-814-3432

Betty Ann Quinn, Toxicologist
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Attachment 12
Green/Sustainable Remediation Track at Battelle Conference

*Green/Sustainable Remediation at the
Seventh International Conference on
Remediation of Chlorinated and
Recalcitrant Compounds*

Monterey, California

May 24-27, 2010

BUSINESS SENSITIVE 1

Summary of Potential Sessions

- Session 1: Need for Green
- Session 2: Metrics and Tools for baseline assessments
- Session 3: Incorporating GSR into upfront remedial processes
- Session 4: System optimization for impact mitigation
- Session 5: Use of on-site renewable energy
- Session 6: Programmatic considerations
- Session 7: Sustainability in site reuse/revitalization

BUSINESS SENSITIVE 2

Description of Sessions

• **Session 1: Need for Green**

- Effects remediation has on the ecosystem
 - Groundwater aquifers
 - Watershed impacts
 - Ecological habitats
 - Emissions of GHGs, emissions of criteria pollutants
 - Consumption of resources etc.
- Impacts of emission of GHG and pollutants on the environment.
 - Impacts of climate change and link to GHG emissions
 - Responses now needed to plan for climate change.
 - Linking between criteria pollutants (e.g. NO_x, SO_x and PM) to health issues

BUSINESS SENSITIVE

3

Description of Sessions

• **Session 2: Metrics and Tools for baseline assessments**

- GSR concepts, definitions and terms
- Characterization of metrics: tools and methodologies
- Balancing of metrics
- Case studies

• **Session 3: Incorporating GSR into upfront remedial processes**

- EPA on preliminary recommendations on how to integrate sustainability into CERCLA
- Papers from DoD and private sector on approaches
- Case studies of where GSR has been part of the process

BUSINESS SENSITIVE

4

Description of Sessions

- **Session 4: System optimization for impact mitigation:**

- Impact mitigation and estimated reductions metrics for using these methods and cost implications.
 - Rail instead of road, greener fuels, after-treatment technologies, idle management plans, variable frequency drives, etc.
- Approaches green site assessment
 - Direct push, non-intrusive screening methods, triad to reduce re-mobilization
- Case studies.

Description of Sessions

- **Session 5: Use of on-site renewable energy**

- Analysis of the environmental and economic impacts of using on-site renewable energy
- Practical considerations associated with the actual implementation
- Case studies

- **Session 6: Programmatic considerations**

- Federal agencies and private companies on how they are implementing GSR within their organization
- Contractual methods for promoting GSR
- Regulatory aspects & potential changes in the regulatory environmental that will promote GSR
- Provide an international perspective

Description of Sessions

- **Session 7: Sustainability in site reuse/revitalization**

- Sustainability concepts used in practice at Brownfields sites and other programs designed to clean up properties to with the goal of site reuse/revitalization
- Session should include case studies

Potential Panel Discussions (Only One Panel is Planned)

- **Promoting GSR:** Regulations and other incentives can be discussed along with roadblocks and how those can be overcome
- **GSR State of the Practice:** Sustainable Remediation will be 4-years old by the time of the conference. Should be an interesting discussion on where we are at, what we've learned in getting here and where we still need to go

Timeline of Activities

Date	Responsibility	Activity
6/30/09	GSR Sub-committee/SuRF	Provide session list and list of prospective session chairs with contact information to the Battelle Program Coordinator.
7/1/09	Battelle Program Coordinator (PC)	E-mail (citing tentative title of session) prospective session chairs, providing guidelines for soliciting abstracts.
6/22/09-7/20/09	Prospective session chairs	Contact possible presenters asking for abstracts by Aug 31 at the latest.
7/22/09	Prospective session chairs	Provide list of names and contact info to Battelle program coordinator to ensure that abstracts submitted in response to the request are flagged. New information can be added as new prospective presenters are identified.
7/31/09 - 8/31/09	Prospective Presenters	Submit abstracts (published due date is 7/31 but invited abstracts need to be in no later than 8/31 to be considered for the program (accepted abstracts can be modified at a later date).
8/5/09 – 9/14/09	Program Committee	Complete general review of abstracts (800 to 1000), develop list of sessions and session chairs and assign abstracts to sessions.
9/25/09	Battelle PC	E-mail those invited to chair sessions and confirm their willingness to serve as chairs. Also email prospective session chairs for which no sessions are available for them.
10/5/09	Battelle PC	Send session chairs abstracts tentatively assigned to that session.
10/15/09	Session Chairs	Complete abstract review and inform Program Coordinator of the recommendations of which are selected as platforms, posters, appropriate for alternate session or not appropriate for conference
10/16/09-11/23/09	Battelle PC and Session Chairs	Modify the recommendations due to abstracts that are moved to alternate sessions.
~11/23/09	Battelle PC	Inform prospective presenters of the selection results and provide instructions.

BUSINESS SENSITIVE

9

Attachment 13
SURF Organizational Structure Discussion

Mission Statement

Breakout Group Participants

Dan Watts, New Jersey Institute of Technology (Breakout Group Leader)

Stewart Abrams, Langan Engineering & Environmental Services

Bill Broderick, WRS Compass

Carol Dona, U.S. Army Corps of Engineers Environmental and Munitions Center of Expertise

Paul Favara, CH2M Hill

Lisa Hamilton, GE Corporate Environmental Programs

Tim Havranek, ENTRIX

Ken Kastman, URS Corporation

Erik Petrovskis, Geosyntec Consultants

Dave Schlott, ENVIRON International Corporation

BJ Seagrist, ENTRIX

Alexis Steen, ExxonMobil Environmental Services Company

Annette Stumpf, U.S. Army Corps of Engineers Research Center

Karina Tipton, Brown and Caldwell

Jake Torrens, AMEC Geomatrix

Summary of Discussions

Participants were provided with the current working draft of the mission statement and objectives, as stated below.

The mission of SURF is to promote the use of sustainable practices during the remedial action process (decision making through implementation) in a way that balances the conservation of natural resources and biodiversity, economic viability, and quality-of-life enhancements for surrounding communities while providing long-term protection of human health and the environment and achieving public and regulatory acceptance.

In support of the mission, SURF strives to meet the following objectives:

- Assume a leadership role in the global remediation community by providing scientific and educational information regarding sustainable remediation to professionals in the remediation field.
- Provide forums and other opportunities for the exchange of information among all segments of the remediation community and for networking vital to members' interests.
- Promote the advancement and application of sciences and technology relevant to environmental management.
- Educate and inform as appropriate to foster regulations and practices based on good science.

- Strengthen and build alliances with organizations throughout the world incorporating members of all professions dedicated to the preservation and enhancement of water quality and water resources.
- Promote professional ethics by adhering to the Environmental Principles for Engineers, scientists, and other professionals involved in the remediation field.

The following specific revisions to the mission statement were recommended:

- ☐ Revise first sentence to read, “The mission of SURF is to promote the use of sustainable practices during the life cycle of a remedial action in a way that balances....”
- ☐ Revise fifth bullet to include other media (not just water).
- ☐ Delete the word “professional” from last bullet.
- ☐ Include what is trying to be achieved.
- ☐ Revise objectives to consider societal elements, not exclusively environmental issues.
- ☐ Omit “remediation” language so as not to limit scope.
- ☐ Include words to incorporate concepts of professional development and advancement of the practice of sustainable remediation.
- ☐ Include communications with communities living near site.

A long discussion ensued about whether the definition of “sustainable remediation” was needed within the mission statement. Opinions varied and no consensus was reached. An option was to list the characteristics of sustainable remediation. In addition, some people thought the draft mission statement was too specific and others believed it was not specific enough.

Membership Categories

Breakout Group Participants

Mike Houlihan, Geosyntec Consultants (Breakout Group Leader)

Ralph Baker, TerraTherm

Mohit Bhargava, Battelle Environmental Restoration

Louis Bull, Waste Management

Brandt Butler, URS Corporation

Dave Ellis, DuPont

Jessica Furey, The Whitman Strategy Group

Elie Haddad, Haley & Aldrich

John Kuper, WRS Compass

John Ryan, AECOM Environment

Tiffany Swann, GSI Environmental

Rick Wice, Shaw Environmental & Infrastructure Group

Summary of Discussions

The discussion began very generally, with one participant asking why membership was necessary. The group took this as a sign that a common vision of the organization's structure, mission, and operating method does not yet exist.

The group agreed that the membership structure and fees will depend on the benefits and privileges of membership and that those benefits and privileges are not currently well defined. The group agreed, however, that everyone involved in sustainable remediation will benefit from the existence of an organization. Some members will benefit more than others, and the group agreed that this fact needs to be factored into the selection of membership categories and fees. The group recommended that the benefits be defined as specifically as possible so that members can understand the basis of the categories and related fees. Specifically, membership criteria should include the following:

- ☐ Some form of commitment to supporting the mission
- ☐ Financial support
- ☐ Commitment to participate in the activities of the organization

The group agreed that a key goal is to avoid, to the degree possible, membership requirements that are barriers to groups currently contributing to SURF, especially government members. It is particularly important to understand the restrictions on the types of organizations for government employees and determine whether individual memberships would be significantly different than group (i.e., agency) memberships.

The group agreed that a wide range of membership categories should be available. The range should be broad enough to encourage specific targeted segments of the profession (e.g., students and young professionals), but not so broad as to have categories that are not needed or are not tied to specific benefits or responsibilities.

The group proposed the following categories of membership and rough order-of-magnitude fee as an initial starting point, noting that the categories should be reevaluated periodically:

1. Companies (e.g., industry, consulting, manufacturing)
 - a. Small (\$1,000)
 - b. Medium (\$5,000)
 - c. Large (\$10,000)
2. Individuals (\$100)
3. Academia
 - a. Professors/Employees (\$100)
 - b. Students (\$25)
4. Government Agencies
 - a. Regulator (e.g., USEPA, state agencies) (\$1,000)
 - b. Nonregulator (e.g., USACE, Department of Defense) (\$1,000)
5. Nongovernmental Nonprofit Organization (\$1,000)

The fees listed above were estimated based on an assumption of the organization holding two large meetings per year and two smaller working meetings per year. Resources to support these meetings were assumed to cost \$100,000 per year.

Strong Links with Other Groups

Breakout Group Participants

Carol Baker, Chevron Energy Technology Company (Breakout Group Leader)

Neno Duplancic, Locus Technologies

Wei-Lin Feng, ARCADIS

Angela Fisher, GE Global Research

Ben Foster, LFR

Karin Holland, Haley & Aldrich

John Markey, ERM

Mike Miller, CDM

Leah Pabst, Conestoga-Rovers & Associates

Dave Woodward, AECOM Environment

Summary of Discussions

The group discussed that the role of a professional society is to be aware of all efforts within the field of sustainable remediation to influence the direction of the field. If the activities of others in the field are not known, then no influence can be achieved. As such, the group agreed that SURF members should belong to other organizations such as (1) SURF organizations in other countries, (2) external groups (e.g., ASTM, Green Building Council, National Brownfields Association), and (3) state green/sustainable remediation groups. The goal would be to ensure that SURF would be aware of the activities of the groups and identify common goals. The group recommended that SURF serve as the liaison between the groups to achieve the common goals and avoid potential overlaps. As a starting point, the group recommended the following:

- ☐ Develop a list of organizations.
- ☐ Assign at least one SURF member to participant in each organization to ensure dialogue.
- ☐ Identify at least one SURF member to track state green/sustainable remediation activities.

The group also agreed that, although SURF is focused on the United States currently, the ultimate goal should be an international umbrella organization for SURF organizations in other countries. The group recommended that research be conducted to determine the scope of international expansion and noted that the process will likely be complicated, but worthwhile. The group proposed ISURF as an international forum with chapters in different countries. In this way, each chapter could maintain its independence while agreeing to high level principles.

Although the group agreed that SURF need to share its knowledge to external groups and organizations, it recognized that SURF needs a better way of communicating internally first before it can bring other organizations into the conversation. The group discussed the web site as one solution to this problem. Upgrades to the web site will be crucial to internal communication and, ultimately, external communication and outreach.