Sustainable Remediation Forum (SURF)
SURF 23: July 23 – 25, 2013
Chicago, Illinois

SURF 23 was held at the University of Illinois at Chicago on July 23 – 25, 2013 and focused on "Societal Perspectives in Sustainable Remediation." SURF members that participated in the three-day meeting are listed in Attachment 1. Participant contact information is available to members on the SURF website. After logging into the website, select "member resources" then "membership directory."

The meeting marked the 23rd time that various stakeholders in remediation—industry, government agencies, environmental groups, consultants, and academia—came together to discuss the use of sustainability concepts throughout the remediation life cycle. Meeting minutes are posted on the SURF website.

Day 1

The meeting began with Mike Rominger (meeting facilitator) discussing meeting logistics, ground rules, nonconfidentiality assumptions, export control laws, and antitrust issues. In addition, he thanked current SURF sponsors for supporting the organization. (Members interested in sponsorship opportunities should contact the SURF Treasurer at treasurer@sustainableremediation.org.)

Welcoming Remarks

Krishna Reddy (University of Illinois at Chicago) welcomed participants to Chicago and the university. He presented an overview of UIC, which operates under the motto "teach, research, serve, and care." Krishna also reviewed the following current research projects related to sustainable remediation:

- Phytoremediation of soils with mixed contaminants
- Optimization of a bioreactor landfill design and operations based on coupled process modeling
- Sustainable biocover to mitigate methane emissions at landfills
- In-ground permeable reactive filter to remediate urban stormwater runoff
- Application of biochar for nutrient adsorption from wastewater and use as fertilizer

Krishna ended his remarks by presenting a trend graph showing the increasing amount of publications associated with sustainable remediation. He acknowledged the complexity and importance of addressing the social aspects of the triple bottom line and told participants he was looking forward to interesting presentations addressing this theme. Presentation slides are provided in Attachment 2.

Introduction to SURF

Nick Garson (Boeing) presented SURF's mission, value proposition, and an updated definition of sustainable remediation. Based on SURF member input, the updated definition is as follows:

"Sustainable remediation protects human health and the environment while maximizing the environmental, social, and economic benefits throughout the project life cycle."

Nick also reviewed the triple bottom line of sustainability and said that the purpose of the meeting was to explore how to define the societal impacts of sustainable remediation and determine how these impacts intersect with environmental and economic considerations. For meeting participants new to SURF, he provided an overview of SURF's organization, technical initiatives, and student chapters. Presentation slides are provided in Attachment 3.

Community Involvement Panel Discussion

This panel discussion focused on how EPA employees are working with a specific organization in a predominantly Latino community of Chicago to engage in meaningful dialogue and collaboration. Jerry Mead-Lucero [Pilsen Environmental Rights and Reform Organization (PERRO)] described the challenges of obtaining and sustaining the engagement of public officials and government employees; Heriberto León and Rosita Clarke-Moreno [Environmental Protection Agency (EPA) Region 5] described the EPA's outreach activities, listening sessions, response actions, and information/communication strategies.

Participants' questions focused on community engagement, feedback, and communication, as summarized below.

- Community Engagement
  One participant asked about the amount or percentage of engaged community members. Jerry said that, unfortunately, the amount of actively engaged community members is a very small percentage of the overall community. If 100 people attend an event, it is considered a great success. He believes that efforts over the last decade to raise awareness (e.g., developing a relationship with Spanish language media) have proven successful in increasing community engagement. Jerry estimated that about 50% of the overall community is aware of the site activities and plans. Door-to-door outreach would increase active engagement, but resources are limited.

- Community Feedback
  One participant asked the panelists about Pilsen residents' vision for redevelopment. Jerry said that residents primarily want green space and access to the river, followed fairly closely by minimum wage jobs. The broader vision is being developed, and Rosita

said that the appropriate cleanup standards will be incorporated during the assessment and remediation phases of the project.

- Communication with the Community
  One participant asked about how often residents use the website. Heriberto said that creation of a website is routine, but a portal was created for this project so that individuals could access the various sites and projects. Information is provided in English and Spanish. Jerry said that the website has been a great resource for PERRO members; website use tends to be divided along generational lines (i.e., the older generation does not use it but the younger generation does).

  Rosita emphasized the importance of timing when communicating with community members. For example, door-to-door outreach efforts are conducted in the evening. In addition to its work with PERRO, the EPA is contacting other community organizations to attempt to increase community outreach and awareness.

Remediation Projects in Densely Populated Urban Communities: Loewenthal Site

Jerry Mead-Lucero (PERRO) provided background about a former lead smelting site in the Pilsen community of Chicago and described how PERRO, a local environmental justice organization, mobilized community residents and pushed the EPA to conduct tests and commit to remediation of the site. Remediation is scheduled to begin in the next few weeks, but is complicated by several factors. Because the site is privately owned by an individual whose whereabouts are unknown and who does not respond to any communications, every step in the process requires a court order. Given the location of the site, ensuring the safety of community residents requires extra care and a community safety plan for the remediation work. PERRO and the local Alderman have expressed interest in the City obtaining the site and turning it into a public park, which requires that the remediation meet the standards required of intensive public use in the future. Jerry presented the challenges of remediating sites in close proximity to homes, schools, and public spaces and discussed community residents' concerns with the remediation. Presentation slides are provided in Attachment 4.

Discussions focused on the challenges associated with phytoremediation, such as plant disposal and fugitive dust concerns when plants are pulled. One participant noted that typical phytoremediation applications involve a second sowing, which extends the process for several growing seasons. He recommended using phytoremediation when residual contamination is present after the remedy is implemented or for longer term projects.

The Surplus Roundtable: Bounding Environmental Liability - Maximizing Asset Value

Robert Colangelo (Surplus Property Roundtable) provided an overview of his organization and asked for participants' feedback about how SURF and the Surplus Property Roundtable can

work together. Alcoa Inc., BASF, Ford, and ExxonMobil are founding members of the Surplus Property Roundtable, which is a forum where information and experiences related to managing surplus properties can be exchanged and discussed. (In this use, "surplus property" is defined as nonstrategic.) The member-based organization is run by a volunteer Board of Directors. Robert asked participants to think about the commonalities between SURF and his organization and brainstorm potential ways to work together. Presentation slides are provided in Attachment 5.

Participants asked questions aimed at clarifying the organization's current activities and focus. One participant mentioned that he was going to present SURF's framework document to the roundtable.

Triple Bottom Line in Cook County's Environmental Programs

Deborah Stone (Cook County Department of Environmental Control) described how her organization is refocusing to promote social and economic as well as environmental health. To this end, Cook County is linking departments such as environment; transportation; planning and community development; and local, county and regional governments by targeting resources (including proposed brownfield planning and assessment) to transit- and cargo-oriented development sites. Strong participation by nonprofit organizations as well as local communities in planning and policy-setting strengthens these efforts. For example, Cook County is the first government in the Midwest to require reuse as well as recycling of building demolition/ renovation waste. In this program, deconstruction jobs are an important potential new career path for residents in the neighborhoods where most of the vacancies exist.

Deborah also highlighted the common challenges associated with sustainability. Some of the challenges, such as perception, the need for case studies, and the need for standardized measures, have been discussed at previous SURF meetings. Presentation slides are provided in Attachment 6.

Participants' questions focused on diverting food from landfill disposal and the possibility of legislation to regulate energy efficiency standards.

- Diverting Food from Landfill Disposal
  Deborah said that food is being separated and composted at some facilities (e.g., jails) with help from the local agricultural society. In addition, the Department participates in a food scrap consortium, which is aimed at evaluating the feasibility of establishing separate pickups for items slated for composting.

- Potential Energy Efficiency Standards
  Rather than legislation, Deborah believes that her Department's job is to develop tools

and provide the technical resources available to help economically depressed communities.

Sustainable Development as Common Sense

Jim Van der Kloot (EPA Region 5) described ongoing sustainable development efforts through the Partnership for Sustainable Communities within EPA Region 5. The Partnership was created in 2009 when the U.S. Department of Housing and Urban Development, U.S. Department of Transportation, and EPA joined together to help communities nationwide improve access to affordable housing, increase transportation options, and lower transportation costs while protecting the environment. Jim highlighted three case studies (see below) that are being implemented through the Partnership. Presentation slides are provided in Attachment 7.

- Indianapolis Smart Growth District
  This neighborhood has experienced a 70% loss of its population and, therefore, a variety of quality of life issues. Jim believes that the creation of a vision is an important initial step in the process, adding "money follows vision." After the vision was created, short-term projects were identified for targeted investment as a way to leverage funds. The primary challenge of the project was the amount of unrelated projects, including legacy contamination, brownfield sites, and vacant properties. An Advisory Committee composed of different stakeholder groups was established to develop a project structure that encouraged funding and documented ideas. The focus of the revitalization strategy was selected by this committee and developed based on committee members' needs. Two years later, over $1.5 million has been raised for implementation efforts. Jim believes that using the EPA as a convenor of influence and creating a vision are two of the keys to this project's success.

- Lick Run Watershed
  In the Lick Run Watershed in Cincinnati, Ohio, the EPA has used combined sewer overflow (CSO) enforcement as an opportunity to implement a sustainable infrastructure program. The project integrates green infrastructure (e.g., stream restoration, wetlands, bioswales, rain gardens) with gray (e.g., new storm sewers) to provide cost-effective solutions with community benefits. In May 2013, the EPA approved a solution proposed by the Metropolitan Sewer District of Greater Cincinnati that will eliminate 1.78 billion gallons of CSOs annually into the Mill Creek. The remedy seeks this reduction primarily by focusing on reducing the amount of stormwater entering combined sewers during heavy rains.

- Gary, Indiana
  The EPA has completed the due diligence phase of a program planned for Gary, Indiana.

With the upcoming kickoff a week away, the following project objectives have been developed: (1) improve the quality of life for residents, (2) achieve specific redevelopment goals in four Gary neighborhoods, (3) identify and help secure funding for those projects through a variety of sources, and (4) facilitate partnerships that will continue long-term revitalization efforts once EPA assistance is complete.

Discussions focused on climate adaptation planning. Jim said that green infrastructure is viewed as a necessary part of climate adaptation; the more water that can be infiltrated into the ground before reaching the combined sewer system, the better.

Estimating Societal Impacts Using Environmental Footprint Evaluation Tools

Melissa Harclerode (CDM Smith) presented two case studies calculating the societal cost using environmental footprint sustainability metrics. The first case study used results from an environmental footprint evaluation to assess the impact of in situ thermal remediation as an interim response option at an urban brownfield site. The second case study used results from an environmental footprint evaluation to assess the differences among environmental impacts between a phased focused investigation approach and a conventional approach during site characterization. Both evaluations were conducted using the Naval Facilities Engineering Command (NAVFAC) SiteWise program. Presentation slides are provided in Attachment 8.

In response to participants' questions, Melissa said that the societal impacts estimated in these case studies addresses only regional impacts (vs. local). She emphasized that these estimations are only one piece of the larger picture; community involvement and interaction is important. In response to other questions, Melissa said she will perform a sensitivity analysis to identify appropriate social costs and provide documentation for the selection of specific costs.

Day 2

The presentation slides for Day 2 are provided in Attachments 9 through 18.

Leveraging the Synergy of ITRC, API Energy, and SURF

Buddy Bealer (Shell) provided an update of the work of the Sustainable Remediation Initiative (SRI) Work Group. SURF members in this group are creating synergy with the Interstate Technology Regulatory Council (ITRC) and API Energy to coordinate and combine sustainable remediation communication and outreach efforts. The group's overarching goal is to establish common concepts, definitions, and a language for sustainable remediation. The concept of this new government outreach initiative is modeled on the Risk-Based Corrective Action effort. The accomplishments, objectives, and next steps associated with this initiative are provided in Attachment 9. Additional information about SRI is provided on page 11 and in Attachment 18.

Standard Guide for Integrating Sustainable Objectives into Cleanup

Helen Waldorf (Massachusetts Department of Environmental Protection, retired) provided an overview of ASTM E2876 – 13, *Standard Guide for Integrating Sustainable Objectives into Cleanup*. The guide provides a scalable framework that helps users identify and incorporate sustainable best management practices (BMPs) into site cleanup (including site assessment and remediation) and enables users to measure BMPs during the cleanup process. Helen reviewed the key concepts of the guide, including the relationship between the sustainable aspects, core elements, and BMPs as well as the BMP selection and implementation process. The appendices to the guide provide additional examples, resources, and documentation. Presentation slides are provided in Attachment 10.

ASTM's Greener Cleanup Standard Guide

Deb Goldblum (EPA Region 3) provided an overview of ASTM E2893 – 13e1, *Standard Guide for Greener Cleanups*, which is expected to be released late this summer. The guide provides a step-by-step process for implementing, verifying, and recognizing greener cleanups across regulatory and voluntary cleanup programs. Unique aspects of the standard include a comprehensive list of greener cleanup BMPs, definition of elements that "set a bar" for achieving a greener cleanup, and a robust verification structure. The ASTM greener cleanup standard was developed by representatives from industry, consulting, and state and EPA cleanup programs. The task group designed the standard for a variety of uses such as contracting, incorporating into program policy, or referencing in legal documents. Presentation slides are provided in Attachment 11.

State Perspective on the ASTM Greener Cleanup Standard Guide

Heather Nifong (Illinois EPA) provided a state perspective of the voluntary *Greener Cleanup Standard Guide*. Although a few states (e.g., New York, Wisconsin) have created their own protocols for green cleanups, the process is resource intensive. She believes that the *Greener Cleanup Standard Guide* will simplify and accelerate greener cleanups. Using the guide, states will be able to apply the standard at select sites (e.g., operation and maintenance sites) for early gains and cost savings. Heather discussed the alternatives to this guide (i.e., a policy statement or regulatory amendment) and the disadvantages of each. She ended her presentation by providing her thoughts about why the standard is voluntary. Presentation slides are provided in Attachment 12.

Pilot Use of ASTM Greener Cleanup Standard Guide at an Industry Site

Stephanie Fiorenza (BP) presented an application of the *Greener Cleanup Standard Guide* at an existing retail station. At this site, a remedy had been selected and the project was in the remedy design phase, which was ideal for screening BMPs using the guide. The opportunity

assessment involved reviewing 160 BMPs and selecting all BMPs that could be used at the site. Although this step was time consuming and involved a three-hour conference call, Stephanie said that the process would likely improve with experience and the use of a searchable Microsoft Excel file. Several BMPs were eliminated through the BMP prioritization and selection steps (i.e., 59 BMPs reduced to 16 BMPs). The BMP implementation is currently underway. Stephanie ended her presentation by providing her thoughts on her experience with the guide to date. She believes the guide is useful, particularly for simple sites, because it allows the user to eliminate BMPs and document the rationale for nonuse. Presentation slides are provided in Attachment 13.

Regulatory Perspective Panel Discussion

Buddy Bealer (Shell) served as the moderator for a panel discussion on regulatory perspectives. Panelists Jennifer Borski (Wisconsin Department of Natural Resources), Brad Bradley (EPA Region 5), Deb Goldblum (EPA Region 3), and Heather Nifong (Illinois EPA) discussed the four questions listed below. Presentation slides are provided in Attachment 14.

1. How do your agency co-workers view green and/or sustainable remediation (i.e., is there a difference between the terms)?

   - Heather said that some of her co-workers have been integrating green remediation for a while (i.e., before there was a label for it), while others have been struggling with the learning curve associated with green remediation efforts. She believes that her co-workers do not make a distinction between the terms "green" and "sustainable," stating that all cleanups are sustainable.

   - Deb does not believe people make a distinction between the terms, but acknowledged that everyone brings his/her own experience when interpreting the terms "green" and "sustainable."

   - Jennifer said that confusion between the terms "green" and "sustainable" exists in her organization, which promotes the applicability of green and sustainable remediation at sites throughout the project life cycle.

2. How do you personally view green and/or sustainable remediation?

   - Brad views green remediation and sustainable remediation as complementary, but different.

   - Heather said she personally sees a distinction between the terms "green" and "sustainable," but she promotes greener cleanups because it fits under her agency's purview.

- Deb agreed with Heather's previous comment that cleanups are inherently sustainable. In her opinion, sustainable remediation needs to be renamed to reflect the goal. To her, sustainability is a broad, holistic concept that is not reflected in some remediation activities because of the shorter timeframes. She suggested developing indicators to support the goal and integrating primary and secondary impacts.

- Jennifer believes that sustainability is the "bigger picture" perspective.

3. How do you and/or your agency co-workers believe that social perspectives can be best incorporated into green and sustainable remediation?

    - Brad said he is looking forward to implementing the ASTM's guide for sustainable remediation.

    - Heather said that larger policy discussions need to occur about addressing social perspectives. She commented that social impacts do not lend themselves to BMPs.

    - Deb found this question difficult to answer because she is uncertain of the definition of "societal perspective." She believes that the protection of human health is the social component of the triple bottom line.

    - In Wisconsin, Jennifer said that part of the scoring process involves social considerations. To date, these considerations have been specific to keeping the community informed and communicating health risks. She believes that the ASTM guide will help provide additional opportunities to address greener cleanups in general and social considerations specifically.

4. What do you see as the future of green or sustainable within your organization?

    - Panelists discussed the challenges associated with a decrease in resources, furloughs, and sequestration.

Student Chapter Updates

Members from four SURF student chapters provided brief updates on the activities and needs of their chapter (see below). Presentation slides are provided in Attachment 15.

- University of Illinois at Chicago
  Erin Yargicoglu and Yamini Sadasivam highlighted their chapter's recent efforts, including a sustainability workshop. They emphasized the importance of establishing connections with local SURF members and obtaining the support of all SURF members through presentations at chapter meetings and/or field trips to remediation sites.

- Clarkson University
  Emily Gonthier and Joshua Knapp said that their chapter has hosted two guest speakers at chapter meetings and welcomes more. They stressed the need for mentors and suggested that SURF could provide professional development events for students to explore remediation career options.

- Colorado State University
  Melissa Tracy reviewed some of her chapter's activities in the past year, including a field trip to the City of Fort Collins stormwater treatment system. Similar to other SURF student chapters, guest speakers are needed for chapter meetings and local connections for field trips and site visits.

- Stanford University
  Ching-Hong Hsieh stated the objective of the Stanford chapter, which is to "develop knowledge of sustainable environmental remediation and provide professional mentorship to benefit Stanford students interested in environmental remediation by providing a focused group for discussions, collaborative projects, and networking opportunities." He emphasized the need for more speakers for a seminar series or roundtable and for feedback on the chapter's life-cycle assessment projects.

After the presentation, participants provided additional ideas about how students could promote SURF and obtain guest speakers despite travel restrictions. One participant suggested that students contact the local chapters of specific organizations (e.g., Society of Women Engineers, American Chemical Society) and offer to make a presentation to them about SURF. Another participant suggested using remote webmeeting tools to allow SURF members to present topics at chapter meetings remotely.

Technical Initiatives and Committee Working Sessions

Working sessions were held by the following groups to obtain participant input:

- *Academic Outreach Initiative* – In this working session, participants brainstormed about possible sites and the key elements of a problem statement associated with a SURF student chapter design competition. Presentation slides and notes from the brainstorming are provided in Attachment 16.

- *Membership Committee* – In this working session participants brainstormed about how to increase membership. Presentation slides and notes from the brainstorming are provided in Attachment 17.

- *Financial Committee* – During this session, Grant Geckeler (SURF Treasurer) reviewed SURF's financial information, including expenses. He highlighted the committee's

accomplishments, including transitioning information to QuickBooks for more streamlined reporting. Grant asked for volunteers for two efforts: evaluating strategies for fund management and exploring different options for generating a return.

Sustainable Remediation Initiative

Buddy Bealer (Shell) provided additional detail about the Sustainable Remediation Initiative mentioned on Day 2. The initiative has the following two goals: (1) promote sustainable remediation to key stakeholders in the U.S., and (2) develop synergy from organizations who promote sustainable remediation. Buddy reviewed the group's strategy, which involves establishing a common language (i.e., definitions) and common concepts for sustainable remediation and developing a system to perform outreach (vs. the current ad-hoc method). He highlighted the group's plan, which consists of two major efforts: developing standardized deliverables and implementation plans. Buddy ended his presentation by reviewing the group's progress to date and its planned activities. Presentation slides are provided in Attachment 18.

Day 3

The presentation slides for Day 3 are provided in Attachments 19 and 20.

Quantifying the Social Aspects of Sustainable Remediation: Classroom Examples

Krishna Reddy (UIC) provided an overview of classroom examples in which students evaluated potential engineering solutions for sustainability, including social sustainability, for several projects. The work was conducted as part of a UIC graduate level course on sustainable engineering. The students identified several key social issues and quantified them to assess social sustainability of their engineering solutions. Krishna emphasized that social sustainability quantification is not a goal in and of itself – rather, it is a process where a comparison and assessment can be made to allow for informed decisions about project design, implementation, and mitigation as necessary. Results from the evaluation were shown as part of a Social Sustainability Evaluation Matrix, which focuses on the social aspects of the triple bottom line. Presentation slides are provided in Attachment 19.

Discussions focused on the potential bias of the evaluation, material substitution opportunities, and the inclusion of weighting in the process.

- Potential Bias
  One participant noted the bias involved in completing the questionnaire and suggested that a social scientist be involved to develop questions so that different biases (e.g., gender) can be addressed. Another participant agreed and furthered the idea by recommending the involvement of a nonparametric statistician.

- Material Substitution
  One participant suggested including material substitution opportunities, such as replacing Portland cement with Pozzolan material.

- Weighting
  One participant discussed the fact that each community will have its own priorities and focus and asked if a weighting process could be included to incorporate community-specific priorities. Krishna said that a weighting process could be included in the existing process, but emphasized the complexities associated with weighting. He believes weighting could be added as a long-term goal.

Measuring Social, Community, and Public Health Aspects of Milwaukee's Menomonee Valley Brownfields Redevelopment

Susan Kaplan (UIC School of Public Health) described the increasing interest in and challenges of measuring the social, community, and public health impacts of brownfield cleanups in the context of the Menomonee Valley redevelopment and Menomonee Valley Benchmarking Initiative. The Menomonee Valley in Milwaukee is a 1,200-acre brownfields area that has been redeveloped to maintain its primarily industrial nature. The project is unique because it involves a partnership with a university, a community health center, and others to identify and measure dozens of economic; environmental; and community, social, and health indicators of redevelopment impacts over many years. The community indicators being measured range from crime rate and ozone action days to public art installations and community recreation opportunities. Susan reviewed the findings and the lessons learned from the benchmarking initiative experience (see Attachment 20 for details). She also briefly described additional efforts aimed at measuring the social, community, and public health impacts of brownfield cleanups:

- Agency for Toxic Substances and Disease Registry (ATSDR) Brownfields/Land Reuse Action Model, which creates a framework for incorporating sustainable public health endpoints in redevelopment plans

- Social Impact Assessment Model by Sharon Merriman-Nai and Dionna Sargent (University of Delaware), which includes indicators for demographics, civic engagement, neighborhood economy, health and safety, and cultural/aesthetics

- Sustainable Brownfields Redevelopment Tool by Christopher Wedding and Douglas Crawford-Brown (University of North Carolina at Chapel Hill), which defines 40 indicators in four categories (i.e., environmental health, finance, livability, and social-economic)

Susan concludes that the increased interest in measuring social and associated impacts of brownfield redevelopment is a result of the broader conception of sustainability and the public benefits that redevelopment projects can provide. With this increased interest comes concern about how to define sustainability and its metrics, as well as private sector concerns about increased reporting requirements and uncertainty about how information will be used. All of these concerns highlight the need for standardization. Susan believes that the Menomonee Valley Benchmarking Initiative and other efforts offer remediation practitioners good models to assess the social aspects of the triple bottom line. Presentation slides are provided in Attachment 20.

Discussions focused on the beneficial reuse aspects of the project. About $25 million was saved through value engineering, material reuse, and avoidance of disposal. In addition, about 1,500 jobs were created. Landscape restoration was guided by a single principle – to restore complex, mutually beneficial species and the greatest diversity of native species.

Attachment 1
SURF 23 Participant Contact Information

Pending

Attachment 2
Welcoming Remarks

UIC The University of Illinois at Chicago

SURF SUSTAINABLE REMEDIATION FORUM

Welcome to SURF23

Krishna R. Reddy, PhD, PE, FASCE
Professor of Civil & Environmental Engineering
University of Illinois at Chicago
(e-mail: kreddy@uic.edu)

University of Illinois at Chicago (UIC)

UIC

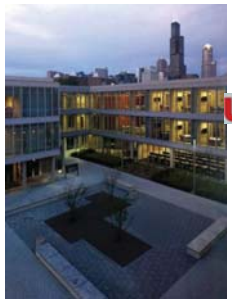
University of Illinois at Chicago (UIC)

- Motto: *Teach, research, serve and care*
- Public research university located in the heart of Chicago
- Established in 1982
- Largest university in the Chicago area
  - 28,000 students enrolled in 15 different colleges
- UIC's student body
  - 61% undergraduate and 39% graduate and professional
  - one of the nation's most diverse
- Offers:
  - 74 bachelor degrees, 77 master degrees, and 60 doctoral degrees in various programs

UIC Colleges

UIC COLLEGE OF APPLIED HEALTH SCIENCES

UIC School of Architecture
COLLEGE OF ARCHITECTURE & THE ARTS



UICBUSINESS

UIC COLLEGE OF DENTISTRY
UNIVERSITY OF ILLINOIS AT CHICAGO

UIC COLLEGE OF EDUCATION
UNIVERSITY OF ILLINOIS AT CHICAGO

UIC COLLEGE OF ENGINEERING
UNIVERSITY OF ILLINOIS AT CHICAGO

UIC COLLEGE OF LIBERAL ARTS & SCIENCES

UIC COLLEGE OF PHARMACY
UNIVERSITY OF ILLINOIS AT CHICAGO

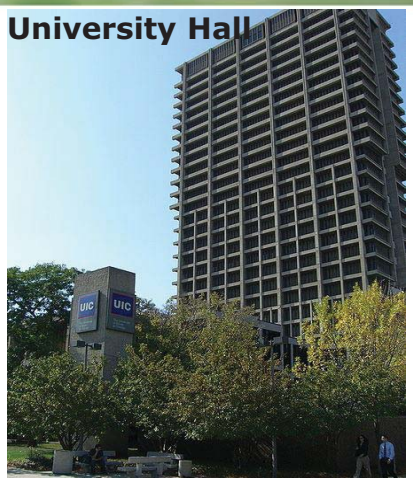
UIC SCHOOL OF PUBLIC HEALTH
UNIVERSITY OF ILLINOIS AT CHICAGO

UIC JANE ADDAMS COLLEGE OF SOCIAL WORK

UIC COLLEGE OF URBAN PLANNING & PUBLIC AFFAIRS
UNIVERSITY OF ILLINOIS AT CHICAGO

UIC Landmarks

University Hall



Office of Sustainability (Grant Hall)

UIC Pavilion

UIC Forum

Department of Civil & Materials Engineering

- Offers:
  - BS, MS and PhD in Civil Engineering
  - MS and PhD in Materials Engineering
- Major research areas in Civil Engineering include:
  - Environmental and Water Resources Engineering
  - Geotechnical and Geoenvironmental Engineering
  - Structural Engineering
  - Transportation Engineering
- Major research areas in Materials Engineering are:
  - Materials Processing and Characterizations
  - Mechanics of Solids
  - Materials Engineering
- Consists of 15 full-time faculty and 6 staff members

Geotechnical & Geoenvironmental Engineering Laboratory (GAGEL)

UIC

- Serves both research and teaching functions
- Equipped to perform geotechnical/environmental research

Gas Chromatography (GC)

Atomic Absorption spectrophotometer

Consolidation Testing

Triaxial Testing Apparatus

Direct Shear Device

Research Areas

UIC

- Coupled geoenvironmental processes (mechanical, flow, biochemical and thermal) and modeling
- Environmental remediation of soils, sediments, stormwater and groundwater
- Waste management & treatment/Landfill engineering
- Sustainable engineering with special focus on life-cycle based sustainable civil and environmental materials and systems
- Geotechnical engineering: Foundations, Earth structures, Geomechanics, Geotechnical earthquake engineering

Current Research Projects

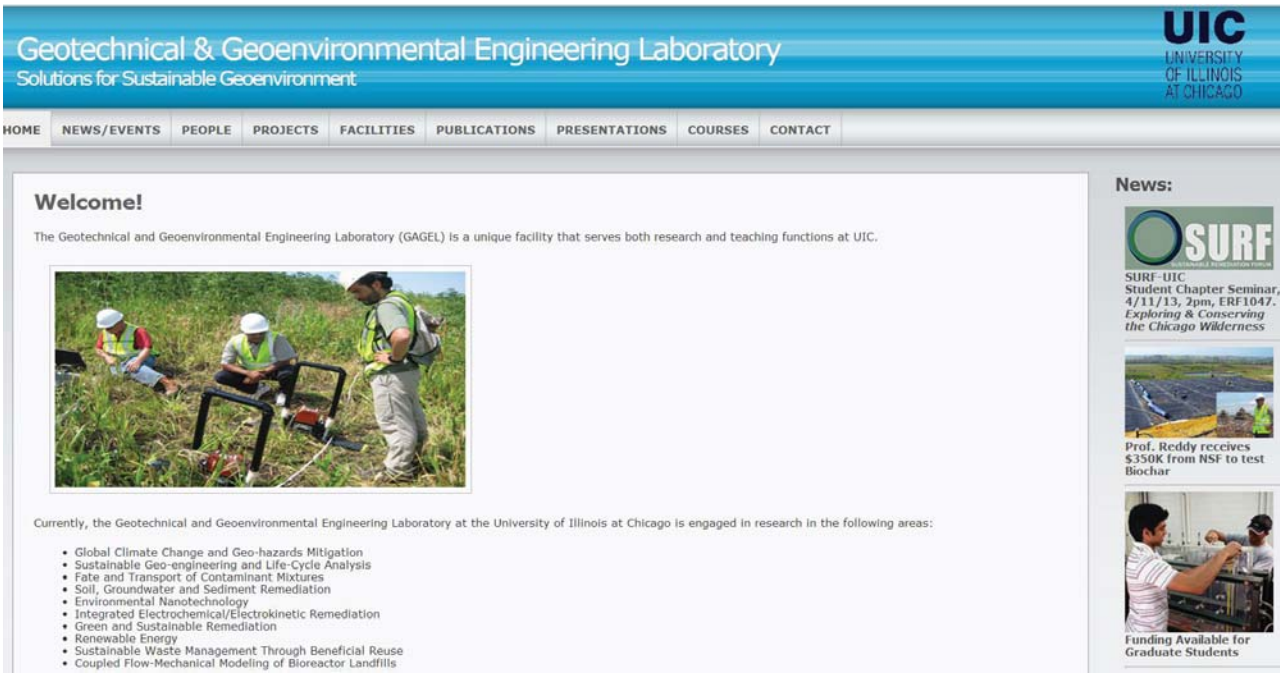
UIC

1. Phytoremediation of Soils with Mixed Contaminants
   Reshma A. Chirakkara and Erin Yargicoglu
2. Optimization of Bioreactor Landfill Design and Operations Based on Coupled Process Modeling
   Rajiv K. Giri
3. Sustainable Biocover to Mitigate Methane Emissions at Landfills
   Yamini Sadasivam and Erin Yargicoglu
4. In-ground Permeable Reactive Filter to Remediate Urban Stormwater Runoff
   Sara Dastghuobi and Tao Xie
5. Application of Biochar for Nutrients Adsorption from Wastewater and Use as Fertilizer
   Tao Xie

Current Research Team

UIC

Lab Website



www.uic.edu/labs/geotech/

SURF Student Chapter at UIC

Team Members:

- BalaYamini Sadasivam
- Erin Yargicoglu
- Reshma A. Chirakkara
- Rajiv Giri
- Kamel Babaeivelni
- Nasir Ahmad

Recent Activities:

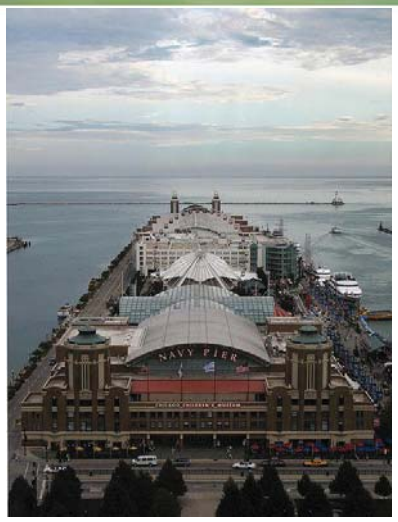
- Established UIC-SURF chapter
- Sustainability workshop
- Sustainability seminars

December, 2012

Chicago Attractions

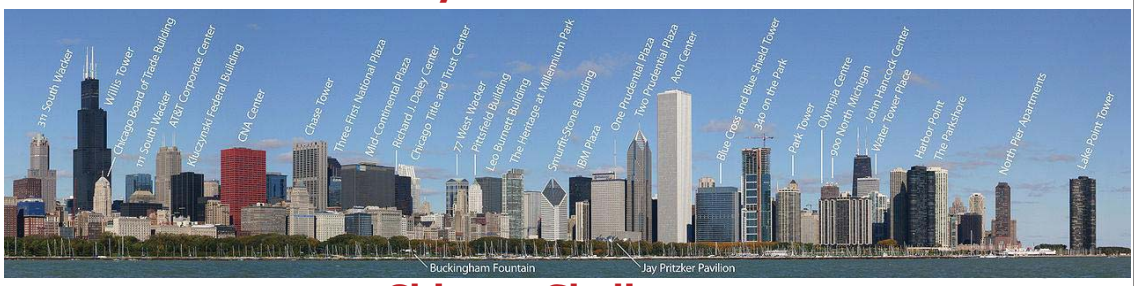
UIC

Willis Tower



Navy Pier

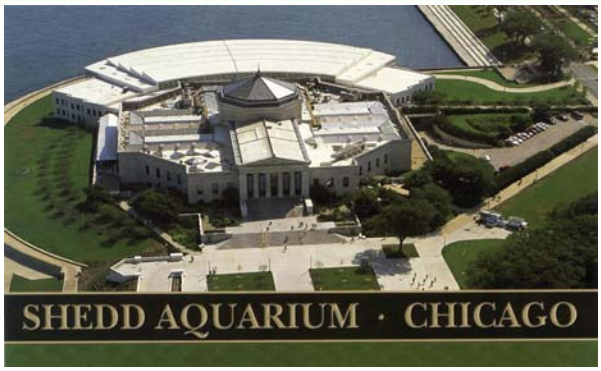
John Hancock Tower



Chicago Skyline

Chicago Attractions

UIC



Millennium Park

Buckingham Fountain

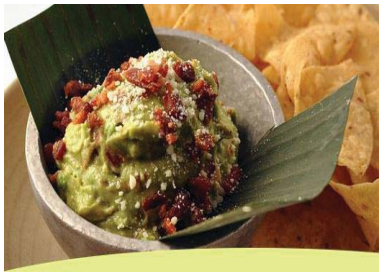
Chicago Attractions

Chicago Restaurants

Gibsons Bar & Steakhouse

Alinea Restaurant

The Berghoff



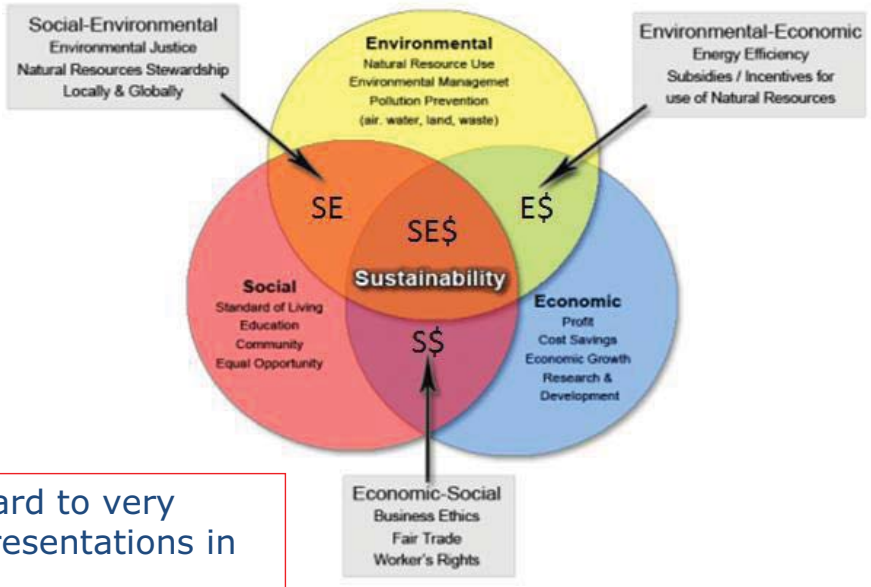
Frontera Grill (Mexican)

India House

Giordanos

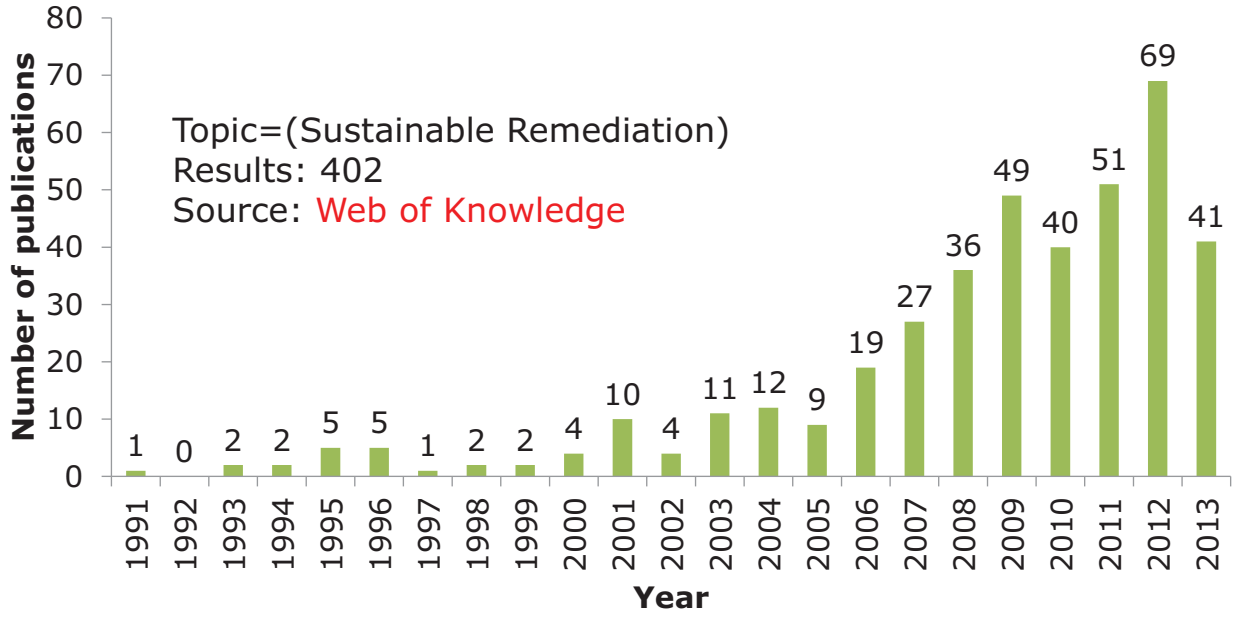
SURF23 Theme: Social Perspectives

Complex and difficult, but very critical component of sustainable remediation (triple bottom line or three pillars)

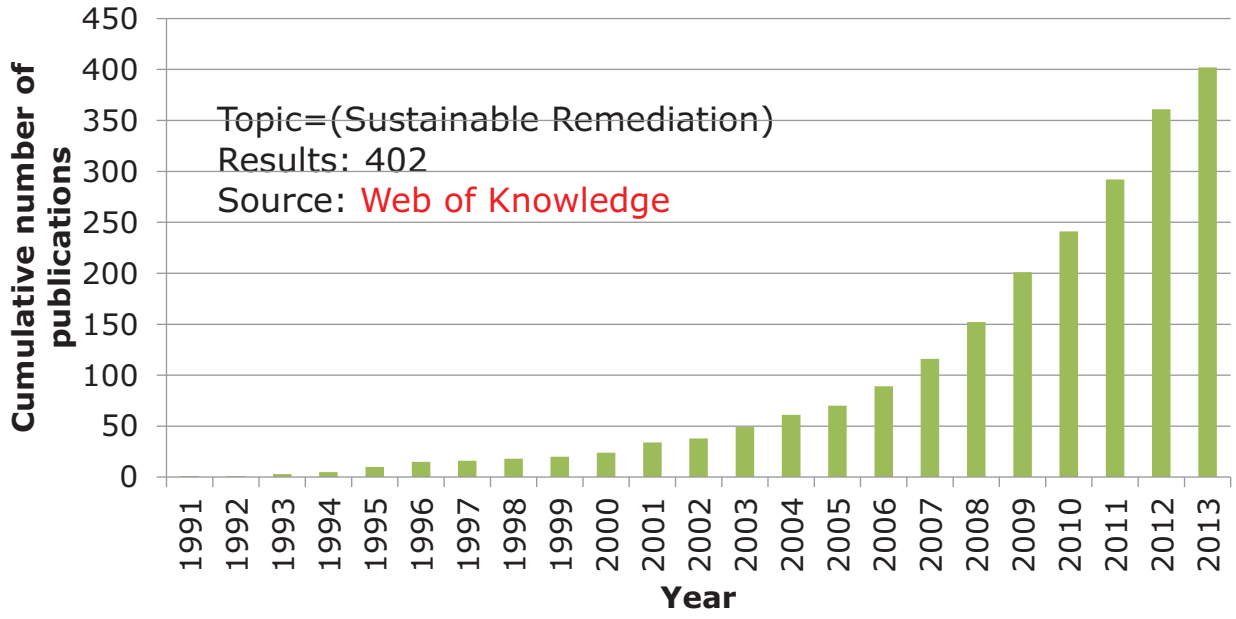


Looking forward to very interesting presentations in the program

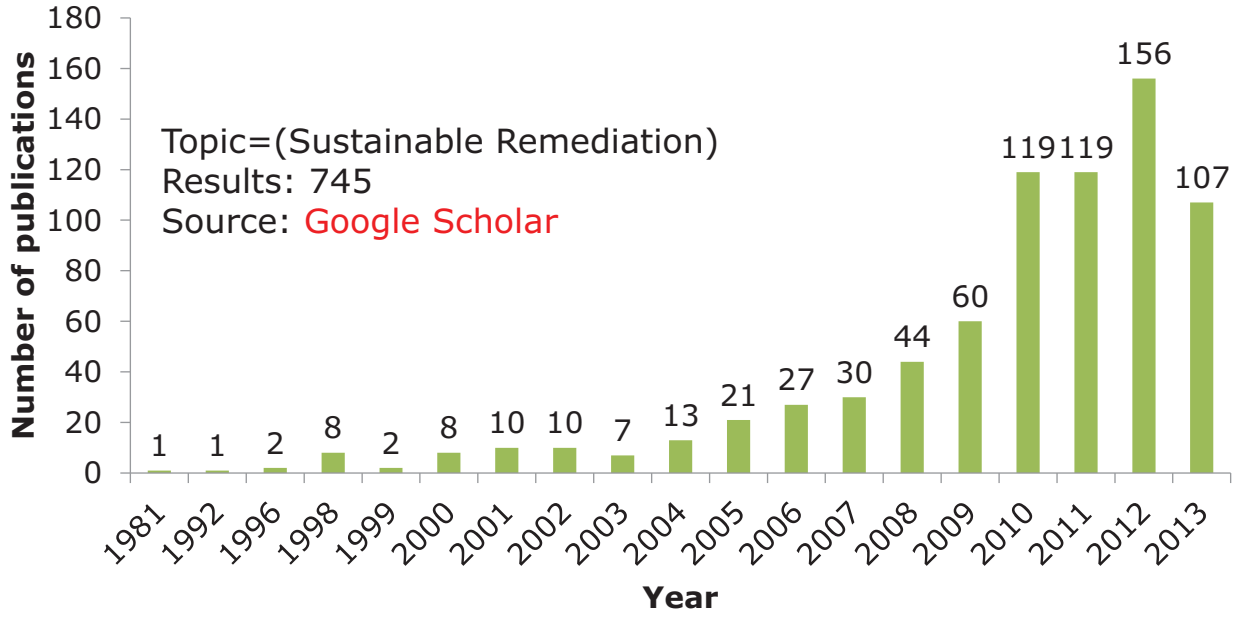
Publication Trends



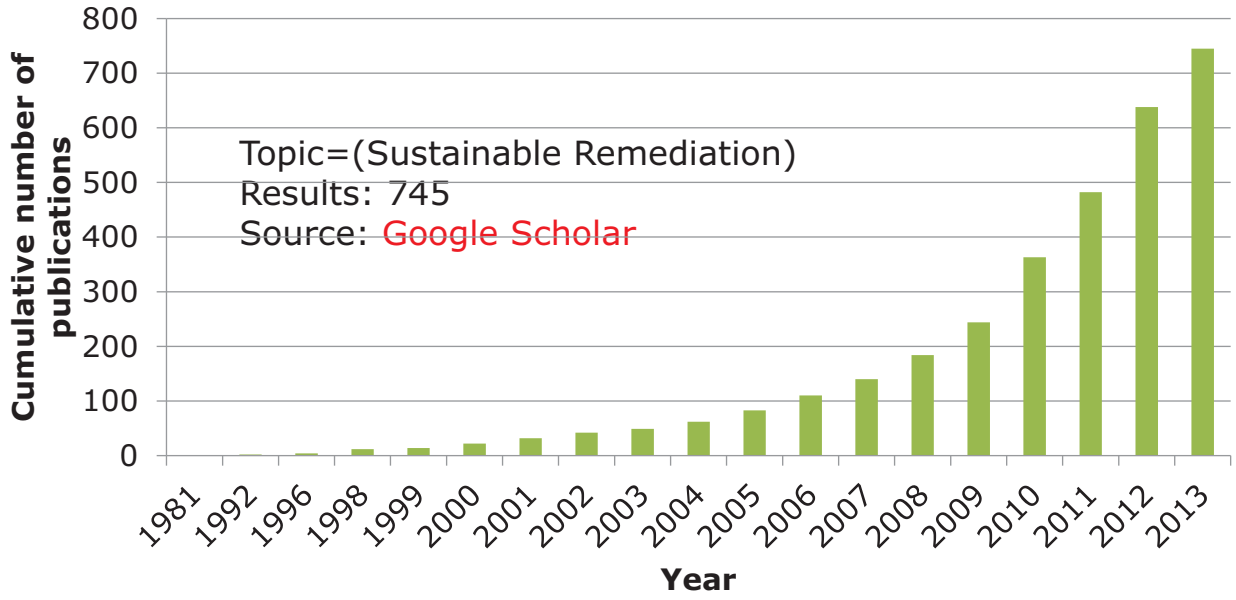
Publication Trends



Publication Trends



Publication Trends



UIC The University of Illinois at Chicago

Let's Have Successful SURF23

Thanks for attending!

UIC The University of Illinois at Chicago

Attachment 3
Introduction to SURF

SURF

Overview

Presented by:

Y. Nicholas Garson, P.G.

President – Sustainable Remediation Forum

SURF 23

July 23, 2013

SURF's Mission Statement

The mission of SURF is to maximize the overall environmental, societal, and economic benefits from the site cleanup process by:

- Advancing the science and application of sustainable remediation
- Developing best practices
- Exchanging professional knowledge
- Providing education and outreach

Sustainable Remediation Defined

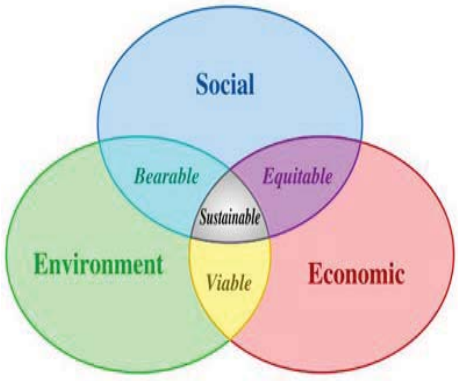
Original:
Sustainable remediation is broadly defined as a remedy or combination of remedies whose net benefit on human health and the environment is maximized through the judicious use of limited resources (SURF White Paper, 2009)

Updated Revision:
Sustainable Remediation protects human health and the environment while maximizing the environmental, social, and economic benefits throughout the project life cycle.

SURF

Sustainability – Triple Bottom Line

- Compliance
- Environmental footprint reduction
- Project life cycle integration
- Partnering with all stakeholders
- Public awareness
- Safety
- Risk management
- Return on Investment (ROI)



SURF

SURF Membership

- Industry
- Consultants
- Academics
- Regulatory
- Government
- Vendors

SURF Organization

Board of Trustees

President: Nick Garson
Vice President: Angela Fisher
Secretary: Karina Tipton
Treasurer: Grant Geckler
Past President: Karin Holland
At Large: Stew Abrams
At Large: Buddy Beeler
At Large: Amanda McNally
At Large: Jake Torrens
At Large: Rick Wice

Auditor - Frank Brulenski/Smart Devine.
Legal Support - Karyllan Dodson Mack/K&L Gates LLP

COMMITTEES

- **Education & Outreach** — Stephanie Fiorenza; Rick Wice
- **Communications** — Maile Smith; Jake Torrens
- **Finance** — Grant Geckler
- **Meetings and Programs** — Dave Ellis; Stephanie Fiorenza; Maile Smith
- **Membership** — Jake Torrens; Open
- **Technical Initiatives** — Paul Favara; Karin Holland
- **Nominations** — Brandt Butler

INITIATIVES

- **Academic Outreach** — Mike Miller; Pamela Dugan
- **Government Outreach** — Buddy Bealer; Stephanie Fiorenza
- **Research Support** — Stew Abrams; Charter TBD
- **Water Reuse** — Paul Hadley; Patrick Keddington
- **International White Paper** — Dave Ellis

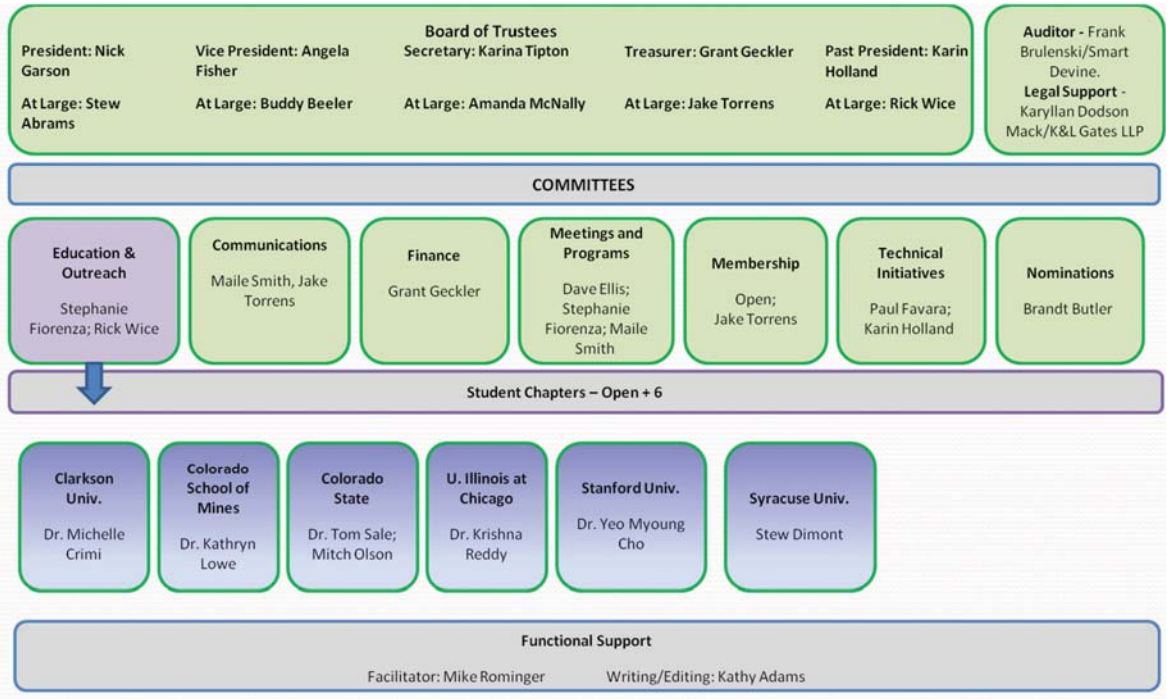
Working Groups

- **Education** — Rick Wice; Open
- **Student Chapters*** — Pamela Dugan; Open (+6)
- **SRI (SURF, ITRC, API)** — Buddy Bealer
- **ISO Sustainable Remediation Document** — Paul Nathanail
- **Case Studies** — Open; Charter TBD
- **Sustainable Remediation Site Rating System** — Dick Raymond; Diana Hasegan

Functional Support

Facilitator: Mike Rominger
Writing/Editing: Kathy Adams

Student Chapters



How We Work

- General membership meetings
  - Approximately 3 per year
- Working groups
  - As-needed teleconferences
- Professional conferences
- Participation in international SR conferences, webinars, affiliate work-products
- Technical journal articles

SURF

What we do

Guidance Development

SR Publications

Meetings/Networking

2011-2013:
- Framework Paper ("White Paper")
- Guidance for Footprint & LCA
- Metrics Paper
- Sustainable Remediation and Redevelopment

Upcoming:
- Water Reuse Paper (2013)
- International White Paper (2013)
- Rating & Certifications System Paper (2014)

SURF 21 Dec 2012 (D.C.): International Perspectives
SURF 22 Feb 2013 (UC Berkeley): Working Meeting

SURF 23 July 2013 – Chicago, IL
SURF 24 Oct (TBD) 2013 – Houston, TX

SURF

SURF's 2013 Initiatives

- Ongoing communications and outreach
  - Encourage government and academic participation
  - Student Chapter development
- Technical initiatives
  - Water conservation and reuse
  - SR rating & certification system
  - International SR (White Paper)
  - ISO Standard
  - Sustainable Remediation Initiative (SRI)
  - SR case studies (in development)
  - SR research support (in development)
  - Social aspect of SR (in development)

SURF

6 Panel Charts – Example
Water Conservation and Reuse Initiative

Team Members:
- Co-Leads – Paul Hadley, Patrick Keddington
- Jake Torrens, Katy Mouzakis, and Richard Rush – Leads on outline
- Carl Lenker and Melissa Harclerode– Leads on case studies
- Board Liaison - Jake Torrens

Objectives:
- Publish a document that advocates the reuse and conservation to further the practice of sustainable remediation.

Accomplishments:
- Text of reviewable draft of the document is approximately 85% complete
- Compiled 14 case studies, a few more are being prepared
- Format for presenting case studies consistently has been developed
- Paul and Patrick gave a talk at AEHS in San Diego in March, 2013; no other outreach in the near term

Next Steps:
- Finalize text for review draft (end of June)
- Put additional case studies in new format (end of May)
- Submit for peer review and courtesy stakeholder review from entities included in case studies (end of June)
- Remediation Journal Publication
  - Submit in August for December publication

Upcoming Meetings/Presentations:
- Monthly team meetings are being held

Help Needed:
- **Help Needed: Board**
  - Identify SURF Peer review team
  - Publishing support
  - Activate services of Kathy Adams; approve copyright cost ($138)
- Help Needed: Membership
  - Complete your assigned text sections

SURF

Updated by Paul Hadley – May 2013

Website

www.sustainableremediation.org

SURF

Where to find initiatives

- Publications in **Remediation Journal**

REMEDIATION

- Available on **SURF's** website: www.sustainableremediation.org

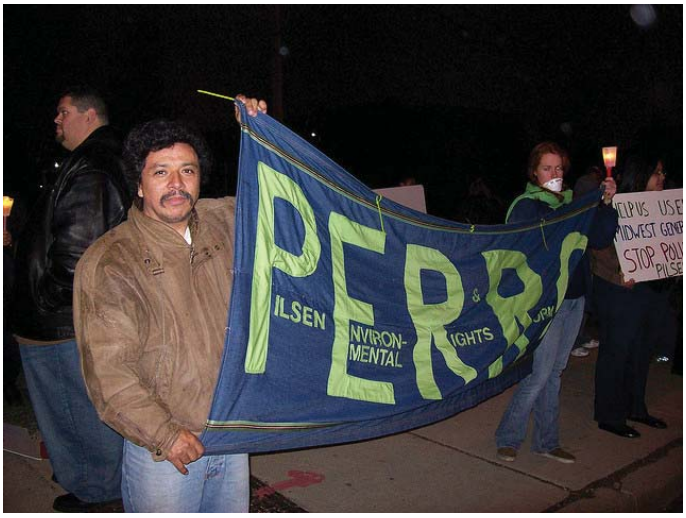
SURF
SUSTAINABLE REMEDIATION FORUM

Questions

Attachment 4
Remediation Projects in Densely Populated Urban Communities: Loewenthal Site

Remediation Projects in Densely Populated Urban Communities: *Case Study Loewenthal Metals Site*

P.E.R.R.O.



P.E.R.R.O.

Pilsen Environmental Rights and Reform Organization

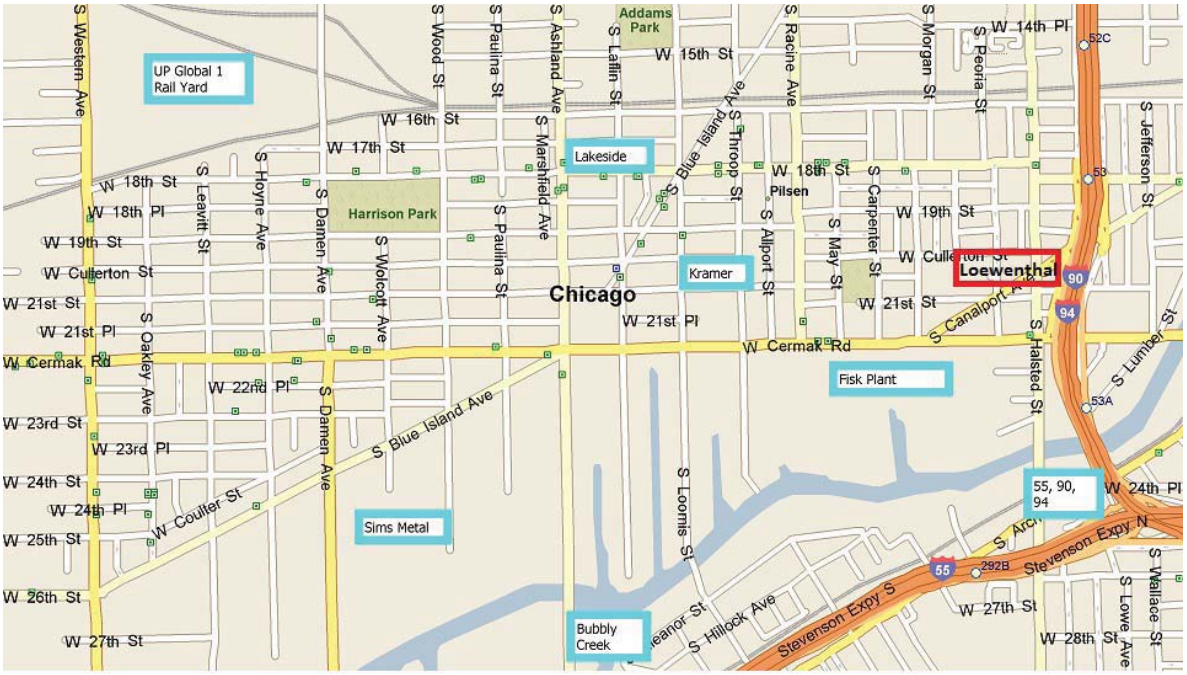
La Organización sobre Derechos y Reformas Ambientales de Pilsen

Founded in 2004

PERRO is an Environmental Justice Organization

P.E.R.R.O.

Pollution Sources in Pilsen



H. Kramer & Co.

1345 West 21st Street

H. Kramer & Co. is a brass smelting company and the primary source of airborne lead pollution in Pilsen.

In 2006 PERRO's efforts resulted in an EPA investigation that revealed violations at H. Kramer that lead the company to invest in over $800,000 worth of new pollution control equipment.

FRIDAY APRIL 7, 2006

Smelter plans fixes for Pilsen emissions

By Michael Hawthorne
Tribune staff reporter

Owners of a Pilsen smelter that is the largest source of toxic lead in the Chicago area will spend at least a half-million dollars to curb air pollution in the neighborhood.

PERRO pressured the EPA to include Pilsen in an air monitoring program announced in 2009. That air monitor, located on Perez Elementary School lead to the revelations of high levels of lead pollution in the air in Pilsen.

Chicago Tribune | ARTICLE COLLECTIONS

You are here: ChicagoTribune.com > Collections

High levels of toxic lead found in air outside Chicago school

Monitor readings of lead pollution prompt investigation by federal, state environmental regulators

April 01, 2011 | By Michael Hawthorne, Tribune reporter

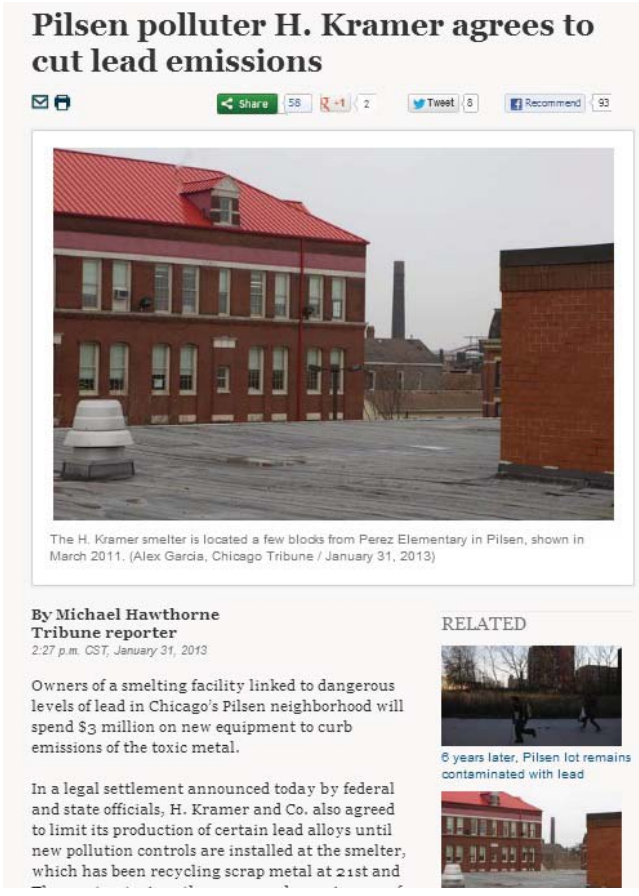
Alex Garcia, Chicago Tribune

Residents in Chicago's Pilsen neighborhood complained for years about meta tasting smoke rolling down their narrow streets but had little evidence it was h

Now they have proof. New monitoring data obtained by the Tribune reveal tha levels of toxic lead frequently lingered in the air last year outside an elementa in the predominantly Latino enclave that is attended by nearly 500 children.

Average lead levels at Perez Elementary School were at or above federal limi three three-month periods in 2010, the data show. Lead pollution exceeded h standards during a fifth of the days monitored and, on one day in December, more than 10 times higher — findings that alarm even veteran investigators.

None of the 14 other lead monitors placed near factories, steel mills and high



Pilsen polluter H. Kramer agrees to cut lead emissions

Share 58 +1 2 Tweet 8 Recommend 93

The H. Kramer smelter is located a few blocks from Perez Elementary in Pilsen, shown in March 2011. (Alex Garcia, Chicago Tribune / January 31, 2013)

By Michael Hawthorne
Tribune reporter
2:27 p.m. CST, January 31, 2013

Owners of a smelting facility linked to dangerous levels of lead in Chicago's Pilsen neighborhood will spend $3 million on new equipment to curb emissions of the toxic metal.

In a legal settlement announced today by federal and state officials, H. Kramer and Co. also agreed to limit its production of certain lead alloys until new pollution controls are installed at the smelter, which has been recycling scrap metal at 21st and

RELATED

6 years later, Pilsen lot remains contaminated with lead

On Jan. 31st, 2013, the Illinois Attorney General, ILEPA, USEPA, and Dept. of Justice issued a consent decree reached with H. Kramer that will require H. Kramer to invest in $3 million worth of pollution control equipment. This equipment should reduce lead emissions from H. Kramer to near zero.

Fisk Coal Fired Power Plant

1111 West Cermak Rd.

The
Fisk Generating
Station, was
built in 1903

The current
equipment
operating at
the plant
dates from
1959

Particulate pollution from the Fisk and Crawford coal fired power plants results in…

41 deaths

550 Emergency room visits

2800 asthma attacks

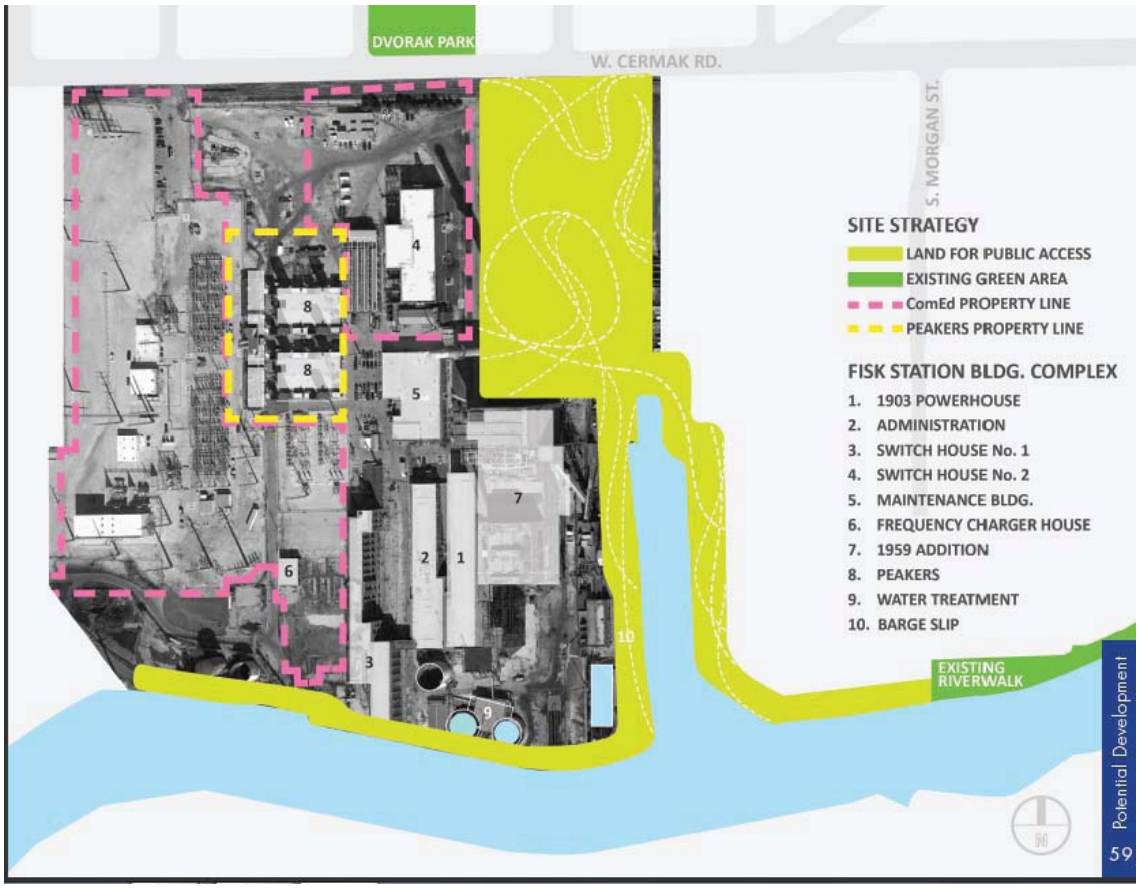
Every Year!

February 29th, 2012 - VICTORY!!!

After a decade of struggle Midwest Generation agrees to retire Fisk and Crawford

Focus of Task Force and Community Engagement Council…

- Remediation of the sites
- Re-development of the sites



Alternate, Midwest Generation / ComEd proposal for green space at the Fisk Site…

Loewenthal Metals Site

Loewenthal metals was a lead smelter that closed down sometime in the 1940's or 50's. The building was torn down but the land was never remediated.

The site remained an open field for decades with no knowledge by community residents of the level of contamination on the site. Over the years homes, a school, a community health clinic, a senior living facility and a community garden were established adjacent the site.

Red = Loewenthal Site

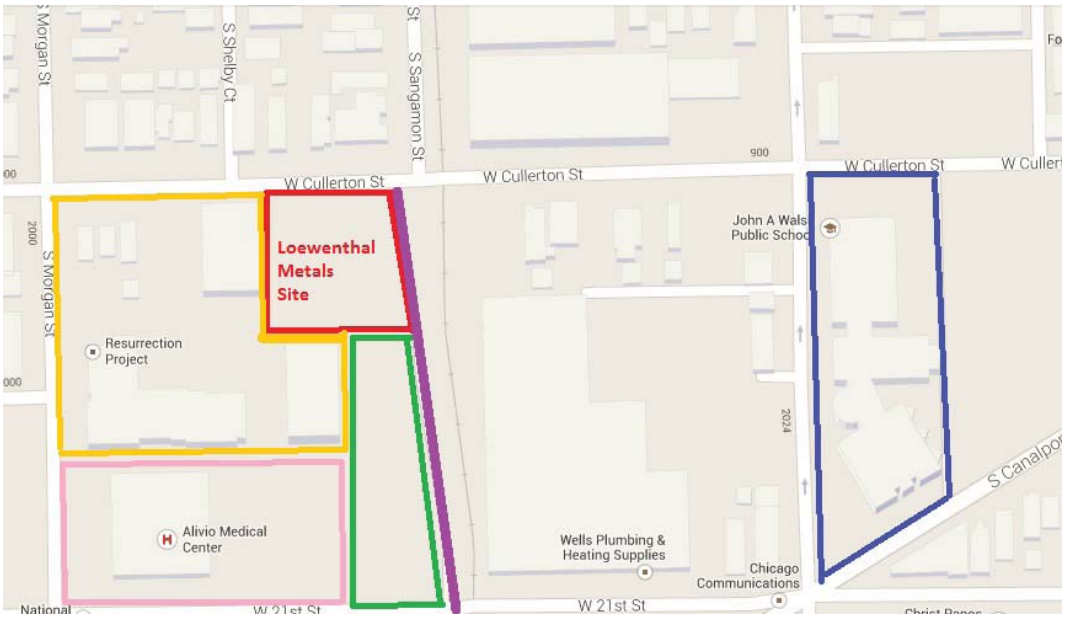
Blue = Elementary School

Green = Community Garden

Orange = Senior Living

Pink = Community Health Clinic

Purple = Walking Path



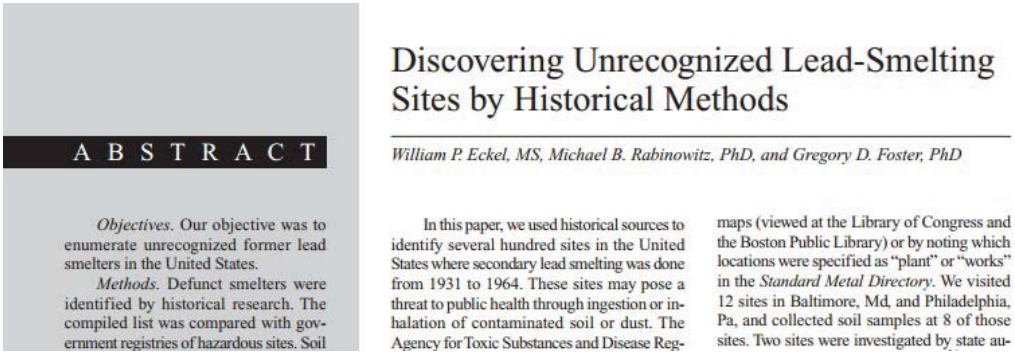
Residential properties across the street…

Senior living facility next door…

Growing Station Community Garden and walking path, South of Loewenthal…

Walsh Elementary School is one block to the East and the Loewenthal site is on the walking path for many of the schools children…

The site was first uncovered as one of 464 previously unknown contaminated sites identified by researcher William P. Eckel in an April 2001 article “Discovering Unrecognized Lead- Smelting Sites by Historical Methods” published in the American Journal of Public Health. The smelters were identified based on historical literature searches for potential smelters and cross-checking of the findings against EPA and state environmental databases.



ABSTRACT

Objectives. Our objective was to enumerate unrecognized former lead smelters in the United States.

Methods. Defunct smelters were identified by historical research. The compiled list was compared with government registries of hazardous sites. Soil

Discovering Unrecognized Lead-Smelting Sites by Historical Methods

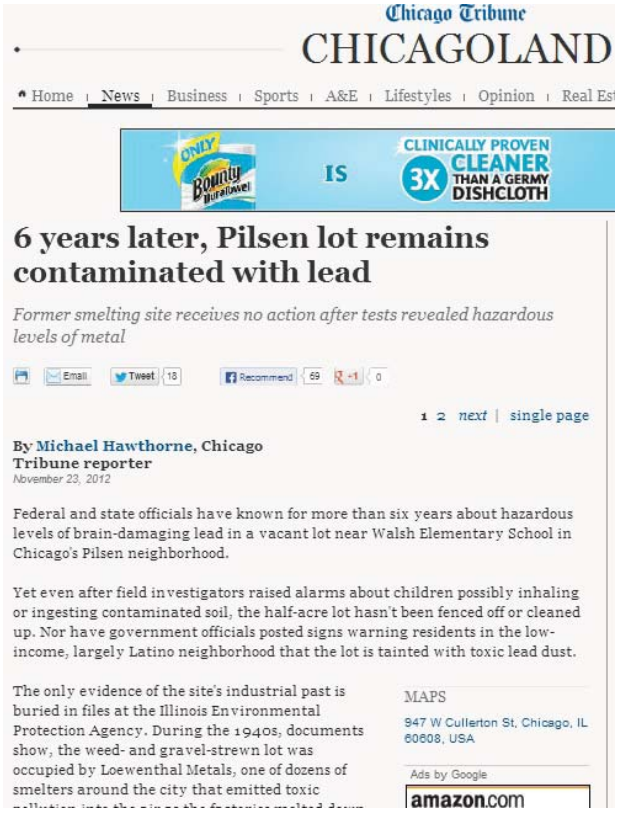
William P. Eckel, MS, Michael B. Rabinowitz, PhD, and Gregory D. Foster, PhD

In this paper, we used historical sources to identify several hundred sites in the United States where secondary lead smelting was done from 1931 to 1964. These sites may pose a threat to public health through ingestion or inhalation of contaminated soil or dust. The Agency for Toxic Substances and Disease Reg-

maps (viewed at the Library of Congress and the Boston Public Library) or by noting which locations were specified as “plant” or “works” in the *Standard Metal Directory*. We visited 12 sites in Baltimore, Md, and Philadelphia, Pa, and collected soil samples at 8 of those sites. Two sites were investigated by state au-

The site was investigated by the IL EPA in 2006 and preliminary test results showed elevated levels of lead, but nothing further was done.

PERRO found out about the site because of an investigation by Chicago Tribune reporter Michael Hawthorne, in early November 2012.



Chicago Tribune

CHICAGOLAND

Home | News | Business | Sports | A&E | Lifestyles | Opinion | Real Est

6 years later, Pilsen lot remains contaminated with lead

Former smelting site receives no action after tests revealed hazardous levels of metal

1 2 next | single page

By Michael Hawthorne, Chicago Tribune reporter
November 23, 2012

Federal and state officials have known for more than six years about hazardous levels of brain-damaging lead in a vacant lot near Walsh Elementary School in Chicago's Pilsen neighborhood.

Yet even after field investigators raised alarms about children possibly inhaling or ingesting contaminated soil, the half-acre lot hasn't been fenced off or cleaned up. Nor have government officials posted signs warning residents in the low-income, largely Latino neighborhood that the lot is tainted with toxic lead dust.

The only evidence of the site's industrial past is buried in files at the Illinois Environmental Protection Agency. During the 1940s, documents show, the weed- and gravel-strewn lot was occupied by Loewenthal Metals, one of dozens of smelters around the city that emitted toxic

MAPS

947 W Cullerton St, Chicago, IL 60608, USA

PERRO's first concern was to prevent residents, especially children from Walsh Elementary School from accessing the site. PERRO worked with Alderman Solis to get fencing around the property…

PERRO Pressured the IL. EPA and US EPA to investigate. The US EPA agreed to conduct testing on Nov. 27, 2012.

The US EPA's test results revealed serious levels of lead contamination. All the samples far exceed the 400 ppm residential standard for Chicago. Some samples found lead levels as high as 23,000 PPM!

PERRO worked with the US EPA to plan out a remediation of the site. The US EPA agreed to remediate the site to meet the 400 PPM standard. This will involve the removal of at least 3 feet of contaminated soil, maybe more. The remediation finally got underway in June of 2013.

Chicago Tribune

NEWS

Front Page | News | Sports | Business | Lifestyles | Opinion | A&E

Home > Featured Articles > Leaded Gasoline

U.S. vows to clean up lead-polluted lot near Pilsen school

February 06, 2013 | By Michael Hawthorne, Chicago Tribune reporter

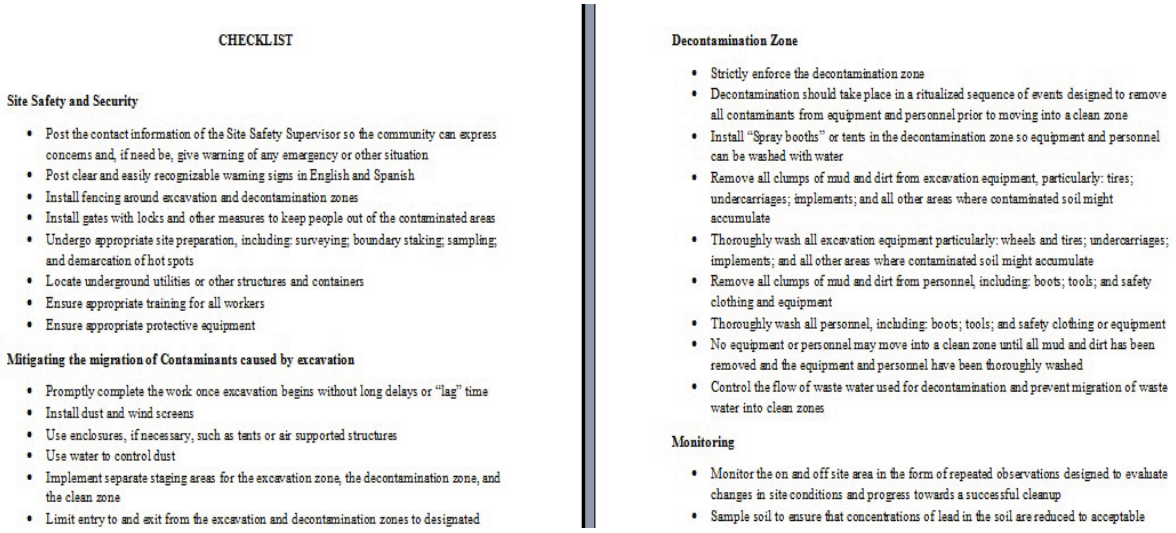
Recommend 0 Tweet 0 Share 79 +1 0

Federal officials vowed Wednesday to conduct an emergency cleanup of a lead-contaminated lot near a Pilsen elementary school, more than six years after authorities first identified the hazards.

The Tribune reported in November that the lot had not been cleaned up or fenced off even though the Illinois Environmental Protection Agency had cautioned in 2006 that its testing indicated children could inhale or ingest contaminated soil on their way to and from nearby Walsh Elementary School.

Ads

Along with our attorney, Keith Harley, a specialist in environmental law, PERRO presented on behalf of the community a list of community safety concerns in regards to the remediation project…



CHECKLIST

Site Safety and Security

- Post the contact information of the Site Safety Supervisor so the community can express concerns and, if need be, give warning of any emergency or other situation
- Post clear and easily recognizable warning signs in English and Spanish
- Install fencing around excavation and decontamination zones
- Install gates with locks and other measures to keep people out of the contaminated areas
- Undergo appropriate site preparation, including: surveying; boundary staking; sampling; and demarcation of hot spots
- Locate underground utilities or other structures and containers
- Ensure appropriate training for all workers
- Ensure appropriate protective equipment

Mitigating the migration of Contaminants caused by excavation

- Promptly complete the work once excavation begins without long delays or "lag" time
- Install dust and wind screens
- Use enclosures, if necessary, such as tents or air supported structures
- Use water to control dust
- Implement separate staging areas for the excavation zone, the decontamination zone, and the clean zone
- Limit entry to and exit from the excavation and decontamination zones to designated

Decontamination Zone

- Strictly enforce the decontamination zone
- Decontamination should take place in a ritualized sequence of events designed to remove all contaminants from equipment and personnel prior to moving into a clean zone
- Install "Spray booths" or tents in the decontamination zone so equipment and personnel can be washed with water
- Remove all clumps of mud and dirt from excavation equipment, particularly: tires; undercarriages; implements; and all other areas where contaminated soil might accumulate
- Thoroughly wash all excavation equipment particularly: wheels and tires; undercarriages; implements; and all other areas where contaminated soil might accumulate
- Remove all clumps of mud and dirt from personnel, including: boots; tools; and safety clothing and equipment
- Thoroughly wash all personnel, including: boots; tools; and safety clothing or equipment
- No equipment or personnel may move into a clean zone until all mud and dirt has been removed and the equipment and personnel have been thoroughly washed
- Control the flow of waste water used for decontamination and prevent migration of waste water into clean zones

Monitoring

- Monitor the on and off site area in the form of repeated observations designed to evaluate changes in site conditions and progress towards a successful cleanup
- Sample soil to ensure that concentrations of lead in the soil are reduced to acceptable

Top concerns for a community safety plan…

- Perimeter air monitoring
- Notice to nearby residents, businesses and schools
- Fencing around excavation and decontamination zones to keep people out of the contaminated areas and reduce airborne transmission of contaminants into surrounding area
- Clear posting of a phone number to an on-site safety coordinator residents can call 24/7 with concerns
- Dust suppression methods
- Use of lead stabilizing agents
- Redirection of pedestrian traffic
- Truck decontamination methods and zones

SITE HEALTH AND SAFETY PLAN

EMERGENCY AND RAPID RESPONSE SERVICES
Loewenthal Metals Site – Chicago, Illinois

Prepared for

U.S. Environmental Protection Agency - Region 5
77 W. Jackson Blvd.
Chicago, IL 60604

Under Contract No.: EP-S5-09-05
Task Order: 0121
Project No: L5-121

June 3, 2013

ENVIRONMENTAL RESTORATION

AIR MONITORING PLAN
LOEWENTHAL METALS REMOVAL SITE
CHICAGO, COOK COUNTY, ILLINOIS

Prepared For

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Emergency Response Branch
Region V
77 West Jackson Boulevard
Chicago, IL 60604-3507

Prepared By

WESTON SOLUTIONS, INC.
750 East Bunker Court, Suite 500
Vernon Hills, IL 60061

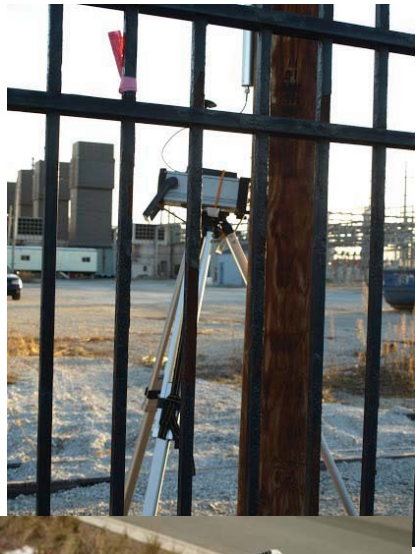
Date Prepared	May 14, 2013
TDD Number	S05-0001-1304-012
Document Control Number	2123-4H-BDQL
Contract Number	EP-S5-06-04
START Project Manager	Tonya Balla
Telephone Number	(847) 918-4094
U.S. EPA On-Scene Coordinator	Steve Faryan

The most important aspect of the community safety plan, and the frontline of defense against contamination of the surrounding community is the continuous air monitoring…

"During the removal activities, the objectives of the air monitoring at the Site are to:

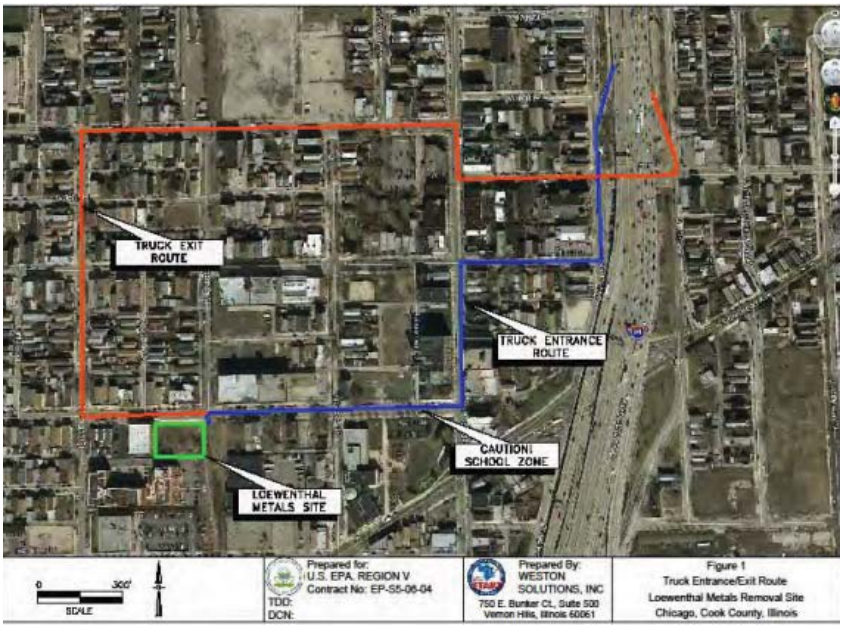
- *Collect and record meteorological data including temperature, wind direction, wind speed; and current weather conditions;*
- *Using MultiRAE, DataRAM 4 (DR-4), and Personal DataRAM (PDR), to monitor for offsite migration of VOCs and particulates to (a) ensure that the perimeter action levels are not exceeded and (b) assess the need for implementation of engineering controls; and*
- *Using MultiRAE, DR-4, and PDR, to monitor for VOCs and particulates in work zones to ensure worker protection and that proper PPE is being utilized."*

"During the removal activities, the AMP will be designed to continuously monitor particulate concentrations at up to three locations; based on work zones, wind direction, and sensitive populations (e.g.; two locations downwind and one location upwind). The equipment selected to conduct particulate monitoring are the DR-4 and PDR which are capable of monitoring for particulates down to 0.1 micrograms per cubic meter (µg/m3) and 0.001 milligrams per cubic meter (mg/m3), respectively."



Another important part of the plan is the use of dust suppressant methods and use of lead fixation agents to minimize transfer of pollutants off site.

A truck exit route was established that avoided the most sensitive nearby areas like the school, the garden and the medical center…



Truck decontamination area, redirection of pedestrian traffic and protection of the sidewalks…

The Growing Station community gardeners worked out a plan to shutdown the half of the garden closest to the Loewenthal site during remediation and received a promise of assistance from the EPA to relocate their raised beds, sheds and other structures.

PERRO and the EPA Staff worked closely together to educate community members about the remediation efforts to further ensure their safety.

EPA
United States Environmental Protection Agency

EPA Open House scheduled
The EPA will hold an open house about the new cleanup project at the former Loewenthal Metals site:

Casa Morelos
2015 S. Morgan
5 to 7 p.m.
Tuesday, June 25

For questions, comments or for more information about the Loewenthal Metals site, contact these U.S. EPA team members.

For technical questions:
Steve Faryan
On-scene Coordinator
Superfund Division
EPA Region 5
77 W. Jackson Blvd.
Chicago, Illinois 60604
312-353-3951
faryan.steve@epa.gov

For general questions:
Heriberto León
Community Involvement Coordinator
Superfund Division
EPA Region 5
77 W Jackson Blvd.
Chicago, IL 60604
312-886-6163
leon.heriberto@epa.gov

You may call the EPA toll-free: 800-621-8431, weekdays, 8:30 a.m. – 4:30 p.m.

Website:
www.epa.gov/region5/cleanup/loewenthal/

Pilsen Environmental Rights and Reform Organization (PERRO)
312-854-9247

Three-Month Lead Cleanup Scheduled to Begin June 24

Loewenthal Metals Site
Chicago, Illinois June 2013

The U.S. Environmental Protection Agency plans to begin a cleanup Monday, June 24, at the former Loewenthal Metals site, 947 W. Cullerton St. The $750,000 project should be completed in about three months.

Nearby residents may see heavy equipment working at the site and may experience traffic interruptions and heavy equipment noise during site activity hours Monday through Friday. The sidewalk in front and the paved path that runs from Cullerton Street to 21st Street along the Sangamon right-of-way will be closed at times. Curbside street parking in front of the site will be unavailable during the project. Pedestrians and drivers are urged to follow all warning and detour signs.

Workers will dig up contaminated soil down to about three feet from the surface, then treat and dispose of the soil off-site. The goal is to make the site suitable for residential development. After the contaminated soil has been removed, workers will replace it with clean soil and seed the area to prevent soil erosion. EPA has the legal authority to do the cleanup.

EPA will also take samples at the property immediately east of the site beside the Sangamon walkway to check for lead contamination.

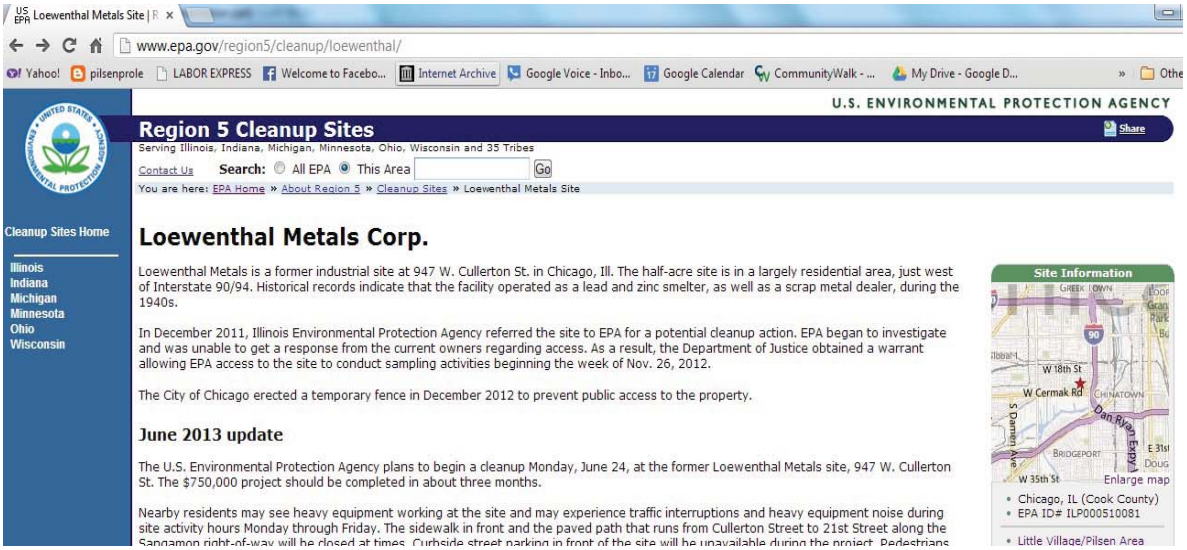
EPA will follow strict health and safety guidelines to protect workers and the public from exposure to hazardous materials. The Agency will also monitor the air to ensure dust levels are under control. All equipment and vehicles will be inspected and decontaminated if needed before they leave the site. Workers will be on the site weekdays from 7 a.m. to 5 p.m.

EPA will use equipment like this backhoe in a cleanup at the Loewenthal Metals site this month. The white bags contain material used to treat contaminated soil before it is hauled away to an EPA-approved facility.

The regular discussions and consultations with PERRO over the community safety plan minimized community concerns and paved the way to a smooth start to the beginning of the remediation effort..

For more info on the Loewenthal Site remediation, including the SITE HEALTH AND SAFETY PLAN…

http://www.epa.gov/region5/cleanup/loewenthal/



P.E.R.R.O.

Pilsen Environmental Rights and Reform Organization

La Organización sobre Derechos y Reformas Ambientales de Pilsen

www.pilsenperro.org

Attachment 5

The Surplus Roundtable:

Bounding Environmental Liability – Maximizing Asset Value

Surplus Property Roundtable
Bounding Environmental Liability-Maximizing Asset Value

"You never change things by fighting the existing reality.

To change something, build a new model that makes the existing model obsolete."

Buckminster Fuller

SURPLUS PROPERTY ROUNDTABLE

Vision

- A forum for executives involved with the management and disposition of surplus properties that can meet with their PEERS to exchange ideas and information, share experiences, present case studies on lessons learned *(what works and more importantly, what doesn't)* and discuss best practices to better bound environmental liabilities and maximize real estate asset values.

Governance

•Surplus Property Roundtable (SPR) is a member based educational organization of executives who manage portfolios of surplus properties.

•It was established in December 2012 as an Illinois corporation and in the process of applying for non profit, tax exempt status under Section 501 (c) (3) of the Internal Revenue Code.

•The SPR is a director run corporation with a representative of each member in good standing making up the membership.

•The Directors nominate Officers to manage the business of the association.

Officers - Founding Members

Bob Parker- President
Global Commercial Manager
ExxonMobil Environmental Services Company
Houston, Texas

Vernon C Burrows – Vice President
Remediation Specialist Sr II
BASF The Chemical Company
Florham Park, New Jersey

Monica T. Brower –Secretary
Senior Brownfields Redevelopment Manager
Alcoa Inc.
Pittsburgh, PA

Jay Gardner- Treasurer
Director of Real Estate
Ford Land
Dearborn, MI

Members : BP, BASF, Boeing, Chevron, Celanese, CSX Properties, DOW, Detroit Edison, Ford, Exxon Mobil, General Motors, Shell

Membership

Member Profile executives with expertise in real estate, legal, risk, remediation, facility decommissioning and environmental management.

Eligibility

- Corporation is the member
- Seeking corporations with large portfolios of surplus properties
- To achieve maximum value as a roundtable seeking participation of up to 20 members.

Meetings

- Quarterly
  - Members host meeting
    - Rotate location
  - Sponsors host dinner
- Noon – 5:00 pm with networking dinner
- Noon -5:00pm networking dinner
  - 8:00- Noon Tour
- Content rich

Issue Driven

- Liability minimization and liability transfer
- Traditional & non-traditional disposition strategies
- Creative end-use strategies for surplus properties
- Comparison of metrics for managing surplus properties
- Staying in the redevelopment game
- Due diligence and risk evaluation of sites
- Managing operating locations with an eye to end of life

Thank you

Robert Colangelo
Executive Director
T (847) 387-3797
Robc@surpluspr.org
http://surpluspr.org

SURPLUS PROPERTY ROUNDTABLE

Attachment 6

Triple Bottom Line in Cook County's Environmental Programs

Cook County Local Sustainability

Sustainability Plan
Sustainable Development
Demolition Debris Diversion Program

Deborah Stone, Chief Sustainability Officer,
Director, Cook County Department of Environmental Control

Sustainability Supports 4 Goals of Cook County

Fiscal Responsibility	Transparency & Accountability	Innovative Leadership	Improved Services
Jobs Savings for taxpayers, residents and businesses	Benchmarking guides investment Track and disclose impacts	Sustainable action today to meet future needs	Healthier, more livable communities

Create 45 jobs for every $1M spent on energy efficiency

Cook County is large and diverse, multiple spheres of influence

5 million residents – half suburban, 2% unincorporated

130 municipalities

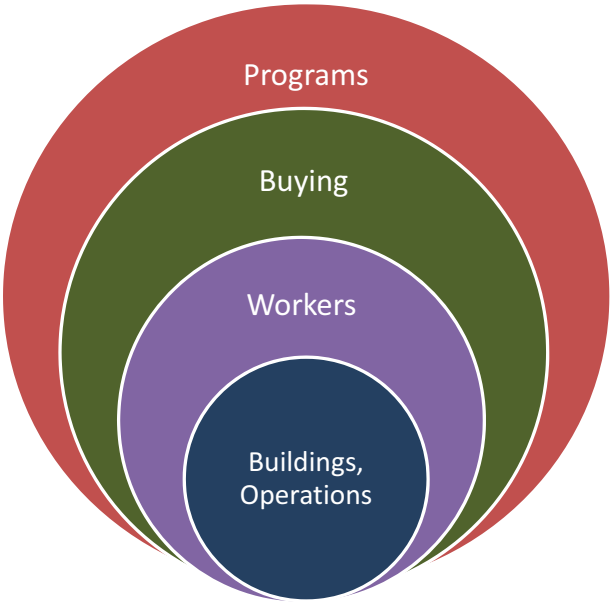
Half of state's economic activity

22,000 employees

150 government buildings

45,000 green jobs in the region

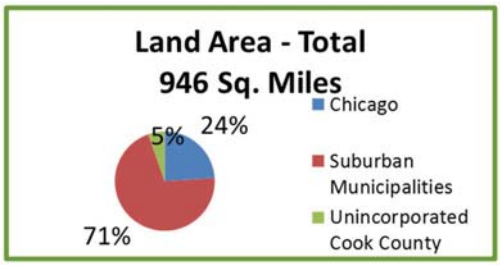
Reaches millions of taxpayers, patients, court attendees, licensees



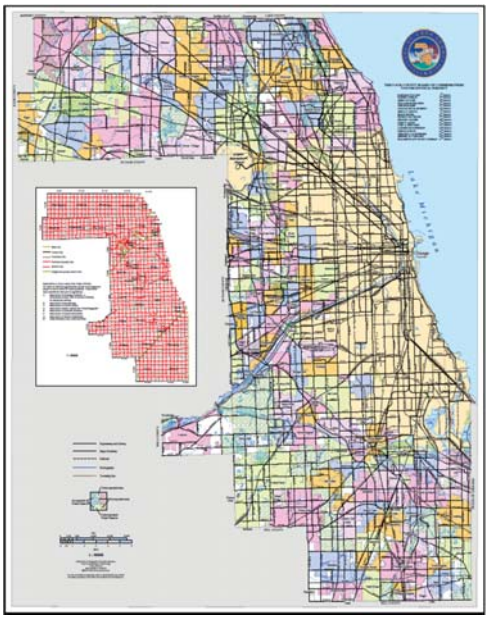
Cook County is highly fragmented

Communities

- 130 municipalities
- 30 townships
- 236 special districts
- 152 School districts



11% of the Land Belongs to the Forest Preserve District



Department Services, Partners and Relationships

- Air quality Ordinance
- USEPA grants for monitoring, enforcement, annual work plan with IEPA
- Growing force in solid waste
- Collaboration with Chicago
- Provide services to Suburban municipalities
- Sustainability lead for County

REGULATORY AUTHORITY:

Suburban Cook County
Both incorporated and unincorporated

Cook County – A Sustainability Leader

President's Goal: *Establish Cook County as a world-class model of sustainability, cost savings and conservation by embedding a culture of sustainability in all County operations, services and partnerships with suburban communities.*

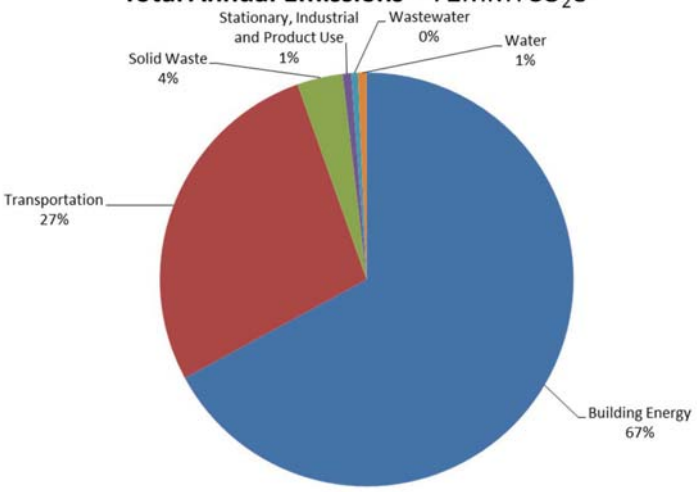
Role of the Sustainability Advisory Council:
Serve as a resource, a catalyst and advocate for the change necessary to make Cook County environmentally, socially and economically sustainable now and in the future.

We Can Reach Goal of 80% decrease in GHG by 2050 by Addressing the Largest Sources of GHG

Countywide, 67% of **Greenhouse Gas Emissions** come from Building Energy use.

GHG emissions are a useful way to organize sustainability work because climate change is such a major issue, and GHGs come from so many sectors. There are **additional environmental benefits** from efficiencies in these sectors, e.g. conservation of water, land and other natural resources, and reduction of particulates, toxic metals and other pollutants.

Cook County Community GHG Emissions by Sector
Total Annual Emissions = 72MMTCO$_2$e



Data from Chicago 2010 Regional Greenhouse Gas Emissions Inventory Report, March 2012

Energy – Ahead of target of 2% annual emissions reduction for County buildings

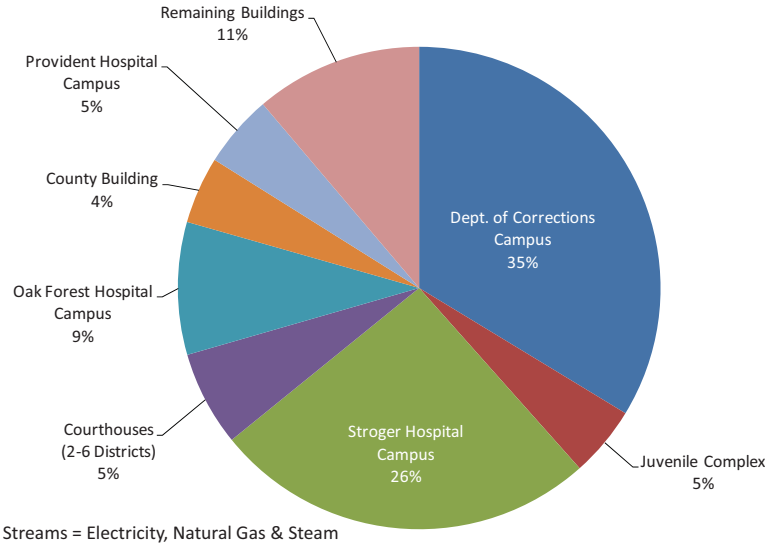
Cook County Government:

- 150 structures
- 247M kwh of Electricity
- 13M therms of Natural Gas last year
- Annual Energy Budget in 2010 Was $34.1 M

11 County government facilities use 90% of energy.

Focusing on these facilities will give the most results.

Annual County Facility Energy Use

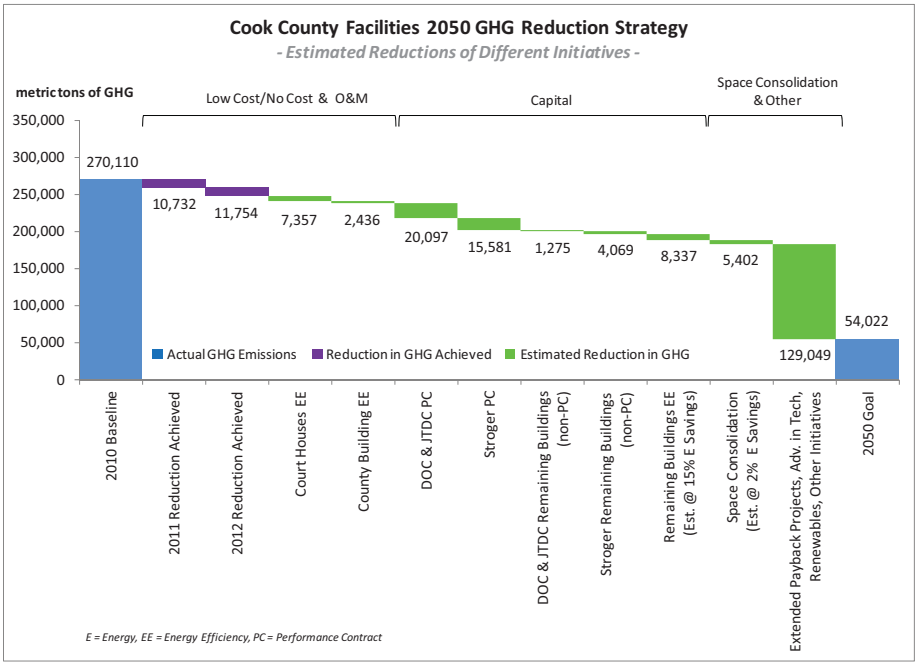


Energy Streams = Electricity, Natural Gas & Steam
Graph based on 2010 Utility Data, kBTU's
Results may change once all utility data is collected

Energy - The 2050 Goal for County Government Buildings is Ambitious – and Achievable

The goal is ambitious, but known solutions can get Cook County quite far on the path. GHG benefits, as well as savings, are cumulative.

Electricity has higher GHG impact than natural gas, but both can represent dollar savings.



Energy Efficiency Leadership

- Saved over $3 million through operations.
- ESCOs guarantee a 20% reduction in energy use at Jail and Hospital campuses; positive return on investment.
- Comprehensive space use and facility condition analysis provide basis for comprehensive capital plan with energy projects.
- 20 energy audits.
- 49 buildings added to USEPA Portfolio Manager.
- Transportation and Highways replaces incandescent-bulb traffic signals with LEDs, reducing energy bills 70%.
- 600 energy audits for homes, businesses, municipal facilities.
- More than 90 suburban municipal building energy projects.

Largest ESCO by a County

GHG Reductions with Fleet Management

County could reduce GHG emissions by almost 2,000 metric tons, or 15% by 2016 by:

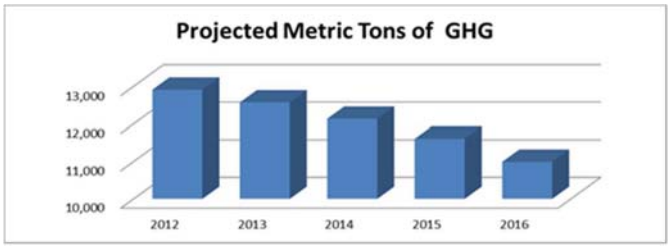
1. Reducing annual miles driven 2%

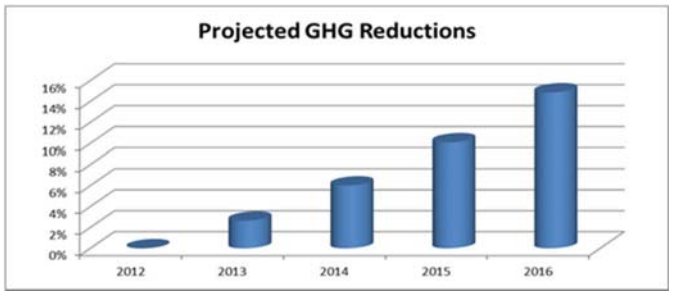
2. Replacing unleaded vehicles for the next 4 years with:

10 units per year CNG

10 units per year Hybrid

10 units per year Propane





Information from CST Fleet Services, Cook County Fleet Assessment Draft Report, May 2013

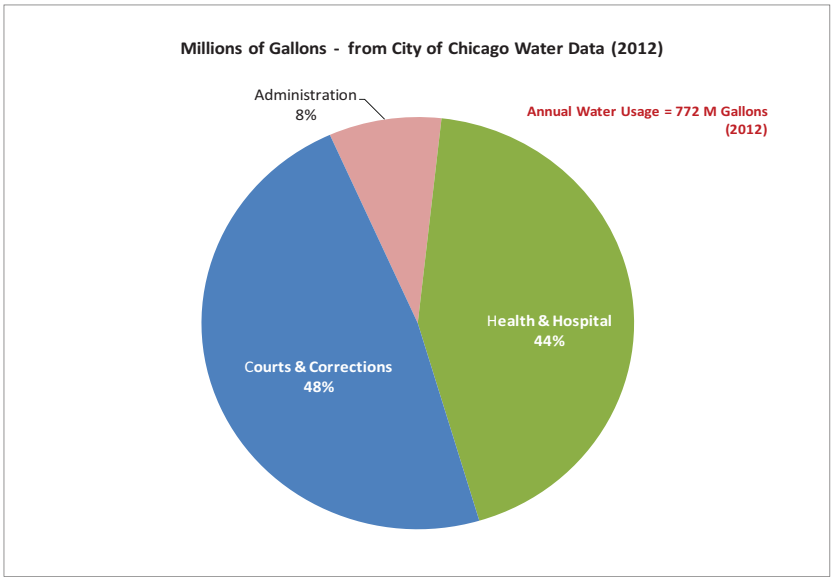
Efficient Transportation and Growth

Partnering for Prosperity

- Shared fleet, Diesel retrofits.
- Transit tax benefits for employees.
- Alternative-fueling projects.
- Dept. of Transportation & Highways revamped to focus on economic development, Complete Streets for multiple modes of travel.
- $40m expansion of Joe Orr Road in Lynwood.
- Center Street in Harvey near the CN freight terminal.
- Bureau of Economic Development, Council of Economic Advisors focus on spurring growth @ transit and freight nodes.
- Tools for infill development: Land Bank, $30 Million HUD Loan Pool for E.D. financing, Brownfield cleanup and redevelopment, income-tax increment district.

Water - Most County Government Water Use is in Courts & Corrections, and Health & Hospitals Facilities

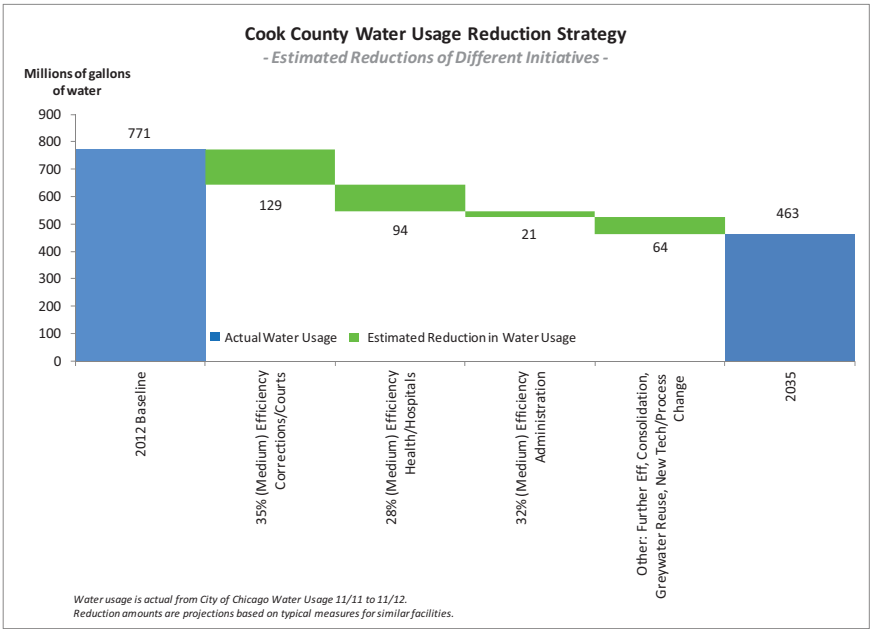
Achieving the "Medium" level of water reduction for all 3 facility types would lower annual water use by about 244 M gal.



Water and wastewater caused 540,000 MTCO2e of GHG emissions in suburban Cook County in

Water – Cook County Government Can Meet the Water Reduction Goal of 40% by 2035

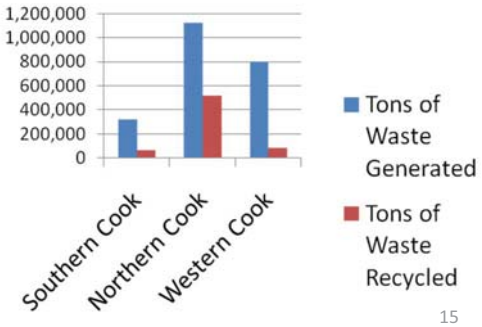
Typical strategies include fixing leaks; low-flow fixtures (& specialized fixtures for correctional setting),; repairing and updating cooling towers; ozone or other alternative laundry systems; alternative landscaping approaches.



Solid Waste Plan (2012)

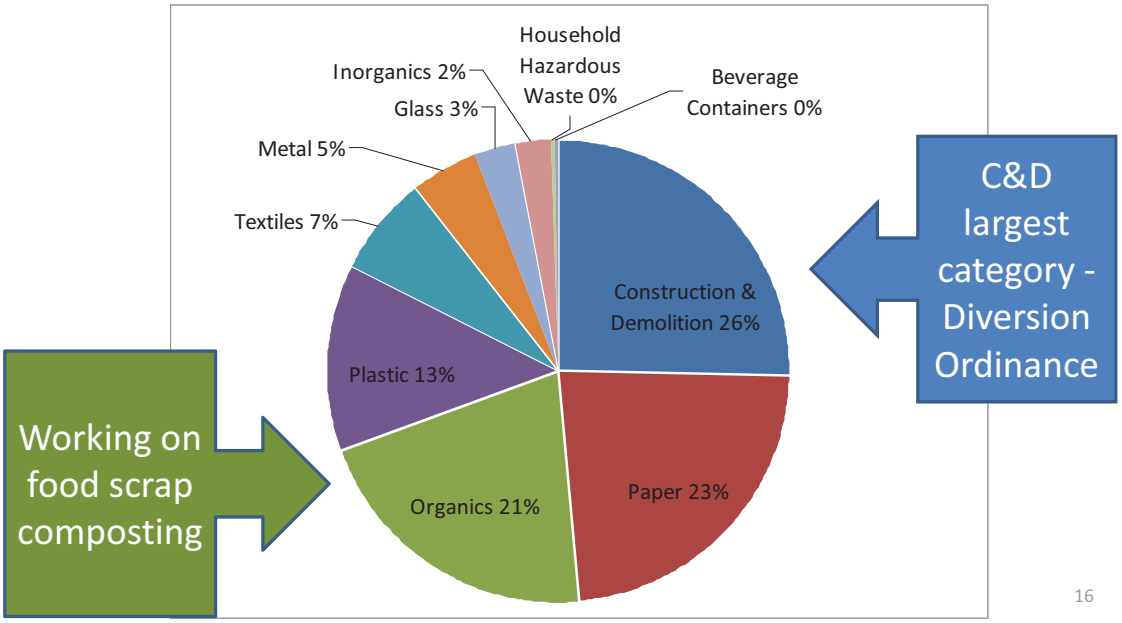
State requires minimum 25% recycling goal, but other counties reach higher. 100% diversion – ideal. 50-70% - challenge.

- **Waste generation up --** slight increase in population and larger increase in per capita waste.
- Some Cook County residents **create more than 7 pounds of waste per day,** more than the US average of 4.3 lbs., and **recycle less** (29% vs. 33%).
- Only one open landfill remains in Cook County.
- **Recycling rates declined** in South and West Cook.

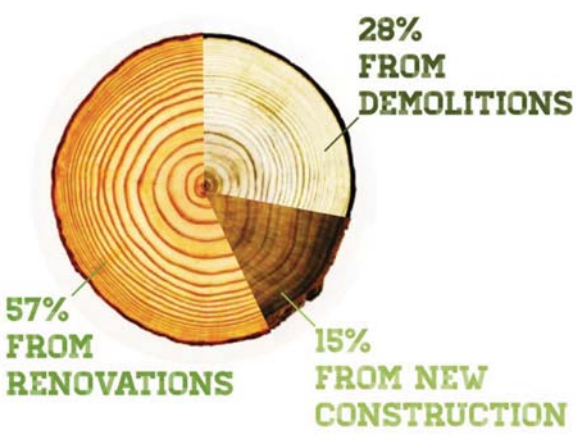


Goals cannot be met without diverting all major waste categories

Major categories of the waste stream

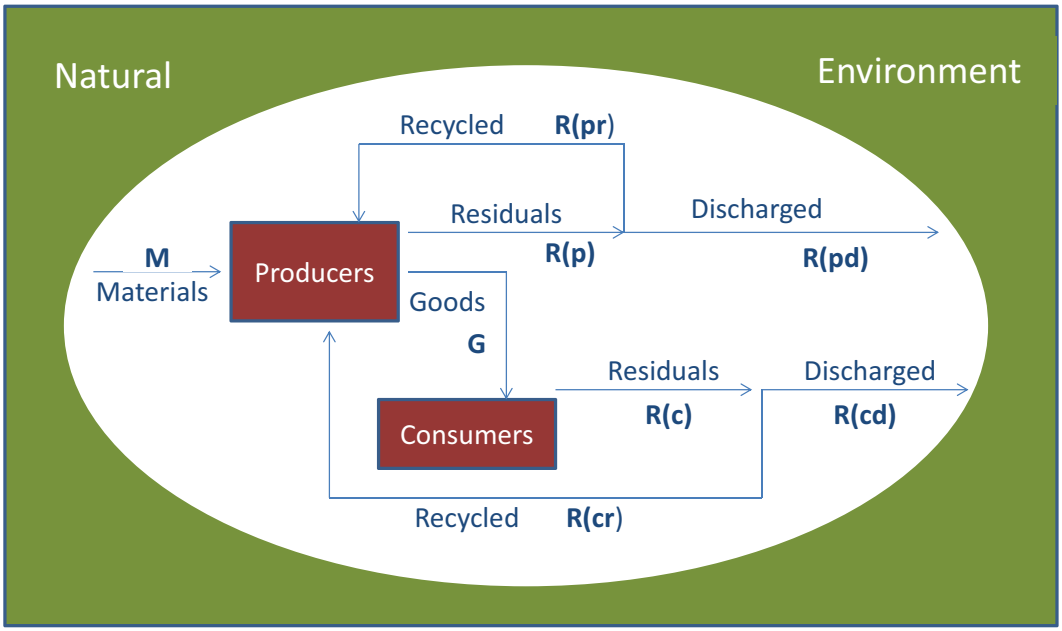


New construction consumes 60% of materials used in the nation



Materials/energy Balance

M = R(pd) + R(cd) …in the long run



But …there’s no such place as “away”.

* And waste is just a resource in the wrong place.

Recycling vs Re-use of Building Materials

Recycling:

Saves landfill space

Cuts down on new raw materials needed

Recovers some of the “embodied energy” used in original manufacture (extraction of materials, manufacturing, transportation)

Reuse:

Has benefits of recycling plus:

Greater (95%) savings of original embodied energy, as components are used in closer to final form.

1.2 billion board feet of reusable lumber annually from homes demolished nationally (forest destruction = 20% of global greenhouse gas emissions).

Buildings account for 40% of raw materials used globally.

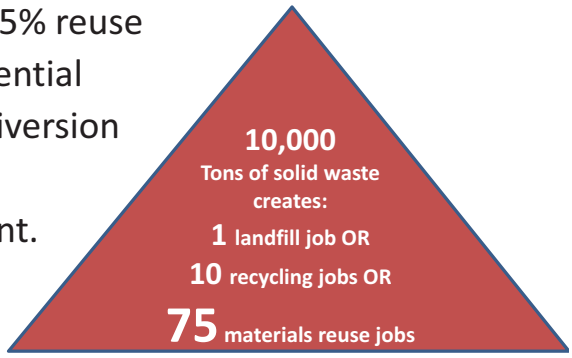
Less dust/asthma.

Demolition Debris Diversion Ordinance

Waste from **demolition, Deconstruction or alteration** of a structure.

- Residential structures (SF-1 up to 4 units): 70% diversion w/5% reuse
- Commercial/Industrial/Residential (5+ units) structures: 70% diversion

Penalties and Fines for enforcement.
Waiver options as safety valves.



Growing constituency for deconstruction

Removing 30 homes creates 1.5 FTE demo jobs, 26 deconstruction jobs

- Environmental benefit
- Saves landfill capacity
- Cost
  - "It's what others are doing
  - Jobs:
    - Deconstruction
    - Retail, warehouse

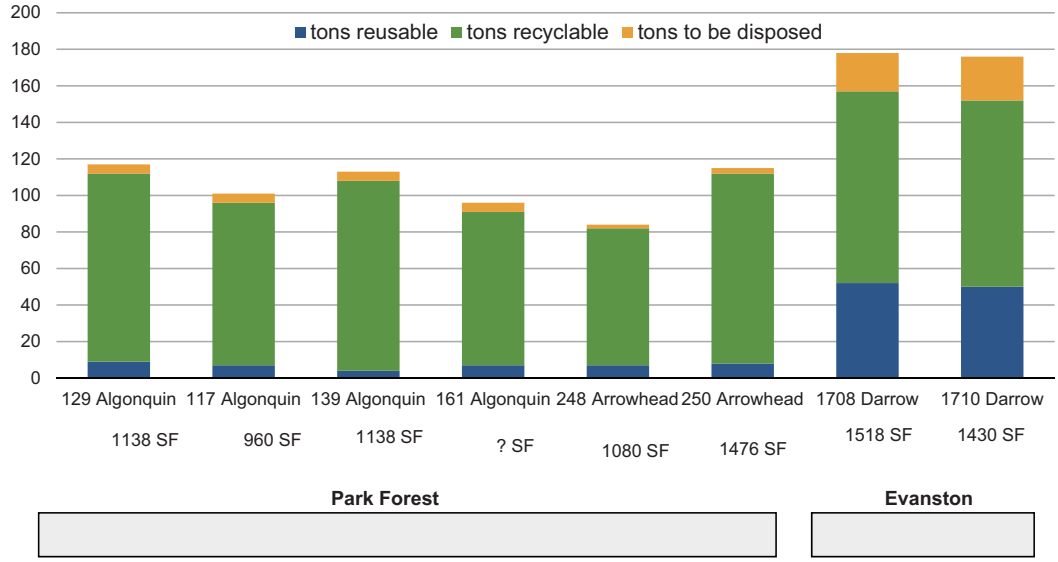
… individuals and companies realize the high quality and lower cost of reclaimed materials. The Pottery Barn catalogue lists 24 separate furniture products made from reclaimed lumber. Large restaurant chains such as Rosebud and Lettuce Entertain You use reclaimed materials in fixtures, furniture and wall décor.

-Delta Institute

Deconstruction jobs are an important potential new career path for those in the very neighborhoods where most vacancies exist.

-Faith in Place

Building Material Audits – Cook County Deconstruction Program



Cost Comparison

Example:
2,000 square foot house

	Deconstruction	Demolition
Structure Removal	**$6,750**	$2,500
Foundation Removal, tip fees	$6,000	$6,000
Tipping Fees (Other Materials)	**$1,000**	$2,000
	$13,750	$10,500

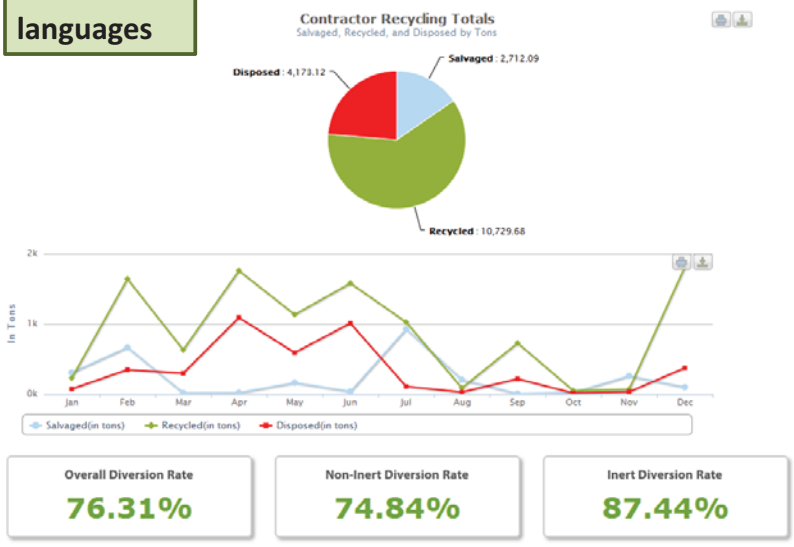
Potential Donation/Resale Value - **$3,500-$500**

Total Project Costs	**$10,250**	**$10,000**

Real time Recycling, Diversion Rates and Trends by project, building, industry, with any mobile device

Cook County is first in the Midwest to use paperless Green Halo waste reporting system. Helps contractors find savings.

Now in 53 languages



Overall Diversion Rate	Non-Inert Diversion Rate	Inert Diversion Rate
76.31%	74.84%	87.44%

greenhalo

26 ft. long old growth Douglas Fir – example of valuable material found in Pre-1939 structures common in Cook County

Kimball Ave. Church Deconstruction

Sold to make flooring for a home office and a boxing gym

La Sirena Clandestine on Fulton and Carol

RX Materials include the flooring, bar, tabletops, and the host stand

Maria's Packaged Goods and Community Bar
31st St. Chicago
Bridgeport Neighborhood

Material used:
Reclaimed flooring, lumber, and light fixtures

Some Common Sustainability Challenges

- Marketing and perception are key
- Case studies and accepted authorities are needed
- Standardized measures, units of comparison for unlike things
- Perceptions about risk, standardization units and definitions, time, all need to evolve
- Should we regulate, encourage, educate?
- How do we build in performance monitoring, real-time feedback, responsibility?
- Not all-or-nothing – you have to start somewhere
- Sustainability is becoming expected

Contact

http://blog.cookcountyil.gov/sustainability/

Deborah Stone, Chief Sustainability Officer and
Director, Cook County Dept.
of Environmental Control
69 W. Washington St., Suite 1900
Chicago, IL 60602
312-603-8200
deborah.stone@cookcountyil.gov

Attachment 7
Sustainable Development as Common Sense

Partnership for Sustainable Communities

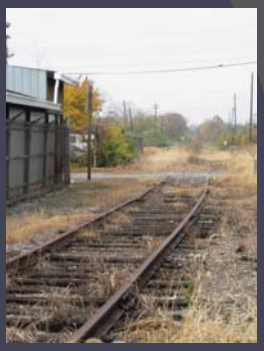
SURF

Jim Van der Kloot
USEPA

Indianapolis Smart Growth District

Background:

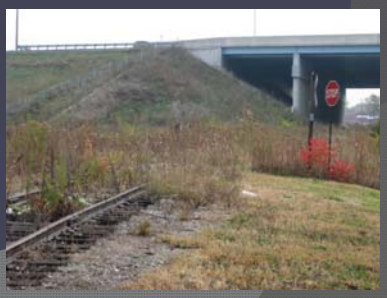
- Highly impacted neighborhood
  - Build upon local momentum
- Our Project
  - Creation of a Vision
  - Selection of location for targeted investment
  - Leverage funds



Indianapolis Smart Growth District

Challenges

- Sheer number of unrelated efforts
- Low capacity in CDCs/little communication between neighborhood projects
- Perfect storm of legacy contamination, BF sites, and vacant properties with neighbors who feel over-planned or afraid of gentrification



Indianapolis Smart Growth District

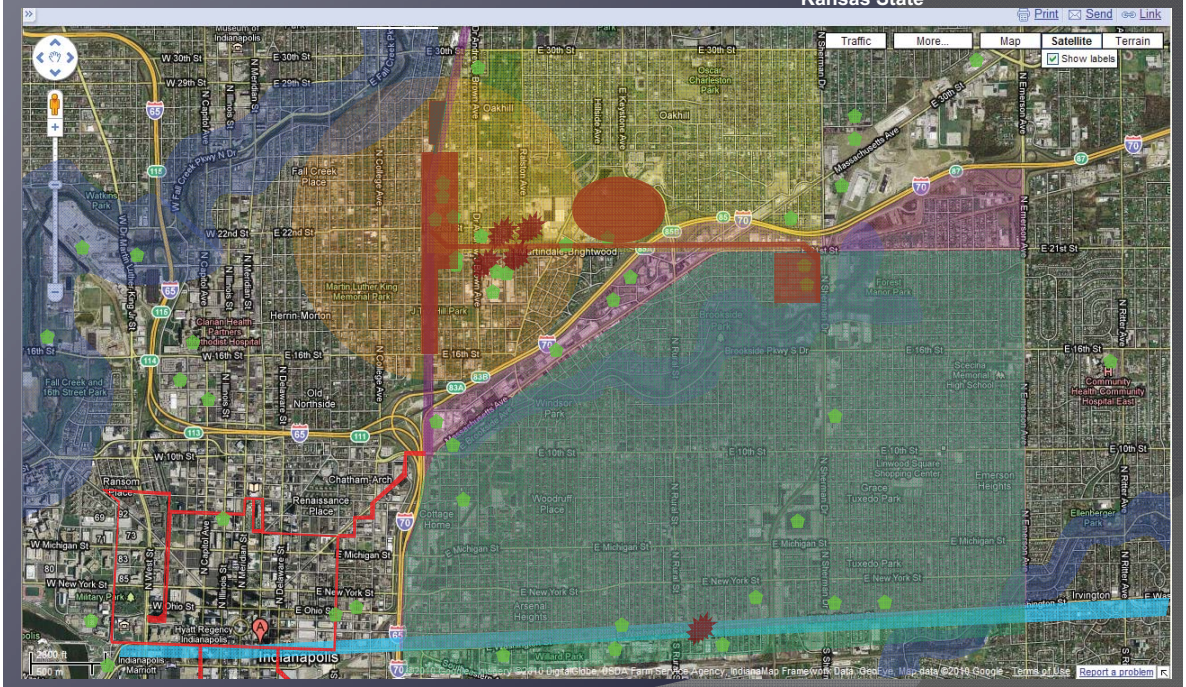
Advisory Committee
Comprised of many different stakeholder groups:

- City of Indianapolis:
  - Department of Metropolitan Development
    - Planning
    - Brownfields
    - Grants Management
  - Office of Sustainability
  - Mayor's Office of Economic Development
  - Parks and Recreation
  - Indianapolis MPO
- Community Development Corporations:
  - Martindale-Brightwood CDC
  - King Park Area CDC
- Federal Partners
  - EPA
  - HUD
  - FHWA
  - FTA
- State – Indiana Finance Authority/Indiana Brownfields Program
- Unofficial Committee Member – AIA Sustainable Design Action Team Implementation Committee

Smart Growth Redevelopment District
Brownfields Redevelopment Area
CSO Long Term Control Plans
Sustainable Skylines Initiative

East Washington/Historic US 40 corridor
Monon Parkway
NFL Legacy Project
Cultural Trail

RCRA Sites – Toxic or Air Releases only
CARE Grant
Superfund Removal Sites
ORD & Brownfields K6 Grantee
Kansas State



Indianapolis Smart Growth District

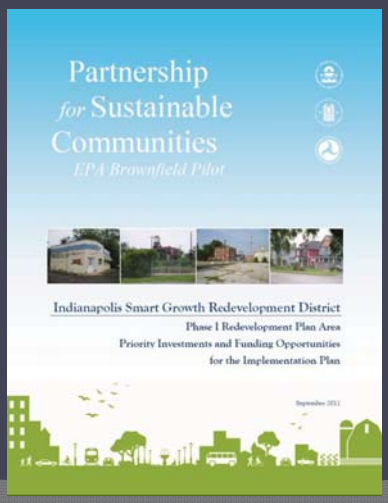
Solutions

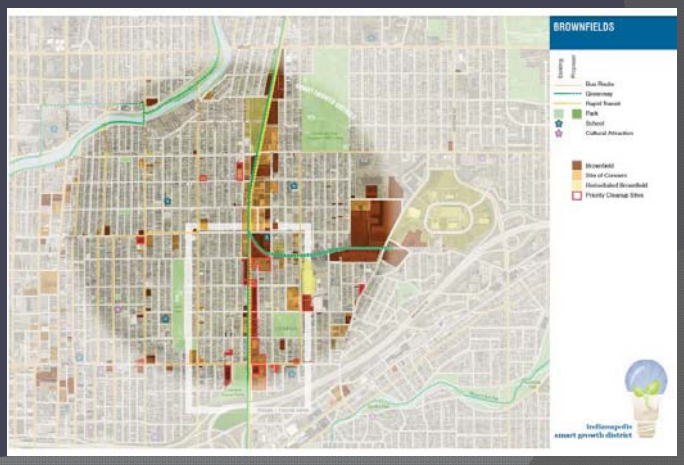
- Advisory committee
- Use Monon Trail as a connector
- Revitalization Strategy focus was chosen by this committee, built around their needs and give specific implementation steps for successful outcomes

Indianapolis Smart Growth District

Prioritizing Actions to Support a Transit-Oriented Future
released December, 2010

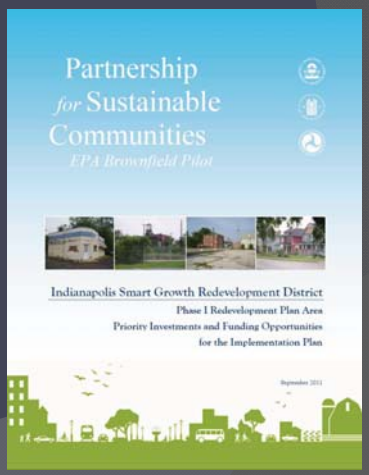
Next steps:
Site Selection, Prioritization, Implementation





Indianapolis Smart Growth District

- Financial Charrette
  - Coordinated site selection, prioritization
  - Presentation of 1 year and 5 year plan to potential “investors” and stakeholders: federal, state, local, non-profit, and foundations
  - Breakout groups to refine priority funding strategies, possible sources



SGD Strategic Action Plan

Outline of Influences and Considerations

	Previous	2009	2010	2011	Ongoing/Future
Previous Planning Contributions					
SGD Concept Plan					
SDAT					
EPA - Partnership for Sustainable Communities					
Resources					
Central Indianapolis Comm. Foundation Grant					
Current Guiding Projects					
LISC TOD Quality of Life Plan					
Indy Rezone (HUD Challenge Planning Grant)					
DMD Redevelopment District					
Regional Transit Plans (CIRTA + MPO)					
Supporting Development					
Keystone Enterprise Park					
Ertel Manufacturing/Major Tool					
The Project School					
EPA Urban Agriculture					
IU Health Campus Improvement					
Tinker Street Improvement					
16 Park					
National Apartments					
E 10th Street Improvements					
Parks and Rec "Bark Park"					
KPADC NSP Housing					
MidNorth QOL Plan					
Tech 16					
MLK Park Foundation Improvements					
Martindale on the Monon					

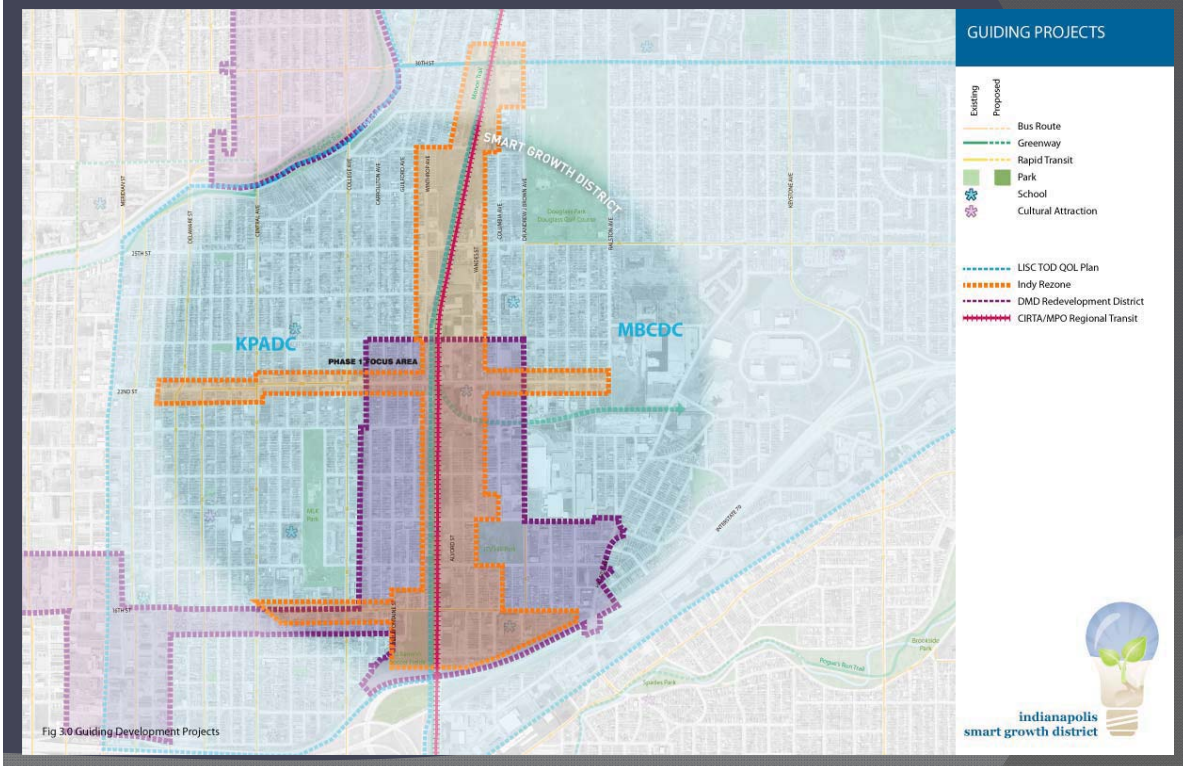


Fig 3.0 Guiding Development Projects

Indianapolis Smart Growth District

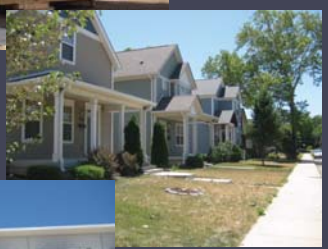
Brownfields

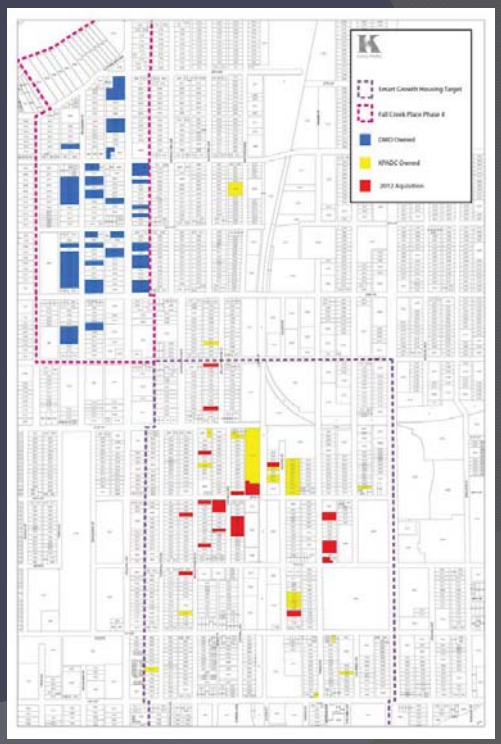
- $400K in Assessment grants

Business Growth

- Façade Grants
- Focus on small businesses

Indianapolis Smart Growth District





Indianapolis Smart Growth District

Parks

- Bicycle Boulevard and Civil Rights History Trail
- Bark Park
- Monon Gardens

Indianapolis Smart Growth District

Two years later:

- Over $1.5M raised for implementation

Keys to success:

- EPA as convener
- Building capacity at the local level
- Working to create a vision
- Foundation support

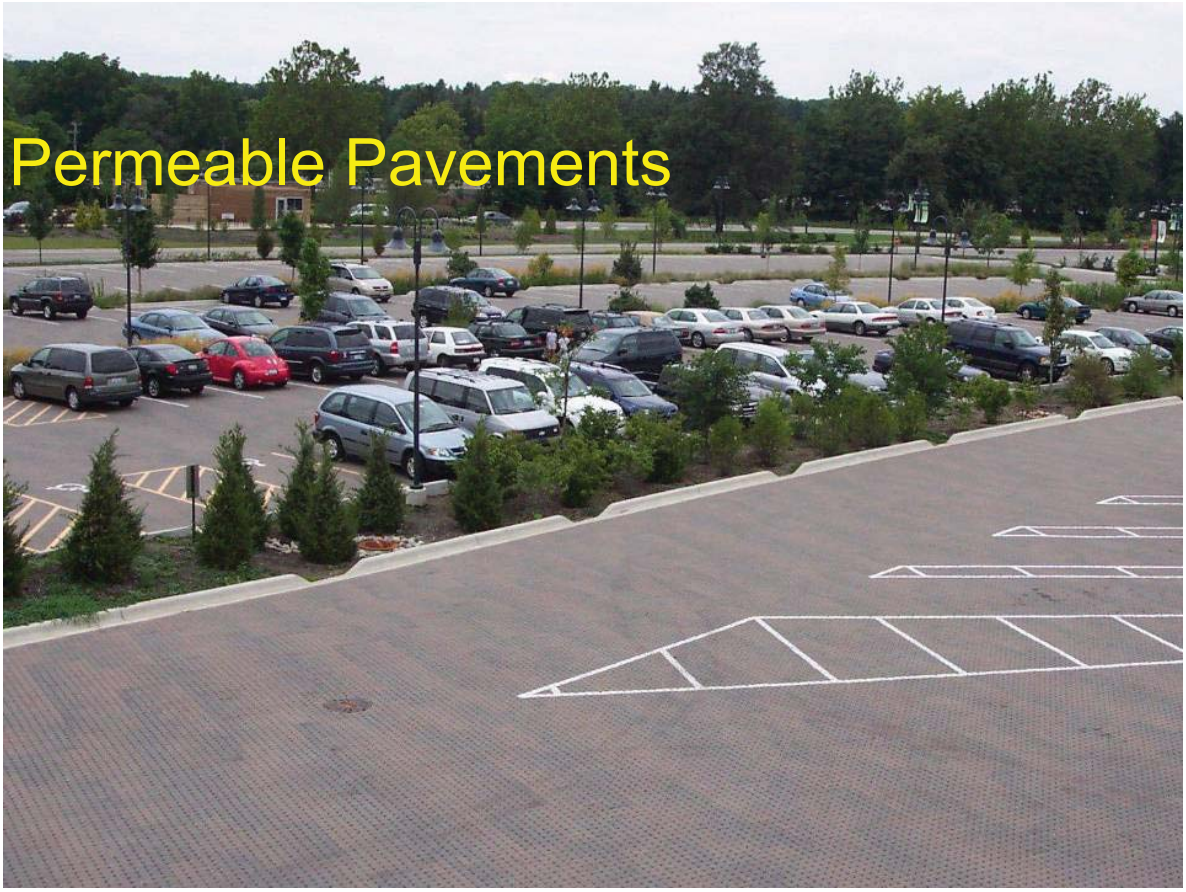
CINCINNATI

What Other Measures Could Be Implemented to Reduce Stormwater Discharges and CSOs, and Possibly Provide Other Community Benefits?

Green infrastructure

- **Increase Infiltration**
- **Increase Evapotranspiration**
- **Harvest and Re-use Stormwater**
- **Reduce Volume of Runoff**


Rain Gardens


Permeable Pavements

Green Alleys (Chicago)

Green Roofs

Highland Gardens, Milwaukee, WI

Green Infrastructure on Vacant Parcels

Saylor Grove

Saylor Grove

Tanner Springs Park - Portland

Over the past several years EPA and States have begun to weave green infrastructure provisions into CSO long-term control plans and Consent Decrees

This offers significant opportunities for collaboration between Sustainable Communities efforts and water enforcement cases

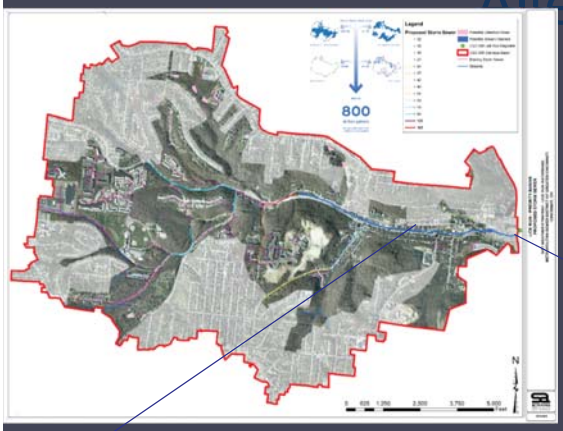
Water Enforcement Case

HAMILTON COUNTY & CITY OF CINCINNATI/METROPOLITAN SEWER DISTRICT OF GREATER CINCINNATI (MSDGC)

Cincinnati's Environmental Challenge

MSD among the Top 5 CSO dischargers in the US

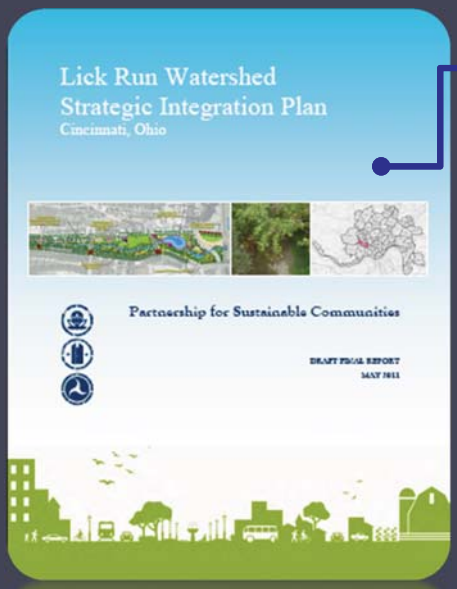
Lick Run: Sustainable Infrastructure Alternative



How many problems can your community solve for $3 billion?

- CSO Tunnel:
  - Reduce sewerage overflows to our rivers
- Land-Based Storm-Water Mgmt Strategies:
  - Reduce sewerage overflows to our rivers
  - Create green space and parks, urban land restoration, mitigate global climate change, reduce heat island, improve quality of life, water conservation, energy use, education, recreation, riparian buffers, flood control, access, unimpaired streams…
    - How to make theory into reality??

Lick Run Watershed: Integration Strategy



3.4 Framework Action #3: Cincinnati Parks Coordination (Ongoing)

Goal:	Continue to update and work through the MOU between MSD and Cincinnati Parks to accomplish planning and implementation of the Sustainable Infrastructure Program and improve neighborhood open space and park resources.
Opportunity:	Provide a model for cooperative maintenance, funding and upkeep of distributed stormwater source control and treatment; provide "green jobs" opportunities and training once projects are implemented.
Lead responsibility:	MSD and Cincinnati Parks.
Additional agencies:	Mill Creek Restoration; HUD Neighborhood Stabilization; Cincinnati Schools.
Timeframe:	First MOU expires December 30, 2012; MOU Renewal for 2013 – 2015.

Recommendations:

- Develop a scope for the Lick Run Watershed Plan, as part of the LDC update that makes implementation of the Sustainable Infrastructure Program a principal goal and brings together the Framework Actions identified in this Plan.

Deconstruction/Demolition

- EPA interview on residential demolition practices (2012)
- Cincinnati MSD not experienced in demolitions
- Mixed results in previous demolition work with City

Back

- 90+ buildings in Lick Run Watershed to be demolished
- Light deconstruction planned with local non-profit partner
- Need assistance in drafting bid specification language for contractor work
- Monitoring cost data and performance

Proposed projects

Green Infrastructure Operations and Maintenance

- EPA ORD Monitoring of St Francis Rain Garden
  - MSD Enabled Impact Project

- ORD Data Sharing and Lessons Learned
- Job Training - Green Infrastructure Maintenance
- Professional Article Series
  - Topics:
    - Parknerships: Sewer Districts and Park Board
    - Selecting green infrastructure sites - soils
    - Installation cost share, ownership, MOUs, maintenance cost share

Proposed projects

Leverage Federal Partner Projects and Resources

- Lick Run Strategic Framework Report (2012)
  - Partnership opportunities and obstacles
  - "Roadmap to partnering"
- HUD Community Challenge Grant (2011)
  - Downspout disconnects, impervious surface reductions
- HUD DOT EPA Deputies Tour (2013)

Background

- Convene Federal Partners to leverage resources
  - Green Streets
    - Harrison Ave, Queen City, Westwood, I-75
  - Business Retention and (Re)Development
  - HUD – Housing Planning and Development
  - APA *Zoning Practice* Article
    - Stormwater Friendly Zoning

Proposed projects

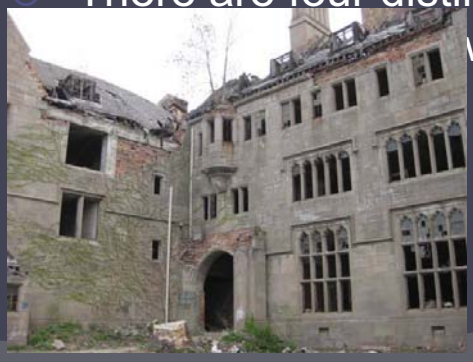
GARY!

Objectives

- To improve quality of life for Gary residents.
- To achieve specific redevelopment project goals in four Gary neighborhoods.
- To identify and help secure funding for these projects through public, non-profit and private sources.
- To facilitate partnerships that will carry forward long-term revitalization efforts once EPA assistance is complete.

Findings

- There are pockets of community enthusiasm.
- These need to be channeled into productive work.
- There are four distinct project areas, and
  wn st



Sustainable Communities Focus Area

Focus on four Gary neighborhoods:

- Horace Mann/Methodist
- Emerson/Downtown
- Aetna
- Miller

THANK YOU!

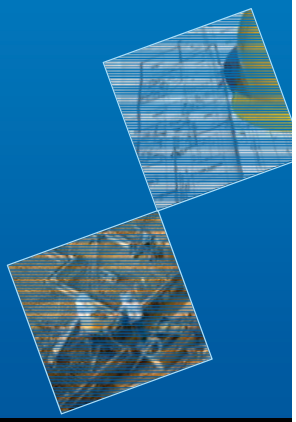
Attachment 8
Estimating Societal Impacts Using Environmental Footprint Evaluation Tools

Estimating Societal Impacts of a Remediation Project's Lifecycle Using Environmental Footprint Evaluation Tools

Sustainable Remediation Forum (SURF) 23

Melissa Harclerode,
ENV SP

July 23, 2013



CDM Smith

Overview

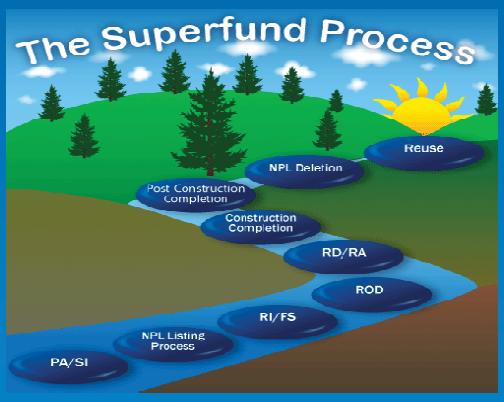
- Sustainable Remediation
  - *Knowledge Gaps*
- Methods
  - *Estimating Societal Impact using Environmental Footprint Metrics*
- Case Study One
  - *Phased Focused Field Investigation Approach*
- Case Study Two
  - *In Situ Thermal Remediation*
- Conclusions

Sustainable Remediation

- Protects human health and the environment during ***each phase*** of a hazardous waste site's ***life cycle,*** while holistically maximizing benefits to the environmental, social, and economic nexus.
- *Sustainable Remediation Forum (SURF)*

Key Knowledge Gaps

- Primary Focus on the Remedial Stage of a Hazardous Waste Site's Lifecycle



- Lack of Evaluation of Economic & Social Impact

METHODS

Estimating Societal Impact using Environmental Footprint Metrics

Simplified Methodology

Costs Borne by Society

- Reduction in Aesthetic Value of Nature
- Health Impacts from Inhalation of Emissions
- Reduction in the Quality of Life
- Reduction of Employment Due to Increased Health Insurance
- Reduction of the Earth's Ozone
- Reduction in Water and Energy Resources
- Increase in Smog

How Does Society Pay For These Costs?
How Do We Quantify These Societal Costs?

Societal Unit Costs: Greenhouse Gas Emissions & Nitrous Oxide

Methodology Greenhouse Damage Potentials (GDP)	• Present value of future damages from one metric ton • Impacts of climate change on all relevant market and non-market sectors
*Societal Cost of Represented Metric(s)**	• Carbon Dioxide (CO_2) - $74/ton • Methane ($CH_4$) - $2,000/ton • Nitrous Oxide (N_2O) - $29,000/ton
Data Gaps	• Values for water vapor & ozone
Reference:	• USEPA National Center for Environmental Economics (Marten et al. 2011)

**per metric ton using the 95th percentile 2010 societal cost estimate*

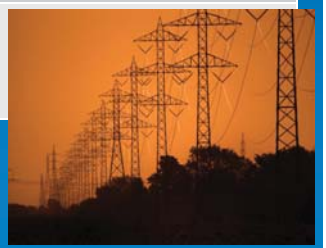
Societal Unit Costs: Coarse Particulate Matter & Sulfur Oxides

Methodology Air Pollution Emission Experiments and Policy (APEEP) Model	• Consequences of emissions through air quality modeling, exposure, dose-response, and valuation. • For example: health effects, reduced crop yields, lost recreation services.
*Societal Cost of Represented Compound(s)**	• Coarse Particulate Matter (PM10) - $1,960/ton • Sulfur Dioxide (SO_2) - $4,130/ton
Reference:	• Regulation (Muller et al. 2010)

**per metric ton using the 99th percentile 2010 societal cost estimate*

Societal Unit Cost: Total Energy Used

Methodology	• Consequences of energy production and use e.g. health effects, expensive environmental clean-ups, contribution to climate change, etc.
Societal Cost of Represented Compound(s)	• Non-carbon societal and carbon emission costs of fossil fuel electricity generation - $0.149 cents per kilowatt an hour (kWh) in 2010
Reference:	• The Hamilton Project Strategy Paper (Greenstone et al. 2011)



Societal Unit Cost of Environmental Metrics

Societal Impact Metric	GHG [1.]	N_2O	SO_2	PM_{10}	Total Energy
	Per metric ton				MMBTUs
Referenced Societal Impact Costs/ Year [2.]	$2,074	$29,000	$4,130	$1,960	$0.0005375
	2010	2010	2007	2010	2010
2008	$1,954.94	$27,335.28	$4,253.90	$1,847.49	$0.0001090
2013	$2,266.32	$31,689.08	$4,931.44	$2,141.74	$0.0001263
2015	$2,404.33	$33,618.95	$5,231.76	$2,272.18	$0.0001340

1. Greenhouse Gas (GHG) = CO_2 plus CH_4 societal costs
2. 3% discount and inflation rate assumed

CDM Smith

CASE STUDY ONE

PHASED FOCUSED FIELD INVESTIGATION APPROACH

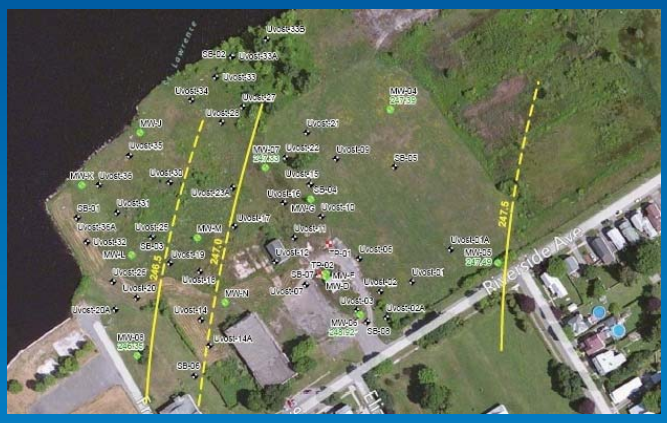
Case Study One: Background

- Historical uses include: coal and lumber yard, machine shop, and bulk petroleum storage
- 14 large capacity ASTs previously onsite
- Two NYSDEC spill incidents
- Subsurface soil and groundwater impacted

CDM Smith

Case Study One: Objectives

- Determine the extent of the **on-site petroleum plume**



- Integrate **sustainable remediation principles and practices** into site characterization activities
- Support future remedial and construction activities

CDM Smith

Case Study One: Sustainability Assessment Parameters

Investigation Parameters	Conventional Investigation Techniques	Phased Focused Investigation Approach
Field Days	12	8
Soil Boring Footage	304	140
PVC Well Footage	570	180
UVOST Screening Footage	0	560
Soil Samples	80	9
Groundwater Samples	51	20

Case Study One: Environmental and Societal Impact Evaluation – SiteWise™ Outputs

Sustainability Metrics

Site Characterization Alternatives	GHG Emissions	Total Energy Used	Water Usage	NO_x Emissions	SO_x Emissions	PM10 Emissions	Accident Risk Fatality	Accident Risk Injury
	metric ton	MMBTU	gallons	metric ton	metric ton	metric ton		
Conventional	9.05	1.18E+02	1.11E+02	2.00E-02	2.03E-03	6.34E-04	5.11E-05	8.59E-03
Phased Focused	5.84	7.31E+01	1.11E+02	1.15E-02	1.20E-03	5.85E-04	3.78E-05	5.76E-03

Relative Impact

Site Characterization Alternatives	GHG Emissions	Total Energy Used	Water Usage	NO_x Emissions	SO_x Emissions	PM10 Emissions	Accident Fatality Risk	Accident Injury Risk
Conventional	High	High	High	High	High	High	High	High
Phased Focused	Medium	Medium	High	Medium	Medium	High	High	Medium

Case Study One: Societal Impact Evaluation

Sustainability Metrics - SiteWise™

Site Characterization Alternatives	GHG Emissions	Total energy Used	NO_x Emissions	SO_x Emissions	PM10 Emissions
	metric ton	MMBTU	metric ton	metric ton	metric ton
Conventional	9.05	1.18E+02	2.00E-02	2.03E-03	6.34E-04
Phased Focused	5.84	7.31E+01	1.15E-02	1.20E-03	5.85E-04

Costs Borne by Society – 36% Savings for Phased Field Investigation

Site Characterization Alternatives	GHG Emissions	Total energy Used	NO_x Emissions	SO_x Emissions	PM10 Emissions
	metric ton	MMBTU	metric ton	metric ton	metric ton
Conventional	$19,912.77	$0.063	$615.32	$9.72	$1.32
Phased Focused	$12,849.79	$0.039	$353.81	$5.75	$1.22

Case Study One: Phased Field Investigation Evaluation of Economic Impact vs. Societal Impact

Economic Impact

- **38% Reduction in Economic Costs**
  - 8% Increase in Subcontractor Costs
  - 77% Reduction in Analytical Costs
  - 34% Reduction in Consultant Costs

Societal Impact

- ***36% Reduction in cost borne by society***
  - Primarily due to reduced emissions of GHGs and NOx

CASE STUDY TWO

IN SITU THERMAL REMEDIATION

Case Study Two: Background

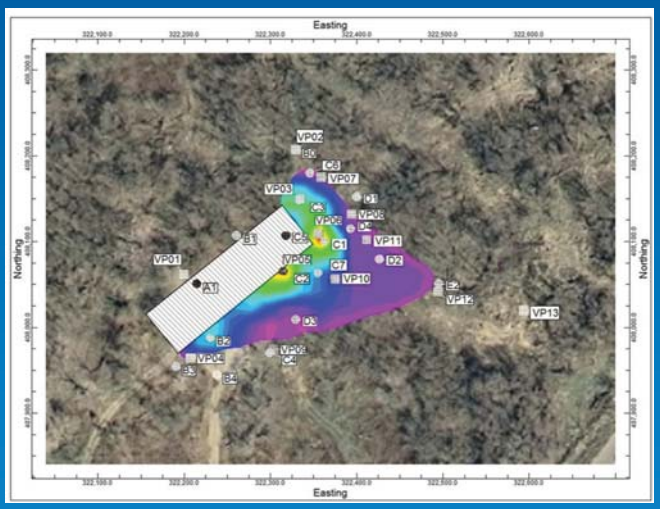
- 85-acre municipal landfill
- 200-acre Brownfield Development Area
- Unlined landfill operated from 1952 until 1971
- Chlorinated benzenes
- Excavation performed in the “source area”; however not all source removed

CDM Smith

Case Study Two:
Potential Interim Remedial Options (IROs)

- IRO1 – ISCO (source & plume)
- IRO2 – ISTR (source)/ISCO (plume)
- IRO3 – ISCO (source)/ Monitoring (plume)
- **IRO4 – ISTR (source)/Monitoring (plume)**
- IRO5 – Excavation (source)/ISCO (plume)
- IRO6 - Excavation (source)/ Monitoring (plume)

Extent of Clay Contamination



Case Study Two:
Environmental Impact Evaluation – SiteWise™ Outputs

Sustainability Metrics

In-Situ Thermal IRO	GHG Emissions	Total Energy Used	NO_x emissions	SO_x Emissions	PM10 Emissions
	(metric ton)	(MMBTUs)	(metric ton)	(metric ton)	(metric ton)
Thermal Treatment - ERH	2.99E+03	5.81E+04	3.70E+01	2.60E+01	1.60E+00
Annual Monitoring	8.71E-01	1.13E+01	7.81E-03	3.70E-04	1.16E-04

Case Study Two: Societal Impact Evaluation

In-Situ Thermal IRO	Year	GHG Emissions	Total Energy Used	NO_x Emissions	SO_x Emissions	PM10 Emissions
Thermal Treatment – ERH	2012	$ 6,578,917	$31.23	$ 1,138,346	$ 124,483	$ 3,327
Annual Monitoring	2013	$ 1,974	$ 0.006255	$ 248	$ 1.82	$ 0.25
	2014	$ 2,033	$ 0.006443	$ 255	$ 1.88	$ 0.26
	2015	$ 2,094	$ 0.006636	$ 263	$ 1.94	$ 0.26

Conclusions

- Costs borne by society can be calculated using environmental footprint tools
- Significant savings to society are metric specific.
- Major contributors towards one aspect of the triple bottom line may not be the same for others.
- To reduce costs borne by society, an effort should be made to offset societal impacts in the same year the impacts are accrued and implement alternatives with short operation and maintenance periods.
- Is “Socio-Economic Costs” a better term?

Questions and Answers

Contact Information:
Melissa Harclerode
Harclerodema@cdmsmith.com
(732) 590-4616

Acknowledgments:
Jessica Beattie, Maria Watt, Sean Coan,
and Dr. Michael Miller- CDM Smith
Pankaj Lal, Assistant Professor, Montclair State University
Michael Burlingame - NJDEP

New SURF Initiative:
Methods to Evaluate the Triple Bottom Line

- Environmental Stewardship
  - Environmental Footprint Analysis
    - Lifecycle Assessments

- Economic Growth
  - Cost Benefit Analysis
  - Property Value Analysis
  - Job Creation Analysis

- Social Responsibility
  - Costs Borne By Society
  - Community Feedback
  - Quality of Life Analysis

- Triple Bottom Line
  - Envision™

New SURF Initiative:
Social Aspect of Sustainable Remediation

- Key Objectives
  - Illustrate the importance of performing a complete sustainability assessment when evaluating contaminated site remediation projects.
  - Provide tools to the remediation sector for evaluating impacts to the social and socio-economic nexus of remediation.
  - Share knowledge of existing case studies where the impacts to the social and socio-economic nexus have been evaluated for the remediation sector.
- Upcoming Milestones – Fall 2013:
  - Solicit initiative team members
  - Solicit comments on initiative proposal
- Co-Chair: Kristin Mancini

Attachment 9

Leveraging the Synergy of ITRC, API Energy, and SURF

Gov.Outreach SRInitiative

Team Members:

- Leads – Buddy Bealer & Stephanie Fiorenza

•Keith Aragona, Charles Blanchard, Brandt Butler, Angela Fisher, Nicholas Garson, Diana Hasegan, Karin Holland, Marianne Horinko, Melissa Koberle-Harclerode, Jason McNew, Kathryn Moxley, Leah Pabst, Olivia Skance, Dave Woodward

- Board Liaison – Buddy Bealer

Objectives:

- Update standardized presentations (525: 5 words, 5 minutes, 25 minutes, 2.5 hours)
- Identify strategic regulatory stakeholders and develop engagement plan with specific strategy and plan
- Begin implementation of Region plans using standardized materials
- Develop methods to encourage and promote regulatory participation and membership in SURF

Accomplishments:

- Final drafts of presentation materials to be updated monthly on SURF website
- Final draft implementation strategy to be US EPA Region based with each region developing specific plan with team lead
- API preliminary commitment for $30K

Next Steps:

- Complete Region specific regulatory engagement plans
- Seek additional SURF member support for engagement efforts
- Schedule and perform engagements

Upcoming Meetings/Presentations:

- Calls every two weeks
- Individual Region Specific Team calls per team lead

Help Needed:

- **Help Needed: Board**
  - Continue support
- Help Needed: Membership
  - Participation in Region ngagement teams

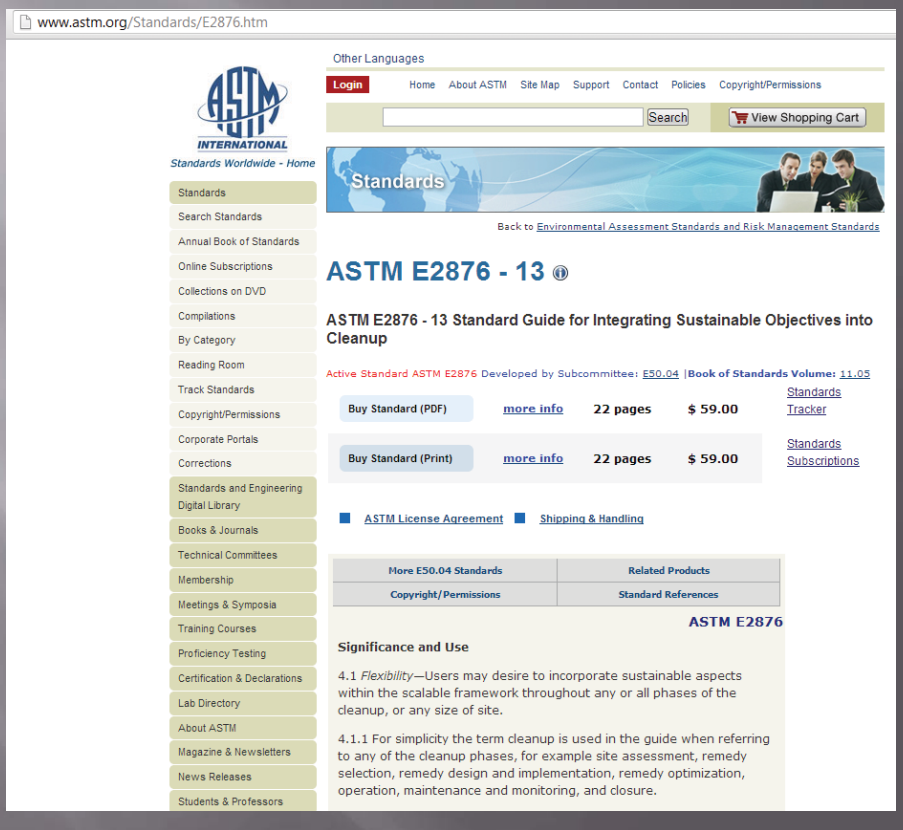
Completed by: Buddy Bealer
Date: 6-21-13

Attachment 10

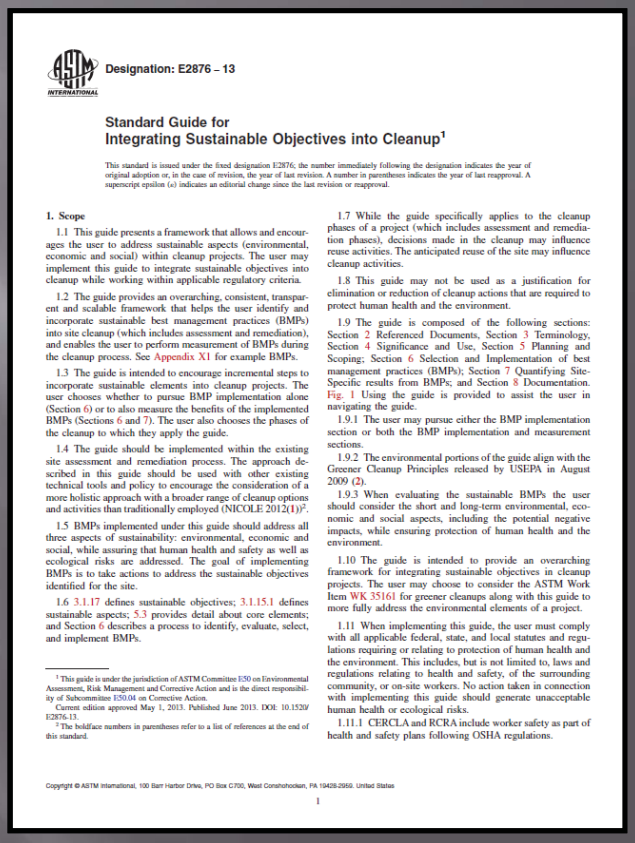
Standard Guide for Integrating Sustainable Objectives into Cleanup

ASTM E2876 - 13 STANDARD GUIDE FOR INTEGRATING SUSTAINABLE OBJECTIVES INTO CLEANUP

Helen Waldorf: hawaldorf@aol.com



Cover Page



Designation: E2876 – 13

Standard Guide for Integrating Sustainable Objectives into Cleanup[1]

This standard is issued under the fixed designation E2876; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This guide presents a framework that allows and encourages the user to address sustainable aspects (environmental, economic and social) within cleanup projects. The user may implement this guide to integrate sustainable objectives into cleanup while working within applicable regulatory criteria.

1.2 The guide provides an overarching, consistent, transparent and scalable framework that helps the user identify and incorporate sustainable best management practices (BMPs) into site cleanup (which includes assessment and remediation), and enables the user to perform measurement of BMPs during the cleanup process. See Appendix X1 for example BMPs.

1.3 The guide is intended to encourage incremental steps to incorporate sustainable elements into cleanup projects. The user chooses whether to pursue BMP implementation alone (Section 6) or to also measure the benefits of the implemented BMPs (Sections 6 and 7). The user also chooses the phases of the cleanup to which they apply the guide.

1.4 The guide should be implemented within the existing site assessment and remediation process. The approach described in this guide should be used with other existing technical tools and policy to encourage the consideration of a more holistic approach with a broader range of cleanup options and activities than traditionally employed (NICOLE 2012(1))[2].

1.5 BMPs implemented under this guide should address all three aspects of sustainability: environmental, economic and social, while assuring that human health and safety as well as ecological risks are addressed. The goal of implementing BMPs is to take actions to address the sustainable objectives identified for the site.

1.6 3.1.17 defines sustainable objectives; 3.1.15.1 defines sustainable aspects; 5.3 provides detail about core elements; and Section 6 describes a process to identify, evaluate, select, and implement BMPs.

1.7 While the guide specifically applies to the cleanup phases of a project (which includes assessment and remediation phases), decisions made in the cleanup may influence reuse activities. The anticipated reuse of the site may influence cleanup activities.

1.8 This guide may not be used as a justification for elimination or reduction of cleanup actions that are required to protect human health and the environment.

1.9 The guide is composed of the following sections: Section 2 Referenced Documents, Section 3 Terminology, Section 4 Significance and Use, Section 5 Planning and Scoping; Section 6 Selection and Implementation of best management practices (BMPs); Section 7 Quantifying Site-Specific results from BMPs; and Section 8 Documentation. Fig. 1 Using the guide is provided to assist the user in navigating the guide.

1.9.1 The user may pursue either the BMP implementation section or both the BMP implementation and measurement sections.

1.9.2 The environmental portions of the guide align with the Greener Cleanup Principles released by USEPA in August 2009 (2).

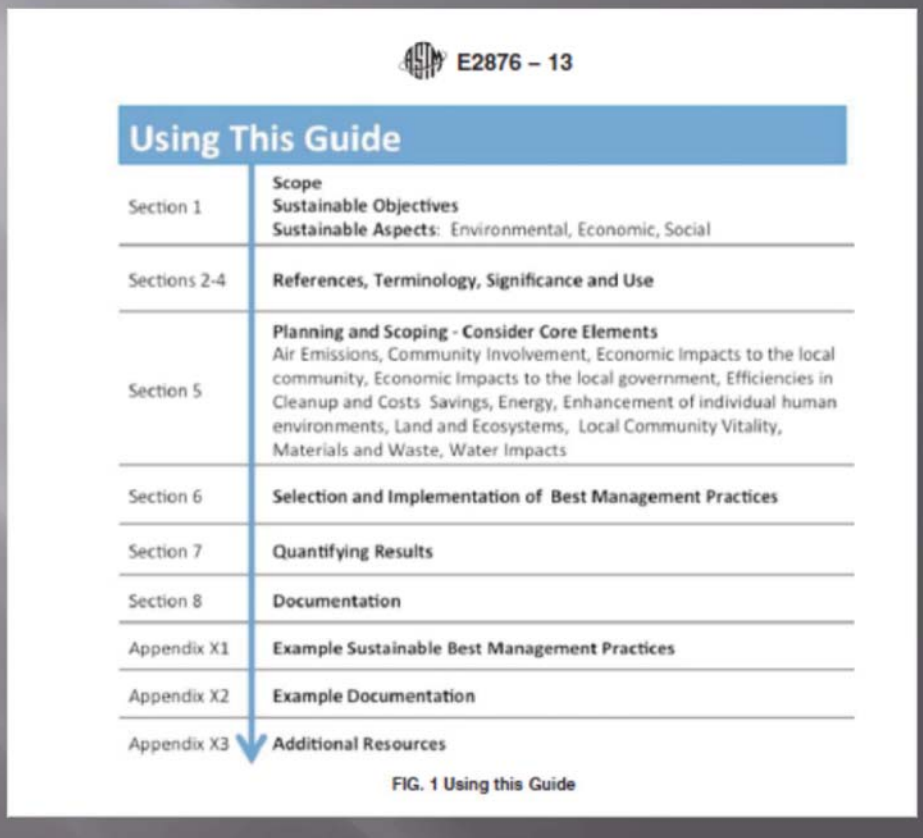
1.9.3 When evaluating the sustainable BMPs the user should consider the short and long-term environmental, economic and social aspects, including the potential negative impacts, while ensuring protection of human health and the environment.

1.10 The guide is intended to provide an overarching framework for integrating sustainable objectives in cleanup projects. The user may choose to consider the ASTM Work Item WK 35161 for greener cleanups along with this guide to more fully address the environmental elements of a project.

1.11 When implementing this guide, the user must comply with all applicable federal, state, and local statutes and regulations requiring or relating to protection of human health and the environment. This includes, but is not limited to, laws and regulations relating to health and safety, of the surrounding community, or on-site workers. No action taken in connection with implementing this guide should generate unacceptable human health or ecological risks.

1.11.1 CERCLA and RCRA include worker safety as part of health and safety plans following OSHA regulations.

[1] This guide is under the jurisdiction of ASTM Committee E50 on Environmental Assessment, Risk Management and Corrective Action and is the direct responsibility of Subcommittee E50.04 on Corrective Action.
Current edition approved May 1, 2013. Published June 2013. DOI: 10.1520/E2876-13.
[2] The boldface numbers in parentheses refer to a list of references at the end of this standard.



E2876 – 13

Using This Guide

Section 1	**Scope** **Sustainable Objectives** **Sustainable Aspects**: Environmental, Economic, Social
Sections 2-4	**References, Terminology, Significance and Use**
Section 5	**Planning and Scoping - Consider Core Elements** Air Emissions, Community Involvement, Economic Impacts to the local community, Economic Impacts to the local government, Efficiencies in Cleanup and Costs Savings, Energy, Enhancement of individual human environments, Land and Ecosystems, Local Community Vitality, Materials and Waste, Water Impacts
Section 6	**Selection and Implementation of Best Management Practices**
Section 7	**Quantifying Results**
Section 8	**Documentation**
Appendix X1	**Example Sustainable Best Management Practices**
Appendix X2	**Example Documentation**
Appendix X3	**Additional Resources**

FIG. 1 Using this Guide

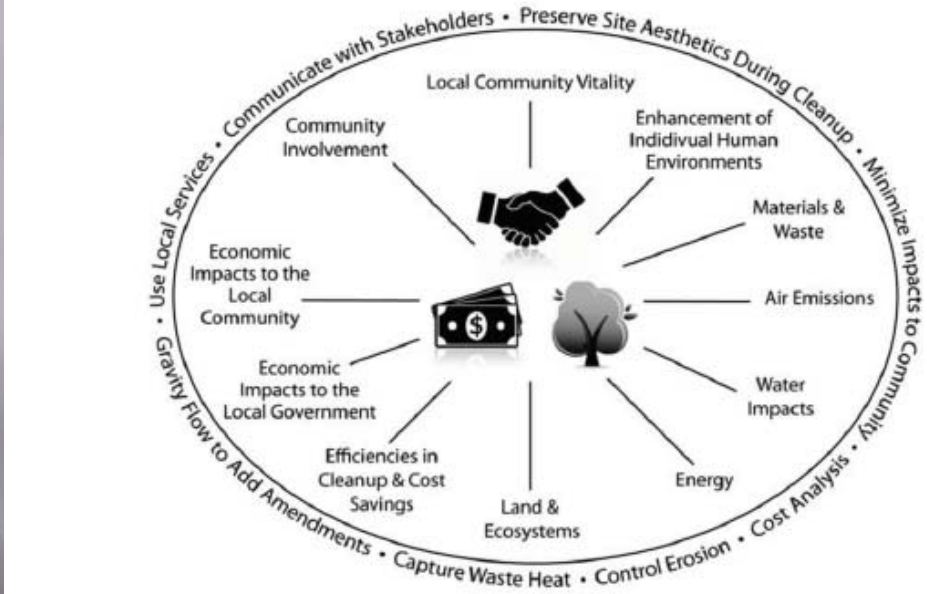


FIG. 2 Relationship Between the Sustainable Aspects (Center), Core Elements (Spokes) and BMPs (Outer Rim of Wheel)); see Appendix X1 for a more complete list of BMPs.

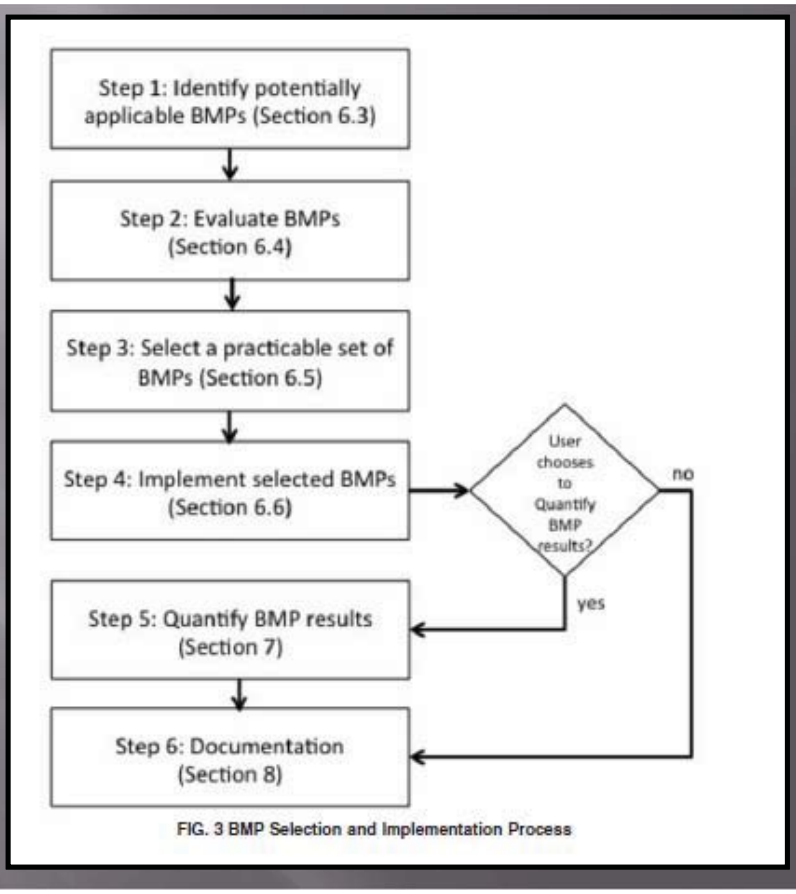


FIG. 3 BMP Selection and Implementation Process

TABLE X1.1 Sustainable Best Management Practices

Core Element[A]	Additional Core Elements Benefitted	Best Management Practices
Air Emissions	Energy Materials and Waste	Buy carbon offset credits (for example, for airline flights) when in-person meetings are required.
Air Emissions	Energy Efficiencies in Cleanup and Cost Savings Materials and Waste	Implement a telemetry system to reduce frequency of site visits
Air Emissions	Energy Efficiencies in Cleanup and Cost Savings	Implement an idle reduction plan to reduce the amount of vehicle idling at the cleanup site.
Air Emissions	Efficiencies in Cleanup and Cost Savings Materials and Waste	Install one-way check valves in well casing to promote barometric pumping (passive SVE) as a poli step once the bulk of contamination has been removed and venting to atmosphere is acceptable
Air Emissions	Energy Efficiencies in Cleanup and Cost Savings	Minimize diesel emissions through the use of retrofitted engines, low sulfur diesel or alternative fuel filter/treatment devices.
Air Emissions	Energy Efficiencies in Cleanup and Cost Savings	Use biodiesel produced from waste or cellulose based products, preferring local sources when avail reduce transportation impacts
Air Emissions	Materials and Waste	Use teleconferences rather than in- person meetings when feasible.
Air Emissions	Energy Efficiencies in Cleanup and Cost Savings	Use variable frequency drive motors to automatically adjust energy use to meet system demand on vacuum pumps, etc. that accommodate changes in operating requirements as treatment progresses
Air Emissions	Energy	When nearing asymptotic conditions and/or when continuous pumping is not needed to contain the and/or reach clean-up objectives, operate pumping equipment in pulsed mode
Air Emissions	Energy Efficiencies in Cleanup and Cost Savings Materials and Waste	Replace conventional vehicles with electric, hybrid, or compressed natural gas vehicles
Air Emissions	Energy Efficiencies in Cleanup and Cost Savings Materials and Waste	Use rebuilt or replaced engines to maximize emission reductions.
Community Involvement	Local Community Vitality	Develop templates of communication strategies
Community Involvement		Use a neutral party convener or facilitator for community engagement activities.
Community Involvement	Local Community Vitality	Amend planned remedial actions where stakeholder comments or concerns have merit and where f Communicate the updates to the community using forums that have been identified as the most effe that area. Communication sources could include: local news spots or articles, social networking site to community groups, etc.
Community Involvement	Local Community Vitality	Take steps to include stakeholder needs
Community Involvement	Local Community Vitality	Communicate public participation requirements set out in different regulatory programs to stakehold
Community Involvement	Local Community Vitality	Communicate site activities to stakeholders and the community in a non-technical fashion so that is public health risk are understood.
Community Involvement	Local Community Vitality	Conduct a public involvement charrette during remediation design early in the project where possibl times and places that, to the extent feasible, facilitate attendance or involvement by the affected pul Notify the public of potential consultation and involvement activities early enough to ensure the publ adequate time to obtain and evaluate information; consult experts, and formulate and express their options, and suggestions prior to completing specific project steps (action). Involve the public during implementation and remedy operation, using methods described in this Appendix X1.[B]
Community Involvement	Economic impacts to the local community (for example, neighborhood)	Conduct onsite citizen training sessions (for members of the local community) that directly relate to assessment and cleanup efforts.
Community Involvement	Local Community Vitality	Consider clean-up technologies which are favorable to each of the different stakeholders identified v appropriate and/or possible
Community Involvement	Local Community Vitality	Develop a contact list by consulting with community organizations and add to the list those member public who request they be added. Update the list regularly and subdivide the list by category of int geographic area. Use the list to send announcements, reports and other communication with the pu
Community Involvement	Local Community Vitality	Empathize with stakeholders. Listen carefully to what stakeholders are saying
Community Involvement	Local Community Vitality	At the start of the project, establish clear lines of communication with stakeholders, particularly the l community.
Community Involvement	Local Community Vitality	Establish regular meetings and/or workshops to provide information to the public on the status of th The number of meetings will be based on stakeholder needs and will be site-specific.
Community Involvement	Local Community Vitality	Extend public participation activities beyond regulatory requirements, especially for sites with impact

TABLE X1.1 *Continued*

Core Element[A]	Additional Core Elements Benefitted	Best Management Practices
Community Involvement	Local Community Vitality	Identify and implement opportunities to enhance community dynamics
Community Involvement	Local Community Vitality	Identify organizations with common environmental, social and/or economic concerns. Determine how partner with these organizations or individuals to build a relationship with the local community.
Community Involvement	Local Community Vitality	Identify the various groups who constitute the stakeholders and the community.
Community Involvement	Local Community Vitality	Implement strategies to develop a more collaborative relationship with stakeholders beyond existing regulatory requirements to the extent possible, for example by engaging the stakeholders and increas transparency of operations at the site.
Community Involvement	Local Community Vitality	Monitor on a continuing basis, both the effectiveness of the efforts to improve public involvement, and effectiveness of public involvement activities.
Community Involvement	Local Community Vitality	Obtain and review stakeholder feedback early in the project and implement to the extent possible.
Community Involvement	Economic impacts to the local community (for example, neighborhood)	Plan and budget for the public involvement. Budget documents should include resources for public involvement separate from and in addition to funds required to comply with statutes and executive or that require public involvement.[C]
Community Involvement	Local Community Vitality	Provide feedback to stakeholders.
Community Involvement	Economic impacts to the local community (for example, neighborhood)	Provide financial assistance for public involvement, when needed, for example providing public transp to public meetings for community members.
Community Involvement	Local Community Vitality	Provide the public with adequate and timely information concerning forthcoming actions or decisions. sheets, news releases, summaries, and similar publications in print and on the Internet may be used provide notice of availability of materials.
Community Involvement	Local Community Vitality	Resolve conflicts, for example, diverging opinions about site end uses or redevelopment, with stakeh as early as possible.
Community Involvement	Local Community Vitality	Respond to stakeholder questions and concerns in a timely fashion to ensure that their needs are ad as quickly as possible.
Community Involvement	Local Community Vitality	Take steps to resolve conflicts among stakeholders regarding site end uses or redevelopment as earl possible by acknowledging and recording each divergent opinion.
Economic impacts to the local community (for example, neighborhood)	Economic impacts to the local government (for example, city or county)	Acquire supplies such as cleanup products, safety supplies, work equipment, fuels/lubricants from the of or adjacent to the cleanup site to the maximum extent practicable.
Economic impacts to the local community (for example, neighborhood)	Economic impacts to the local government (for example, city or county)	Encourage contractors to use local services while working on the site (for example motels, trailer par restaurants, grocery stores) from the area of or adjacent to the cleanup site to the maximum extent practicable.
Economic impacts to the local community (for example, neighborhood)	Community Involvement	Gather information on each potential contractor's and supplier's social responsibility for its employees Review wages, benefits, personnel policies and discrimination complaints during the contractor and s selection process where feasible.
Economic impacts to the local community (for example, neighborhood)	Economic impacts to the local government (for example, city or county)	Identify a post-cleanup land-use development type which spurs the neighborhood-scale economy, wit displacing legacy residents.
Economic impacts to the local community (for example, neighborhood)	Local Community Vitality	Make provisions to accommodate temporary access to local businesses, public facilities and residenc the extent possible.
Economic impacts to the local community (for example, neighborhood)	Community Involvement	Modify cleanup approaches to address concerns about disruptions and disturbances to local resident businesses. Solicit opinions from local residents and implement suggested mitigation measures that a appropriate.
Economic impacts to the local community (for example, neighborhood)	Materials and Waste	Provide on-site collection and storage area for compostable materials for use on-site or by the local community
Economic impacts to the local community (for example, neighborhood)	Economic impacts to the local government (for example, city or county)	Use local staff (including subcontractors) when possible to minimize resource consumption
Economic impacts to the local government (for example, city or county)	Economic impacts to the local community (for example, neighborhood)	Employ local contractors, where possible. Hire labor including skilled and professional labor as well a manual labor from the area of or adjacent to the cleanup site to the maximum extent practicable. Lab includes subcontractors, part-time labor, security, environmental technicians, professional geologists, professional engineers, and health and safety professionals. The project could specify a minimum percentage of jobs that must be given to qualified local residents and businesses, or semi-qualified re who can be qualified with minimal training.
Economic impacts to the local government (for example, city or county)	Economic impacts to the local community (for example, neighborhood)	Encourage the provision of training (for example, Hazwoper training per 29 CFR 1910.120) for the lo workforce (for example, apprenticeships for young adults between the ages of 18 to 25) so as to exp opportunities for site employment activities.
Economic impacts to the local government	Economic impacts to the local community (for	Identify and implement innovative techniques to create economically and socially sustainable opportu

X2. INTEGRATING SUSTAINABLE OBJECTIVES IN CLEANUP: EXAMPLE DOCUMENTATION

X2.1 *Introduction*—This appendix supports the documentation elements described in Sections 5 through 8 of the guide. This documentation should be publicly available and include the following information:

X2.1.1 *Documentation Report*—The user should record conducted activities and their associated substantial benefits in an Integrating Sustainable Objectives in Cleanup (ISOC) report.

X2.1.2 Site Information, including impact of the release and planned cleanup activities

X2.1.3 Sustainable Objectives

X2.1.4 Use of Property Before, During, and After Cleanup

X2.1.5 Level of Stakeholder Participation

X2.1.6 Core Elements to be Addressed and Associated BMPs

X2.1.6.1 Identification of potentially applicable BMPs (see 8.2.6 of the guide)

X2.1.6.2 Evaluation process for comparison of BMPs

X2.1.6.3 Selected BMPs

X2.1.6.4 Implementation of BMPs

X2.1.7 Surrounding Area identified for application of BMPs

X2.1.8 Time Horizon for Project

X2.1.9 Project Team

X2.1.10 Data Needed

X2.1.11 Results

X2.1.12 *Example Reports*—Two example report forms are provided. X2.2 provides a general form suitable for an ISOC report for most sites. X2.3 provides a shorter form suitable for an ISOC report for small non-complex sites.

X2.2 *General Form*—This form supports the documentation of most sites.

X2.2.1 *Identify Site Information:*
(1) Site name:
(2) Site location (address, city, state): _____
(3) Site owner name: _____
(4) Tax parcel ID #: _____
(5) EPA, State, Project ID #: _____
(6) Cleanup program (for example, RCRA, State voluntary cleanup program): _____
(7) Lead oversight agency (for example, EPA, State, other): _____
(8) Site size (acres): _____

X2.2.2 *Identify Contact Information:*
(1) User Name/Organization: _____
(2) E-mail address/phone number: _____

X2.2.3 *Identify Impact of the Release and Planned Cleanup Activities:*
(1) Chemicals of Concern: _____
(2) Affected Media (for example, surface soil, groundwater): _____

X2.2.4 *Identify Sustainable Objectives:*
(1) Objective: _____
(2) Objective: _____
(3) Additional objectives as needed.

X2.2.5 *Identify Use of Property Before, During, and After Cleanup* (for example, chemical manufacturer and now a shopping center):
(1) Historical use: _____
(2) Current use: _____
(3) Post-cleanup use: _____

X2.2.6 *Efforts Taken for Stakeholder Collaboration and Community Involvement*—To maintain public transparency, the user documents dates, times and locations of:
(1) Public notifications of the availability of the project information.
(2) Public meetings to discuss the site and sustainable activities.
(3) Public document repositories such as a public library, senior center, offices of regulatory agencies or other secure public place.
(4) Community engagement charrettes.
(5) Posting of the ISOC report on a publicly available web site on the Internet or submittal of the ISOC report to the regulatory agency.
(6) Other activities conducted for stakeholder collaboration.

X2.2.7 *Identify Core Elements to be Addressed, in Alphabetical Order*—The user should identify each of the core elements to be addressed. Discuss each core element and how it applies to the site.
(1) Air Emissions
(2) Community Involvement
(3) Economic Impacts to the Local Community
(4) Economic Impacts to the Local Government
(5) Efficiencies in Cleanup and Cost Savings
(6) Energy
(7) Enhancement of Individual Human Environments
(8) Land and Ecosystems
(9) Local Community Vitality
(10) Materials and Waste
(11) Water Impacts

X2.2.8 *Identify Associated BMPs*—The user should identify the BMPs to be implemented for each selected core element and document the substantial benefits associated with each BMP. The user may choose to develop a table, or other applicable format, to include the information about the BMPs.
(1) Identify the cleanup phase of the project (for example, Site Assessment): _____
(2) For Remedy Design and Implementation or Operation, Maintenance and Monitoring, identify the specific cleanup technology(ies) being used: _____

X3. ADDITIONAL RESOURCES

X3.1 Practice E1527-05 Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process

X3.2 Practice E1903-97(2002) Standard Guide for Environmental Site Assessments: Phase II Environmental Site Assessment Process

X3.3 Favara, P., Krieger, T., Boughton, B., Fisher, A., & Bhargava, M. (2011). Guidance for performing footprint analyses and life-cycle assessments for the remediation industry. Remediation, 21(3), 39–79.

X3.4 Illinois EPA 2008. Green Cleanups.

X3.5 International Standards Organization (ISO), 2008. International Standards Organization, 14400.

X3.6 NRC, 2012. "Alternatives for Managing the Nation's Complex Contaminated Groundwater Sites." National Academies Press. Washington, D.C. http://www.nap.edu/catalog.php?record_id=14668.

X3.7 USACE, US Navy, Battelle, 2008. Site WiseTM.

X3.8 USAFCEE, 2008. Sustainable Remediation Tool (SRT™).

X3.9 USEPA, 2006. Guidance on Systematic Planning using Data Quality Objectives Process. EPA/240/B-06/001. February.

X3.10 USEPA, 2007. Integrating Sustainability into EPA's Cleanup Programs, Deborah Goldblum, CL:AIRE Inaugural Sustainability Meeting.

X3.11 USEPA, 2008a. Green Remediation: An EPA Perspective. Michael D. Gill, EPA Region 9, 2008 International Workshop on P2 and Sustainable Development, San Diego, CA. November.

X3.12 USEPA, 2008b. Green Remediation: Best Management Practices for Excavation and Surface Restoration. EPA 542-F-08-012. December.

Attachment 11
ASTM's Greener Cleanup Standard Guide

1

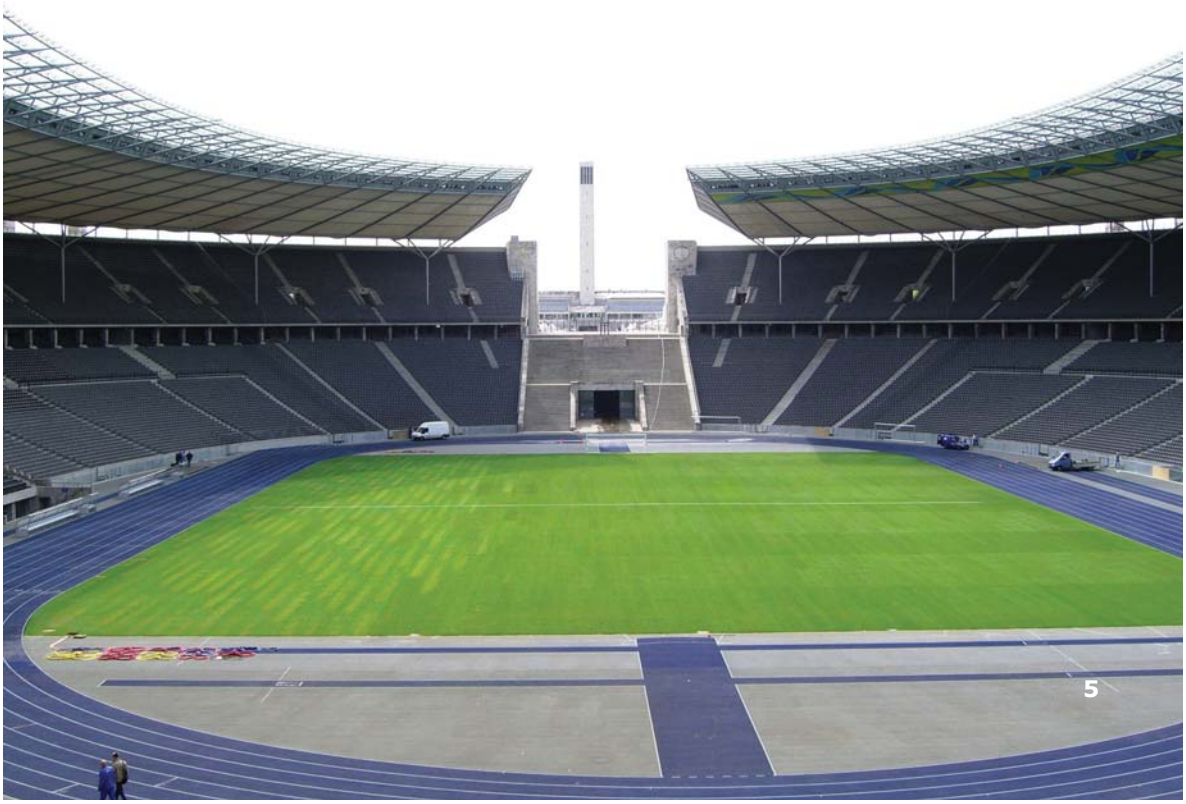
ASTM's
Greener Cleanup Standard Guide

Deb Goldblum, EPA Region 3
SURF Chicago
July 24, 2013

2

3

4

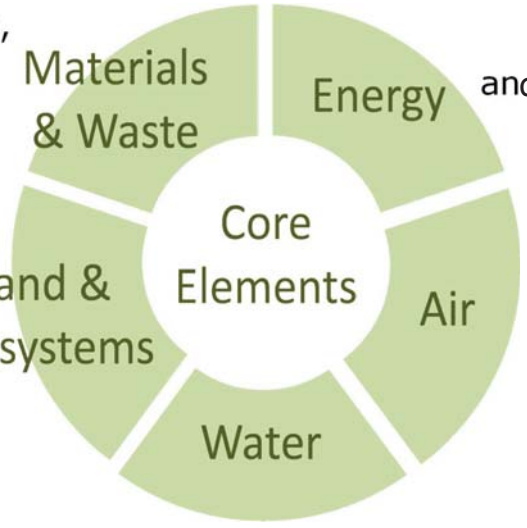


5

6

"Minimize, Reuse, and Recycle…"

"Reduction, Efficiency, and Renewables…"



"Conserve, Protect, and Restore…"

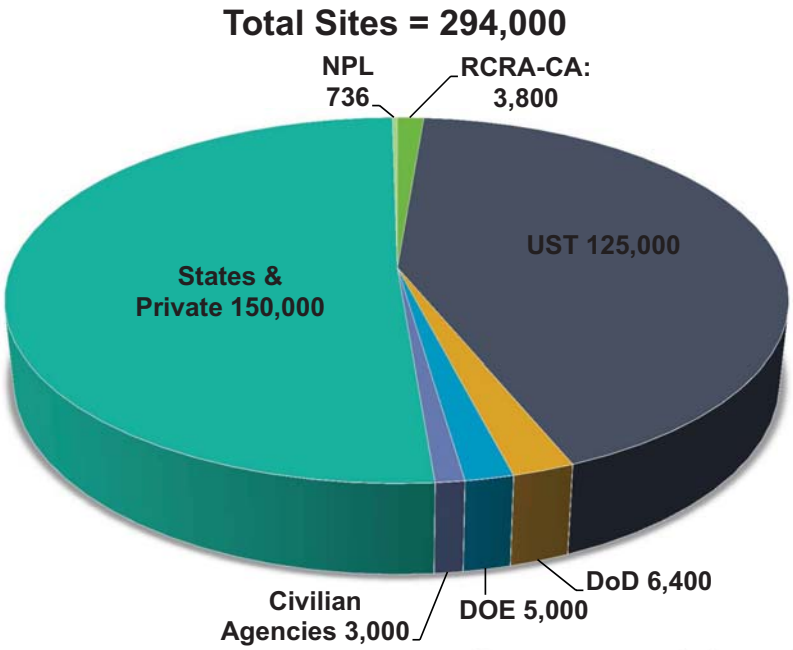
"Protect Air Quality, Reduce Greenhouse Gases…"

"Improve Quality, Decrease Quantity of Use…"

8

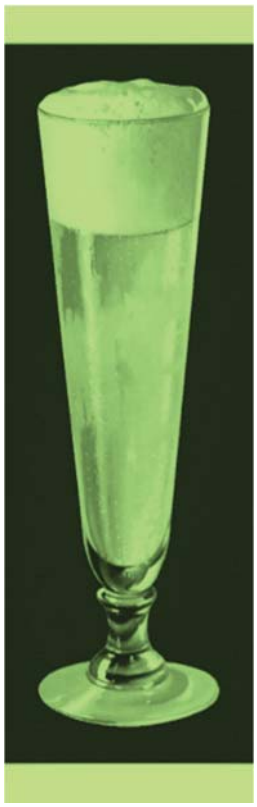
Estimated Number of Contaminated Sites

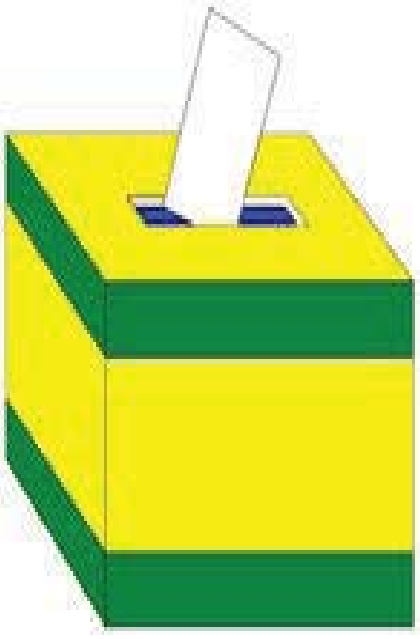
(United States, Cleanup horizon: 2004 – 33)



Source: www.clu-in.org/market

9





10

11

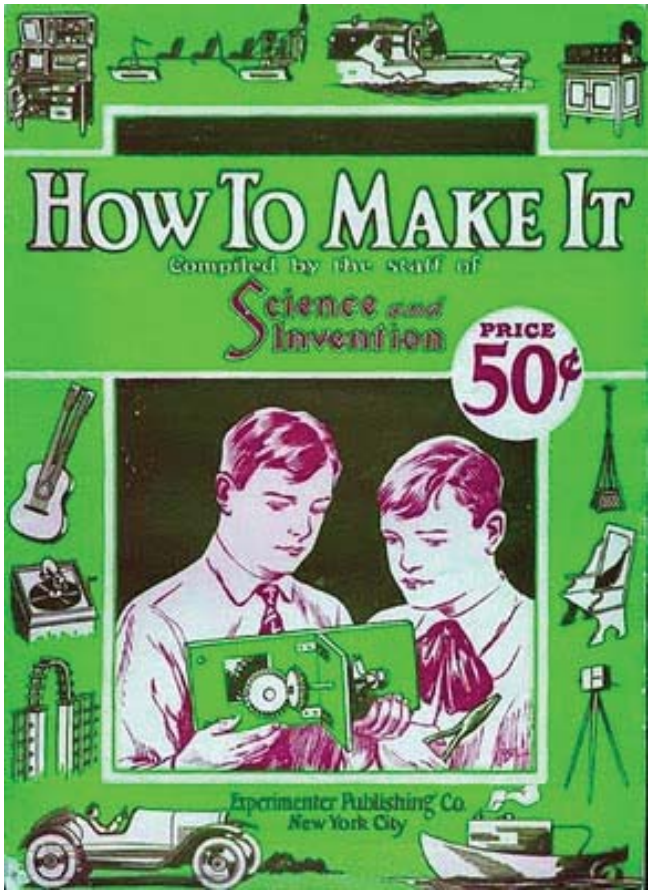
12

13

14


SEEK
TRUTH

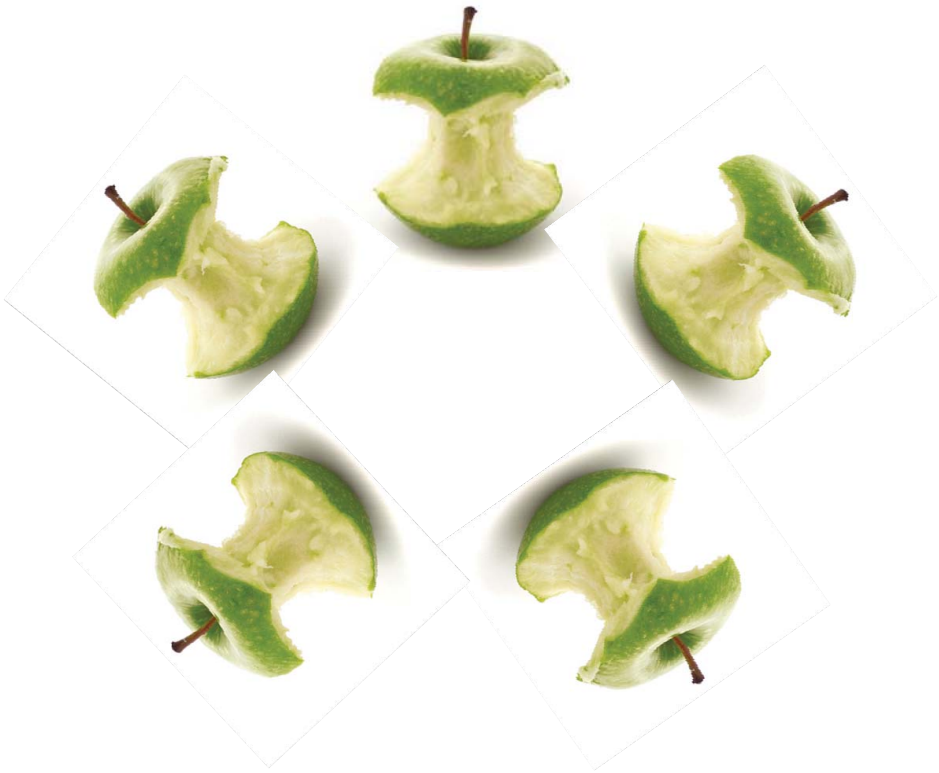
15


HOW TO MAKE IT
Compiled by the staff of
Science and Invention
PRICE
50¢
Experimenter Publishing Co.
New York City

16

17

18



Attachment 12

State Perspective on the ASTM Greener Cleanup Standard Guide

STATE PERSPECTIVE ON THE ASTM GREENER CLEANUP STANDARD GUIDE

HEATHER NIFONG, ILLINOIS EPA JULY 2013

A FEW STATES CREATED THEIR OWN PROTOCOLS

DER-31 / Green Remediation	
New York State Department of Environmental Conservation **DEC Program Policy**	
Issuing Authority: Val Washington	**Title:** Deputy Commissioner Office of Remediation and Materials Management
Date Issued: August 11, 2010	**Latest Date Revised:** January 20, 2011

A Practical Guide to Green and Sustainable Remediation in the State of Wisconsin

BUT, STATE-SPECIFIC GC STRATEGIES ARE **RESOURCE INTENSIVE!**

THE ASTM STANDARD WILL SIMPLIFY AND ACCELERATE GREENER CLEANUPS

- Uniform process that works across programs
- Carefully vetted BMPs
- Robust reporting and transparency requirements
- Doesn't need state regulator review
- ASTM name legitimizes the GC process

WHAT ARE STATE OPTIONS FOR USE?

Some will choose to ignore it.

Application of the GC guide is entirely voluntary.

IMPLEMENTATION AT *SELECT SITES ONLY*

A good place to start is with state-funded O&M optimization for early gains and cost savings.

POLICY STATEMENT OF PREFERRED IMPLEMENTATION AT ONE OR AT ALL PROGRAMS

State Lead NPL and Federal Facilities
State Lead RCRA Corrective Action
State Funded Hazardous Substance Cleanups
Voluntary Cleanups
Tanks

THE MORE CHALLENGING REGULATORY AMENDMENT

- ✓ Incorporation by reference
- ✓ As preferred implementation
- ✓ Required for compliance

Section 742.210 Incorporations by Reference

a) The Board incorporates the following material by reference:

Agency for Toxic Substances and Disease Registry (ATSDR) Minimal Risk Levels (MRLs), U.S. Environmental Protection Agency, 1600 Clifton Road, Mailstop F32, Atlanta, Georgia 30333, (770) 488-3357 (November 2007).

ASTM International. 100 Barr Harbor Drive, West Conshohocken PA 19428-2959, (610) 832-9585.

ASTM D 2974-00, Standard Test Methods for Moisture, Ash and Organic Matter of Peat and Other Organic Soils, approved August 10, 2000.

IF THE GUIDE IS SO GREAT, WHY NOT **REQUIRE** SITES TO USE IT?

- Every state has multiple cleanup program regulations
- Limited authority: remedy selection versus optimizing with BMPs
- Uncertain validity of alternative remedies and innovative strategies
- Unpredictable state budget impacts and procurement constraints
- Meager tech support on a site-specific basis, especially for high volume programs like state voluntary cleanups

HOW ABOUT SOME INCENTIVES?

- For fee-based Voluntary Cleanups and Tank reimbursement programs, states could offer ASTM GC sites percentage rebates or expedited technical review
- For any of the programs, states could recognize ASTM GC sites with awards and publicity

WHAT CAN STATE REGULATORS DO RIGHT NOW?

- Start a conversation
- Make the case for green BMPs
- Showcase lessons learned
- Welcome incremental change

WHAT'S THE LEARNING CURVE LIKE?

Illinois EPA is piloting the ASTM Standard Guide BMP Process at four brownfield sites. The Opportunity Assessment (deciding which of the 160+ BMPs to apply) has taken the most time. To become adept at using this process, regulators and contractors need to figure out which subset of BMPs work for the types of sites they manage, then consider possible add-ons.

FOR MORE INFORMATION

Heather Nifong
Illinois EPA, Bureau of Land
217-785-4729
heather.nifong@illinois.gov

Attachment 13

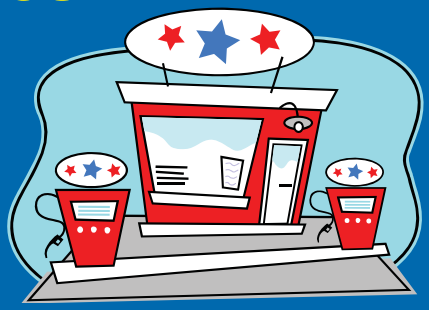
Pilot Use of ASTM Greener Cleanup Guide at an Industry Site

Pilot Use of ASTM Greener Cleanup Guide at an Industry Site

Stephanie Fiorenza
BP Remediation Engineering & Technology

July 24, 2013
SURF 23, Chicago

Site Specifics

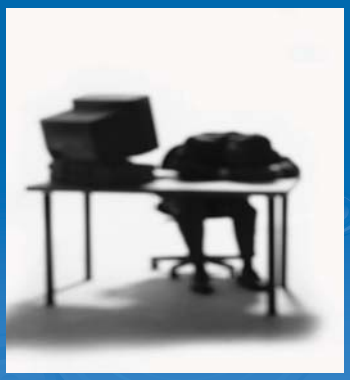


- Existing retail station
- Remedy selected
- Project in Remedy Design
- Ideal for BMP screening with Greener Cleanup Guide

Steps to a Greener Cleanup

1. Opportunity Assessment –

Go through the 160 BMPs and select all that may be possible to use at your site.



Example Selection from BMP Table

Best Management Practice	Energy	Air	Water	Materials and Waste	Land and Ecosystems
Operate system during off-peak hours of electrical demand, without compromising cleanup progress	X				
Use pulsed rather than continuous injections when delivering or extracting air to increase energy efficiency when nearing asymptotic conditions	X				
Use gravity flow where feasible to reduce the number of pumps for water transfer after subsurface extraction	X			X	
Install amp meters to evaluate consumption rates on a real-time basis to evaluate options for off-peak energy usage	X				
Use on-site generated renewable energy (including but not limited to solar photovoltaic, wind turbines, landfill gas, geothermal, and biomass combustion, etc.) to power cleanup activities	X	X			
Use excess plant steam as an energy source to power cleanup activities	X				

Opportunity Assessment

- Most time-consuming step – a 3 hour conference call
- Will improve with searchable Excel file
- Will improve with experience
- BMPs reduced from 160 to 59 yes/maybe

Next Steps

2. BMP Prioritization
3. BMP Selection

Steps 2 and 3 collapsed – resulted in 10 High, 2 Medium, 4 Low Priority BMPs

4. BMP Implementation
5. BMP Documentation

Conclusions

- Learning curve reasonable
- Provides options that users may not have considered
- Provides an out for BMPs that are not suitable
- No reason not to use it, especially on simple sites

Acknowledgments

- Sergio Morescalchi, BP
- Scott Keesey, Broadbent, Inc.

Crossover Benefits to Remediation

Impact / BMP	Environmental	Social	Economic
Soundproof aboveground equipment housing	Land and Ecosystems benefits	Minimize disturbance to neighbors	
Implement telemetry	Reduces Energy consumption and Air emissions	Reduced driving risk	Less transportation cost
Purchase material in bulk quantity	Reduces Waste and Material consumption		Bulk purchasing saves $
Surgically target treatment zone	Improves all 5 core elements		Less material cost, less energy cost, etc

Attachment 14
Regulatory Perspective Panel Discussion

Regulatory Panel

SURF 23

SURF

Panelists

- Jennifer Borski, WI DNR
- Brad Bradley, EPA Region 5
- Deborah Goldblum: EPA Region 3
- Heather Nifong, IL EPA

SURF

Questions

1. How do your agency co-workers view Green and/or Sustainable Remediation (is there a difference)?
2. How do you personally view Green and/or Sustainable Remediation?
3. How do you and/or your agency co-workers believe that the social perspectives can be best incorporated into GSR?
4. What do you see as the future of green or sustainable within your organization?

Regulatory Panel

SURF 23

Attachment 15
Student Chapter Updates

Univ. of Illinois at Chicago Update

Team Members:

1. **Bala Yamini Sadasivam**
2. **Erin Yargicoglu**
3. **Reshma A. Chirakkara**
4. **Rajiv Giri**
5. **Kamel Babaeivelni**
6. **Nasir Ahmad**

Objectives:

1. Promote SURF's mission to students and academic personnel
2. Expand the student chapter and diversify our involvement in several sustainability –related initiatives on- and off-campus

Accomplishments:

1. Established UIC-SURF chapter
2. Conducted a sustainability workshop and organized sustainability seminars with invited speakers from academia

Next Steps:

1. Focus on expanding student chapter
2. Form student chapter Facebook page
3. Organize field-trips and technical seminars to help students understand the application of sustainability principles in engineering design

Upcoming Meetings/Presentations:

1. SURF 23 conference at UIC campus

Help Needed:

- **Help Needed: Board**
  - Invited speakers with experience in sustainable remediation in the industry welcomed
- **Help Needed: Membership**
  - Promote SURF student chapters

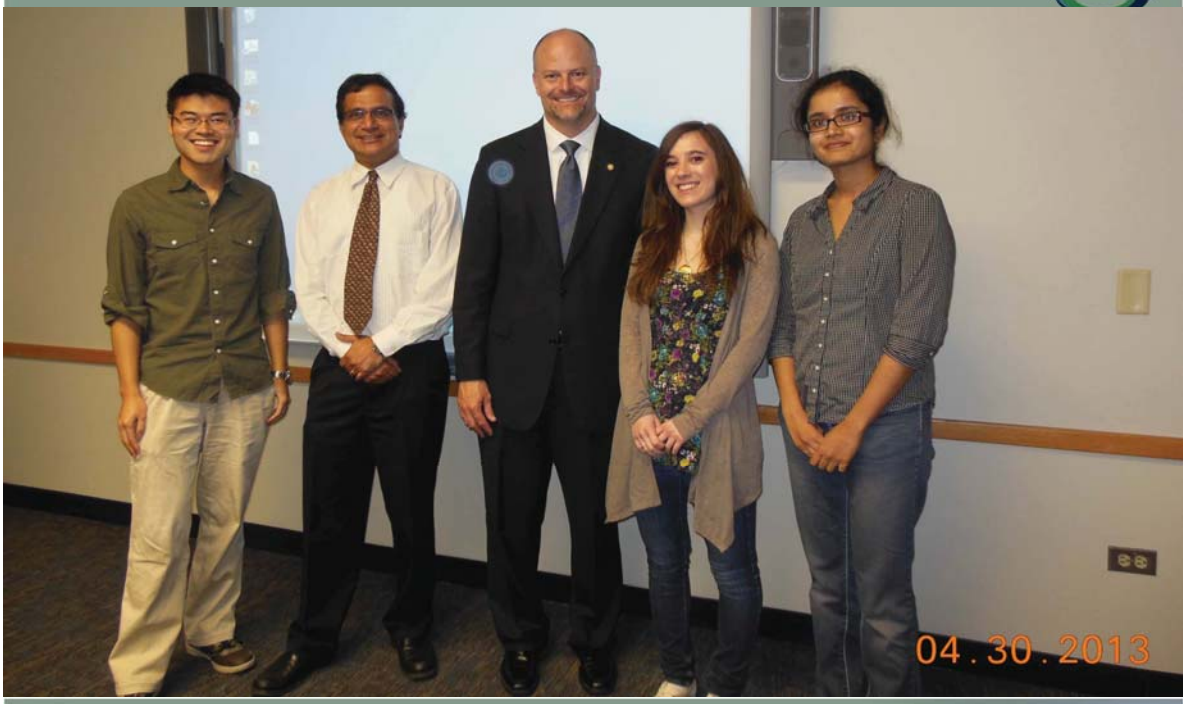
Student Chapter Pics

Spring 2013

SURF Chapter Inaugural Workshop

SURF December 10, 2012

Phytoforensics with Joel Burken



SURF April 30, 2013

Clarkson University Student Chapter

Team Members: Kyle Monahan Laura Tiche Emily Gonthier Kaitlin Hayes Josh Knapp Samantha Karpa Ashley Waldron Chuan Tang	**Objectives:** 1) Increase membership (many members have graduated) 2) Provide professional development events for students to explore remediation career options
Accomplishments: Hosted 2 guest speakers Contributed to SURF newsletter	**Next Steps:** Reschedule AECOM remediation site visit in Albany for fall 2013 Local outreach events planned for summer and early fall 2013
Upcoming Meetings/Presentations: Plan on attending SURF 23	**Help Needed:**

Colorado State University (CSU) Student Chapter

Team Members:

- Mitchell Olson (faculty advisor)
- Dr. Tom Sale (figure head)
- Maria Irianni-Renno (President)
- Missy Tracy (VP)
- Rachael McSpadden (Director of Communications)
- Daria Akhbari (Treasurer)

Objectives:

- Promote student interest in sustainability and remediation
- Attract more students into environmental/engineering fields
- Have fun

Accomplishments:

- Membership currently consists of about 20 students
- Recent Guest speakers – Dr. Tom Sale (CSU), Dr. Susan DeLong (CSU), John Claypool (AECOM)
- Participation in film event at CSU: "Switch"
- Field trip: City of Fort Collins storm water treatment system
- Set up Facebook page: https://www.facebook.com/SurfColoradoStateUniversityStudentChapter?ref=hl

Next Steps:

- Future guest speakers
- Working on fall-semester on-campus movie event
- Broaden the perspective of our student chapter by recruiting students from other disciplines (i.e., non-engineering)

Upcoming Meetings/Presentations:

- SURF 23: student and faculty participation

Help Needed:

- Ideas for discussion topics that promote student involvement and attract interest of early undergraduates.
- Ways to promote student involvement in the SURF parent organization?
- Would like to find guest speakers from outside of CSU!

Stanford Student Chapter

Team Members:

- Lead – Jay Thompson
- Diana Lin
- Yongju Choi
- Chinghong Hsieh
- YeoMyoung Cho
- Niveen Ismail

Objectives:

- From our charter:

"Develop knowledge of sustainable environmental remediation and provide professional mentorship to benefit Stanford students interested in environmental remediation by providing a focused group for discussions, collaborative projects, and networking opportunities."

Accomplishments:

- Received official recognition from University as a student group.
- Abstract for our LCA project accepted for a platform talk at Battelle. (Withdrawn due to lack of travel funds).
- Membership growing. 10-12 members with varying degrees of involvement.

Next Steps:

- Complete LCA project. Prepare manuscript.
- Bring more speakers to Stanford. Seminar series and/or roundtable.
- Prepare for an official "roll-out" as a student group next fall.

Upcoming Meetings/Presentations:

- Biweekly meetings

Help Needed:

Feedback on LCA once manuscript is near completion.

Attachment 16

Academic Outreach Initiative Working Session and Brainstorming Notes

SURF STUDENT CHAPTER DESIGN COMPETITION (SDC)

BREAK OUT SESSION

SDC: BROAD BRUSH VIEW

SURF Student Chapter Design

A **semester long competition** among undergraduate and graduate level **students** within **SURF student chapters** in which students will **strategize and solve** a **"real life" remediation engineering problem** using remediation **engineering and sustainability** tools/concepts for which they will [hopefully] receive college credit toward graduation. Students will [hopefully] **compete** in front of a **live panel of judges** at a summer **2014 SURF meeting**.

SDC OBJECTIVES

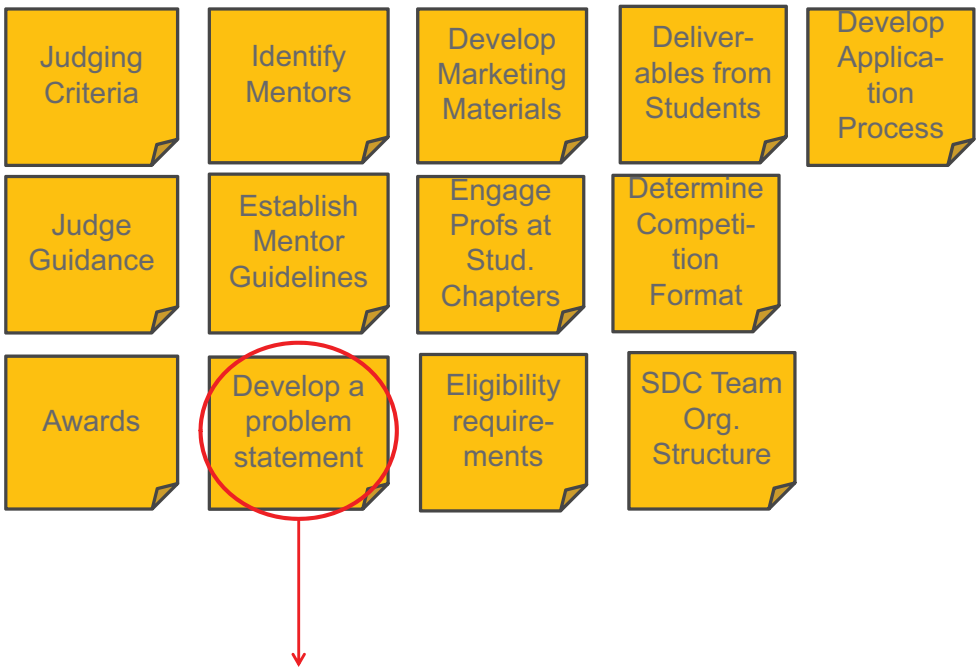
What do STUDENTS get out of it?

- **Solve** an actual **engineering problem,** develop **analytical thinking** skills,
- **Establish and foster relationships** with industry professionals (NETWORKING!),
- **Contribute** at a higher level to a **professional organization**.

What does SURF/REMEDIATION INDUSTRY get out of it?

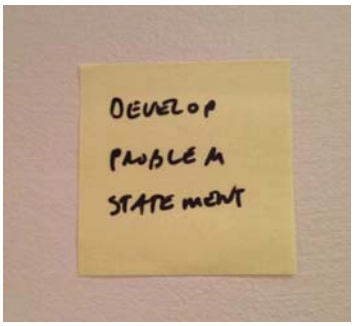
- Provide a **significant contribution** to the **development of students**,
- Future **ACTIVE SURF members**,
- New **industry contacts** (NETWORKING!),
- Students from **top universities** more likely **enter the environmental remediation industry** upon graduation.
- Fresh **ideas** from **student teams**

PROGRAM COMPONENTS



TODAY'S WORK

Make a major swipe at →



FORMAT OF DELIVERABLE:

EPA Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA (EPA.540/G-89/004)

SURF provides sufficient data, such as from Chap. 1 of RI/FS:

- Background Information
- Site Description
- Site History
- Nature and Extent of Contamination
- Contaminant Fate and Transport
- Baseline Risk Assessment

LET'S GET TO WORK!!

Site ideas/possible sites

Key elements of problem statement

Volunteers to provide site & problem

Working Session Notes:
SURF Student Chapter Design Competition
Academic Outreach Initiative

1. Sites for Design Problem
    a. Municipal landfill with solvents in fractured bedrock
    b. Air Force or Navy site (reports publicly available)
    c. Fictional site
    d. Brownfield site
    e. Geotracker site
2. Key Elements of Problem Statement
    a. Provide beneficial reuse of waste
    b. Optimize existing remedial system
3. Approach
    a. Provide limited set of ARARs
    b. Provide booklet of site information
    c. Limit to soil, sediment, groundwater
    d. Limit scope of problem and provide guidelines
    e. Consider student eligibility criteria
    f. Allow for a number of sites to be used

Attachment 17
Membership Committee Working Session and Brainstorming Notes

SURF Membership

- Industry
- Consultants
- Academics
- Regulatory
- Government
- Vendors

SURF Membership

- Participation in SURF activities demonstrates:
  - Environmental stewardship
  - Employee involvement and accountability
  - Stakeholder engagement
  - Commitment to a leadership role in sustainable remediation practices
  - Alignment of business and sustainability objectives

SURF Membership

- By joining SURF:
  - Partnerships and build relationships
  - Discussions and sharing of "lessons learned”
  - Networking with industry leaders
  - Co-author deliverables
  - Advance the practice

SURF Membership

- SURF offers a number of benefits to our members from the academic community, including:
  - Reduced membership rates
  - Assistance in defining research topics and finding research funding
  - Facilitation of cross-discipline linkages for research projects and student theses
  - Additional opportunities for research publication
  - Networking assistance for students during the job search

SURF Membership

- Re-energize the membership committee
- What can we do to increase membership?
- What is our "value proposition"?

Working Session Notes:
Membership Committee

1. Reorganize website based on user experience
    a. Update look
    b. Consider pros and cons of volunteer vs. paid person
    c. Showcase current initiatives and publications more prominently
    d. Develop an *active* blog
2. Increase activity on Twitter, LinkedIn (merge other sustainable remediation group with ours), and other social media
3. Update white paper and reissue
4. Recruit new members
    a. Undergraduates
        i. Travel to other local schools to promote SURF
        ii. Secure a table at an activities fair
    b. Consultants
        i. Make presentations at meetings of other organizations (e.g., AGU)
        ii. Secure a table at Battelle and use opportunity to market SURF brand (e.g., pins, stress balls)
        iii. Partner with AWMA on webinars
        iv. Partner with other professional organizations
        v. Attend industry conferences (e.g., Railroad Environmental Conference)

Membership Benefits

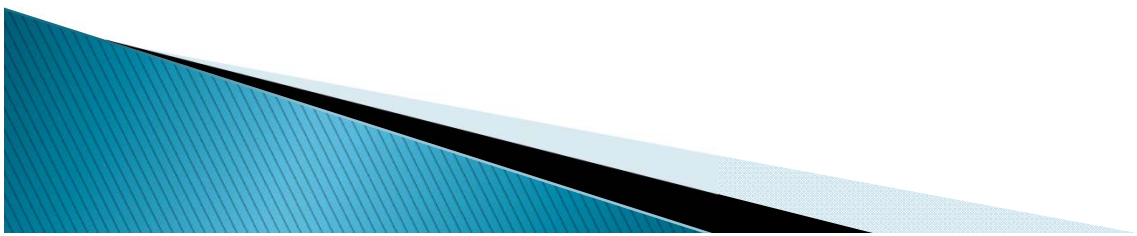
- Networking forum
- Opportunity to author publications
- Sustainable remediation resources
- Benchmarking with other organizations

Attachment 18
Sustainable Remediation Initiative


SRI

Presentation Outline

- Organization
- Charter
  - Goals
  - Members
  - Strategy
  - Plan
- Products
- Engagement Plans
- Schedule



SRI

Sustainable Remediation Initiative

SURF

INTERSTATE TECHNOLOGY REGULATORY COUNCIL ITRC

energy API

Goals

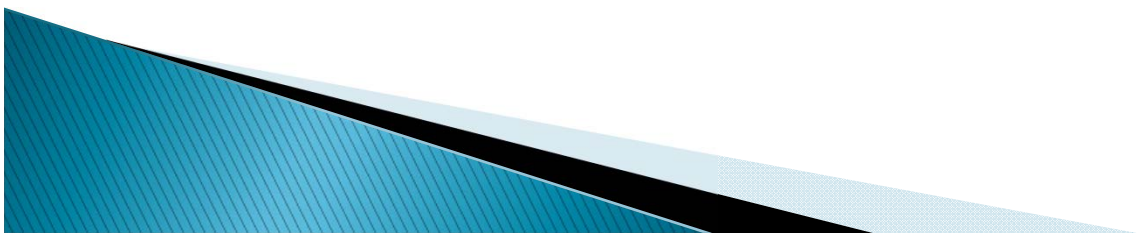
- Promote Sustainable Remediation to key stakeholders in the United States
- Develop synergy from organizations who promote Sustainable Remediation

Team Members

- Keith Aragona, Haley and Aldrich (karagona@haleyaldrich.com)
- Buddy Bealer, Shell (leroy.bealer@shell.com)
- Charles Blanchard, GES (CBlanchard@GESOnline.com)
- Brandt Butler, URS (brandt.butler@urs.com)
- Sean Damon, Langan (sdamon@langan.com)
- Stephanie Fiorenza, BP (Stephanie.fiorenza@bp.com)
- Angela Fisher, General Electric (fishera@ge.com)
- Nicholas Garson, Boeing (nick.garson@boeing.com)
- Diana Hasegan, Langan (dhasegan@langan.com)
- Karin Holland, Haley and Aldrich (kholland@haleyaldrich.com)
- Marianne Horinko, The Horinko Group (mhorinko@thehorinkogroup.org)
- Melissa Koberle-Harclerode, CDMSmith (koberlema@cdmsmith.com)
- Jason McNew, EAEst (jmcnew@eaest.com)
- Kathryn Moxley, Boeing (Kathryn.I.Moxley@boeing.com)
- Leah Pabst, CRA (lpabst@craworld.com)
- Olivia Skance, Chevron (olivia.skance@chevron.com)
- Dave Woodward, AECOM (dave.woodward@aecom.com)

Strategy

- Create synergy from the supporting organizations (API Energy, ITRC, SURF) by using their strengths to coordinate and combine communication and outreach efforts
  - SURF: operating organization with large motivated membership
  - ITRC: recognized and respected work product, motivated members, , regulatory perspective
  - API Energy: stakeholder knowledge and resources
- Establish common concepts, definitions, and language for Sustainable Remediation
- Adopt ITRC framework as basis of outreach
- Establish system to perform outreach to key stakeholders

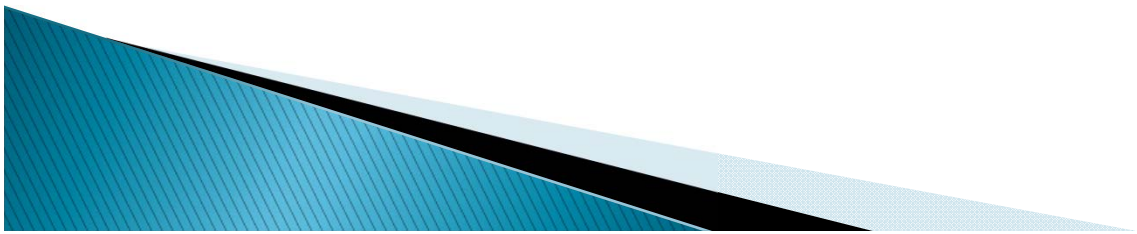


Plan

- Develop standard presentations (slides, webinars, and videos) including:
  - definition
  - 5 minute (one page summary)
  - 25 minute
  - Video formats: YouTube 5 minute and 25 minute
- Identify key stakeholders and regulatory jurisdictions to train on benefits, concepts, and methods to implement SR, identify SRI team lead for each critical organization. They could be early adopters, large impact, or opportunity driven.
- Present to key stakeholders via conferences, webinars, workshops, and one-on-one meetings.

Products

- Definition: revised
- One Page: completed
- 30 Minute: drafted
- AV: to be completed



Sustainable Remediation

Sustainable Remediation (SR) protects human health and the environment while holistically maximizing benefits to the environmental, social, and economic nexus.

It is a systematic process where stakeholders determine and measure relevant risks and benefits of key issues (social, environmental, and economic) and boundaries (spatially and temporally) to weigh the consequences of possible options and select the most appropriate solution for site specific conditions. It stimulates creativity and innovation to design solutions that are better for the environment, people, and the economy. SR is not an excuse to do nothing, a list of sustainable technologies, or new. SR is:

- A simple concept, idea, and way of thinking,
- boundary opening (spatial, temporal),
- holistic (considers social, environmental, economic aspects)
- a stakeholder centric framework (process based),
- flexible and scalable (can be simple or sophisticated)
- evolutionary and state-of-the-art,
- congruent with and readily accepted in most regulations,
- supported by ITRC, SURF, and ASTM,
- common sense.

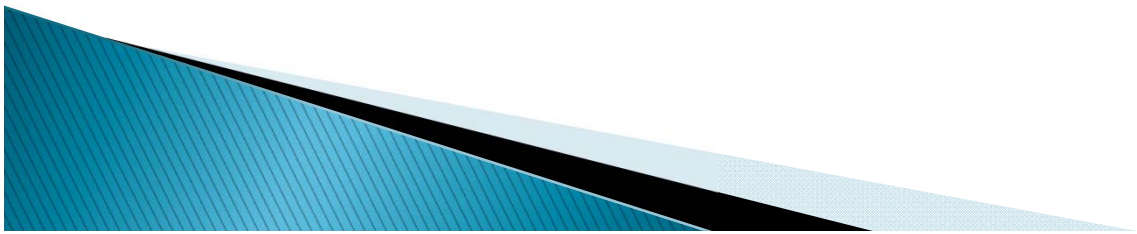
Metric	Excavation	Bioremediation	Soil Vapor Extraction
Greenhouse gases	☹	☺	😐
Solid waste	☹	☺	☺
Sensitive species	☹	☺	😐
Community disturbance	☹	☺	☺
Community acceptance	☺	☺	😐
Cost	☺	😐	😐

The Sustainable Remediation Initiative (SRI) is a collaboration of US organizations seeking to promote the understanding and implementation of sustainable remediation. The Sustainable Remediation Forum (SURF), Interstate Technology & Regulatory Council (ITRC), and API Energy have joined together in their efforts to promote sustainable remediation. SRI supports the ITRC Green and Sustainable Remediation (GSR) Framework as a mechanism for responsible parties, consultants, and regulators to implement SR.

SRI

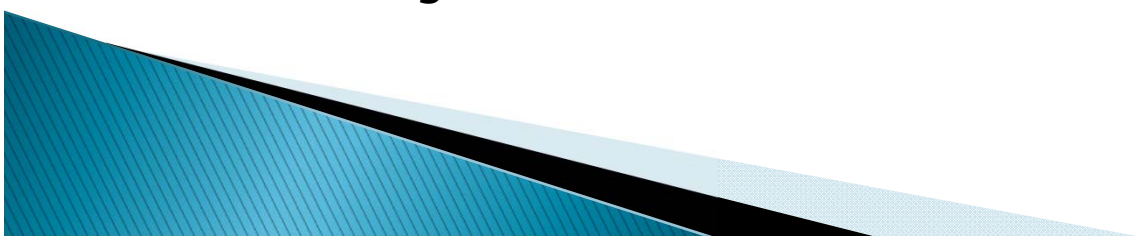
Region Engagement Plans

- **Team Members:** *(indicate team lead)*
- **Key Stakeholders:** *(identify and indicate why a key stakeholder)*
- **Current Region Position on Sustainable Remediation (Federal and Key States in Region)**
  - ❑What (if any) current policy? Is it currently accepted? Possible?
  - ❑Blockers – what is preventing implementation currently?
  - ❑What (if any) is regulatory framework that may allow use?
- **Strategy:** *(general approach on how to address roadblocks & regulatory framework)*
- **Plan:** *(specific steps and action items with accountabilities of what needs to be done to implement strategy with schedule identifying milestones)*
- **Implementation:**
  - ❑Milestones: (current status of implementation of the plan)
  - ❑Status: (how is project progressing)
  - ❑Adjustments: (what needs to be changed)
- **Action Items**
  - ❑List of specific actions to be taken with who and when will be done
- **Success/Key Performance Indicators**:
  - ❑Document what changes or adaptations were made to enable sustainable remediation actions
  - ❑Document just which sustainable remediation actions the state enacted
  - ❑Advertised Success (write up, newsletter, consultant cost saving claims …)



Region Planning

- **Region 2**: Sean Damon, Dave Woodward, Tom O'Neill, Brandt Butler:
  - New Jersey
  - New York
- **Region 3**: Brandt Butler, Dave Woodward
  - Pennsylvania
  - Delaware
- **Region 5**: Keith Aragona, Rebecca Bourdon
  - Michigan
  - Minnesota
  - Wisconsin
- **Region 9**: Olivia Skance, Buddy Bealer
  - California
- **Region 10**: Nick Garson
  - Oregon
  - Washington



Gov.Outreach SRInitiative

Team Members:

- Leads – Buddy Bealer & Stephanie Fiorenza

•Keith Aragona, Charles Blanchard, Brandt Butler, Angela Fisher, Nicholas Garson, Diana Hasegan, Karin Holland, Marianne Horinko, Melissa Koberle-Harclerode, Jason McNew, Kathryn Moxley, Leah Pabst, Olivia Skance, Dave Woodward

- Board Liaison – Buddy Bealer

Objectives:

- Update standardized presentations (525: 5 words, 5 minutes, 25 minutes, 2.5 hours)
- Identify strategic regulatory stakeholders and develop engagement plan with specific strategy and plan
- Begin implementation of Region plans using standardized materials
- Develop methods to encourage and promote regulatory participation and membership in SURF

Accomplishments:

- Final drafts of presentation materials to be updated monthly on SURF website
- Final draft implementation strategy to be US EPA Region based with each region developing specific plan with team lead
- API preliminary commitment for $30K

Next Steps:

- Complete Region specific regulatory engagement plans
- Seek additional SURF member support for engagement efforts
- Schedule and perform engagements

Upcoming Meetings/Presentations:

- Calls every two weeks
- Individual Region Specific Team calls per team lead

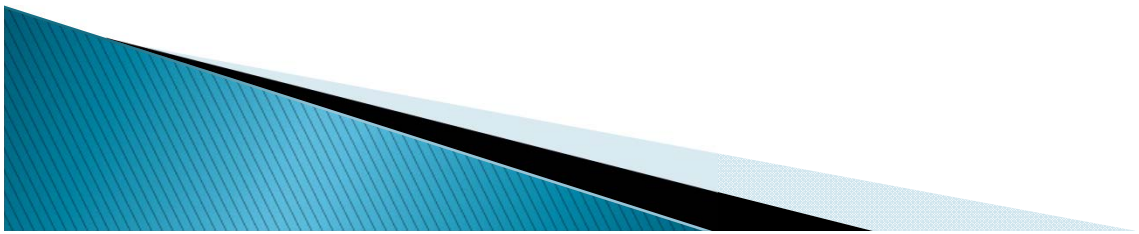
Help Needed:

- **Help Needed: Board**
  - Continue support
- Help Needed: Membership
  - Participation in Region ngagement teams

Completed by: Buddy Bealer
Date: 6-21-13

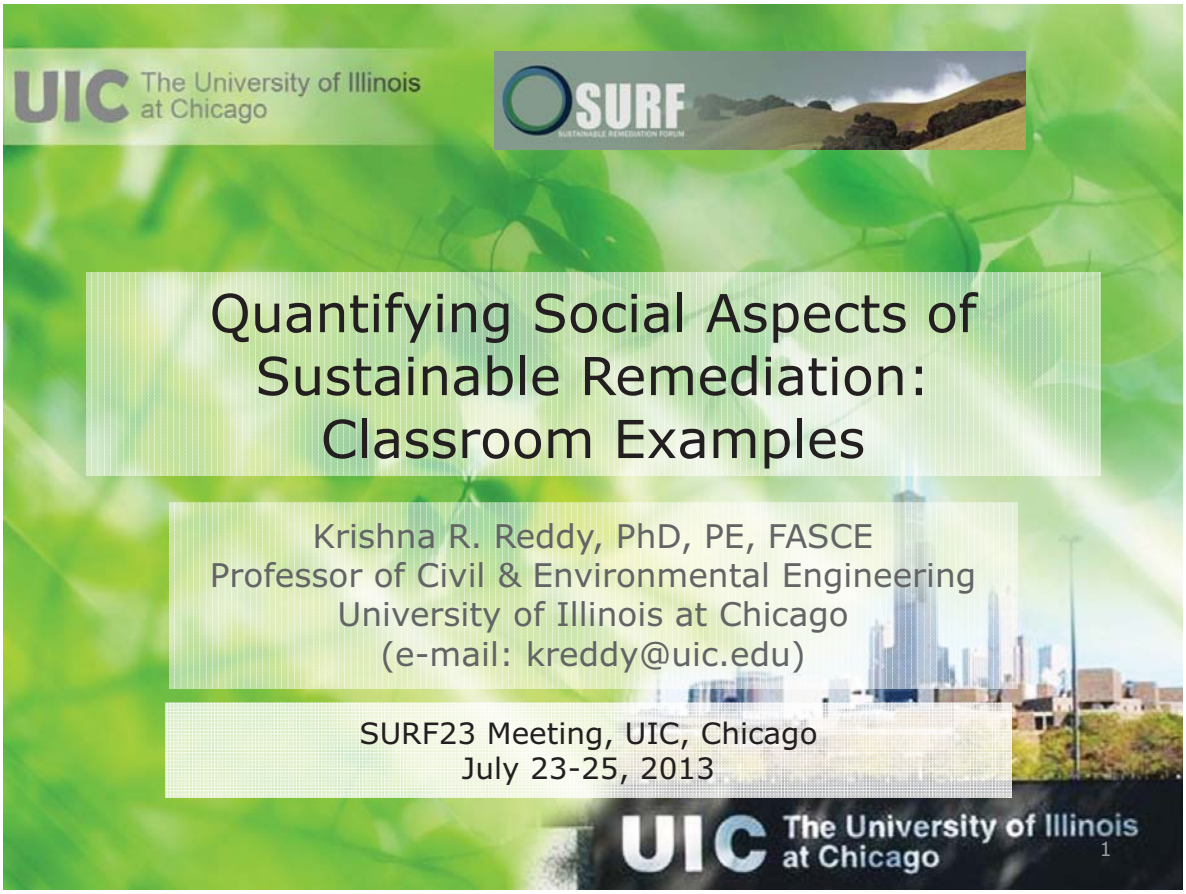
Path Forward

- August: Revise one page
- Evergreen: Update 30 minute presentation
- Q3: Develop alternate presentation materials
- Q3: Develop custom Region engagement plans: team calls
- Q4: Implement engagements




SRI

Attachment 19
Quantifying the Social Aspects of Sustainable Remediation: Classroom Examples



General Definition of Sustainability

UIC

World Commission on Environment and Development report (UN, 1987) entitled, *Our Common Future* (also known as the *Brundtland Report*)

"…development that meets the needs of the present without compromising the ability of future generations to meet their own needs."

Functional Definition of Sustainability

- Sustainability has become a buzzword in every field/organization!!!
- The Brundtland Commission definition is succinct and captures the essence of sustainability, but it is too general for planning and implementation purposes.
- More functional definitions are defined by different organizations/companies that reflect their specific goals.

USEPA Definition of Sustainability

- USEPA Executive Order (Federal Register, 2009)

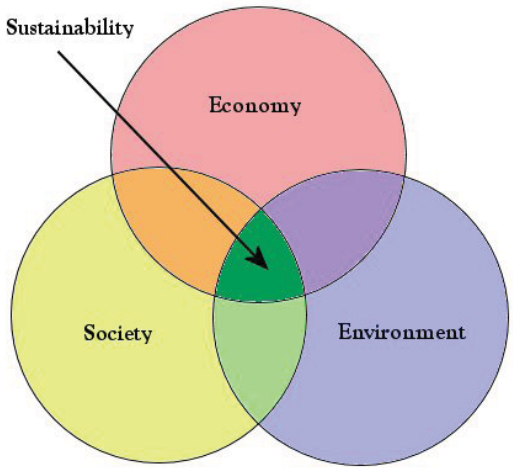
  "Sustainability" and "sustainable" mean to create and maintain conditions, under which humans and nature can exist in productive harmony, that permit fulfilling the social, economic, and other requirements of present and future generations.

- USEPA (2011)

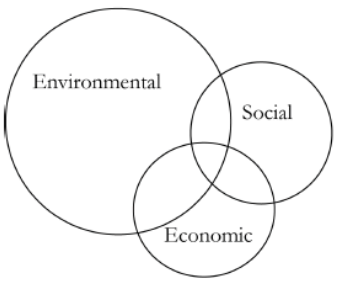
  Sustainability is the continued protection of human health and the environment while fostering economic prosperity and societal well being.

Three "Pillars" of Sustainability

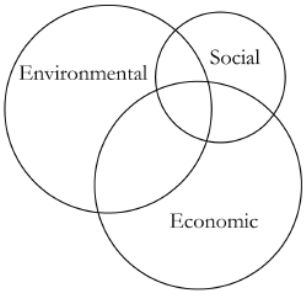
- The essence of sustainability can be captured by the concept of "three pillars" of sustainability
  - environmental, economic, and social



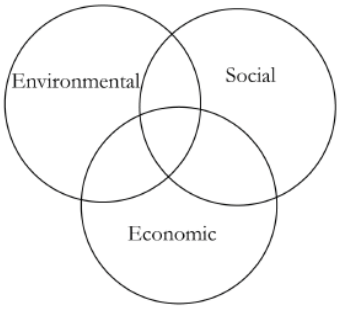
Importance of Three Pillars



1980s /mid-1990s



late 1990s



2000s, balance?

Sustainability Indicators and Metrics

- Sustainability Indicators
  - Measurable aspects of environmental, economic, or social systems (e.g., GHG emissions)
  - Useful for monitoring changes in system characteristics relevant to the continuation of human and environmental well being
- Sustainability Metrics
  - Measured values to assess specific indicators
  - Methods to determine each metric for the specific study (e.g., LCA)

Attributes of Sustainability Indicators

- Formal, Informal, Objective, or Subjective
- SMART

  S=Simple; M=Measurable; A=Accessible; R=Relevant & T=Timely
- SPICED

  S=Subjective; P=Participatory; I=Interpreted and Communicable; C=Cross-checked and Compared; E=Empowering; & D=Diverse and Disaggregated

UN Sustainability Indicators

Poverty
- Unemployment rate
- Poverty index
- Population living below poverty line

Population Stability
- Population growth rate trend
- Population density

Human Health
- Average life expectancy
- Access to safe drinking water
- Access to basic Sanitation
- Infant mortality rate

Living Conditions
- Urban population growth rate
- Floor area per capita
- Housing cost

Coastal Protection
- Population growth
- Fisheries yield
- Algae index

Agricultural Conditions
- Pesticide use rate
- Fertilizer use rate
- Arable land per capita
- Irrigation % of arable land

Ecosystem Stability
- Threatened species
- Annual rainfall

Atmospheric Impacts
- Greenhouse gas emissions
- Sulfur oxide emissions
- Nitrogen oxides emissions
- Ozone depleting emissions

Generation
- Municipal waste
- Hazardous waste
- Radioactive waste
- Land occupied by waste

Consumption
- Forest area change
- Annual energy consumption
- Mineral reserves
- Fossil fuel reserves
- Material intensity
- Groundwater reserves

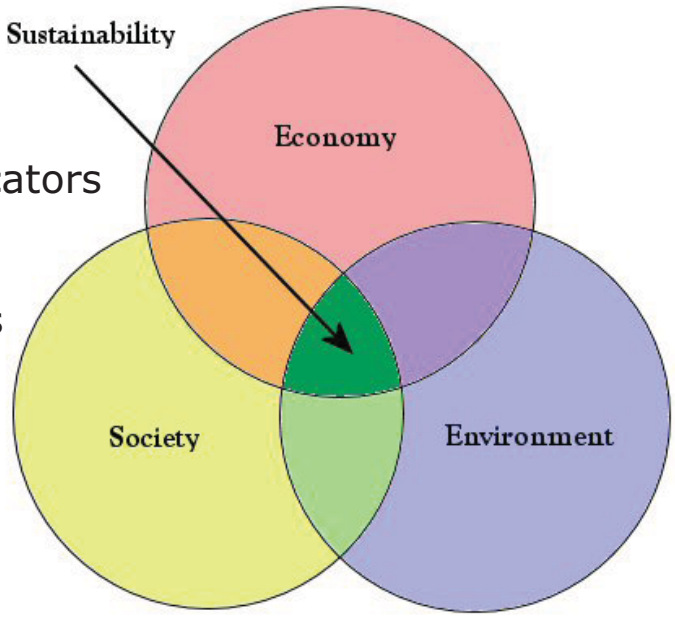
Economic Growth
- GNP
- National debt/GNP
- Average income
- Capital imports
- Foreign investment

Accessibility
- Telephone lines per capita
- Information access

Sources:
United Nations, *Indicators of Sustainable Development*
World Bank, *World Development Indicators*

Functional Sustainability Indicators for Environmental Remediation

- Environmental Indicators
- Economic Indicators
- Social Indicators



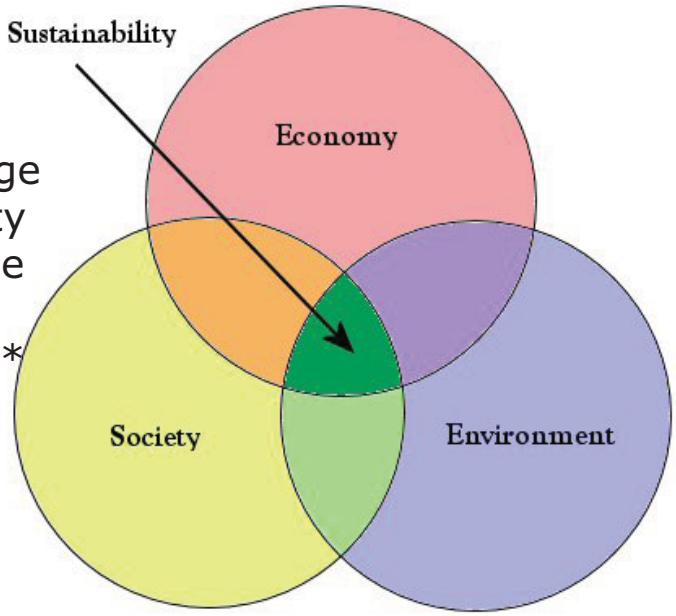
Environmental Sustainability Indicators

Indicators

- ✓ Impact on water
- ✓ Impact on soil
- ✓ GHGs-climate change
- ✓ Air emissions/quality
- ✓ Natural resource use
- ✓ Waste generation
- ✓ Impacts on ecology*
- ✓ …

Metrics and Tools

- ✓ Established



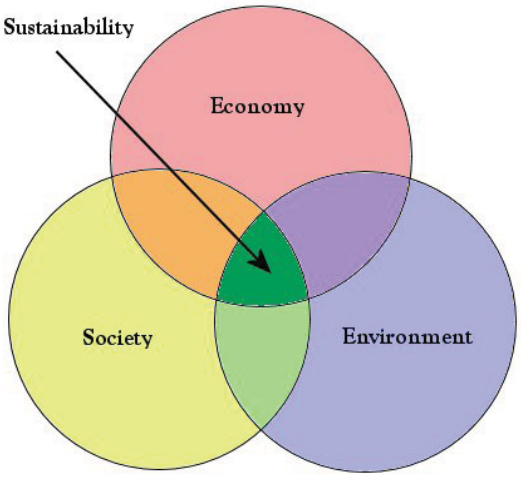
Economic Sustainability Indicators

Indicators

- ✓ Direct economic costs & benefits
- ✓ Indirect economic costs & benefits
- ✓ Employment opportunities & human capital
- ✓ Induced economic costs & benefits
- ✓ Project lifespan & flexibility
- ✓ …

Metrics and Tools

- ✓ Some established



Social Sustainability? Indicators?

- **Definition** (Polese and Stren, 2000)

  Development (and/or growth) that is compatible with harmonious evolution of civil society, fostering an environment conductive to the compatible cohabitation of culturally and socially diverse groups while at the same time encouraging social integration, with improvements in the quality of life for all segments of the population.

- **Common Ingredients** (Colantonio, 2007)
  - ✓ Meeting basic needs
  - ✓ Overcoming disadvantage attributable to personal disability
  - ✓ Fostering personal responsibility, including social responsibility and regard for the needs of future generations
  - ✓ Maintaining and developing the stock of social capital, in order to foster trusting, harmonious and co-operative behavior needed to underpin civil society
  - ✓ Attention to the equitable distribution of opportunities in development, in the present and in the future
  - ✓ Acknowledging cultural and community diversity, and fostering tolerance
  - ✓ Empowering people to participate on mutually agreeable terms in influencing choices for development and in decision-making

Social Sustainability Indicators

- ✓ Physical/mental health
- ✓ Health of vulnerable groups
- ✓ Leisure & cultural facilities
- ✓ Archaeological facilities
- ✓ Cultural facilities
- ✓ Adequate housing
- ✓ Quality of housing
- ✓ Living space
- ✓ Cultural aspects
- ✓ Health consciousness
- ✓ Population growth rate
- ✓ Age distribution
- ✓ Organizational culture
- ✓ Attitude to work
- ✓ Management style
- ✓ Education
- ✓ Earning capacity
- ✓ Living standard
- ✓ Ethical issues
- ✓ Diversity
- ✓ Immigration/emigration
- ✓ Ethnic/religion factors
- ✓ Demographics
- ✓ Equal opportunity
- ✓ Self-reliance
- ✓ Family solidarity
- ✓ Social cohesion
- ✓ Human health-chronic & acute risks
- ✓ Ethics & equality
- ✓ Neighborhood & locality
- ✓ Communities & community involvement
- ✓ Uncertainty & evidence
- ✓ Life expectancy at birth
- ✓ Student graduation rates
- ✓ Homeless households
- ✓ Employed, unemployed, inactive
- ✓ Working age
- ✓ Community health and safety
- ✓ Workers' health and safety
- ✓ Drinking water supply
- ✓ Direct local employment
- ✓ Business opportunities
- ✓ Public unrest
- ✓ Quality of life
- ✓ Public use
- ✓ Cultural heritage

Metrics and Tools

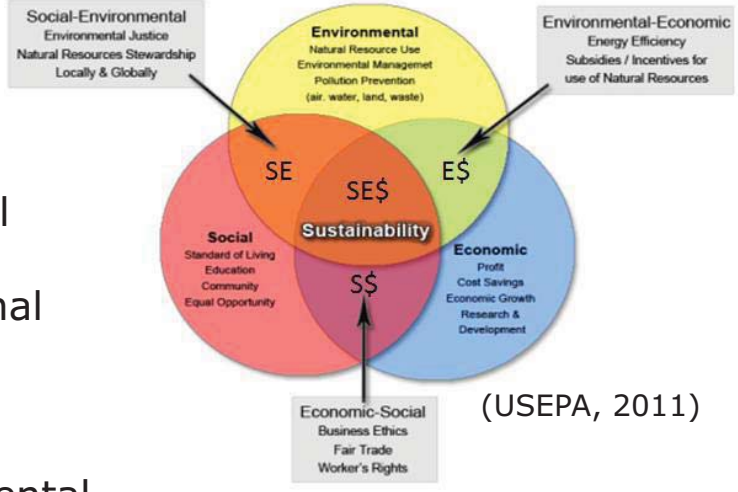
✓Scarce?

Quantifying Social Aspects of Sustainable Remediation

UIC

Dimensions

- ✓ Social-Individual
- ✓ Socio-Institutional
- ✓ Socio-Economic
- ✓ Socio-Environmental



(USEPA, 2011)

Social Sustainability Evaluation Matrix (SSEM)

UIC

- Under development (using for classroom instruction)
- Excel spreadsheet (available upon request)
- Four dimensions and several identified key measures for each dimension
  - Social (18 key measures)
  - Socio-Institutional (18 key measures)
  - Socio-Economic (11 key measures)
  - Socio-Environmental (13 key measures)
- Flexible to add more key areas based on specific project

Social: Key Areas

Dimension	Key Measure
Social	Effect of proposed remediation on quality-of-life issues during and post-construction/remediation
	Crime
	Cultural identity and promotion
	Overall public health and happiness
	Population demographics (age, income)
	Gender equity
	Justice and equality
	Care for the elderly
	Care for those with special needs
	Degree to which post-remediation project will result in learning opportunities and skills development for community
	Degree to which post remediation project will result in leadership development/empowerment opportunities
	Enhancement of community/civic pride resulting remediation and post-remediation project
	Degree to which tangible community needs are incorporated remediation design
	Transformation of perceptions of project and environs within greater community
	Potential of post-remediation project to enhance cultural diversity in community
	Potential of incorporating newcomers to community
	Potential of remediation to foster better health through enhanced recreational opportunities
	Enabling knowledge management (including access to E-knowledge)

Socio-Institutional: Key Areas

Dimension	Key Measure
Socio-Institutional	Appropriateness of future land use with respect to the community environment
	Degree of land use planning fostered by proposed construction/remediation
	Involvement of community in land use planning decisions
	Enhancement of commercial/income-generating land uses
	Improvement and enhancement of market-rate housing stock
	Improvement and enhancement of affordable housing stock
	Enhancement of recreational facilities
	Enhancement to the architecture/aesthetics of built environment
	Enhancement and participation of school system (i.e., new buildings) in community
	Enhancement and participation of religious institutions (i.e., new congregations and facilities) in community
	Enhancement and participation of government institutions (i.e., new facilities) in community
	Degree of "grass-roots" community outreach and involvement
	Involvement of community organizations pre- and post-construction/remediation
	Enhancement of cultural heritage institutions within community
	Involvement and enhancement of community-based charitable organizations
	Incorporation of green and sustainable infrastructure into construction/remediation
	Enhancement of transportation system improvements
	Trust, voluntary organizations and local networks (also know as social capital)

Socio-Economic: Key Areas

Dimension	Key Measure
Socio-Economic	Disruption of businesses and local economy during construction/remediation
	Employment opportunities during construction/remediation
	Employment opportunities post-construction/remediation
	Degree of project investment toward Local Business Entities (LBEs)
	Degree of project investment toward Disadvantaged Business Entities (DBEs)
	Post-construction/remediation 3rd party business generation
	Relative degree of increased tax revenue from Site Reuse
	Relative degree of increased tax revenue from nearby properties
	Degree to which green/sustainable or other "new economy" businesses may be created
	Degree of stimulated informal activities/economy
	Degree of anticipated partnership and collaboration with outside investors/institutions

Socio-Environmental: Key Areas

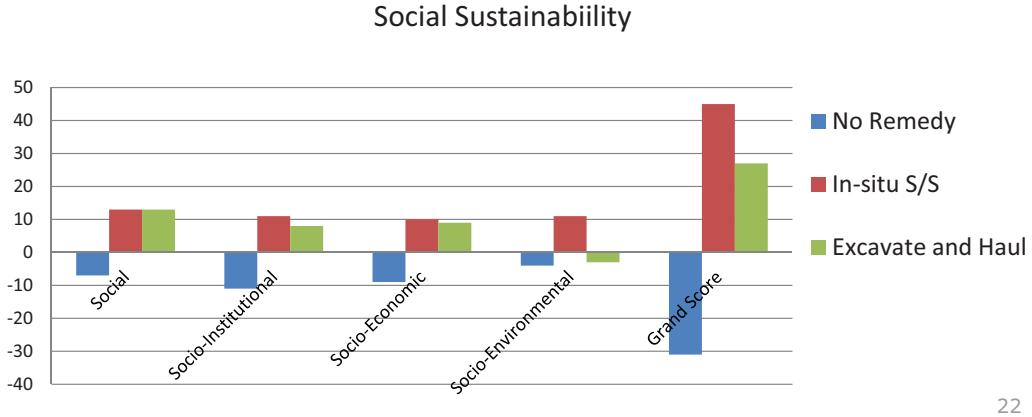
Dimension	Key Measure
Socio-Environmental	Remediation of naturally-occurring contaminants (i.e., naturally-occurring asbestos, radon)
	Remediation of anthropogenic contaminants at "chronic" concentrations
	Remediation of anthropogenic contaminants at "acute" concentrations
	Remediation of pervasive "economic poison" or other pervasive condition endemic in community
	Degree of protection afforded to remediation workers by proposed remediation
	Degree of disruption (noise, truck traffic) from proposed remedial method to the surrounding neighborhoods
	Degree of contaminant removal/destruction vs. in-place capping or immobilization
	Degree of future characterization/remediation required by re-zoning or altered land use
	"Greenness"/sustainability of proposed remedial action
	Incorporation of green energy sources into remediation activity
	Restoration or impact to productive surface water or groundwater use
	Degree proposed remediation will affect other media (i.e., emissions/air pollution resulting from soil or groundwater remediation)
	Potential of future environmental impact (i.e., diesel exhaust from trucks) that resulted from remediation and allowable land re-use

Scoring

Score				
Positive Impact		**No Impact or Not Applicable**	**Negative Impact**	
Ideal	Improved		Diminished	Unacceptable
2	**1**	**0**	**-1**	**-2**

Example SSEM Results

Social Sustainability Matrix			
	No Remedy	In-situ S/S	Excavate and Haul
Social	-7	13	13
Socio-Institutional	-11	11	8
Socio-Economic	-9	10	9
Socio-Environmental	-4	11	-3
Grand Score	-31	45	27



Two Classroom Examples

1. Indian Marsh Ridge Site

2. Former Matthiessen and Hegeler Zinc Site

Publications with more background details

- Yargicoglu, E.N., and Reddy, K.R., "Green and Sustainable Remediation of Contaminated Indian Ridge Marsh Site in Chicago, USA," *Proceedings of the Symposium on Coupled Phenomena in Environmental Geotechnics (CPEG)*, Politecnico Di Torino, Torino, Italy, July 2013

- Goldenberg, M., and Reddy, K.R., "Sustainability Assessment of Excavation and Disposal versus In-Situ Stabilization of Heavy Metal Contaminated Soil at a Superfund Site in Illinois," *Proceedings of GeoCongress2014*, ASCE.

Note: Available upon request

Example 1

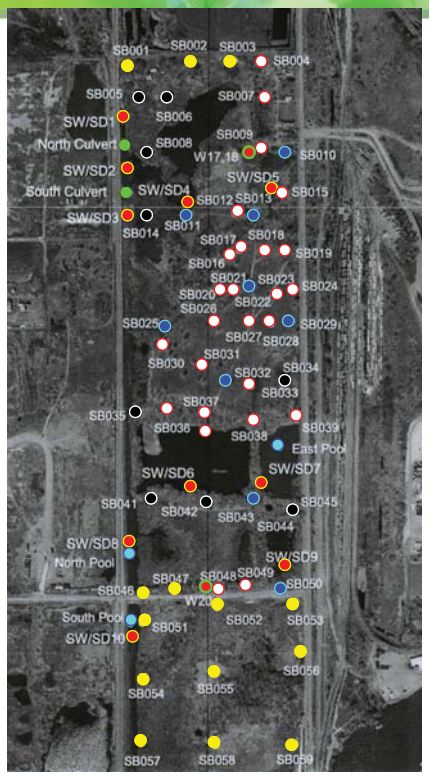
1. Indian Marsh Ridge Site

Indian Ridge Marsh Site: Contamination

- Soils, groundwater, sediments & surface water sampled and tested for SVOCs, VOCs, RCRA metals, and TPH.

LEGEND
- Culvert Sample
- Soil Sample (Geoprobe)
- Soil and Groundwater Sample (Geoprobe)
- Soil Sample (Hand Auger)
- Sediment and Surface Water Sample
- Soil Sample not Attainable
- ISWS Monitoring Well
- ISWS Surface Water Sample

400 0 400 Feet



Contaminants & Impacted Media

	SOIL	GROUNDWATER	SEDIMENT	SURFACE WATER
PAHs	Benzo(a)pyrene (C; GI) Benzo(a)anthracene (C; GI) Benzo(b)fluoranthene (C; GI) Benzo(k)fluoranthene (C; GI) Dibenzo(a,h)anthracene (C; GI) Indeno(1,2,3-cd)pyrene (C; GI)	Benzo(a)pyrene (C; GI) Benzo(a)anthracene (C; GI) Benzo(b)fluoranthene (C; GI) Benzo(k)fluoranthene (C; GI) Bis(2-Ethylhexyl) Phthalate (C; L) Chrysene (C; GI) *1991-92 GW data:* *trans-1,2-trans-Dichloroethene, cis-1,2-Dichloroethene, 1,1-Dichloroethene, Benzene*	Benzo(a)anthracene (C; GI) Benzo(a)pyrene (C; GI) Dibenz(a,h)anthracene (C; GI) Naphthalene (C; R)	
VOCs	Tetrachloroethene (PCE) (C; L) Trichloroethene (TCE) (C; L) Vinyl chloride (C; L, RS)	Vinyl chloride (C; L, RS) LNAPL *(containing total petroleum hydrocarbons (TPH) gasoline, diesel, and oil)*		
METALS	Lead Mercury (NC; CNS, IS)	Iron Lead Manganese (NC; CNS)	Antimony (NC; CS) Arsenic (C; RS) Cadmium (NC; K) Chromium Copper Lead Nickel Thallium Zinc (NC; CS)	Iron Manganese (NC; CNS)

C	Carcinogen	**NC**	Non-Carcinogen

CS -	Circulatory System	**IM** -	Immune System	**L** -	Liver
GI -	Gastrointestinal System	**K** -	Kidney	**RS** -	Respiratory System

Contaminated Areas Of Concern (AOCs) Summary

	Surface area		Media for Remediation		Maximum Depth to Contaminant (ft)		Average Depth to Water Table (ft)
	ft²	acres	Soil	GW	Soil	GW	
A	60,000	1.4	x	--	2.0	--	1.3
B	27,000	0.6	x	x	3.0	14	2.8
C	320,000	7.3	x	x	6.5	13	6.6
D	85,000	2.0	x	--	7.0	---	4.1
E	50,000	1.1	x	x	2.0	13	2.5
F	186,000	4.3	x	x	2.0	19	2.3
Total	728,000	16.7					

pH	Dissolved $O_{2(g)}$	Hydraulic Conductivity (K)
7.8 - 9.0*	7.9 - 12.0 mg/L	10^{-5} – 10^{-3}

*In some areas, pH as high as 12

Risk-Based Remedial Goals

Area	Media	Contaminant	Maximum Depth of Contamination (ft bgs)	Contaminant Concentration (mg/kg or mg/L)	Remedial Goal (mg/kg or mg/L)	% Exceedance	Governing RO	
							HH	Ecotox
A	Soil	Benzo(a)pyrene	2	0.22	0.09	144	X	
B	Soil	Benzo(a)anthracene	3	3.62	0.9	302	X	
		Benzo(a)pyrene		3.13	0.09	3,378	X	
		Benzo(b)fluoranthene		3.41	0.9	279	X	
		Dibenzo(a,h)anthracene		0.47	0.09	422	X	
		Indeno(1,2,3-c,d)pyrene		1.49	0.9	66	X	
	GW	Manganese	14	1.11	1.0	11		X
C	Soil	Benzo(a)anthracene	6.5	44.1	0.9	4,800	X	
		Benzo(a)pyrene		29.5	0.09	32,678	X	
		Benzo(b)fluoranthene		26.8	0.9	2,878	X	
		Benzo(k)fluoranthene		31.8	9	253	X	
		Dibenzo(a,h)anthracene		8.43	0.09	9,267	X	
		Indeno(1,2,3-c,d)pyrene		12.9	0.9	1,333	X	
		Lead		1800	400	350	X	
		Mercury		81.3	1.3	6,154		X
	GW	Manganese	13	1.19	1.0	19		X
D	Soil	Benzo(a)pyrene	7	0.21	0.09	133	x	
E	Soil	Lead	2	499	400	25	x	
	GW	Manganese	13	1.48	1.0	48		
F	Soil	Benzo(a)pyrene	2	1.23	0.09	1,267	X	
		Tetrachloroethylene		21.1	11	92	x	
		Trichloroethylene		41.2	5	724	x	
		Benzo(a)anthracene		2.6	0.9	189	X	
		Benzo(b)fluoranthene		1.2	0.9	33	X	
		Dibenzo(a,h)anthracene		0.28	0.09	211	X	
		Vinyl Chloride		0.64	0.28	129	x	
		Lead		648	400	62	x	
	GW	Benzo(a)anthracene	19	1.50E-03	2.00E-04	650		X
		Vinyl Chloride		5.70E-02	1.00E-02	470	X	
		Iron		16	1	1,500		X
		Lead		2.56	0.1	2,460	X	
		Manganese		1.8	1.0	80		X

Applicable Soil & GW Remedial Technologies

Soil Technology	Qualifying Site Conditions
Phytoremediation/ Enhanced Biostimulation	Effective with a variety of mixed contaminants (heavy metals, PAHs, VOCs, SVOCs) in soil and groundwater
Excavate	Effective with non-hazardous and hazardous soils (PCBs, chlorinated solvents, lead)
Cap/Cover + Vertical Barrier	Prevents infiltration, which can lead to leaching

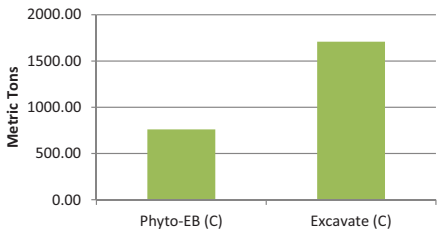
GW Technology	Qualifying Site Conditions
Phytoremediation/ Enhanced Biostimulation	Effective with a variety of mixed contaminants (heavy metals, PAHs, VOCs, SVOCs) in soil and groundwater
In-situ Containment – Slurry Trench	Effective for containing a variety of organic & inorganic contaminants, it's cost-effective

Quantitative Assessment: SiteWise™ – Area C

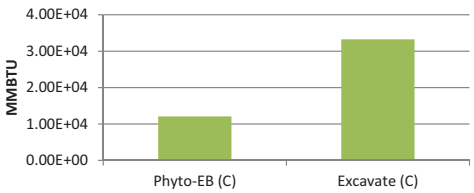
Relative Impact

Remedial Alternatives	GHG Emissions	Energy Usage	Water Usage	NOx emissions	SOx Emissions	PM10 Emissions	*Accident Risk Fatality	*Accident Risk Injury
Phyto-EB (C)	Medium	Medium	High	Medium	Low	Low	High	High
Excavate (C)	High	High	Low	High	High	High	High	Medium

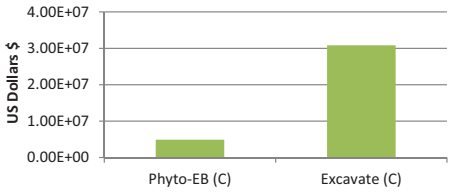
GHG Emissions



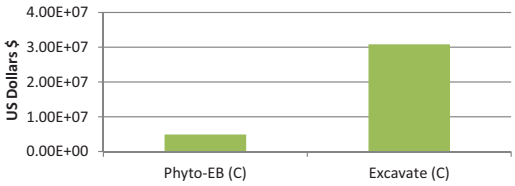
Total Energy Used



Costing

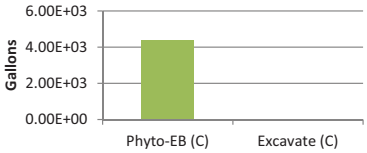


Final Cost with Footprint Reduction

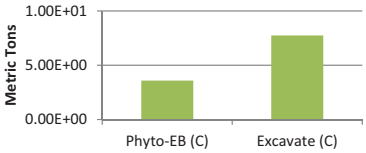


Quantitative Assessment – SiteWise™ – Area C

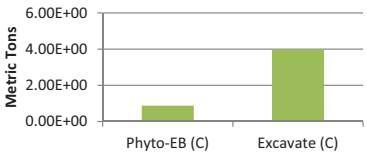
Water Impacts



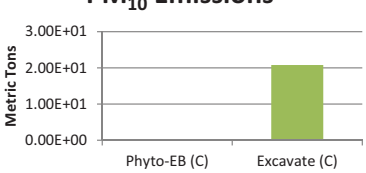
NO_x Emissions



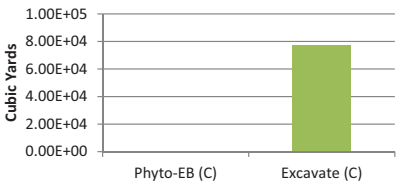
SO_x Emissions



PM_{10} Emissions



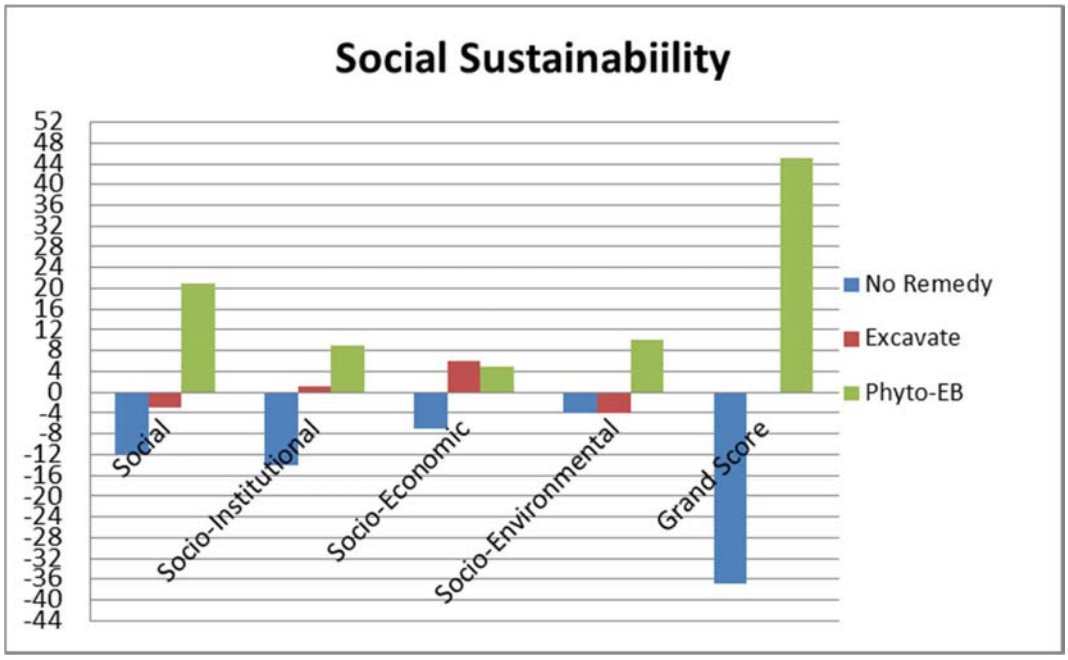
Topsoil Consumption



Other Metrics Evaluated with SiteWise™:

- Accident Risk of Fatality & Injury
- Lost hours due to Injury
- Hazardous & Non-Hazardous Landfill Space (tons)

Social Sustainability Evaluation Matrix (SSEM) Results



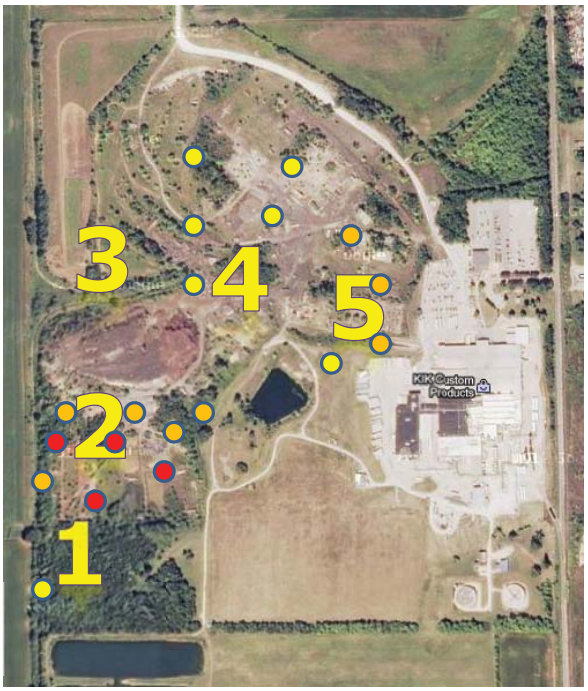
Example 2

2. Former Matthiessen and Hegeler Zinc Site

Former Matthiessen and Hegeler Zinc Site - Danville, Illinois

Arsenic, Controlling Limit = 11.3 mg/kg

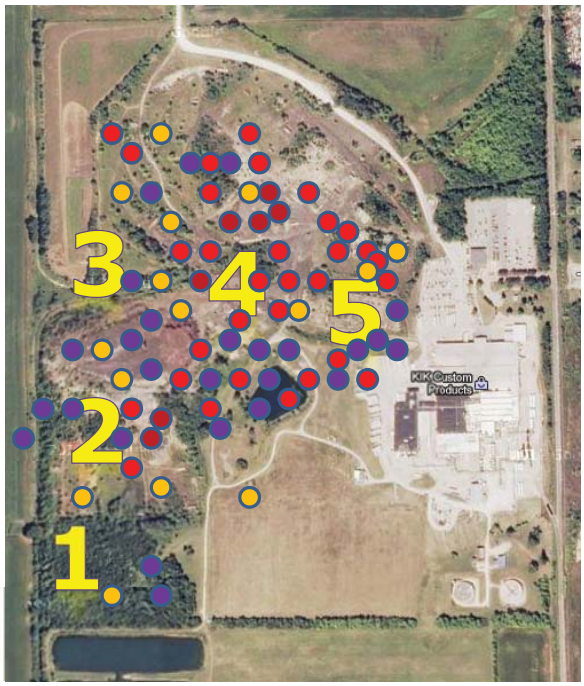
- 11.3-20 mg/kg
- 20-50 mg/kg
- >50 mg/kg



Lead, Controlling Limit = 400 mg/kg

UIC

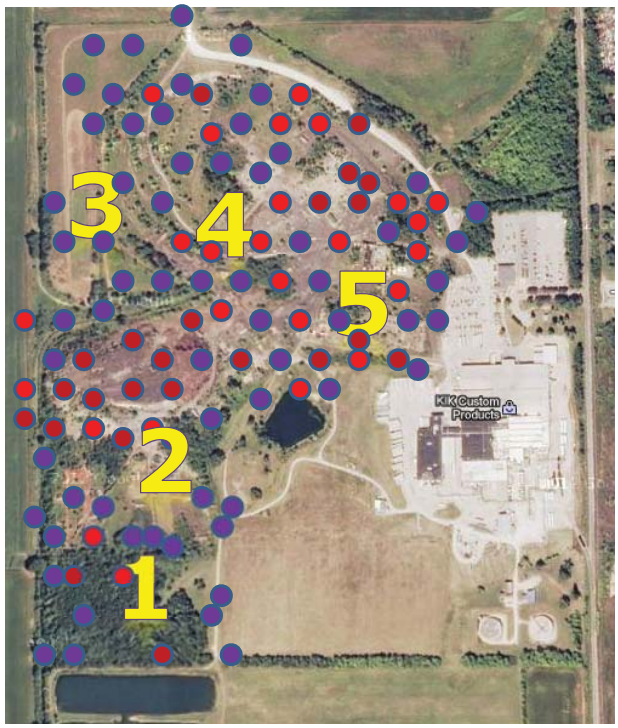
- 400-750 mg/kg
- 750-2,000 mg/kg
- 2,000-10,000 mg/kg
- >10,000 mg/kg



Iron, Controlling Limit = 23,000 mg/kg

UIC

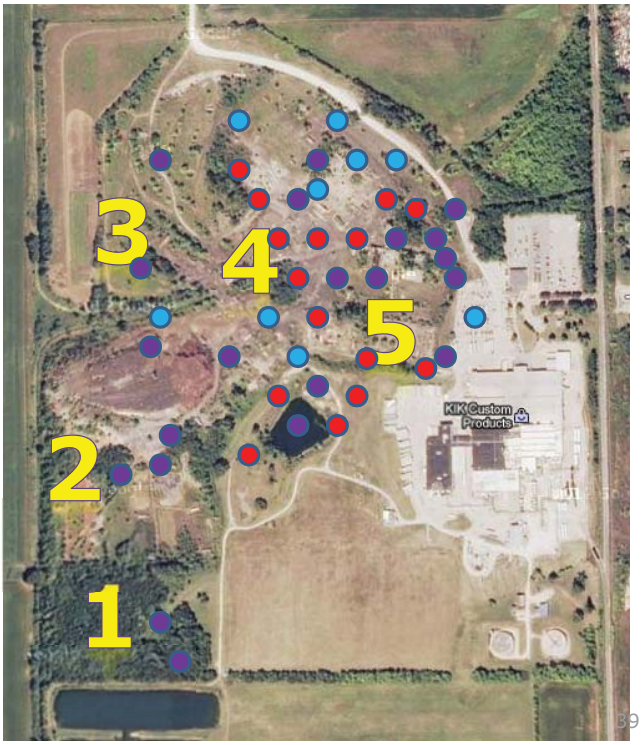
- 23,000 – 100,000 mg/kg
- 100,000 – 200,000 mg/kg
- >200,000 mg/kg



Zinc, Controlling Limit = 12,000 mg/kg

UIC

- 12,000 - 23,000 mg/kg
- 23,000 – 100,000 mg/kg
- >100,000 mg/kg



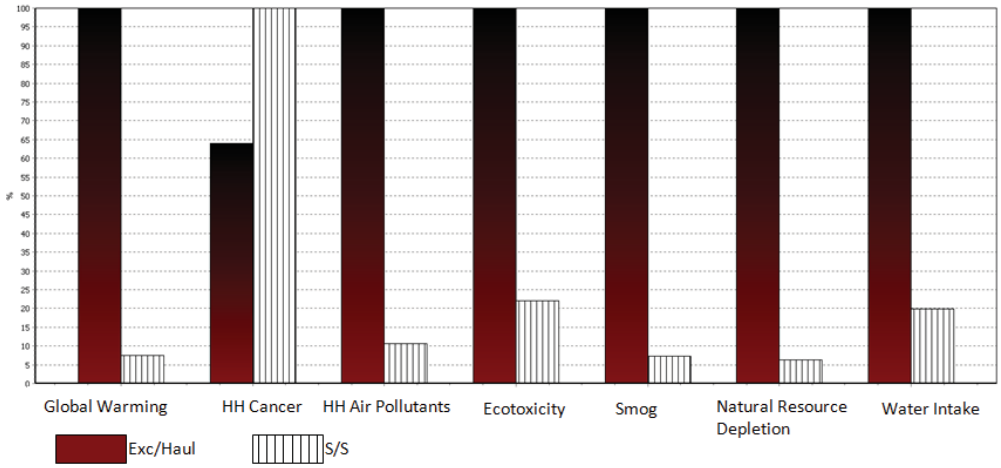
Potential Remediation Techniques

UIC

- In-situ Remediation methods:
  - Solidification/Stabilization (S/S)– using additives or processes to chemically bind and immobilize contaminants.

- Excavation and Hauling

Life-cycle Assessment: SimaPro Results

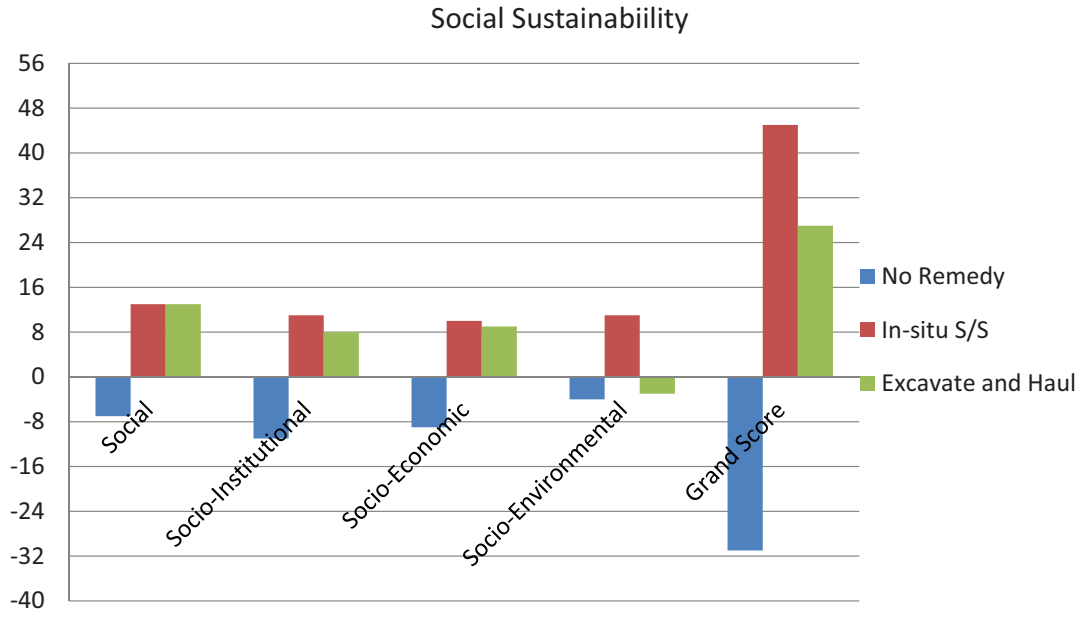


Economics

Item	In-situ S/S	Excavation/Disposal	Notes
Portland Cement	$1,601,255	NA	Assume $73/ton for PCC
Fill Sand	NA	$1,492,984	Assume $5.18/ton for Fill Sand
Diesel	$164,619	$23,073,843	Assume $3.90/gallon
Labor	$661,500	$661,500	9 hr/day, 245 days, $20/hr, 15 laborers
Tipping Cost	NA	$17,189,690	Soil density = 1.3 g/cm^3, tipping fee = $70/ton (171,365 m^3 waste total)
Hauling Cost	NA	$3,427,300	$300/haul (11,425 total trips)
Total	$2,427,374	$45,845,317	Large variance is due mostly to diesel cost

Note: Prelim Estimates

Social Sustainability Evaluation Matrix (SSEM) Results



Final Remarks

1. Indicators, metrics and tools are available to quantify environmental and economic aspects of sustainability.
2. Social aspects of sustainability are complex and more difficult to quantify.
3. Social sustainability evaluation matrix (SSEM) is developed as a tool to identify key social issues and quantify their relative positive or negative impacts.
4. Social quantification is not a goal in or of itself- rather, it is a process where a comparison and assessment can be made to allow for informed decision on the remedy selection.

Acknowledgements

- Jeff Adams, ENGEO Inc., San Ramon, CA
- Graduate Students:
  - *Erin Yargicoglu*
  - *Marat Goldenberg*
  - *Tao Xie*
- Students who have put up with me in two courses:
  - *CME425 Environmental Remediation Engineering*
  - *CME596 Sustainable Engineering*
- Sustainable Remediation Forum (SURF)
  - *Pamela Dugan*

Thanks for listening!

Questions & Answers

Attachment 20

Measuring Social, Community, and Public Health Aspects of Milwaukee's Menomonee Valley Brownfields Redevelopment

MEASURING SOCIAL, COMMUNITY AND PUBLIC HEALTH ASPECTS OF MILWAUKEE'S MENOMONEE VALLEY BROWNFIELD REDEVELOPMENT

Susan Kaplan, J.D., School of Public Health and
Institute for Environmental Science and Policy, UIC
July 25, 2013

Objectives of talk

- Describe increasing interest in and challenges of measuring social/community/public health impacts of brownfield cleanups
- Describe how these were taken into account in Menomonee Valley redevelopment and Menomonee Valley Benchmarking Initiative
- Identify lessons from Menomonee Valley experience

This presentation reports in part on work made possible by grant number TR-83418401 from the U.S. Environmental Protection Agency. Its contents are solely the responsibility of the presenter and do not necessarily represent the official views of the U.S. EPA. Much of this presentation draws on the work of Prof. Christopher De Sousa, Ryerson University.

Sustainable Brownfields Consortium

3

- Current project funded by grant from U.S. EPA
- Collaboration of UIC, University of Illinois at Urbana-Champaign, University of Wisconsin-Milwaukee, Ryerson University, Resources for the Future, Kandiyo
- Analyzing best practices and benefits of sustainable redevelopment of brownfields

Increasing interest in social/ community impacts of brownfields

4

- Brownfields are more often in areas “where neighboring residents are disproportionately impacted by economic, social, environmental, health, and energy disparities” (Merriman-Nai and Sargent).
- Tracking progress towards sustainability and improving the quality of urban life in a more holistic manner – going beyond just economic indicators - has become an important consideration for many communities (De Sousa).

Challenges remain

5

- Social/health impacts may be less clear-cut or concrete than economic or environmental impacts.
- Can be hard to separate impacts of brownfields from other factors.
- Not evaluated as often as other outcomes – thus a less established methodology

The Menomonee Valley

6

- 1,200-acre brownfield area in the heart of Milwaukee
- Redeveloped to maintain its mainly industrial nature
- Strong public/private partnership: Menomonee Valley Partners, city and state agencies, Business Improvement District, 16th Street Community Health Center

The Menomonee Valley

7

Above: bicycling trails. At right: Menomonee Valley Industrial Center and Stormwater Park (Charter Wire building & Derse building). Source: Chris De Sousa case study

Incorporated sustainability throughout

8

- 1999 US EPA grant to 16th Street Health Center to look into ways of incorporating sustainability
- Sustainable Design Guidelines encompass green building, stormwater management, indoor air quality, energy efficiency
- Established family-sustaining living wage
- Improved connectivity with surrounding neighborhoods
- Long-term tracking…

The Menomonee Valley Benchmarking Initiative (MVBI)

9

- Developed by UW-Milwaukee and 16th Street Community Health Center
- Goals: track progress toward sustainability; educate community; stimulate research by assembling data that considers economic, environmental and social concerns in a holistic manner
- Indicator Work Groups identified key "issues of concern" and specific "indicators" for investigating those issues.

MVBI Environment Work Group

10

- Identified 4 key issues and 10 benchmarks:
  - Water Quality - index of biotic integrity, physical water quality parameters
  - Air Quality – particulate matter 2.5, air toxics, 1- and 8-hour ozone
  - Land Cover & Habitat - % of impervious surfaces, % of canopy cover
  - Flora & Fauna – breeding bird population, native & non-native tree species

MVBI Economic Work Group

11

- Identified 4 key issues and 20 benchmarks:
  - Employment – includes average salary, residential location of employees, and provision of health insurance
  - Commercial Property
  - Business – includes type of business activity and % of local ownership
  - Infrastructure & Access – road and rail access, linear feet of sidewalks, and bus routes/ridership

MVBI Social/Community Work Group

12

- Identified 4 key "Community" issues and 18 benchmarks:
  - Housing – ethnicity, household income, housing values, owner-occupancy rate, number of units
  - Crime – number of selected offenses
  - Health – number of births, ozone action days, child lead poisoning rates
  - Arts & Events – public art installations, community recreation

Menomonee Valley Benchmarking Initiative

13

- First MVBI report – 2003; second in 2005; third now being completed
- Reports on: What has been measured? Why is it important? How are we doing?
- The Sigma Group evaluated its own project, including in comparison with its previous site. Looked at employment/social benefits including employee commute, employee morale, and employee participation in the community.

Social/community findings of 2005 report (from De Sousa paper)

14

- Slight increase in the % of Valley employees living in adjacent neighborhoods (1/4) - important because "captures the link between job growth in the Valley and community benefits from that growth."
- Owner occupancy rates rose; much new housing built
- Housing values closest to the Valley soared 2000-2005 – so "proximity to older industrial areas doesn't necessarily negatively impact residential real estate."

Social/community findings of 2005 report (from De Sousa paper)

15

- Crime and childhood lead poisoning rates declined.
- Neighborhoods surrounding the Valley are ethnically diverse – but there is a lot of racial separation.
- Neighborhoods to the south offer many cultural opportunities, including recreation and public art installations.
- Incomes of those living in and around the Valley are one-third less than the city average.

Photo: Mitchell Park Domes. From Menomonee Valley Partners website

Lessons from the MVBI experience (from De Sousa paper)

16

- MVBI a success in creating information clearinghouse and synthesizing data on sustainable redevelopment of this brownfields area for wide variety of users.
- Neighbors thought public art and recreational opportunities very important metrics
- Report itself an important tool for presenting the Valley as a location and community. A key benefit associated with taking a broader sustainability approach “is thinking about the area as not an agglomeration of derelict brownfield sites, but as part of a larger community”.

Lessons from the MVBI experience (from De Sousa paper)

17

- Problems encountered:
  - Indicator reporting is time-consuming and challenging to coordinate
  - Response from economic/business communities has been “lukewarm”
- Overall – more sustainable and ambitious brownfields redevelopments benefit from this type of comprehensive tracking of outcomes

Other social/community measurement efforts

18

- ATSDR Brownfields/Land Revitalization Action Model: Brainstorming 4 questions creates a framework for incorporating sustainable public health endpoints in redevelopment plans.
  - Step 1: What are the issues in the community?
  - Step 2: How can development address these issues?
  - Step 3: What are the corresponding community health benefits?
  - Step 4: What data are needed to measure change?

Other social/community measurement efforts

19

- Merriman-Nai and Sargent, U. of Delaware -
- "…[T]there has been very little analysis of the *social* impact of brownfield development on a community. Such an evaluation would consider whether the overall well-being of community members had changed as a direct or indirect result of the remediation and reuse of these formerly obsolete and contaminated properties."
- Developed social impact assessment model with indicators including demographics, civic engagement, neighborhood economy, health and safety; cultural/aesthetics.

Other social/community measurement efforts

20

- Wedding and Crawford-Brown (UNC-Chapel Hill) Sustainable Brownfields Redevelopment Tool
  - Adds metrics for green building ("represents more than 75% of overall cost and value at buildout")
  - Says government incentives require a demonstration of public benefit
  - Tool defines 40 indicators in 4 categories: environmental health, finance, livability, social-economic

Conclusions

- Increased interest in measuring social/community/health impacts of brownfields, due to broader conception of sustainability, public benefits of projects
- MVBI and others offer good models
- Concern about defining sustainability and metrics; private sector concerns about increased reporting requirements and how information will be used
- Need for standardization

Links

- Sustainable Brownfields Consortium, www.brownfields.uic.edu
- Milwaukee's Menomonee Valley: A Sustainable Re-Industrialization Best Practice, http://www.uic.edu/orgs/brownfields/research-results/
- Menomonee Valley Benchmarking Initiative, http://epic.cuir.uwm.edu/mvbi/

Thank you

The Sustainable Brownfields Consortium is an interdisciplinary group of researchers and technical advisors who are analyzing best practices for sustainable redevelopment of brownfields and the environmental, economic and public health benefits that can result. Funded by a grant from U.S. EPA, the project is a collaboration of the University of Illinois at Chicago (where it is based), University of Illinois at Urbana-Champaign, University of Wisconsin-Milwaukee, Ryerson University, Resources for the Future, Kandiyo, and Hellmuth + Bicknese Architects. The project website is at www.brownfields.uic.edu.

Susan Kaplan
kaplans@uic.edu
312-355-0738