Origins of the term “sustainability”:

- **Origins of the term “sustainability”:** (Stivers, 1976) systems”
- Present without compromising that meets the needs of the present without compromising the ability of future generations to meet their own needs” (UN, 1987)

**Green and Sustainable Remediation (GSR) Overview**

**Green and Sustainable Remediation** begin where standard remediation practices leave off. Green and Sustainable Remediation are founded upon a baseline of mitigating contaminant risk to receptors while making decisions that are cognizant of balancing net environmental effects. Both utilize site-specific products, processes, technologies, and procedures.

**Green:** Incorporates and implements options to reduce the environmental footprint of a cleanup action. It does not necessarily cover societal and economic considerations, as many green remediation practitioners and regulators view that those topics are already covered in promulgated regulatory frameworks, such as in the cost effectiveness and community acceptance criteria in the Superfund remedy selection process.

**Sustainable:** Sustainable remediation practitioners hold the view that cost effectiveness and community acceptance are not adequately explored or considered in existing regulatory frameworks, and where they are considered as balancing criteria, do not adequately balance or address societal and economic issues related to cleanup practices and technologies.

**Green Remediation: Incorporating Sustainable Environmental Practices into Remediation of Contaminated Sites:** EPA Technology Primer (April 2008)

**Green and Sustainable Remediation:** State of the Science and Practice: ITRC Guidance Document to help educate and inform state regulators and other stakeholders in the concepts and challenges of GSR (May 2011)

**Green Remediation:**

- Incorporating Sustainable Environmental Practices into Remediation of Contaminated Sites:
- EPA Technology Primer (April 2008)
- Principles for Greener Cleanups, Regional Policies, and Best Management Practices Factsheets (2009-2010)

**Green and Sustainable Remediation:**

- State of the Science and Practice: ITRC Guidance Document to help educate and inform state regulators and other stakeholders in the concepts and challenges of GSR (May 2011)

**EPA Principles for Greener Cleanups, Regional Policies, and Best Management Practices Factsheets (2009-2010)**

**Green and Sustainable Remediation:**

- State of the Science and Practice: ITRC Guidance Document to help educate and inform state regulators and other stakeholders in the concepts and challenges of GSR (May 2011)

**ASTM Standard Guide for Integrating Sustainable Objectives into Cleanup:** Scalable framework for addressing sustainable aspects throughout all phases of site cleanup (2013)

**Who is SURF?**

SURF was one of the early think tanks for the development of GSR. SURF brings together representatives of government, industry, consultancy, and academia to parse the means and ends of incorporating societal and economic considerations into environmental cleanup projects. Faced with decades-old treatment programs with high energy outputs and no endpoints in sight, a small group of individuals published the institutional knowledge gathered in two years of ad hoc meetings into a 2009 White Paper on sustainable remediation drivers, practices, objectives, and case studies.

**US Remediation Estimates**

- Total = $120 Billion
- DOE $37B
- Civilian Agencies $7B
- State & Private $130,000
- RCRCA CA $3,800
- LST 173,000

**Visit SURF online for more information and links to GSR resources:** www.sustainableremediation.org

**Overviews:**

- Solutions for the星星舰队 Command regarding remediation activity on Earth?”
- “...a watershed event in public policy deliberations about environmental remediation.”
- “It’s crucial that 21st century environmental clean-ups burn less fuel, emit less greenhouse gas and still protect human health and the environment.”
- Christine Todd Whitman
- Former EPA Administrator and NJ Governor
- “To establish a framework that incorporates sustainable concepts throughout the remedial action process that provides long-term protection of human health and the environment and achieves public and regulatory acceptance.”

**SURF 1**

A group of remediation practitioners convene to discuss how sustainability concepts can be incorporated into remediation projects (November 2006)

**SURF 22**

Integrating Remediation and Reuse to Achieve Whole-System Sustainability Benefits (March 2013)

**SURF 24**

Groundwater Conservation and Reuse at Remediation Sites (November 2013 – pending publication)

**SURF 25**

Strategic Partnerships for strengthening the practice and improving transparency (February 2014)

**SURF 10**

SURF publishes White Paper on Sustainable Remediation (June 2009)

**SURF 17**

Suite of Guidance documents:
- SURF Framework for Integrating Sustainability Into Remediation Projects
- SURF Guidance for Performing Footprint Analyses and LCAs
- SURF Metrics for Integrating Sustainability Evaluations Into Remediation Projects (June 2011)

**SURF**

Integrating Remediation and Reuse to Achieve Whole-System Sustainability Benefits (March 2013)

**White Paper on sustainable remediation drivers, practices, objectives, and case studies.**

**Primer**

EPA Technology Solutions Factsheets


**Principles for Greener Cleanups, Regional Policies, and Best Management Practices Factsheets (2009-2010)**

**Principles for Greener Cleanups, Regional Policies, and Best Management Practices Factsheets (2009-2010)**

**ASME Standard Guide for Integrating Sustainable Objectives into Cleanup:** Scalable framework for addressing sustainable aspects throughout all phases of site cleanup (2013)

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