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Using Lifecycle Analysis to Select Remediation Technologies for Petroleum-Impacted Sites

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Background/Objectives. 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, 2009).

Approach/Activities. A lifecycle analysis was conducted to comprehensively evaluate alternative remediation technologies, with considerations of environmental footprints, including physical footprint of the facility, energy consumption, water demands / consumption, greenhouse gas (GHG) emissions, criteria pollutant emissions, and wastes generated. Technologies evaluated included conventional alternatives (bioremediation, capping, landfill, thermal desorption, incineration), beneficial reuse technologies (backfill, red brick, roads), and downhole injection technologies.

The methodology used is in alignment with ASTM E-2876-13 (2012) and the Interstate Technology & Regulatory Council (ITRC) (2011) on green and sustainable remediation. Sensitivity of key operating parameters were performed to identify major contributors to overall footprint, and to better understand potential trade-offs between different alternatives. The system boundary of the analyses was further defined by regulatory, economic and technical feasibility.

Results/Lessons Learned. This presentation summarizes the LCA methodology employed to evaluate and select a preferred remedial alternative that is green and sustainable.