

Early Decision Framework for Integrating Sustainable Risk Management for Complex Remediation Sites: Drivers, Barriers, and Performance Metrics

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Background/Objectives. Even though risk-based cleanup guidance and published case studies showing successful implementation are available to remediation professionals, this remediation approach is currently under-utilized in the US. Risk-based cleanup guidance is often criticized for its shortcomings (Foran et al., 2015), which subsequently prevent or delay the consideration of risk-based cleanup approaches. These shortcomings include the lack of frameworks available for developing site-specific cleanup objectives that are reflective of both primary and secondary risk management cleanup objectives, site characterization without regard to the intended remedy or future use for the site (Hadley et al., 2014), lack of alternative remedy performance metrics (Geosyntec, 2004; NRC, 2005), lack of consideration for stakeholder needs (Foran et al., 2015), and the absence of sustainability considerations. In this paper, we attempt to develop a foundational framework to overcome these shortcomings by facilitating identification of drivers and barriers, and utilizing performance metrics and tools representative of sustainability and risk management objectives early in a complex project's life cycle to move towards a more sustainable state.

Approach/Activities. A comprehensive literature review was conducted to identify current guidance on risk-based approaches. Each guidance was reviewed for the following: drivers and barriers to sustainable risk management, performance metrics to measure risk reduction and sustainable attributes of cleanup, and tools used to track progress towards achieving sustainable risk management objectives. The purpose of the literature review is to also understand the current and potential role of sustainable risk management within the remediation community and regulatory programs, with an US-focus. Collectively, this body of information was used to build a framework that integrates sustainable remediation and risk management practices early in the project life cycle to address the environmental, socio-economic, management, and risk perception barriers for acceptance of risk-based cleanup approaches.

Results/Lessons Learned. The results of this paper present a comprehensive list of drivers, barriers, performance, metrics and tools to support applicable sustainable risk management. The framework presented here is designed to assist remediation professionals in considering and incorporating sustainable risk management approaches early in the project life cycle to confidently evaluate performance and overcome barriers associated with risk perception, uncertainty and lack of transparency. The strategy helps develop cleanup objectives that are not solely focused on risk reduction and decreased consumption of natural resources; but also acts as a vehicle to integrate applicable sustainability frameworks, facilitate early stakeholder engagement, and consider property redevelopment and regeneration of impacted communities and ecosystems. The findings of the literature review highlight resources, both natural and financial, that can be saved by conducting sustainable risk management. In addition, this approach supports the issuance of related policies to maximize benefits to all stakeholders and alleviate detrimental impacts to the global society.