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Hidden Benefits and Scalability Opportunities for Sustainable Remediation at Hydrocarbon-Impacted Sites

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Background/Objectives. Traditional remediation approaches (e.g., excavation, soil vapor extraction, etc.) may involve environmental, social and economic impacts (e.g., carbon dioxide emissions, noise from equipment, etc.). Recently, sustainable remediation approaches have garnered increased interest from industry, regulators, and the community. Sustainable remediation broadly includes the selection of technologies and procedures with consideration of social, environmental, and economic impacts and benefits. The concept of sustainable remediation has been brought to the forefront by efforts from the Sustainable Remediation Forum (SURF), ASTM, Interstate Technology and Regulatory Council (ITRC) and US Environmental Protection Agency, among others, to minimize the social, environmental and economic impacts associated with remediation while ensuring the benefits of undertaking remediation.

Approach/Activities. The objectives of this study were to document the tangible and intangible benefits of incorporating sustainable approaches to remediation activities and identify opportunities for scaling sustainable remediation approaches to different types of hydrocarbon impacted sites. Our team first developed a framework for identifying and evaluating aspects of sustainable remediation and then applied this framework to a set of Chevron environmental projects at different phases of remediation with unique site conditions and risk profiles. Sustainable remediation practices were implemented at these sites for a variety of reasons including lowering environmental footprints and improving remediation efficiency, field worker safety, community relations, and overall cost-effectiveness of the project. Our work consisted of a desktop review of the information from the sites combined with interviews with project managers and consultants.

Results/Lessons Learned. Results demonstrated that sustainable remediation can be implemented across a wide variety of remediation phases as well as sites of different sizes and risk profiles. We learned that sustainability practices and benefits may be hidden or overlooked and that developing a sustainability framework is key to facilitating identification of sustainability aspects. We will present our framework along with compiled data from several upstream (crude oil releases) and downstream (refined product releases) sites where sustainable remediation practices were implemented. We will also discuss hidden benefits of sustainable remediation that are not commonly documented, such as the development and pilot testing of innovative, research-level, low-energy remedial technologies. Testing and documenting these innovative technologies provide benefits to the individual site as well as to the wider remediation community by advancing our understanding of effective sustainable remediation practices. We will also discuss the opportunities presented by implementing sustainable remediation at small sites to scale it to larger projects.