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Transferrable Lessons Learned from Advances in Amendment Formulation

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Background/Objectives. Purpose-developed amendment formulations for environmental remediation first broke onto the scene in the early 1990s. Over the ensuing two decades, the range and number of vendors, products and formulations has burgeoned and indeed appears to be ever increasing. The process of evaluation and selection of the optimal approach from the wide range of alternatives has become bewildering.

At the same time, advances in amendment formulation all come from somewhere. Where do the ideas come from, and what are the processes by which new advances are evaluated prior to commercial release? Insights into this process provide a valuable light into the wider evaluation of reagents and amendments that is equally applicable to the process of reagent selection for a given project.

Approach/Activities. This talk explores the process of how advances are made, drawing on examples from bio, ISCO and mitigation of vapor intrusion among other technology sectors. It provides a window into the technology development process, and considerations by which the predicted utility or 'USP' of a new technology is evaluated. This venture is not merely an exercise in intellectual curiosity, but is of transferrable, practical utility to remediation professionals involved in the technology selection process at the project level. The development approach reveals telling or insightful technical questions that facilitate clear differentiation of one amendment formulation or product from another, and thus enable defensible, objective, decisions to be made as the basis for technology selection to provide optimal value for a given project.

Results/Lessons Learned. Advances in amendment formulation come from need (pain points) and from breakthrough ideas leading to concept or technology platforms that may often then be extended. A clear understanding of the problem and also of its fundamental contributory factors is the common starting point. Thereafter, the application of creativity coupled with fundamental science and established processes of prototype development, beta testing and continuous utility-in-use evaluations serve to hone the process while also providing fertile ground for the identification of the next new advancement or new technology opportunity.

In the evaluation process, unit price comparisons are among the few evaluations that can be made without a project design. Although arguably the easiest comparisons to make, they are probably also the least informative. Differences in quantity required and ease of and/or frequency of reapplication may significantly change the value equation. Evaluation of these various factors – made possible only with a complete application design verified through field tests and pilot studies – represents the critical decision supporting steps that are equally important in both the development of a value proposition during the design and formulation of a new amendment or in the calculation of 'lowest cost to closure' for a given project. In each case, the importance of these considerations quickly increases in proportion to the scale of investment.