Parameterization of Project Footprints: Estimating Your Impact

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Background/Objectives: Since 2007, there has been an explosion of green and sustainable remediation (GSR) tools and resources available to site owners and remediation practitioners. Too often, the selection and application of GSR tools and resources on projects has been constrained by uncertainty of which tools and resources should be used. These tools also vary in effectiveness based on the size and scope of a project. It can be difficult at project offset to determine what rough order of magnitude a project footprint is likely to be and identify appropriate GSR tools accordingly. At the completion of a footprint analysis it can be difficult to determine whether the results make sense and are "reasonable."

Approach/Activities: Nineteen reference projects, including 10 different technology components (e.g., soil vapor extraction, transportation, monitor well installation), where footprints were generated using SiteWise™ Versions 3 and 3.1, were analyzed to develop GSR impacts in terms of a defined functional unit for various common remediation technologies and components. The functional unit normalizes the GSR metrics for remediation technologies, so they can be more easily compared with other technologies or alternatives (e.g., megawatt hour of operation, per 1,000 cubic yards of saturated media, per ton of treatment reagent, among others).

The functional unit value for the reference project (i.e., one of the 19 projects evaluated in the study) was calculated by dividing the total GSR metric results by the total quantity of the functional units. For example, if a reference project had greenhouse gas (GHG) emissions of 38 tons (i.e., the GSR metric) for installation of ten 50-foot monitor wells (or 500 total feet of monitoring well), and the functional unit is "per 100 feet of monitoring well", the 38 tons would be divided by 5 to represent the results as per 100 feet of monitoring well. In this example, the GHG emissions per 100 feet of monitoring well installed would be 7.6 tons of GHG emissions per 100-feet of monitoring well installed.

Reference project remedial technologies included soil vapor extractions, in situ bioremediation, in situ chemical oxidation, air sparging and bio sparging, in situ chemical reduction, low permeability cover, well installation, excavation and disposal, long-term monitoring, and transportation. Reference values, based on the defined functional units, were calculated for nitrous oxides, sulfur oxides, GHG, particulate matter, and energy.

The reference project information can be used two different ways. One way is to estimate the approximate impacts of a potential project to determine if a more detailed SiteWise assessment is warranted. The second way is for a completed SiteWise assessment to be assessed for functional unit factors and applied to reference projects to determine if they are "reasonable".

Results/Lessons Learned: By multiplying project specific information by the project reference functional unit factor, the footprint can be estimated to determine if a more detailed assessment is warranted. The reference table is not meant to replace a site-specific footprint analysis. At the beginning of a project this method can be used to estimate the size of the footprint and to choose an appropriate GSR tool (such a BMPs, Footprint Tools, or a full LCA). If a SiteWise evaluation is conducted, the table can also be used as a quality control tool.

This presentation will present the reference table with background on how it was created and provide examples of how it can be used and the benefit it provides.