Actionable Science for Communities

Implementation Guidance for the Next Generation Leaching Tests – SHC 3.63

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Purpose/Utility of Research

Purpose of implementation Guidance:

- Overview of drivers for leaching of inorganics
- How to apply LEAF for specific management scenarios
- Overview of data management & analysis tools
- Case studies to illustrate use of LEAF to develop source terms that evaluate (1) materials for reuse and disposal and (2) treatment effectiveness
- How to use LEAF results to model releases and inform reuse decisions

EPA has defined beneficial use as the incorporation of an industrial material into a commercial product that:

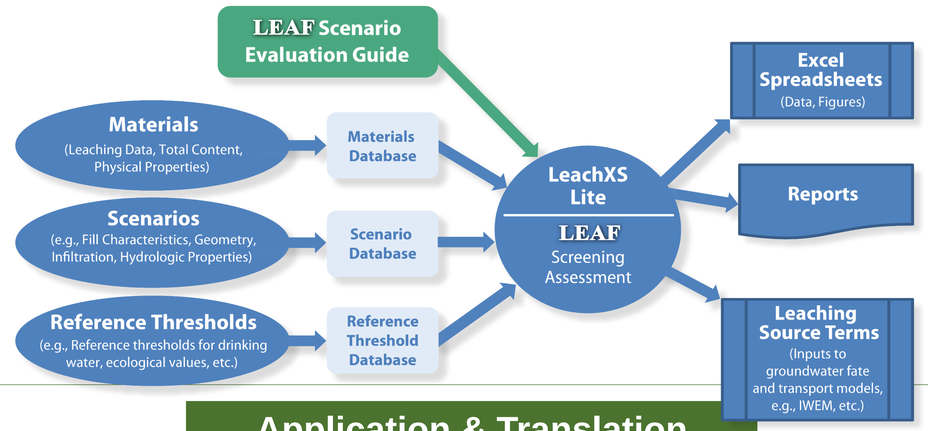
(1) Provides functional benefit
(2) Meets relevant design specifications and performance standards for the proposed use
(3) Replaces virgin, raw materials in a product already on the market, and
(4) Is implemented in an environmentally acceptable manner ***(LEAF is being used to assess potential environmental impacts from use of fly ash or other industrial by-products)***

Virtually all industrial sectors generate by-products that are typically discarded but may be used to replace natural resources and conserve energy – LEAF addresses the question of how to evaluate potential environmental impact for a specific industrial by-product and use

Highlights

Leaching Environmental Assessment Framework (LEAF)

- LEAF is a collection of (1) four leaching methods (EPA Methods 1313, 1314, 1315, and 1316); (2) data management tools; (3) geochemical speciation and mass transfer modeling; (4) QA/QC; and (5) integrated leaching assessment approaches
- Integration of leaching results provides a material-specific "source term" for use in fate and transfer models to assess potential ground and surface water impacts of land placement of materials and use in material management decisions



Application & Translation

All four LEAF methods have been validated for estimating partitioning of inorganic constituents in the environment. The results have been used for variety of applications including to

- Support the regulatory impact assessment for the coal combustion residues rule
- Evaluate use of fly ash as a substituent for portland cement in production of cementitious materials
- Evaluate use of FGD gypsum in national assessment for agricultural applications;

The methods are in use by EPRI, industry, academia, and commercial labs. Methods have received support by NGOs, National Academy of Sciences, EPA and State regional offices, and academia. Used internationally in Europe, Scandinavian countries, Australia, China, Brazil, Israel, New Zealand, and Canada.

Intended End users

- Decision makers for waste management, beneficial use of secondary materials, and site remediation
- Risk assessors
- State environmental agency officials
- Waste generators
- Analytical laboratories
- Technical consultants and other interested stakeholders

Lessons Learned

- Research recognized internationally as providing more precise and accurate estimate of leaching that is achievable as conservative assumptions are replaced with more accurate valuates
- Testing can be tailored to site conditions, waste form, and level of information needed