Long Term Stewardship – Do We Need A New Paradigm?

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Abstract: Stewardship is often defined as those activities that take place after active remediation to ensure long term protection of human health and the environment, including so-called institutional controls. Clearly if stewardship is to be effective, planning for stewardship must begin well in advance of "closure"

The authors are conducting an evaluation of stewardship requirements for contaminant isolation facilities with the goal of providing an approach to the estimation of the types and likelihoods of failure, failure consequences, responses and costs. Preliminary work confirms our suspicions that little actual data are available and that asking these kinds of questions before failure occurs can provide valuable insight concerning possible new approaches to facility and monitoring program design.

The Department of Energy has estimated that long term stewardship will be required at over 100 of the 144 waste sites under its control.(U. S. Department of Energy, 1999). Residual contamination which will remain at these sites will prevent areas from being released for unrestricted use and will require containment and associated environmental monitoring and maintenance for many (perhaps 100s) of years. Many more sites under federal and state EPA oversight will leave long-lived residuals behind and trigger long term stewardship requirements as well.

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In a recent report, the National Research Council of the National Academies found that “Engineered barriers have limited design lives compared with the time periods over which wastes will remain hazardous and hence will require ongoing surveillance and maintenance, and, in some cases periodic replacement, to insure their continued ability to isolate wastes” (National Research Council, 2000).

In fact, it appears to us that, while there is a tacit understanding, within the scientific and engineering community, that long term contaminant isolation systems will eventually fail, systems are, nevertheless, designed and implemented as if this were not the case. Consequently, further analysis is needed to determine better estimates of actual costs of stewardship, costs which could easily exceed those being used currently to form the basis for the financial vehicles (e.g., trusts) which are being established.

The authors are conducting an evaluation of contaminant isolation systems with the objective of quantifying the requirements for effective post-closure care through an analysis of event/response scenarios with probabilistic estimates of likelihoods of specific failures and associated consequences and response costs. Example systems include uranium mill tailings cover systems and RCRA/CERCLA designs which feature bottom liners and covers with multiple barriers. Potential outcomes and applications of this work include more realistic input to financial vehicles, better information concerning the relationship between remediation objectives and stewardship requirements, and improved post closure approaches, featuring, perhaps, simpler designs enabling easier and more effective monitoring and maintenance.

Results of the work to date will be presented.

References

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