Near-Surface Soil Contaminant Characterization
Proposed add-on for consideration in prioritizing MARSSIM Multi-Agency Workgroup Revision 2

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Brief Background

The topic of subsurface characterization has long been considered as a highly important topic for MARSSIM given its objective to serve as *"guidance for planning and conducting radiation surveys for the decommissioning of radiologically contaminated sites"* (Dr. Wilson, Chair, SAB, 1997). As one of the top RAC recommendations on MARSSIM made in 1997, the Agency was asked to *"discuss its rationale for limiting its scope to guidance for contaminated surface soils and building surfaces…"* and *"include some discussion of why these particular media (e.g., subsurface soil, surface water and ground water) were not included, the potential for incorrect decisions if they are not evaluated and the plans, if any, to cover them in the future."* The Agency was also asked to "… discuss the extent to which it is necessary to evaluate scenarios under which subsurface contamination might be expected to contribute to surface contamination in the future, and how this affects the decision of whether the site meets release criteria."

In its 1997 response the Agency stated that *"The text has been modified to state that MARSSIM's focus is on surface soil and building surfaces after remediation…"* This appears to contradict the basic objective (above) that MARSSIM is a guidance document for *"…decommissioning contaminated sites."* This issue has also led to great confusion in the field application of this document, as reported in the comments made by the CRCPD Working Group and the US Army Corps of Engineers:

> *"Like it or not, when subsurface contamination is allowed to be left on site, which is more common with restricted-use releases, MARSSIM users try to conform it to fit the situation… Even some ground rules on what to not to do with subsurface contamination would be better than nothing."* *CRCPD Working Group Comments, 2011*

> *"…there are a significant number of environmental remediation sites that contain subsurface contamination, and in many cases in survey units that will not require excavation. Final status surveys for subsurface residual radioactive contamination developed from MARSSIM guidance have been used successfully to confirm the attainment of cleanup levels. It is recommended this revision …increase its cope and provide additional guidance on the final status survey of subsurface radioactivity. This will also be useful for the UMTRCA cleanup standards that contain a specific subsurface concentration limit."* *U.S. Army Corps of Engineers, 2011*

Proposal

Based on (i) the importance of this topic to field surveys, (ii) the Agency's Response to RAC in 1997 that *"Further changes may be made if future revisions of the document are developed"* and (iii) the 2011 Workgroups own classification of this topic as HIGH in importance and LOW in difficulty, it seems that at a minimum, an Appendix that addresses subsurface contamination, should be included in Revision 2 to address current concerns. This would also do away with the very arbitrary concept of 2D characterization. More and more site surveys and remediation efforts use soil cores and geophysical tomographic methods to explore contaminants in the near surface soils (e.g., ground penetrating radar, electrical and EM tomography and potential measurements) such that the different techniques used are associated with different penetration or sampling volumes, in addition to varying degrees of sensitivity.

On a side note, in lieu of the word *'subsurface'* I would rename this *'near-surface'* characterization to restrict this MARSSIM guidance to soils, and distinguish it from subsurface contaminant remediation, which commonly includes the characterization of the vadose zone, saturated zone and groundwater systems.