

Comments on Geosyntec ISCO Bench Test Work Plan, Dated May 2013

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Comments are provided in order of occurrence and referenced by page and paragraph number. (Note that some are repeats from a previous set of comments provided).

1. P 2. Parg 1. Innocuous degradation products is a blanket statement. There is no attempt to collect data to confirm/refute. Given the complex mixture, what are the end products?
2. P 2. Parg 1. There is still no attempt made to justify the use of the selected oxidants: ozone, ozone with hydrogen peroxide, catalyzed hydrogen peroxide (CHP) and peroxide-activated persulfate (PAP). No case made for delivery and target treatment zone (TTZ) is not defined. Is a gas oxidant appropriate? Success will only result if good sweep is possible. All these systems lead to highly reactive species, but very short half-lives in situ. Lack of persistence means careful delivery to TTZ is required to ensure contact. This is a key element of this effort that should be addressed now otherwise much of this effort is useless! Also CHP typically stands for catalyzed H_2O_2 propagations.
3. P3. Parg 1. Non-target oxidant demand or NOD is a rather mis-used term and assumes that all oxidants have a finite demand. While not all site materials behave the same, permanganate has a NOD, whereas peroxide and persulfate both show enhanced decomposition (and no finite non-target oxidant demand NOD).
4. P4. Parg 3. Note that homogenization of contaminated soils, particularly if NAPLs are present, is non-trivial. How will this be done? What is the basis for the 4:1 mass ratio?
5. P4. Parg 5. Again the non-target oxidant demand terminology.
6. P5. Parg 3. To treat the presence of solids as simply having a competing oxidant demand is rather simplistic. There is a lot more happening.
7. P6. Parg 1. Are the ozone tests comparable with respect to dosing as the liquid oxidant tests? Will mixing be the same? I guess I'd like to know if there is a bias. The gas flow rate interval seems rather wide, how will you know what to use?
8. P6. Parg 2. Aside from convenience what is the basis for the 10-day reaction period?
9. P6. Parg 5. Why do you need to destructively sample aqueous reactors?
10. P7. Parg 3. Again, what is the purpose for this blending of sediments? Why add oxidants before groundwater?
11. P7. Parg 5. What is the basis for the 5-day reaction period? Seems rather short. Provide additional details on the use of ascorbic acid to "quench".
12. P8. Parg 2. This experimental design will not provide in situ oxidant dosing values.
13. P9. Parg 1. Bullet 2. See comment 12.
14. P9. Parg 4. Why use "75 g of homogenized Site soil with residual NAPL" here and not in the comparative studies where some blending was used.
15. P10. Parg 1. Again, why run 2 sets of identical tests given the expected high variability in initial conditions and hence results. Design the system so that COC and oxidants samples/data can be collected together. If needed you can use oxidant data to inform if COC analyses should proceed. These don't appear to be sacrificial reactors hence will need to open them to sub-sample solids – mass lost?
16. P10-11. Section 4.2.2. Why back to the blended sediments again? Again, why not inject this solution into a packed column to simulate the more appropriate soil to solution volume ratio?
17. P15. Not sure if you have asked all the design questions yet, some data can be used, but the scale-up from well-mixed batch reactors etc is weak. Also the number of replicates you are planning to run is very low and will not capture sufficient variability. Use of these data to design a field-scale pilot-test is will be problematic.