

## MEMORANDUM

**TO:** Mark Bohne, PBOW RAB Co-chair and RAB members

**FROM:** Julie Weatherington-Rice, Ph.D., RAB TAPP Coordinator

**RE:** Interim Soil Removal Action Continuation Report Soil Excavation, Composting, and Disposal Plum Brook Ordnance Works – Pentolite Road Red Water Ponds Sandusky, Ohio, McTech Corp.

**DATE:** March 10, 2009

Per our current contractual arrangement with US ACE which require both a technical memorandum for each report and an educational explanation to the RAB, this memorandum constitutes the educational review of the McTech January 2009 “Interim Soil Removal Action Continuation Report Soil Excavation, Composting, and Disposal Plum Brook Ordnance Works – Pentolite Road Red Water Ponds Sandusky, Ohio” document. Please forward these comments to the other RAB members.

As has been typical of the work submitted by McTech, this document is very well written and well thought out. In reviewing their work, I often am relegated to making spelling and typing corrections for lack of anything substantive that needs correcting and/or further clarification. With the review of this document, I find that I am in that same position again. In fact, I think this may be the best report I have reviewed for the Plum Brook Ordnance Works (PBOW) site since I began reviews almost four years ago.

The quality of the presentation, the clarity of the text, and the supporting documentation of more than 400 photos and laboratory documentation lifts this report from the position of a technical engineering summary and places it in the realm of a research document. In fact, at this summary level, the report is only missing the technical and statistical analyses and conclusions that would be typical of a field-scale research project report. It appears that there is enough information collected from the project to perform an inorganic soils and geochemical evaluation of the breakdown processes affecting the deterioration of the residual TNT and DNT at the Pentolite Road Red Water Ponds. There is no information presented on the microbiological communities in the soils, in the chicken manure, and on the straw to quantify that portion of the alkaline and composting process. However, that effort was NOT assigned to McTech and so is outside the scope of their effort.

A number of the comments listed below go beyond the scope of this report to try to tease out a better understanding of the microbiological processes at work. These are included to further the thought processes. I do not expect McTech to have the answers to these questions, but the answers are critical to fully understanding the biological processes at work and replicating them elsewhere on the site and at other locations.

## General & Specific Comments

1. Table 3 – Laboratory Results Stockpiles 1-22, page 15

I found this table somewhat hard to follow although the color-coded “category” column helped. I have several suggestions that might make it easier to read. One option would be to orient the table in a landscape format and add columns to the table that list the PRG and RCRA limits directly in the table for comparison instead of having to check each number against the footnotes. Another option would be to leave the current configuration but use the same set of color coding on the final readings so that it would be apparent that the numbers measured placed the stockpiles into the specific categories of backfill, landfill, and compost.

2. 4.1 Process Summary, page 16

This first paragraph is a good summary of the bioremediation process of composting. However, in this setting, I expect that the sources of microbes that are involved in the composting process are not limited to those naturally found in the contaminated soils. I expect that the chicken manure adds another source of microbes, as well as nitrogen and a number of other nutrients and elements in significant and trace amounts. The straw may also have a set of microbes present on/in the plant materials used to provide the carbon to the mix.

It is this specific microbiological identification and quantification research component that has been missing in this application to date. We KNOW that the process works. This report gives excellent documentation of that effort. What we are missing is the “how” and “why” of the process that would make it possible to fine-tune these applications for use at PBOW and at other sites with TNT and DNT contamination.

3. Top page 17, 4<sup>th</sup> line – typo

Should the sentence read “Below 90 degrees F the process will be very slow and above **140** the microbes may die.”? If so, please replace the second “90” with “140”.

4. 4.4 Compost Operational Procedures, page 18

This section includes the “receipt” for the composting process.

5. Table 6 – Carbon/Nitrogen Ratio, page 22

The final ratio of C/N in the various windrows varies from 20:1 to 11:1 which is almost half the ratio of the highest mix. Was there an analysis of the soil to C/N ratio added vs. final results run to try to quantify the microbe activities in each of

the windrows? Is the level of residual TNT and DNT, which varies throughout the site and probably spatially in the windrows, also controlling factors? Could this data be used to determine relative rates of microbe activity?

6. Table 8 – Windrow Total TNT Weekly Results, page 26

What is controlling the variations in numbers through the various windrows, showing high levels weeks after low levels have been reported? Could this be caused by an incomplete mixing pattern in the windrows?

7. Appendix A – Photographs

The CD includes more than 430 photographs in PDF format. By scanning through them, it is possible to literally recreate a visual of the operations undertaken at the site. This is excellent documentation and is very helpful for visualization. The photographs could be even more useful if there was an identification log that captioned the activities and possibly the dates of each of the photos. The changing in the seasons was apparent from the weather and vegetation seen at the site. Another helpful process would be to include some short video clips of activities, such as turning the windrows that would be helped in understanding by the motion visualization. Perhaps these two suggestions could be included in the next summary report at the next site treated.

Again, this is a superb report. All RAB members should take the time to read through it. This concludes my educational comments on this Interim Soil Removal Action Continuation Report Soil Excavation, Composting, and Disposal Plum Brook Ordnance Works – Pentolite Road Red Water Ponds Sandusky, Ohio document. If you have any questions and/or need further clarification on any point discussed in this memorandum, please feel free to contact me.