

Consistent with our October 7, 2011 proposal to review and comment on the September 2011 “DRAFT Alternative Feasibility Study (AFS)--Groundwater Remedial Strategy” for the Badger Army Ammunition Plant (BAAP) in Baraboo, Wisconsin, SCS BT Squared is pleased to provide you with the following attached files:

1. MS Word version of the main document with a few direct edits using Track Changes and a number of inserted Comments and questions in the right-hand margin
2. PDF of Appendix D with just a few comments inserted using Adobe Reader

The SCS BT Squared editors included Gregg Borucki (Civil Engineer and Office Manager in Lake Delton), Eric Oelkers (Senior Hydrogeologist in Madison), and me (Senior Hydrogeologist and Project Director in Madison). Gregg reviewed Sections 9.8, 10, and 11, plus the costs in Appendix E. Eric’s review focused on the modeling effort in Section 6.3 and Appendix D, and the rest of the edits are mine.

Overall, I was impressed by the breadth and detail of the document, which was clearly a major effort representing multiple phases of work over a long time period in a complex setting. I did not evaluate changes between the April and September 2011 AFS drafts, but it appears that the current draft addresses most of the WDNR’s concerns outlined in Jeff Ackerman’s May 24, 2011 letter to Installation Director Joan Kenney. One possible exception – Mr. Ackerman asked for isopach maps of the modeled units/layers. I didn’t specifically see these maps, but don’t know what value they would add at this point, especially since Mr. Ackerman also said “... that the actual data collected to-date...will probably be more persuasive than computer model simulations, which inherently include a number of simplifying assumptions and limitations.” Accordingly, SCS BT Squared spent less time on reviewing model details and instead focused on the underlying hydrogeologic regime, contaminant migration patterns, monitored natural attenuation (MNA) rationale, and the selected remedy.

While we agree that the selected remedy (Alternative 3) is a reasonable approach to mitigate the human exposure pathway and reduce future project costs (i.e., long term operation of the active groundwater remediation systems), there are several prevalent themes/opinions in our comments:

1. The document does not make a convincing argument “...that natural attenuation has a reasonable probability of restoring groundwater to the extent practicable” (Ackerman May 24 letter) based on the off-site migration of CTET and DNT at depth (i.e., expanding plumes).
2. The lack of detail regarding the locations, depths, and construction details for private wells (placed in the context of the identified hydrogeologic units and plume geometry) is a significant oversight, given that private well owners are the primary pathway/receptors of concern.
3. While the geologic cross sections and data presentation are comprehensive, the document text does not convey a “confident understanding” of which hydrogeologic factors most influence contaminant migration. Specific examples – no discussion of strong vertical hydraulic gradients vs. horizontal, apparent preferential flow paths in the unconsolidated materials, incorrect reference to dense VOCs (DNAPL) in a discussion of dissolved-phase contaminants, and little or no summary of the typical degradation products for the contaminants of concern and where those have been detected, if any.
4. The estimated costs for Alternative 3 are missing some significant details (and/or assumptions) for true comparison to Alternatives 1 and 2. While a safe public water system makes technical sense, Alternative 3 has a number of logistical, political, and design considerations that could

drastically affect cost and time frame. While the AFS is not intended to be a well siting study, the document does not generally identify where the two proposed public water supply wells would be located, and what construction techniques would help prevent BAAP plume contaminants (or other contaminant sources in the area) from affecting future public water supplies. In addition, the long term effectiveness of Alternative 3 depends greatly on stable plumes (see Item 1 above) and a thorough evaluation of known and possible future private wells located inside and outside the proposed remedy area shown on Figure 39 (see Item 2 above).

We appreciate the opportunity to review and comment on the DRAFT AFS. Feel free to call if you have any questions.

**John B. Tweddale, PG, CHMM**

Vice President, Project Director

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