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Sent Via E-Mail

Subject: Comments on the Remedial Investigation/Feasibility Study for Site-Wide Groundwater at the Former Badger Army Ammunition Plant, Baraboo, Wisconsin
BRRTS #02-57-001002

Dear Mr. Lynch:

The Department of Natural Resources (Department) has reviewed the document entitled "Remedial Investigation/Feasibility Study for Site-Wide Groundwater at the Former Badger Army Ammunition Plant, Baraboo, Wisconsin", dated November 2019 prepared for U.S. Army Environmental Command by SpecPro Professional Services, LLC.

The Department has the following comments on that document:

- Overall, the RI/FS is well written. It presents a good summary of site conditions. The data tables consolidate information from many years of investigation and monitoring and the figures clearly depict known site hydrogeologic conditions and contaminant plume locations.

- The Groundwater Human Health Risk Assessment indicates that the Army conducted vapor intrusion pathway analyses for all of the groundwater contaminant plumes in 2012 using the Department's vapor intrusion guidance (PUB-RR-800, dated December 2010). Based on significant advances in the science of vapor intrusion, substantial revisions were made to this guidance and an updated version was published in January 2018. We request that the Army review its assessment of potential vapor intrusion using the updated guidance.

- Based on the Human Health Risk Assessment (HHRA), no constituents of concern (COCs) were identified for the Nitrocellulose Production Area Plume because no existing, nearby receptors were identified for this plume. Based on the lack of COCs, this plume was subsequently not addressed in the Remedial Alternatives Analysis (RAA) despite the presence of chemical constituents in the plume above Wis. Admin. Code NR 140 (NR 140) enforcement standards (ESs). The contamination in this plume must be addressed. State law (Wis, State Statute 292.11(3)) requires "A person who possesses or controls a hazardous substance which is discharged or who causes the discharge of a hazardous substance shall take the actions necessary to restore the environment to the extent practicable and minimize the harmful effects from the discharge to the air, lands or waters of this state." This response must be done in accordance with applicable regulations (Wis. Admin. Code NR 700 series as authorized in Wis, State Statute 292.31(2). Therefore, we request that the Army include this plume in the RAA and evaluate remedial options consistent with the other contaminant plumes at the site.

- Consideration should be given to including analysis of major ions (e.g,, calcium, sodium, magnesium, iron, chloride, sulfate, bicarbonate, and nitrate) for groundwater samples collected from select monitoring wells along the longitudinal axis of the plume and from select private wells in areas near the plume boundaries. This may allow better identification of the plume extent and migration in advance of COCs being detected. These indicator parameters may also be helpful in identifying local sources of COCs (particularly VOCs) and differentiating those originating the plumes emanating from the site.

- The characterization of the downgradient extent of the Central Plume is inadequate. The fact that this plume is impinging upon a residential area accentuates the need for additional study. The hydrogeologic flow patterns (particularly at depth) near Grubers Grove Bay and beyond are poorly defined. The likely ultimate fate of this plume, if it were to continue to propagate, needs to be better defined.

- Detections of COCs in monitoring wells near the downgradient edges of the Deterrent Burning Ground Plume and Central Plume suggest plume expansion in those areas. An enhanced monitoring network for those areas should be developed and installed. Long term use of residential wells as the primary means of plume delineation is unacceptable.

- Remedial Alternative 4 (injection of emulsified vegetable oil to promote anerobic biodegradation of CVOCS and DNTs) is conceptually attractive. However, the technical basis regarding injection point locations, spacing and depth are not well defined. The proposed depths of the injections were not indicated and the spacing was based upon groundwater rather than contaminant velocity. Some additional detail should be provided as the density of the injection network can have a large effect on the cost estimate.

- Active remediation (as opposed to relying solely on monitored natural attenuation) may be necessary in the PBG source area and the downgradient portion of the DBG plume due to the rising contaminant concentrations.

- Continued evaluation of contaminant concentrations and groundwater elevations is necessary in the PBG source area to determine whether rising DNT concentrations are the result of increased groundwater elevations or cap integrity issues.

We appreciate the work you have done in preparing the RI/FS and look forward to your responses to our comments.

If you have any questions, please feel free to contact me by telephone at 608-293-0112 or via e-mail at stevenl.martin@wisconsin.gov.

Sincerely,

Steven L. Martin, P.G.
South Central Region Team Supervisor
Remediation & Redevelopment Program

cc: Judy Fassbender – DNR CO