



June 2, 2023

Quang Nguyen  
U.S. Army Environmental Command  
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Subject: DNR Comments on Draft Proposed Plan for Site-Wide Groundwater  
Former Badger Army Ammunition Plant, Baraboo, WI  
DNR BRRTS Activity #02-57-001002, 02-57-562629, and 02-57-526445

Dear Mr. Nguyen:

The Wisconsin Department of Natural Resources (DNR) has received and reviewed the document entitled “Draft Final Proposed Plan for Site-Wide Groundwater Former Badger Army Ammunition Plant Baraboo, Wisconsin” (Draft PP), dated February 2023, prepared for U.S. Army Environmental Command (Army) by SpecPro Professional Services, LLC (SpecPro).

### **Background:**

The Draft PP identifies the Army’s preferred alternative to address impacted groundwater associated with the former Badger Army Ammunition Plant (BAAP). The Army’s preferred alternative for the Central Plume, Deterrent Burning Ground (DBG) Plume, and Propellant Burning Ground (PBG) Plume is anaerobic bioremediation.

This alternative includes in-situ bioremediation utilizing emulsified vegetable oil pumped into vertical injection wells, monitored natural attenuation (MNA), groundwater sampling of monitoring and residential wells, groundwater land use controls, and an alternate water supply provision. This alternative will include targeted remediation of impacted groundwater with dinitrotoluene (DNT) concentrations above the ch. NR 140, Wis. Adm. Code Enforcement Standard (NR 140 ES). The Army expects MNA to remediate groundwater impacted by volatile organic compounds (VOCs) via natural processes.

No remedial alternatives were evaluated for the Nitrocellulose Production Area (NC) Plume due to a lack of identified risk. The Draft PP states the Army will continue to monitor groundwater impacts associated with the NC Plume until it is deemed unnecessary by the DNR.

### **DNR Response:**

The DNR has reviewed the Draft PP and provides the following comments:

#### Draft Proposed Plan Comments

- The DNR understands the Army will be conducting pilot scale testing as part of the remedial design phase. **The DNR requests involvement with pilot scale testing and would appreciate the opportunity to review and comment on all aspects of pilot scale testing efforts.**

- The data presented in the Draft PP are from between 2015 and 2018 and are thus outdated. **All relevant tables and figures should be updated using recently available data.**
- The Remedial Investigation/Feasibility Study (RI/FS) and Draft PP do not adequately demonstrate that site conditions are favorable for anaerobic bioremediation. **Provide data that has been collected to date that would indicate anaerobic bioremediation will be an effective remedy given site conditions. If limited information is available, the DNR recommends collecting data to help understand the effectiveness of anaerobic bioremediation.**
- The Human Health Risk Assessment (HHRA) used a cumulative cancer risk greater than  $1 \times 10^{-6}$  outside of the BAAP property line (off-site), and a cumulative cancer risk greater than  $1 \times 10^{-4}$  within the BAAP property line (on-site), as criteria for potential action or additional evaluation. The HHRA found no unacceptable risk associated with the Nitrocellulose Plume, which is only present on-site, or for several Contaminants of Potential Concern (COPCs) associated with the on-site portions of the Central Plume, DBG Plume, and PBG Plume. **The DNR utilizes a  $1 \times 10^{-6}$  excess lifetime cancer risk threshold for establishing risk-based levels for groundwater. The DNR considers any contaminant found in groundwater that exceeds the NR 140 ES or Maximum Contaminant Level (MCL), whichever is more stringent, a contaminant of concern (COC) for that plume, regardless of if on-site groundwater is considered under the control of the Army. The DNR recommends amending on-site COCs for all groundwater plumes using a  $1 \times 10^{-6}$  cancer risk threshold. Any additional on-site COCs identified should then be reviewed for potential action or additional evaluation.**
- The RI/FS and Draft PP state MNA is expected to reduce concentrations of VOCs via natural processes.
  - **Provide data that has been collected to date that would indicate MNA will be an effective remedy.**
  - **Consideration should be given to analyzing groundwater for additional geochemical parameters to support MNA effectiveness.**

### General Comments

- Elevated concentrations of DNT in groundwater continue to be detected in the PBG Plume source area. The RI/FS and Draft PP suggest elevated DNT concentrations in groundwater are likely due to groundwater rising and coming into contact with contaminated soil underneath the PBG Waste Pits. **Describe how the proposed remedy will address this potentially continuous source of DNT contamination in groundwater.**
- The PBG plume continues to shift toward the east since the shutdown of the Interim Remedial Measure/Modified Interim Remedial Measure (IRM/MIRM) groundwater extraction systems. **Evaluate the need to modify the groundwater sampling program, for both monitoring wells and residential wells, to better understand eastern PBG Plume dynamics and potential risk to nearby residential wells.**
- Evaluate the need for additional monitoring wells compliant with ch. NR 141, Wis. Adm. Code to better define the degree and extent of groundwater impacted by DNT associated with the NC Plume.
- The DNR's acceptance of the preferred alternative will be determined after the public comment period ends and will be described in the Record of Decision (ROD).

The DNR appreciates your efforts to restore the environment at this time. If you have any questions or comments, please contact the DNR Project Manager, Luke Lampo, at 608-206-5809 or at [luke.lampo@wisconsin.gov](mailto:luke.lampo@wisconsin.gov)

Sincerely,

A handwritten signature in black ink, appearing to read 'L. Lampo', written in a cursive style.

Luke Lampo  
Hydrogeologist  
Remediation & Redevelopment Program

cc:

Dwight Hollon, Army  
Clayton (Matt) Dayoc, Army  
Joel Janssen, SpecPro  
Issac Ross, DNR