



*This Fact Sheet is a summary of comments Environmental Stewardship Concepts, LLC provided to Citizens for Safe Water Around Badger on the August 2012 Alternative Feasibility Study: Final Creek, Settling Ponds, and Spoils Disposal Areas at the Badger Army Ammunition Plant. A complete copy of this report is available online at [www.cswab.org](http://www.cswab.org).*

## Background

Badger was constructed in 1942 in Sauk County, Wisconsin, near the city of Baraboo. Over a 33 year period, until 1975, the plant operated intermittently to produce propellants for cannon, rocket, and small arms ammunition. Past industrial activities at this site have resulted in soil and groundwater contamination.

## What is the Alternative Feasibility Study?

The Alternative Feasibility Study (AFS) intends to revise and amend the remediation options and goals that were approved by the Wisconsin Department of Natural Resources, Environmental Protection Agency (EPA), and the Army in 1994.

## The Settling Ponds Area

The Settling Ponds are located along the installation's southern boundary and were first used in 1941. During the years of production, these ponds received sanitary and industrial wastewater from the entire facility and surface runoff from the Nitroglycerine, Rocket Paste, and Magazine areas. By 1970 the ponds covered 25 acres. Contaminated soil removed during dredging operations was placed alongside the ponds.

## COMMENTS ON THE AFS

### Dinitrotoluene

The remedial goals are insufficient for the explosive compound Dinitrotoluene (DNT) because only two forms of DNT (2-4 & 2-6 DNT) are included in the proposed remedial goals. Toxicologists working with the Wisconsin Division of Public Health have also found the



lesser isomers of DNT (2-3, 2-5, 3-4, 3-5) are as toxic or more toxic than 2-4 and 2-6 DNT.

Furthermore, the Army's study does not address the cumulative risk of a mixture of all 6 isomers. Wisconsin has adopted a groundwater standard for total DNT (the summed total concentration of all six isomers of DNT) of 0.05 µg/l (micrograms per liter), which would be appropriate to use.

Certain forms of DNT may degrade in the environment into different compounds which are called breakdown products.

One of the most potent breakdown products of DNT is ortho-nitrotoluene. With DNT clearly identified on site, the breakdown products should be included in soil and groundwater testing at Badger Army Ammunition Plant.

### Lead

The proposed soil remediation goal of 500 mg/kg (milligrams per kilogram) is inappropriate based on information used by both the Centers for Disease Control and Prevention (CDC) and Environmental Protection Agency (EPA). The CDC recently changed the reference point for blood lead levels, reducing the allowable level in our blood from 10 µg/dL to 5 µg/dL. EPA is in the process of updating reference values for lead-contaminated soil cleanup, based on the lower CDC value. The AFS needs to take into account the lower remediation value in order to avoid cleaning up the soil multiple times for compliance.



### Exposure and Intake Rates

Appendix A of the AFS provides equations that were used to calculate various estimations of risk. These numbers are unique to the Badger Army Ammunition Plant area, but should take into account commonly established levels. The soil intake rates are too low (20.8 mg/day for adults and 41.6 mg/day for children) compared to values used in the EPA Exposure Factors Handbook; they should be 100-200 mg/day or greater.

The exposure time rate of 5 hrs/day is also low. It should be greater to account for hunting, recreation and research in a maximum exposure scenario. As a result of a low exposure time rate the risks to visitors are underestimated.

### Wildlife

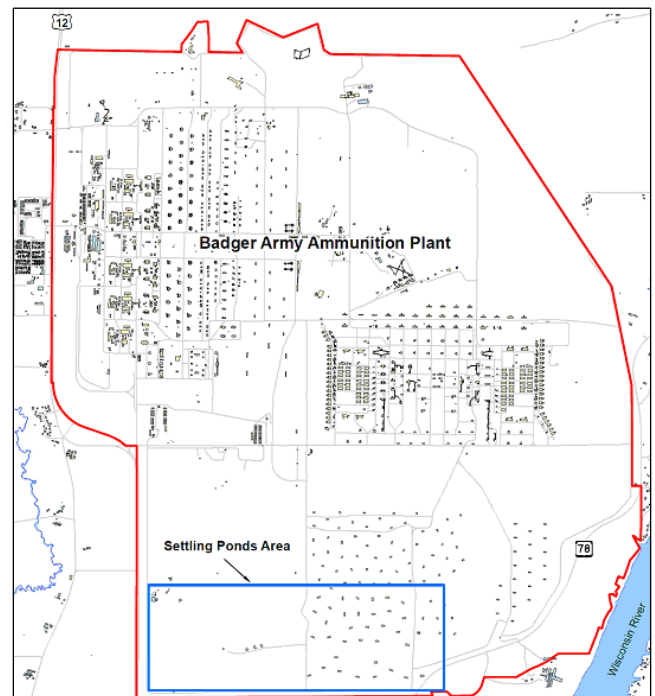
The Badger property is home to deer, squirrels, rabbits, pheasants, and many other species. These animals migrate across the property and could come into contact with contaminated soil and water. Institutional controls (deed restrictions, warning signs, fences, etc.) intended to limit human exposures are not effective for animals. A part of the property is being made into a recreational area for hunting, therefore animal exposure pathways should be given special consideration. More stringent standards are needed to protect both the wildlife and the people who hunt and consume deer and other wild game.



### Contaminants of Concern (COCs)

About 60 contaminants of concern were considered for remediation in the AFS, but only 5 (2-4 DNT, 2-6 DNT, nitroglycerine, chromium, and lead) made the final list after background testing. Total arsenic and total chromium were added to the list after the site investigation because they were found at levels above the site specific soil limits. The list of COCs is similar to the one used in 1994, yet all of the contaminants are to be allowed at a higher concentration in the current proposal. Consideration should be made to return to the lower contaminant concentrations that were initially approved in 1994, as well as including important DNT isomers.

### Settling Ponds Area Location Map Alternative Feasibility Study



### For More Information:

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