



10 April 2013

Laura Olah, Executive Director
Citizens for Safe Water Around Badger
E12629 Weigand's Bay South
Merrimac, WI 53561

RE: Justification for sampling of east side wells

Dear Laura,

The following letter summarizes technical justification for the sampling of high capacity wells and residential wells located on the east side of the Wisconsin River, downgradient of the contaminant plume emanating from the Badger Army Ammunition Plant (BAAP).

Although extensive sampling has been conducted to prepare a map depicting the contaminant plume caused by historical activities at the BAAP, the degree and extent of soil or groundwater contamination has not been fully defined. There are several areas in need of further evaluation, including (but not limited to) the area downgradient of the site on the east side of the river.

The movement of contaminants within the alluvial aquifer could be extensive. Hydraulic conductivity of the alluvial aquifer of the Wisconsin River Valley is reported to be between 55 to 976 feet per day, with a geometric mean of 162 feet per day, based on specific conductivity estimates (source: Gotkowitz, M.B. et al, Hydrogeology and Simulation of Groundwater Flow in Sauk County, Wisconsin, Bulletin 102, WGNHS, 2005). Although the majority of precipitation is expected to enter the Wisconsin River as baseflow, there is also a potential for movement of groundwater beneath the river. Multiple high capacity wells are located directly downgradient of the contaminant plume on the east side of the river. Taking into consideration significant pumping from these irrigation wells and other private wells, transport of contaminants that could potentially affect water quality for receptors located east of the river cannot be ruled out.

As stated in a report by the Wisconsin Natural History and Geological Survey, it is expected that flow does occur in the deep aquifer beneath the Wisconsin River:

Model simulations demonstrated that the aquitard restricts upward flux of water from the deep sandstone aquifer to the Wisconsin River and that some groundwater in the deep sandstone underflows the Wisconsin River from east to west (source: Gotkowitz, M.B, et al, Hydrogeology and Simulation of Groundwater Flow in Sauk County, Wisconsin, Bulletin 102, WGNHS, 2005).

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Given that this model was created without incorporation of the extensive network of irrigation wells within the vicinity of the contaminant plume, including irrigation and other private wells located on the east side of the Wisconsin River, it is entirely plausible that this groundwater movement within the deep aquifer could be moving from west to east. In addition, general groundwater flow of the deep aquifer is known to be to the east, toward Lake Michigan, also suggesting potential movement of contaminants east, under the Wisconsin River.

Further, results of the City of Wausau Superfund Investigation (1987) identified the movement of contaminants under the Wisconsin River in both directions, primarily impacted by the pumping of municipal water supply wells on each side of the river.

The most effective manner of ensuring the health and safety of residents and consumers on the east side of the river is to collect and analyze groundwater samples. It is recommended that groundwater from wells on the east side of the Wisconsin River be analyzed for VOCs, all isomers of DNT, metals, and arsenic, at a minimum. Wells evaluated should include irrigation, commercial, and residential wells.

Please feel free to contact me with any questions or for additional information.

Sincerely,

Lori Huntoon

Lori Huntoon, PG
Principal Hydrogeologist