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MEMORANDUM

TO: Mark J. Peters, Wisconsin Department of Natural Resouces

FROM: Brian Kent, CHMM

DATE: July 27, 2026

RE: Vernon County Groundwater Quality Exemption Requests
SEH No. VERSW 167824 14.00

In accordance with NR140.28 Wis Adm. Code, based on the results of baseline and detection monitoring completed for the above reference monitoring wells installed during 2024 and 2025, exemptions to the groundwater quality standards outlined in NR140.10 and NR140.12 Wis. Adm. Code are requested. Following is a summary of the requested exemptions and justification.

MW-16Z: See below requested exemptions.

Parameter	Well ID	Public Health (NR140.10)		Public Welfare (NR140.12)	
		ES	PAL	ES	PAL
Cadmium	MW-16Z		X		
Manganese	MW-16Z	X		X	

Two PAL exceedances were measured at MW-16Z for cadmium, however, the remaining baseline samples were below laboratory detection limits and the respective PAL. One ES and one PAL exceedance were measured for manganese during the first two baseline sampling events, respectively. Subsequent baseline sampling for manganese indicated that measured concentrations were below the PAL and continued to decrease.

MW-18WT: See below requested exemptions.

Parameter	Well ID	Public Health (NR140.10)		Public Welfare (NR140.12)	
		ES	PAL	ES	PAL
Arsenic	MW-18WT	X			
Chromium	MW-18WT		X		
Lead	MW-18WT	X			
Manganese	MW-18WT	X		X	
Nitrate+Nitrite (as N)	MW-18WT		X		

One ES exceedance and one PAL exceedance were measured at MW-18WT for arsenic, lead, and manganese. While the respective concentrations decreased following the initial baseline sampling event, detections in exceedance of the respective PALs were measured during the final baseline sampling event. PAL exceedances were measured for nitrate+nitrite (N+N) at or near the PAL during three of the four baseline sampling events. One PAL exceedance for chromium was measured at MW-18WT during the first baseline sampling event. The remaining groundwater samples for chromium were non-detect or below the PAL. However, the average of the baseline samples is slightly above the PAL.

MW-18: See below requested exemption.

Parameter	Well ID	Public Health (NR140.10)		Public Welfare (NR140.12)	
		ES	PAL	ES	PAL
Nitrate+Nitrite (as N)	MW-18		X		

Two PAL exceedances were measured at MW-18 for N+N. Given the consistent detections on N+N, along with the apparent stability and consistency of other indicator parameters (conductivity, alkalinity, hardness, pH) suggest that the detections are not anomalous. The presence of N+N is consistent with water quality observed in other site wells and is likely due to historic agricultural practices in the vicinity.

MW-19: See below requested exemptions.

Parameter	Well ID	Public Health (NR140.10)		Public Welfare (NR140.12)	
		ES	PAL	ES	PAL
Benzene	MW-19	X			
Arsenic	MW-19		X		
Chromium	MW-19		X		
Lead	MW-19		X		
Manganese	MW-19	X		X	

One ES exceedance and one PAL exceedance were measured at MW-19 for benzene during the first two baseline sampling events. Subsequent baseline sampling for benzene indicated no further detections. Also, PAL exceedances were measured at MW-19 for arsenic, lead and chromium during the initial baseline sampling event. Subsequent baseline sampling for these parameters indicated no further detection, or low-level detections below the applicable PAL. However, the average concentratio9n of the baseline samples for arsenic, chromium and lead were slightly above their respective PALs. Baseline sampling completed for manganese indicated ES exceedances during the first three sampling events, and a PAL exceedance for the fourth.

MW-19Z: See below requested exemption.

Parameter	Well ID	Public Health (NR140.10)		Public Welfare (NR140.12)	
		ES	PAL	ES	PAL
Manganese	MW-19Z	X		X	

Two NR140.10 ES exceedances were measured at MW-19Z for manganese, however, the remaining baseline samples were below the respective PAL. However, while the last two events were less than the NR140.10 PAL, the measured concentrations were above the NR140.12 ES during the third event, and PAL during the fourth.

MW-20: See below requested exemption.

Parameter	Well ID	Public Health (NR140.10)		Public Welfare (NR140.12)	
		ES	PAL	ES	PAL
Manganese	MW-20		X	X	

NR140.10 ES exceedances and NR140.12 ES exceedances were measured at MW-20 for manganese during all four baseline sampling events. However, concentrations did decrease from the initial baseline sampling event.

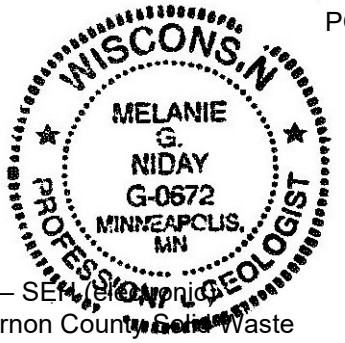
Given the carbonate bedrock geology and naturally occurring metal-bearing minerals present within the Driftless Area of southwest Wisconsin, the observed pattern of elevated manganese, arsenic, chromium, and lead concentrations immediately following well installation, followed by declining concentrations during subsequent monitoring events, is consistent with short-term geogenic mobilization rather than a sustained anthropogenic release. Activities related to drilling, well construction, and development and well purging likely altered localized hydrogeochemical conditions and mobilized naturally occurring trace metals present within the native soil and bedrock matrix. These disturbances may increase the solubility and mobility of naturally occurring metals through desorption from mineral surfaces, dissolution of oxide coatings, and entrainment of fine-grained formation materials. The decreasing concentration trend suggests that the initial detections were associated with aquifer disturbance and mobilization of naturally occurring metal-bearing particulates and mineral phases rather than persistent groundwater impacts. This is further supported by concurrent reductions of turbidity in purged and sampled groundwater.

The presence of benzene, and other petroleum related volatile organic compounds, measured in groundwater collected from MW-19 during the first and second sampling events is likely an artifact of equipment used during drilling, well construction, well development, and/or well sampling, all which may utilize or potentially have contact with fuel. During the initial baseline sampling event for the wells installed during 2024, the first well sampled was MW-19. While samples are purged and collected following rigorous quality control procedures, the equipment is typically decontaminated after each use. If the pump or equipment came in contact with contamination while mobilizing to the site, this could be the reason for the transient detections observed.

I, Melanie G. Niday, PG, hereby certify that I am a licensed professional geologist in the State of Wisconsin in accordance with the requirements of ch. GHSS 2, Wis. Adm. Code; that the preparation of this document has not involved any unprofessional conduct as detailed in ch. GHSS 5, Wis. Adm. Code; and that, to the best of my knowledge, all information contained in this document is correct and the document was prepared in compliance with all applicable requirements in chs. NR 500 to 538, Wis. Adm. Code.

Melanie Niday 672-013 July 27, 2026

Melanie G. Niday, PG PG Number Date
Hydrogeologist



BLK/MGN

c: Melanie Niday, PG – SEH (electronic)
Stacie Sanborn, Vernon County Solid Waste

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