

Mueller, Stephen D - DNR

From: Mueller, Stephen D - DNR
Sent: Friday, June 28, 2019 12:26 PM
To: Greg Johnson
Cc: Norman, Michele R - DNR; Mueller, Stephen D - DNR
Subject: Milwaukee Die Casting - groundwater site investigation work plan
Attachments: 1,4-dioxane vs TCE study abstract.pdf

Good afternoon Greg-

Thank you for accepting our comments #1-5 and, in comment #6, sampling for PCBs in the initial two rounds of groundwater for the pending new monitoring wells. Regarding comment #6, sampling SVOCs (incl. 1,4-dioxane), after re-reviewing the Site's analytical results tables and/or laboratory results, as well as further discussing internally, we make the following additional comments:

1. The MDCC case has a long history with multiple consultants (at least seven) conducting numerous investigations over three decades. During this time, no "officially" defined list of contaminants-of-concern (COCs) has been established for the MDCC site. To date, PCBs and various VOCs, especially PCE, TCE, & related breakdown compounds, have been the primary focus of MDCC site environmental activities. However, until the MDCC case is closed by the Department, new (i.e., emerging) parameters of concern (e.g., 1,4-dioxane) that can reasonably be attributed to the documented contamination, as well as past operations, at the MDCC site should be analyzed before the case is submitted to the Department for closure review.
2. SVOCs have been analyzed in approximately 50 soil samples and 20 'grab' groundwater samples, mostly during the 2004 site assessment by Braun Intertec for the Target Corporation. Several SVOCs were detected above Wis. Admin. Code, §NR 140 Enforcement Standards (ESs) and/or Preventive Action Limits (PALs) mostly in a number of the Braun Intertec 'grab' groundwater samples (e.g., GP-142 and GP-147). Because 'grab' or temporary well groundwater results are "screening" level data and often do not accurately characterize groundwater quality, the Department's long-standing requirement is that the results be confirmed (or refuted) by analytical results for groundwater samples collected from monitoring wells constructed per Wis. Adm. Code §NR 141.
3. While it is common knowledge that 1,1,1-TCA was the primary solvent in which 1,4-dioxane (1,4,-DX) was incorporated as a stabilizer, 1,4-DX has been found at TCE-only plume sites (see attached). High concentrations of TCE (up to 200,000 ug/L in GMMW-104) have been detected across the MDCC site. Furthermore, TCA and its breakdown products, 1,1-DCA and 1,1-DCE, albeit at relatively low concentrations (as you pointed out), have been detected at the MDCC site, especially on the east side of the former plant property. Therefore, it is appropriate to consider 1,4-DX to be a potential contaminant of concern. The Department again suggests that SVOCs, including 1,4-DX, be included in the initial two groundwater sampling rounds for the pending new monitoring wells. If 1,4-DX is found not to be associated with TCE at the MDCC site, it seems likely that concentrations that may be associated with TCA at the site will be minimal.

Please consider our comments when revising and resubmitting the Site Investigation work plan, and/or provide technical information that might alter any of the comments.

Steve

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Co-occurrence of 1,4-dioxane with trichloroethylene in chlorinated solvent groundwater plumes at US Air Force installations: Fact or fiction.

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Author information

Abstract

Increasing regulatory attention to 1,4-dioxane has prompted the United States Air Force (USAF) to evaluate potential environmental liabilities, primarily associated with legacy contamination, at an enterprise scale. Although accurately quantifying environmental liability is operationally difficult given limited historic environmental monitoring data, 1,4-dioxane is a known constituent (i.e., stabilizer) of chlorinated solvents, in particular 1,1,1-trichloroethane (TCA). Evidence regarding the co-occurrence of 1,4-dioxane and trichloroethylene (TCE), however, has been heavily debated. In fact, the prevailing opinion is that 1,4-dioxane was not a constituent of past TCE formulations and, therefore, these 2 contaminants would not likely co-occur in the same groundwater plume. Because historic handling, storage, and disposal practices of chlorinated solvents have resulted in widespread groundwater contamination at USAF installations, significant potential exists for unidentified 1,4-dioxane contamination. Therefore, the objective of this investigation is to determine the extent to which 1,4-dioxane co-occurs with TCE compared to TCA, and if these chemicals are co-contaminants, whether or not there is significant correlation using available monitoring data. To accomplish these objectives, the USAF Environmental Restoration Program Information Management System (ERPIMS) was queried for all relevant records for groundwater monitoring wells (GMWs) with 1,4-dioxane, TCA, and TCE, on which both categorical and quantitative analyses were carried out. Overall, ERPIMS contained 5788 GMWs from 49 installations with records for 1,4-dioxane, TCE, and TCA analytes. 1,4-Dioxane was observed in 17.4% of the GMWs with detections for TCE and/or TCA, which accounted for 93.7% of all 1,4-dioxane detections, verifying that 1,4-dioxane is seldom found independent of chlorinated solvent contamination. Surprisingly, 64.4% of all 1,4-dioxane detections were associated with TCE independently. Given the extensive data set, these results conclusively demonstrate for the first time that 1,4-dioxane is a relatively common groundwater co-contaminant with TCE. Trend analysis demonstrated a positive log-linear relationship where median 1,4-dioxane levels increased between approximately 6% and approximately 20% of the increase in TCE levels. In conclusion, this data mining exercise suggests that

1,4-dioxane has a probability of co-occurrence of approximately 17% with either TCE and/or TCA. Given the challenges imposed by remediation of 1,4-dioxane and the pending promulgation of a federal regulatory standard, environmental project managers should use the information presented in this article for prioritization of future characterization efforts to respond to the emerging issue. Importantly, site investigations should consider 1,4-dioxane a potential co-contaminant of TCE in groundwater plumes.

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