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September 19, 2023

Ms. Cindy Roberts, Outreach and Training Coordinator
State Agriculture Development Committee
New Jersey Department of Agriculture
200 Riverview Plaza - 3rd Floor
Trenton, NJ 08611

Dear Ms. Roberts,

The New Jersey Department of Health (NJDOH) has reviewed information pertaining to an irrigation well on the Compari Farm located in Millville, Cumberland County. This information included water sample data collected from the irrigation well in June 2023 by GEI Consultants, Inc. (GEI), a licensed site remediation professional (LSRP), and GEI's risk assessment based on these data. The sample data, collected as part of an ongoing investigation into groundwater contamination from the nearby former Airwork site, indicated the presence of tetrachloroethylene (PCE) in the irrigation well water. Per your request, DOH reviewed the LSRP's risk assessment on the impact of PCE-contaminated irrigation water on crop consumption by human consumers and domestic farm animals to provide guidance on the continued use of the irrigation well for agricultural purposes.

In June 2023, GEI conducted a risk assessment utilizing a sample collected with the irrigation header in place, which is representative of the distribution of the irrigation well water [GEI Consultants 2023]. The concentration of PCE in the well water with the irrigation header in place was 1.7 parts per billion (ppb). GEI also collected a sample directly from the well without the irrigation header in place (2.6 ppb). Spray irrigation systems reduce VOCs like ethylene dibromide, PCE, trichloroethylene, trichloroethane, and carbon tetrachloride by 96 to 98% [EPA 1998]. In other words, utilizing a spray irrigation system reduces the concentration of VOCs through the process of volatilization. In general, publications have reported that given the high volatility of PCE, and its low potential for bioaccumulation, it is unlikely that fruits and vegetables irrigated with PCE-contaminated water would harm people's health [ATSDR 2019; ATSDR 2021; North Carolina State Extension].

Review of LSRP risk assessment

NJDOH reviewed GEI's risk assessment based on irrigation well sampling conducted in June 2023, which evaluated the potential health impacts of PCE-contaminated water on crop

consumption by domestic farm animals and humans. Two models were used by GEI. The first model evaluated the risk to domestic farm animals from consumption of farm crops. The second model evaluated the risk to humans from the direct consumption of farm crops.

The first model uses an EPA-approved average daily dose (ADD) model to assess the effects on domestic cattle consuming crops irrigated from the well [EPA ExpoBox Tool Sets]. **The findings of this model indicate that the level of PCE detected in the farm irrigation well water will not result in harmful effects to domestic cattle.** Although DOH conducts health assessments evaluating impacts to human health, the ADD methodology uses a similar process and is a valid approach to assess potential health impacts to domestic cattle. Therefore, **NJDOH supports the use of this model and is in agreement with the findings of the model.**

The second model uses the Risk Assessment Information System (RAIS) tool (sponsored by the U.S. Department of Energy in collaboration with Oak Ridge National Laboratory and others). This model evaluates risks from the direct consumption of agricultural crops or homegrown produce irrigated with well water containing 1.7 ppb of PCE (measured post irrigation head) as one of the model parameters. GEI added to this by also evaluating the risks to a subsistence farmer and their family (including children) of consuming farm products like dairy, eggs, and livestock. In general, the EPA uses Regional Screening Levels (RSLs), a tool that is widely used to conduct risk assessments for human exposure scenarios [EPA Regional Screening Levels – Generic Tables]. The RAIS, which is aligned with the EPA approach, includes a broader category of exposure pathways and scenarios (such as the farming scenario). **The results of this model showed no harmful impacts to human health based on consuming crops irrigated with this well water or from ingesting products (meat, dairy, eggs) from animals served by or fed with crops irrigated with well water containing PCE at levels measured in the June 2023 sampling event.** The RAIS tool provides an online calculator to assist in performing risk assessments which comply with EPA’s guidance [RIAS FAQ]. Therefore, **DOH supports the RAIS tool as an appropriate methodology to evaluate the specific scenarios evaluated in GEI’s risk assessment and concurs with the model findings.**

Conclusions

In general, utilizing a spray irrigation system results in the volatilization and reduction of VOCs including PCE. Therefore, a reduced concentration of PCE would be available for uptake by the farm crops resulting in minimal impact to domestic farm animals and humans consuming crops irrigated with PCE-contaminated water.

GEI utilized appropriate risk assessment methodology for the evaluation of health impacts to domestic cattle and to humans consuming crops or ingesting products from animals served by or fed with crops irrigated with well water containing PCE at levels measured in the June 2023 sampling event. Therefore, NJDOH concurs with GEI’s conclusions based on their risk assessment models.

NJDOH is available to review any additional environmental sampling data upon request.

Sincerely,



Somia Aluwalia, Ph.D.
Environmental and Occupational Health Surveillance Program
New Jersey Department of Health

References:

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atsdr.cdc.gov/ToxProfiles/tp18.pdf

ATSDR 2021. Concerns Regarding Vegetables Grown with Tetrachloroethylene Contaminated Water, Utah Department of Health. Available at: appletree.utah.gov/wp-content/uploads/2021/10/PCE_Vegetables.pdf

EPA 1998. Sprinkler Irrigation as a VOC Separation and Disposal Method, Innovative Technology Evaluation Report, Office of Research and Development, U.S. Environmental Protection Agency. Available at: clu-in.org/download/toolkit/540r98502.pdf

EPA ExpoBox Tool Sets: epa.gov/expobox and epa.gov/expobox/exposure-assessment-tools-routes-ingestion

[EPA Regional Screening Levels \(RSLs\) – Generic Tables](https://epa.gov/risk/regional-screening-levels-rsls-generic-tables). Available at: epa.gov/risk/regional-screening-levels-rsls-generic-tables

GEI Consultants 2023. Geotechnical Environmental Water Resources Memo to Property Owner, Porreca Farm Re: Evaluation of Tetrachloroethene Impacted Irrigation Water on Crop Consumption in Domestic Farm Animals and Human Consumers.

North Carolina (NC) State Extension: PCE and TCE in the garden. Available at: gardening.ces.ncsu.edu/wp-content/uploads/2021/11/solvents_v2.0.pdf?fwd=no

RAIS FAQ: The Risk Assessment Information System Frequently Asked Questions. Available at: [Risk Assessment Information System FAQ](#)

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