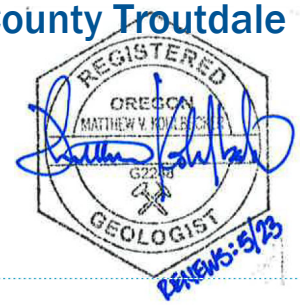
TECHNICAL MEMORANDUM

Review of Zone B and Zone D Closure, East Multnomah County Troutdale Sandstone Aquifer Remedy, ECSI#1479



To: Doug Wise / Portland Water Bureau

From: Matthew Kohlbecker, RG / GSI Water Solutions, Inc.

Date: May 3, 2023

1. Introduction

This technical memorandum (TM), prepared by GSI Water Solutions, Inc. (GSI), summarizes a review of a closure request for Zone B and Zone D of the East Multnomah County Troutdale Sandstone Aquifer (TSA) remedy. The request was made to the Oregon Department of Environmental Quality (DEQ) in the *Annual Performance Report, 1 January 2021 – 31 December 2021* that was prepared by Geosyntec Consultants, Landau Associates, and S.S. Papadopulos and Associates and dated May 2022 (Geosyntec, Landau, and SSPA, 2022). DEQ approved the request in a letter dated November 23, 2023 (DEQ, 2022).

2. Review of Closure Requests

This section summarizes GSI's review of the closure request for Zone B (Subsection 2.1) and Zone D (Subsection 2.2).

2.1 Zone B Closure Request

Based on groundwater quality samples collected in 2021, concentrations of Chlorinated Volatile Organic Compounds (CVOCs) in Zone B are currently below the cleanup standards established by the 1996 Record of Decision (i.e., Maximum Contaminant Levels or MCLs) (DEQ, 1996). It should be noted, however, that trichloroethene (TCE) concentrations are only slightly below the MCL in some wells[1]. It should also be noted that TCE concentrations exceeded the MCL in some wells as recently as August 2018[2]. It is premature to close Zone B at this time because:

- **CVOC Concentration Rebound.** It is premature to close Zone B because the potential for rebound in contaminant concentrations due to the shut down of extraction well EW-23, which was used to remediate CVOCs in Zone B, has not been adequately assessed. Specifically, when extraction wells are shut down, groundwater levels recover to pre-pumping conditions, rising into what was formerly the unsaturated zone and re-dissolving CVOCs that are sorbed to soil grains. EW-23 was shut down in April 2021. Post shut down, only one groundwater quality sample has been collected from monitoring wells in Zone B (August 2021) to assess the potential for rebound in CVOC

[1] The concentration of trichloroethene (TCE) in monitoring well BOP-61ds was 3.5 micrograms per liter (ug/L) in February 2021. The concentration of TCE in monitoring well BOP-61dg was 4.0 ug/L in February 2021. These concentrations are slightly below the MCL for TCE of 5 ug/L.

[2] In August 2018, the concentration of TCE in monitoring well BOP-61dg was 5.2 ug/L, and the concentration of TCE in monitoring well BOP-61ds was 5.3 ug/L.These concentrations exceed the MCL for TCE of 5 ug/L.

concentrations. Moreover, this sample was collected during the summer dry season, when groundwater levels are near their annual lows and the effects of rebound may not yet be apparent. It is possible that CVOC concentrations could rebound to concentrations that exceed the MCL based on the observed concentrations at monitoring wells BOP-61ds and BOP-61dg. Because rebound has not yet been adequately assessed, it is premature to close Zone B.

- **Meeting Remedial Action Objectives (RAOs).** RAO-e in the 1996 ROD is to protect background groundwater quality in the Sand and Gravel Aquifer (SGA) and the Blue Lake Aquifer (BLA), implying that VOCs cannot be permitted to migrate offsite. It should be noted that the groundwater elevation contours in Figure 4-1a and 4-1b, and in Figure 4-2a and 4-2b, do not necessarily demonstrate hydraulic capture. Specifically, groundwater contours only demonstrate hydraulic capture for the special case when the horizontal hydraulic gradient is zero (Fetter, 2001). As a result, it is uncertain whether CVOCs are migrating offsite and potentially impacting the SGA and BLA. Because hydraulic capture has not been adequately demonstrated, it is premature to close Zone B.

2.2 Zone D Closure Request

Based on groundwater quality samples collected in 2021, concentrations of CVOCs in Zone D are nondetect at the only remaining monitoring well (EW-16). It should be noted that concentrations of CVOCs at EW-16 have been nondetect since 2018, and that the pump and treat system has not operated in or near Zone D since 2014. Because no rebound has been observed in the approximately 7 years since pumping ceased in 2014, and because concentrations of CVOCs are nondetect, it may be appropriate to close Zone D at this time.

3. Recommendations

We recommend continued monitoring of groundwater quality at monitoring wells along the northern property boundary of the East Multnomah County (EMC) Site, including BOP-20dg, BOP-20ds, BOP-23dg, and CMW-36dg. The data collected from these monitoring wells are important for evaluating hydraulic control of the CVOC plume as extraction wells are shut down. These data are important for demonstrating hydraulic capture of CVOCs at the site because hydraulic capture is not necessarily demonstrated by the groundwater elevation contours in Figures 4-1a and 4-1b, and Figures 4-2a and 4-2b (Fetter, 2001).

4. References

DEQ. 1996. Remedial Action Record of Decision for the East Multnomah County Groundwater Contamination Site, Troutdale Sandstone Aquifer. December.

DEQ. 2022. RE: Annual Performance Report for 1 Jan. – 31 Dec. 2021. East Multnomah County Troutdale Sandstone Aquifer Remedy. Zones B and D Closure Requests. ECSI #1479.

Fetter, C. W. 2001. Applied Hydrogeology. 4th Edition. Prentice Hall, Upper Saddle River, New Jersey. 598 pages.

Geosyntec, Landau, and SSPA. 2022. Annual Performance Report, 1 January 2021 – 31 December 2021, East Multnomah County, Troutdale Sandstone Aquifer Remedy, ECSI 1479. May.