Oregon
Tina Kotek, Governor

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November 12, 2024 *sent via email*

Jason Hegdahl
Cascade Corporation
2201 NE 201st Avenue
Fairview, Oregon 97024

Deborah Taege
The Boeing Company
P.O. Box 2207, M/S 7A-XA
Seattle, WA 98124

RE: Annual Performance Report 1 Jan. – 31 Dec. 2023 and Five-Year Remedy Performance Evaluation, East Multnomah County, Troutdale Sandstone Aquifer Remedy, Gresham, Oregon. ECSI #1479

Dear Mr. Hegdahl and Ms. Taege,

The Oregon Department of Environmental Quality (DEQ) has reviewed the Annual Performance Report for calendar year 2023 and Five-Year Remedy Performance Evaluation, for the East Multnomah County, Troutdale Sandstone Aquifer Remedy. The report is dated July 2024. This report was prepared on your behalf by Geosyntec Consultants, Inc., Landau Associates, Inc. and SS Papadopulos and Associates, Inc. DEQ approves the document and the Section 7.0 *Recommendations and Future Planned Activities.*

As well, thank you for meeting with DEQ to discuss the recent cVOC and PFAS results of Portland Water Bureau PWB-1 multi-port monitoring well sampling. We look forward to hearing from you on our request for reconnaissance level PFAS sampling in representative project monitoring wells; we respectfully ask that you formally respond to DEQ's request within 30 days of receipt of this letter

DEQ approves the recommended actions in Section 7.2 *Recommended Changes to Monitoring Program and Schedule Modifications* of the July 2024 document (directly quoted below):

- *Decrease monitoring frequency for groundwater elevation and groundwater quality monitoring for Zone C well CMW-10(ds) from quarterly to semiannually. VOC concentrations in this well have been steadily declining since 2010 and are now only slightly above the MCL. Thus, semiannual sampling frequency is sufficient to monitor low-level VOC concentrations.*
- *Discontinue groundwater elevation and groundwater quality monitoring at Zone B and Zone D wells, with the exception of sentinel wells identified for sampling as part of the PWB Contingency Plan. Following the 2022 Annual Report, DEQ requested the continued sampling of wells BOP-20(ds), BOP-20(dg), and BOP-23(dg) to monitor for potential rebound at extraction well EW-23. Groundwater elevation data and TCE concentrations at wells (BOP-20(ds), BOP-20(dg), and BOP-23(dg)) indicate no aquifer rebound almost three years after EW-23 shutdown. Based on this information, we request to discontinue sampling of these three wells as part of the*

routine remedy monitoring program. Wells BOP-20(ds) and BOP-23(dg) are sentinel wells for non-routine monitoring during prolonged PWB operation of the CSSWF, as identified in the PWB Contingency Plan.

- *Following the May 2024 quarterly sampling event, shut off three SVE wells (VMW-H, VMW-C, and VMW-F). Mass removal at these three wells has declined to asymptotic levels. Vapor extraction from the remaining five SVE wells will continue. (DEQ approved this change via email in April 2024).*

From Section 2.1 of the July 2024 document, please retain the following wells in usable condition for possible future sampling while acknowledging that DEQ had previously approved their decommissioning. These wells were not sampled in 2023.

- Zone A: Upper TSA well BOP-44(ds), Lower TSA wells BOP-44(dg) and EMC-2(dg), and SGA well BOP-44(usg);

- Zone B Upper TSA wells BOP-21(ds) and BOP-42(ds) and Lower TSA wells BOP-42(dg) and BOP-60(dg);

- Zone C: Lower TSA wells CMW-8(dg) and CMW-10(dg).

The Portland Water Bureau provided project comments to DEQ titled: *Summary of 2023 Groundwater Quality Impacts at Portland Water Bureau Wells Due to Contaminant Releases by the Boeing Company and Cascade Corporation at the East Multnomah County Site, dated October 1, 2024.* This summary is attached to this letter.

Please feel free to call me with questions.

Sincerely,

Kenneth Thiessen, RG, CEG
Northwest Region Cleanup Section
(503) 887-7636

cc: Cindy Bartlett, R.G. Geosyntec Consultants
Christine Kimmel, L.G, Landau Associates
Brent Miller, P.E. Geosyntec Consultants
Charles Andrews, Ph. D., S.S. Papadopulos & Assoc., Inc.
Dan Hafley, RG, DEQ NW Region
Amber Lutey, R.G, DEQ NW Region
Doug Wise, Portland Water Bureau
Jack Dahl, PE, Portland Water Bureau
ECSI #1479

PORTLAND WATER BUREAU
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TECHNICAL MEMORANDUM

Summary of 2023 Groundwater Quality Impacts at Portland Water Bureau Wells Due to Contaminant Releases by the Boeing Company and Cascade Corporation at the East Multnomah County Site

To: Kenneth Thiessen / Oregon Department of Environmental Quality

From: Jack Dahl, RG / Portland Water Bureau

CC: Douglas Wise / Portland Water Bureau

Date: October 1, 2024

This technical memorandum presents the continuing analysis of the increasing trends in the concentration of trichloroethylene (TCE) in Portland Water Bureau (PWB) monitoring wells in the Troutdale Sandstone Aquifer (TSA).

Background

As the drinking water provider for nearly one quarter of Oregon's population, Portland Water Bureau (PWB) is concerned about any trichloroethylene (TCE) impacts in the vicinity of its groundwater wells in the Troutdale Sandstone Aquifer (TSA) and Sand and Gravel Aquifer (SGA). To that end, and in light of DEQ's issuance of a conditional No Further Action (NFA) determination for the Boeing/EMC Remediation in Zone A, PWB continues to urge DEQ to increase the required monitoring and analysis period to a duration sufficient to confidently determine decreasing or stable TCE concentration trends below the drinking water Maximum Contaminant Level (MCL) for the construction window of PWB's water right, which currently ends in 2085.

PWB presented analysis to DEQ in 2020 that indicated a statistically significant increasing trend in TCE concentrations at both monitoring wells PWB-1(UTS) and PWB-1(LTS) since the shutdown of several EMC extraction wells in 2010. While TCE concentrations in both PWB-1(UTS) and PWB-1(LTS) were and are currently below MCL (5 µg/l), which is the value stipulated in the site Record of Decision (ROD), the statistically significant trend shown in the data would indicate that, without any change, concentrations would exceed MCLs within 42 years. PWB has active water rights within the TSA with construction dates set to 2085, and an exceedance of the TCE MCL in the TSA at PWB-1(UTS) and PWB-1(LTS) would have a deleterious impact on operations of PWB's groundwater resources.

Current Updated TCE Trends at PWB-1

The most recent Mann-Kendall Analysis of trend in both PWB-1(uts) and PWB-1(lts) were completed after the most recent sampling at those wells (2023/5/16). The outcomes of those analyses are shown below in Figure 1 and 2.

Figure 1: Mann-Kendall Analysis at PWB-1(UTS)

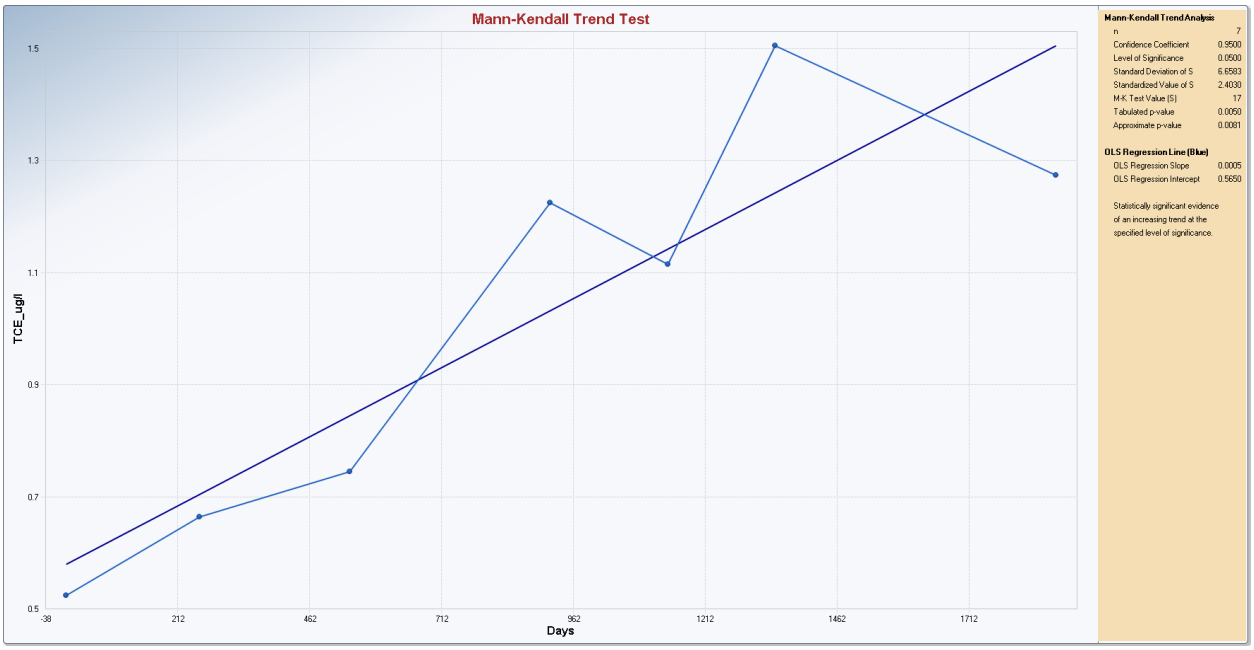

Figure 2: Mann-Kendall Analysis at PWB-1(LTS)

These updated Mann-Kendall Trend Analyses indicate a stronger statistical significance for the increasing TCE concentration trends at both wells. Table 1 presents the results of the Mann-Kendall analyses, and Ordinary Least Squares Trendline Regression analyses recently completed as well as summarizing previous results.

Table 1: Summary of Statistics for PWB-1-UTS and PWB-1-LTS	2019	2021		2023	
	PWB-1-LTS	*PWB-1-UTS*	*PWB-1-LTS*	*PWB-1-UTS*	*PWB-1-LTS*
Date of Last Sample	9/17/2019	11/30/2021	11/30/2021	5/16/2023	5/16/2023
Number of Events (n)	23	6	26	7	27
Mann-Kendall Test Value (S)	**100**	**13**	**134**	**17**	**160**
Approximate P-value	**0.00445**	**0.0121**	**0.00168**	**0.00813**	**0.00046**
OLS Slope	0.00017555	0.0006911	0.0002063	0.0004934	0.000238
Intercept	1.145	0.465	1.1	0.565	1.049
Confidence Level	95%	95%	95%	95%	95%
Increasing Trend Significant at Confidence Level?	Yes	Yes	Yes	Yes	Yes
Extrapolated Date of MCL Concentration	**10/31/2079**	**11/18/2039**	**9/7/2073**	**12/24/2047**	**10/16/2068**

The slopes of the trend lines remain similar to previous results, analysis of the trend from current modeled slope estimates of TCE concentrations indicate MCL exceedances for TCE concentrations at PWB-1(UTS) and PWB-1(LTS) in 23 (2047) and 44 (2068) years, respectively. The Remedial Action Objectives contained in the ROD (DEQ, pg. 6-1, 1996) require that Boeing and Cascade:

> *Restore the TSA to protective concentrations in a reasonable time, if feasible. If not feasible, minimize the extent of the TSA containing VOCs above MCLs, or 1x10-6 excess cancer risk levels, whichever is more stringent, and provide long-term containment of areas where concentrations are above MCLs.*

Action to address the demonstrated increasing trend through hydraulic control or other mitigation would therefore not be unreasonable.

PWB will continue monitoring TCE concentrations at the PWB-1 cluster of wells and update the statistical trend analysis. Continuing analyses will consider the estimated time to exceedance of the TCE MCLs at the PWB-1(UTS) and PWB-1(LTS) wells.

Further Discussion - PFAS Detections

In addition to increasing TCE levels at the PWB-1 monitoring wells, PFAS compounds have now been detected at PWB-1(UTS) in each of the four samples taken for this purpose by PWB. The most recent result of a PFOS concentration of 4.5 ng/l exceeds the applicable MCL of 4 ng/l. This information from monitoring wells associated with the Boeing/EMC site, together with the co-occurrence of PFAS with legacy VOC compounds that has been observed at other sites (e.g. Honeywell/Baron-Blakeslee, NE 148th Avenue, NE Holman, etc.), strongly indicates that additional source area sampling for PFAS should be undertaken at the Boeing/EMC site.