



Oregon

Tina Kotek, Governor

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sent via email

Deborah Taege
The Boeing Company
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800 N 6th Street
Renton, WA 98055-1409

RE: 2023 Annual Progress Report, Troutdale Gravel Aquifer, Boeing Portland Facility, Gresham, Oregon. ECSI #13

Dear Ms. Taege:

The Oregon Department of Environmental Quality (DEQ) has reviewed the document entitled *2023 Annual Progress Report, Troutdale Gravel Aquifer, Boeing Portland Facility, Gresham, Oregon* dated March 15, 2024. This report was prepared on your behalf by Landau Associates, Portland.

DEQ approves the proposed changes to monitoring well gauging and sampling frequency as proposed in Table 1, *Performance Monitoring Program*, except as indicated in comment 3 below.

DEQ approves the *2023 Annual Progress Report* Section 6.0 Recommendations with the following comments and questions about Section 6.0 and the document:

1. The Upper TSA gauge measurements and groundwater quality data remain important to evaluate the potential for downward movement of contaminants from the TGA to the TSA. Potential downward movement of VOCs is important to consider as extraction wells are taken offline and decommissioned.
2. Section 3.3.1 Soil Vapor Extraction System Expansion Progress. Please provide an update on the planned installation of three new subslab vapor extraction wells and conversion of an existing vapor observation well to a vapor extraction well. These soil vapor extraction wells are in the area of the Former Vapor Degreaser Source Area.
3. Section 4.1.1, West Corrective Action Area. Well BOP-57(ib) is screened somewhat deeper than most site TGA monitoring wells. Its well screen partially penetrates the upper siltstone of Confining Unit 1 as well as the lower TGA aquifer. Groundwater from this well contained 50.6 ug/L TCE when sampled on 8/4/2024. This result is in contrast to nearly all other monitoring wells in its area which contain TCE at less than 5 ug/L and are screened in somewhat higher sections of the TGA. Well BOP-7(i) is screened similarly to BOP-57(ib) and includes a portion of Confining Unit 1 and as well as the lower TGA. Please continue to monitor and sample wells BOP-7(i) and BOP-57(ib) annually instead of biannually as proposed.

- a. What explains the increased TCE concentration in groundwater attributed to well screen exposure to upper confining unit 1 siltstone? BOP-57(ib) is located adjacent to active extraction well E-16.
 - b. Are wells BOP-57(ib) and BOP-7(i) preferential pathways for downward migration of dissolved contaminants to the underlying TSA aquifer? How much of confining unit 1 thickness has been penetrated by these wells?
4. Section 4.3 Upper TSA Groundwater Quality. During the August 2023 groundwater gauging event, groundwater elevations in the TGA were found to be higher than in the underlying, confined TSA aquifer. The report provided an example is in the Southwest Corrective Action Area. The depth to unconfined groundwater in the TGA monitoring well BOP-9(i) was 35.79 feet above MSL. The elevation of confined groundwater in TSA monitoring well BOP-62(ds) was 12.56 feet above MSL. The head difference between these two wells is -23.23 feet indicating a downward gradient for groundwater. Monitoring well BOP-9(i) is located about 350 feet south of the nearest currently operating TGA extraction well E-16 and does not appear to be within the cone of influence of the nearest extraction wells E-15 and E-16 (Figure 10, TGA Groundwater Elevation Contours – August 2023).
 5. Section 6.2. Groundwater Performance Monitoring Program. Seventh bullet on page 6-2 regarding monitoring well BOP-7(i). DEQ does not agree with the proposed decrease of elevation measurements, decreased sampling frequency for VOCs, and decreased collection of bioremediation parameters. The 2023 TCE concentration in monitoring well BOP-7(i) is 34.6 ug/L. This well partially penetrates Confining Unit 1 (see comment 3 above). Continued collection of data, including bioremediation parameters, from this well is important to understand potential preferential pathways to the underlying TSA Aquifer.
 6. Through time and with DEQ approval, 12 groundwater extraction wells have been taken offline with five groundwater extraction wells remaining active to maintain hydraulic control in the TGA. The focus of hydraulic control has tended to be in the horizontal sense. Have you evaluated the effects on vertical groundwater gradient resulting from the shutdown of extraction wells? Has the risk from downward contaminant transfer from vertical gradients increased with fewer extraction wells in operation?
 7. The cutting/cooling oil used in Boeing Portland machine shops is Horcut 795B used at about a 1:10 ratio with water to form an emulsion. The Safety Data Sheet for this product provides a limited ingredient list due to proprietary concerns. PFAS ingredients are sometimes used in cutting/cooling oil as a surfactant. Do you have information on PFAS use in Horcut 795B? if not, please submit a product sample for PFAS analysis by EPA1633 to determine if Horcut 795B contains PFAS chemicals.

Comments below are carried forward from the Portland Water Bureau:

- The PWB remains concerned about vertical gradients and possible contaminant transport occurring between the TGA into the TSA. The potential for impacts to the TSA are supported by a statistically significant increasing TCE trend at PWB-1uts and PWB-1lts. Twelve pumping wells of the original Boeing Groundwater Extraction and Treatment System (GWETS) have been taken offline since 2010 leaving five pumping wells to maintain hydraulic control of the Boeing TGA in 2023. Removal of these 12 pumping wells has caused a significant change to the site hydraulic flow regime and warrants a review of these data independent of the data collected with all pumping wells in operation. Given hydraulic changes and TCE concentrations in the TSA, it

seems prudent to maintain any wells that allow for discernment of vertical gradients and that monitoring of these wells be quarterly for water levels.

- In order to fully inform an assessment of risk to the TSA, future annual reports should include information about the depth of the well's screened intervals and the encountered depth of CU1 and the TSA (inferred or known) that demonstrate proposed changes to the monitoring program.
- PWB notes that the Safety Data Sheet for the cutting oil includes an acknowledgement that the State of California knows it to contain 1,4-dioxane. It appears that the wells previously sampled for 1,4-dioxane are downgradient of the sump where the cutting oil release was first recognized. Therefore, it seems appropriate to include 1,4-dioxane in the reconnaissance and continued monitoring of potential impacts from the cutting oil release. Chemicals are often added to products to stabilize them in their containers, and since they aren't part of the recipe for the product, the SDS doesn't usually include these stabilizing chemicals in the Hazard Identification section. Common stabilizers include 1,4-dioxane and various PFAS compounds. The presence of 1,4-dioxane in the SDS suggests that this product has stabilizing compounds added, and as such, it would be reasonable to test for 1,4-dioxane in the release area, as well as where 1,4-dioxane has been detected. 1,4-dioxane and PFAS compounds are miscible and behave differently than cVOCs, and neither are removed from groundwater by any of the current treatment trains in use at the site. As such, further characterization of the extent, horizontal and vertical, of the known 1,4-dioxane impacts is appropriate as part of investigating the reported environmental release. The inclusion of PFAS in this characterization is also appropriate given its use as a stabilizer with similar applications as 1,4-dioxane.

Please feel free to call me with questions.

Sincerely,



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ECSI #13