**Luxelocker (ECSI 6578) Phase I and Phase II ESA Comments**

**September 11, 2024**

General comments:

1. The levels of dioxins detected in the soil samples is surprising , especially at boring B1. All of the five soil samples exceed the occupational RBC (16 ppt) by about an order of magnitude. Four of the five samples exceed the construction worker RBC (170 ppt) by a significant amount. Dioxin TEQ concentrations ≥1,600 would be a hot spot for occupational use, making the concentration at B1 a hot spot.
2. This initial Sampling effort was useful to determine if hazardous substances are an issue at this site, and the assessment demonstrates that there are significant dioxin contamination issues at this property. What it does not tell us is how the contamination is distributed vertically or horizontally. Often, high levels of contamination are focused near the surface, and concentrations attenuate with depth. Because vertical delineation was not done (every 6-inches or every foot), we have no information about the vertical distribution. This is especially concerning because at boring B1, it is likely that there are zones of higher contamination and zones of lower contamination throughout the 3-foot sampling interval. Therefore, we can expect that the concentration of dioxins detected in B1-0-3 are considerably higher at some depths than others, meaning that the very high reported concentration of 4,640 ppt dioxin TEQ is not the highest concentration of dioxin at the site. Increased horizontal delineation is also needed to know how far a hot spot of contamination exists.
3. Additional soil sampling is needed to delineate the areas of higher and lower concentrations of dioxins, both vertically and horizontally.
	1. The Luxelocker team should delineate parts of the site as “decision units” (DUs). This approach allows for spatially evaluating several different zones of the site. This can identify areas of the site where higher concentrations of contamination are located vs. less contaminated areas.
	2. We recommend vertical delineation at smaller depth intervals (for example, 0-6 inches, 6-12”, 12-18”, 18-24”, etc.) to try and determine how deep the high concentrations of dioxin extend. This information will be important when considering options for addressing DEQ cleanup levels, zone by zone.
	3. Using multiple DUs will allow assessment, and future cleanup/management of each DU separately. The DU approach will hopefully identify some areas of the site that are less contaminated than others, which may be better candidates for site controls/management, compared with DUs with higher levels of contamination. DEQ has guidance on DU characterization, which can be found at <https://www.oregon.gov/deq/FilterDocs/DUIMD.pdf>
	4. Incremental Sampling Methodology (ISM) is DEQ’s recommended approach for soil assessment. ISM involves collecting multiple increments of soil, typically 30 to 100, from a specific volume of soil, called a decision unit (DU). These increments are then combined, processed, and subsampled. ISM provides improved data reliability and reduces data variability and provides unbiased estimates of contaminant concentrations. All of these factors can help improve site decision making. While DEQ recommends ISM sampling, we may accept traditional composite sampling at this site if enough subsamples are collected from each DU.
	5. DEQ recommends meeting with Alpine Environmental to discuss further site investigation options before they prepare a work plan for supplemental vertical and horizontal delineation at the site.
4. Site management approaches were mentioned in the Phase II by Alpine to manage/mitigate risks to future human receptors at the site. In order for DEQ to consider management of contamination in place, or under a cap, for example, we need to know the magnitude and extent of the contamination. We know neither of these things at this point. Further, a hot spot determination/delineation should be completed following the next phase of sampling. DEQ is required to select/approve cleanup actions that treat hot spots to the extent treatment is feasible. “Treatment” may include removal/excavation or treating the soil in place or ex-situ to reduce the contaminant concentration. Engineering and institutional controls used to protect human health are not considered “treatment.” DEQ will consider the hot spot evaluation and the rest of the data as it evaluates how hot spots will need to be addressed at this site.
5. Based on the results of supplemental sampling, DEQ will consider the levels and extent of contamination at the site before weighing in on possible cleanup or site management alternatives to mitigate future risk to workers and visitors at the site.

More specific comments:

1. Phase II
	1. Section 2.2.1.1
		1. VOC subsampling. Typically, VOC samples are not composited in order to avoid volatile losses—it is unclear how a representative subsample was taken from the borings. Please describe.
	2. Section 2.4.1:
		1. Wood Debris and Methane potential. Significant wood debris was identified in the subsurface at this site. This is not surprising given that a log pond was present at the site and log ponds typically accumulated wood debris, and wood debris was often used to fill them in when they were no longer in use. Methane sampling was done, and the initial results are encouraging. The sample depths for methane gas in the Phase II (and VOCs) was 30-36 inches. In some cases, this appears to have been above the woody debris zone identified in the boring logs. DEQ recommends some deeper methane sampling within the wood waste zones to check for methane and methane intrusion potential.
		2. Overall, it is unclear how the soil gas sampling depth was selected. DEQ VI guidance generally recommends 5ft and/or 10ft, depending on the depth of planned footer/slabs in buildings.
	3. Section 3
		1. Please provide the lab SOP or a description regarding the dioxin TEQ calculation and how Estimated Maximum Possible Concentration (EMPC) and ND values were evaluated/utilized in the TEQ calculation.
	4. Table 5
		1. Please update this table to reflect data from B3-9.5-10. Aroclor 1260 is the only error I noted, but it would be good to check these tables.
	5. Table 13
		1. VI RBCs for dioxins/furans are by congener, not TEQ. Please revise this table—this is important for characterizing the potential dioxin risk via the VI pathway, especially since soil data can no longer be used to evaluate the VI pathway.
2. Phase I, Section 4.3.2
	1. We noted in 2010 aerial imagery depicted either fire or application of ash/oil/other dark substance on the site. Can you provide clarification or summary of this? The images are publicly available from Google Earth.