From: Winslow, Frank (ECY)
To: Winslow, Frank (ECY)
Subject: FW: K2 Corp (CSID 12390)
Date: Wednesday, February 14, 2024 1:40:56 PM
Attachments: image001.png
WD-19 Boring Log - afj042.pdf

From: Winslow, Frank (ECY)
Sent: Wednesday, February 14, 2024 1:38 PM
To: Emily Ponaski <emily.ponaski@erm.com>
Cc: Miao Zhang <miao.zhang@erm.com>; Michael Pettit <Michael.Pettit@erm.com>; Jones, Kristin <Kristin.Jones@newellco.com>
Subject: RE: K2 Corp (CSID 12390)

Hi Emily,

I apologize for not getting back to you as quickly as I would like to have on this. I have discussed your proposed plans with my peer reviewer, and we are in agreement on the following:

- The rationale for the location of the proposed Outwash aquifer monitoring well makes sense; a southeast flow vector appears to be the most likely flow direction within the Outwash aquifer system in the vicinity of the Site. Therefore, a monitoring well located southeast of the release location (vicinity of monitoring well MW8-1) would appear to have a reasonable likelihood of showing impacts if the release reached this aquifer system.

- We suggest adjusting the location of MW9-1 slightly to be directly due southeast of MW8-1.

Ecology suggests the following modifications to the drilling and construction of monitoring well MW9-1:

- Sonic drilling can result in significant heating of cores in compacted materials (such as the glacial till located beneath the Site). Ecology requests recording of temperature along with the PID readings from drilling cores so that potential impacts from heating on PID results can be considered. Hopefully, the heating of core samples following reaching the Outwash aquifer system will be not be significant. We note that the measurement of PID readings from within the sonic drilling bags prior to fully opening them may potentially mitigate this concern to some degree.

- Ecology notes that pressure grouting is typically the method that results in the most robust conductor well casing seal. We assume that pressure grouting is what is being referred to by grouting the inside of the conductor casing. However, we defer the experienced and licensed driller in determining the casing seal placement methods in compliance with Washington state well construction regulations.

- Ecology concurs with adjusting the monitoring well screened interval if PID results indicate

an impacted zone within the Outwash aquifer system (targeting the screened interval over the zone with the highest PID readings).

- Ecology does not concur with placing the monitoring well screened interval at the base of the Outwash aquifer system if no PID readings above background are evident. Rather, the upper portion of the aquifer should be screened to most conservatively assess potential impacts to the aquifer. If a DNAPL reached the base of the aquifer system, then impacts could be highest in the deepest part of the aquifer; however, a more likely scenario would be potential dissolved phase impacts to the upper part of the aquifer system. Ecology notes that as previously discussed, existing data suggest that impacts to the Outwash aquifer system appear to be unlikely, and this monitoring well installation and sampling is intended to provide further verification of that conclusion. Hence, installation of a well screen and sampling within upper portion of the aquifer makes sense at this time. Avoiding screening the well within silty sand intervals within the upper aquifer zone, such as seen in the boring log for WD-19 (log attached), would also appear to be warranted. Therefore, adjustment of the screened interval based on observed lithologies during drilling of MW9-1 is appropriate. A twenty foot long screened interval sounds reasonable.

- If impacts are found in groundwater in MW9-1, Ecology anticipates that additional investigations would be warranted. If drill rig mobilization is a significant component of cost, it could be worth considering a few contingency location in case contamination indications (i.e. PID readings) are found while drilling MW9-1. Although this appears to have a relatively low likelihood at this time, having such contingency locations prepared has potential to save both time and money if indeed aquifer impacts are found.

Ecology suggests that you proceed with the installation, development, and sampling of MW9-1, incorporating the above comments. We are all hopeful that no contamination is found in the Outwash aquifer system and that this concern can be closed.

Please let me know if you have any questions regarding the above.

Thanks, Frank

Frank P. Winslow, LHG

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From: Emily Ponaski <emily.ponaski@erm.com>
Sent: Friday, February 2, 2024 3:18 PM

To: Winslow, Frank (ECY) <fwin461@ECY.WA.GOV>
Cc: Miao Zhang <miao.zhang@erm.com>; Michael Pettit <Michael.Pettit@erm.com>; Jones, Kristin <Kristin.Jones@newellco.com>
Subject: RE: K2 Corp (CSID 12390)

External Email

Hi Frank,

As a follow-up to our 30 November call, we are presenting a plan for monitoring the outwash aquifer at the K2 site, which includes the proposed monitoring well location, rationale, screen interval, and installation method.

We propose to install one monitoring well (MW9-1) in the Outwash aquifer because sufficient information is available for area-wide groundwater flow direction in the Outwash aquifer (Qva geologic unit). The Vashon/Maury Island groundwater resources have been well studied, as documented in the following reports:

- Vashon/Maury Island Water Resources Study by J. R. Carr/Associates (1983)
  VMI_water_resources_study_1983.pdf (kingcounty.gov)
- Vashon-Maury Island Ground Water Management Plan (King County 1998)
  Vashon-Maury Island Ground Water Management Plan - Final (kingcounty.gov)
- Vashon-Maury Island Phase I Groundwater Model (King County 2005)
  Microsoft Word - Vashon-Maury Island Phase 1 Groundwater Model (kingcounty.gov)
- Vashon-Maury Island Water Resources – A Retrospective of Contributions and Highlights (King County 2013)
  kcr2527.pdf (kingcounty.gov)

The King Couty 2013 report reviewed the historical water level data and concluded (page 86): "water table contour maps of the Qva/Principal aquifer have not changed substantially over time (1982–2010) illustrating that the Qva/Principal aquifer unit responds consistently over time and the patterns are consistent with our basic understanding of unconfined groundwater hydrology, where water level contours reflect overlying topography." Based on Figures 27 through 31 in the King County 2013 report, Outwash aquifer groundwater flow direction in the vicinity of the K2 site is generally from northwest to southeast (Figure 1). Therefore, we propose to install the new well MW9-1 outside the building to the east of well MW8-2 (Figure 2).

After installation, groundwater level data from well MW9-1 will be combined with data from the following two existing outwash monitoring wells in the vicinity to confirm outwash groundwater flow direction around the K2 site. King County collects hourly water level data at these two wells (Figure 1; Station Map - King County):

- VAS_w-71 (Island Center Forest, depth of 104 feet below ground surface) to the northwest of the K2 site.

- VAS_w-65 (Valley Center Park-n-Ride, depth of 159.5 feet below ground surface) to the south of the K2 site.

MW9-1 will be installed using a sonic drill rig and telescoping casing (Figure 3). An 8-inch-diameter temporary conductor casing will be installed to approximately 2 feet below the till/outwash interface. The inside of the conductor casing will be grouted with bentonite, which will provide physical separation between the overlaying Vashon till and the Outwash aquifer during drilling. A 4.25-inch-diameter borehole will be drilled through the bentonite to the bottom of the Outwash aquifer, which is expected to be approximately 175 feet below ground surface, for the installation of 2-inch Sch. 40 PVC casing. Immediately after soil collection, PID readings will be performed every 5 feet by inserting the PID meter probe into the headspace in the sonic bag containing soil cuttings. Soil lithology will be continuously logged. If elevated PID readings are observed, the well screen will be installed across the depth interval with the highest PID readings. If no elevated PID readings are observed, the well screen will be installed across the bottom 20 feet of the Outwash aquifer, as illustrated on Figure 3. Actual depths will depend on lithology encountered and PID readings observed.

MW9-1 will be developed by surging and purging at least 10 well casing volumes at least 24 hours after well completion. One week after development, groundwater elevation will be measured, and groundwater samples will be collected using low-flow sampling methods and submitted to a laboratory for VOC analysis.

Installation is tentatively scheduled for March 2024, pending concurrence from Ecology on this proposed plan. Please let us know if you have any questions.

Regards,
Emily

ERM
Sustainability is our business

Emily Ponaski
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