From: Winslow, Frank (ECY)
To: "Anders Utter"
Cc: "Jeff Pustizzi"; John Foxwell
Subject: Dagmars Marina - XN0039 - Arsenic in Groundwater at MW-1
Date: Friday, October 6, 2023 9:27:47 AM

Hi Anders,

Ecology has completed a review of available data and information pertaining to the cleanup level exceedances at MW-1 for arsenic in groundwater. Based on this review, Ecology has come to the conclusion that the arsenic in groundwater above cleanup levels in the MW-1 area is likely naturally occurring. No data gaps have been identified for this concern, and no further investigations appear to be warranted.

Ecology notes that this conclusion is not intended to apply to other areas on the Property. For example, at location GW-7, arsenic above cleanup levels is likely attributable to diesel in groundwater at this location resulting in highly reducing conditions mobilizing arsenic into groundwater. Arsenic appears to be a contaminated of concern at location GW-7 and may be present in other areas where petroleum is found in groundwater.

Ecology's conclusion regarding the arsenic in groundwater in the MW-1 area is based on the following analysis. Arsenic in groundwater was identified during an environmental investigation conducted in 2004 near a Verizon cell tower. In the vicinity of the tower was grass and gravel boat parking, and no significant surface stating or historical activities of concern were reportedly evident. Boring SDM#4 contained arsenic in groundwater at 50 µg/L, above the Method A cleanup level of 5 µg/L and above the Snohomish Basin regional background concentration of 11.8 ug/L. The borings in this location were evidently installed to collect data for due diligence purposes at the cell tower, but were evidently not based on any site-specific recognized environmental conditions triggering such investigations.

MW-1 was installed and sampled in this area in 2022 and dissolved arsenic was detected at 20.4 µg/L, above the regional background concentration. The Snohomish Basin regional background concentration is higher than the Puget Sound regional background concentration of 8 µg/L due to naturally occurring arsenic in geological units upstream within the Snohomish River watershed. The Site is adjacent to the Snohomish River, and subsurface lithologies in the MW-1 well screen depth interval (10 to 15 feet below ground surface [ft bgs]) are fine grained alluvial deposits (silt and clay). Several borings installed in the MW-1 area had a "trace organics" reported in the well screen depth interval. One boring, ARS-4, had a "slight organic odor" later described as a sulfur odor indicative of reducing conditions. ARS-4 had 4.73 mg/kg total organic carbon (TOC) at 10 to 15 ft bgs.

Arsenic is commonly mobilized into groundwater in western Washington state when carbon sources, natural or anthropogenic (human caused) have resulted in reducing geochemical conditions.

The dissolved arsenic in groundwater at MW-1 appears to be naturally occurring based on the following:

- No contamination releases or anthropogenic carbon sources in the well screen depth interval have been identified. A peat bed was reported at location ARS-1 at a depth of 3.0 to 7.0 ft bgs overlying concrete refusal at 7.0 ft bgs. Hence this "peat" unit may be anthropogenic in origin. However, since this peat unit is well above the MW-1 depth interval, it does not appear to have a bearing on the arsenic found in groundwater in MW-1.

- The naturally occurring strata at 10 to 15 ft bgs in this area appear to be highly reducing based on the fine grained lithologies, natural carbon content, gray color, and reported sulfur odor. In addition, these fine-grained lithologies originate within the Snohomish River watershed where elevated arsenic concentrations are present. Hence, natural mobilization of arsenic above the regional background concentration is not surprising in this setting.

Naturally occurring arsenic in groundwater in not regulated under MTCA. Hence, no further investigations or cleanup appear to be warranted in this area.

Ecology will include this discussion of the arsenic in groundwater at MW-1 within an opinion letter, when such a letter has been requested and is prepared for the Site.

Please let me know if you have any questions regarding this email.

Thanks, Frank

Frank P. Winslow, LHG

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