

Robert D. Miller Consulting

Environmental Services • Project Management

February 11, 2018

Mr. Ted M Uecker
Department of Ecology
N. 4601 Monroe
Spokane, WA 99205-1295

Re: Astro #106
1401 W 1st Avenue
Ritzville, Washington 99169

Ecology Site ID #9596
Ecology Facility ID #53522166
RDM Job #WS-UST52

GROUNDWATER MONITORING REPORT FOR SEPTEMBER 24, 2017 EVENT

This report presents the results of the groundwater monitoring event conducted at the above referenced site for the purpose of site assessment. For this event, field measurements and groundwater sampling were conducted on September 24, 2017 by personnel with Robert D Miller Consulting, Inc (RDM) with assistance from WSCO Petroleum Co. RDM provided the field measurements, sampling, and Apex laboratory analysis; and prepared this report. Proper protocol, care and professional judgement was exercised.

In brief, the test results for this event suggest that the petroleum release at this site remains isolated to the vicinity of monitor well MW1. This follows significant soil and groundwater cleanup, including removal of free product that was performed in 2006. Monitor well MW4 likely became compliant in 2009. The other six wells surrounding the release have remained in total compliance with MTCA, method A action levels since the day they were installed (2006).

Background

The subject property referenced above is owned by WSCO Petroleum Corporation (WSCO). WSCO also owned and operated the Astro #106 gas station until removing it and all USTs in September of 2006. The site has remained vacant since that time. The seven existing monitor wells and two former UST systems are shown in Figure 1. Natural attenuation has been occurring in recent years with little apparent benefit.

Static Water Levels

For this event, RDM personnel measured depths to groundwater from the tops of well casings utilizing a Heron electronic water level meter with tape graduations at 0.01 foot intervals. The water levels were made between 11:32 and 11:48 am. Wells MW2 through MW7 were checked a second time in the afternoon to ensure the static water levels had stabilized, prior to purging and sampling.

For this event depths from top of casings to static water levels were measured to the nearest 0.01 foot. The wells were provided about 15 minutes to stabilize before making measurements. The well depth measurements are believed to be accurate and reliable. All measurements used by RDM to calculate groundwater elevations and associated gradient direction for this event are summarized in Table 1, pages A2 to A4.

The static water levels in monitor wells MW1 through MW7 varied over 5 feet across the site, with an average depth of 25.55 feet below top of well casings. The tops of well casings are roughly one-half foot below the flush monuments at ground surface. The variation in groundwater levels and direction of apparent groundwater flow is similar to previous annual events. We infer the static water levels reported for this event are representative of actual site conditions, and are influenced by the underlying layers of basalt flows.

A groundwater gradient map was prepared using data from our measurements. The Groundwater Map is presented as Figure 1, page A1. The apparent groundwater flow direction and gradient is similar to that reported for the previous events. The groundwater gradient down slope of the two former UST nests is inferred to be generally north 76° west at a slope of 0.018 feet per foot.

Water Quality Sampling and Testing

Groundwater samples for this event were collected from all seven monitor wells and tested for volatile organic compounds, specifically BTEX. Groundwater from MW1 and MW4 were also tested for total petroleum hydrocarbons and total lead. A dark greenish color and petroleum odor were noted in MW1. The greenish color may be related to the lead associated with the old gasoline release. Water in other wells contained no petroleum odors and produced clear water.

For this groundwater monitoring event, the following sampling technique was employed: A new bailer was utilized for each monitoring well, to prevent any possibility of cross contamination. All of the seven monitoring wells were purged via a small submersible pump prior to sampling. Purging rate was approximately 2 gallons per minute. Purging was performed in the usual sequence of historically up gradient clean wells (MW2 and MW3) first, followed by other historically clean wells (MW5 and MW7), then MW6, MW4 and MW1 last. The amount purged was recorded as noted below:

MW1 bailed 1 gal due to contaminated water, MW2 pumped 12 gal, MW3 15 gal, MW4 4gal, MW5; 5 gal, MW6 8 gal, and MW7 bailed 3 gal due to slow recharge. In MW1 groundwater temperature was recorded at 20.0°C (68°F), and total dissolved solids was measured in the field at 848 ppm. There was also a very thin oily sheen on the surface of the water bailed from MW1.

Each water well sample included duplicate 40 ml vials preserved with HCl, intended for BTEX and TPH-Gx testing. Other sample containers included one non-preserved 0.5 L plastic bottle for total lead testing and one HCl preserved 1L amber bottle for TPH-Dx testing. The vials were completely filled with water, then inverted and observed to insure the absence of air bubbles. All samples were uniquely labeled, packed in ice inside a cooler and delivered with Chain of Custody form to APEX labs in Tigard, OR. It is noted that the ice had substantially melted by time of delivery to the lab two days later. The temperature inside the cooler had risen 2.4°C (5.0°F) above the limit of 6.0°C at time of lab arrival. We submit that the slight rise in temperature above 6.0°C likely only occurred in the final two hours before arrival at the laboratory, and this limited exceedance should have no significant effect upon the laboratory test results. The laboratory was directed to analyze each sample, as noted above and listed on the Chain of Custody (COC) form. Laboratory test results are summarized in Table 2, pages A5 and A6 of this report. A copy of the 21-page Laboratory Report with COC form follows Table 2.

Groundwater sample test results for all wells were in compliance with MTCA, method A limits for the parameters tested, except as noted herein. In MW1 all VOCs were in compliance, except for benzene at 205 ug/L and Ethylene dichloride at 16.5 ug/L. Other tests that failed MTCA cleanup limits in MW1 were: TPH-Gx and TPH-Dx. The TPH-Gx concentration of 10,500 ug/L was roughly 12 times the cleanup limit and TPH-Dx concentration of 13,418 ug/L was roughly 25 times the cleanup limit.

Conclusions

From field observations and laboratory data compiled to date, we conclude:

- The groundwater gradient has shown some seasonal variability in static water levels (up to 6 feet), but the gradient remains to the northwest and within the range of previous events. Previous investigations, local well logs and periodic monitoring suggest that the impacted shallow unconfined aquifer beneath this site is a perched water table.
- The test results for this and previous events suggest that perimeter six monitor wells (MW2 through MW7) have remained in compliance, since 2009 for the MTCA Method A parameters that have been tested. The exception is MW1. In MW1 several of the gasoline related hydrocarbons persist well above the MTCA

method A cleanup levels. The trend of remaining petroleum concentrations within the total petroleum hydrocarbon (TPH) group suggest that natural attenuation is not enough to bring this site into compliance within perhaps 50 or more years. Simply stated, there still exists too much degraded leaded gasoline mass to achieve the decay rate needed.

Recommendations

Given 12 years of data collected since the UST systems were removed, we recommend the following actions in an effort to bring this site into compliance with MTCA, method A rules:

- In the spring of this year, commence with a subsurface investigation, inside both backfilled UST excavations and down gradient of the northern excavation. The intent is to better define the horizontal extent and concentrations of residual contamination in soil and groundwater that require further remediation.
- We note that a minimum of two downgradient wells are required from a release to confirm cleanup and obtain an NFA. Only monitor well MW4 qualifies as such. Hence, there needs to be a second well located about 70 feet SW of MW4.
- Unless contaminated soil or groundwater above MTCA, method A is found inside the southern UST pit, there is no need for additional cleanup or monitor wells inside the excavation or downgradient of it. To the best of our knowledge, this pit was dug "clean" in 2006. Hence, this recommendation is intended only to confirm adequacy of that cleanup effort.
- The results of this investigation will provide guidance as to the next steps of action needed to obtain site closure.
- Simultaneous to this effort, we recommend immediately commencing with four consecutive quarters of compliance monitoring in monitor wells MW2 through MW7, such that, all of six of these wells may be permanently closed and removed from further testing requirements of MTCA rules. This would include testing groundwater for: TPH-Gx, TPH-Dx, all gasoline related VOCs and Total Lead.

Limitations

We have prepared this report for WSCO Petroleum Corporation, the Client. This report is available to regulatory agencies or other parties designated by the Client. Any other party may not use this report without written permission. The information contained within this report is not applicable to other sites. The information presented in this report was obtained from widely spaced monitoring wells with field work performed by other WSCO contractors. RDM makes no warranties, either expressed or implied, as to the work of any party except itself, to conditions in areas that were not sampled or tested, or to information generated or provided by others. The conclusions in this report

are dependent on field data, the laboratory data attached to this report and historical data obtained from others. It is possible that currently known or unknown contaminants may exist in portions of the site that were not sampled or tested. The conclusions in this report may not retain their validity in the future as site conditions change or additional information is obtained. This report does not provide or constitute a legal opinion.

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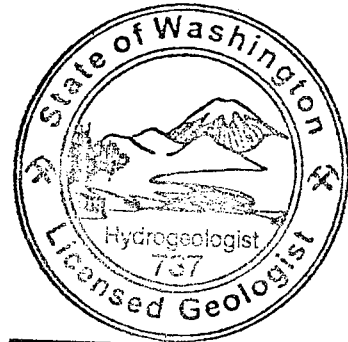
Prepared by,

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Attachments

cc: Glenn Zirkle, WSCO Petroleum Corporation



ROBERT DAVID MILLER