

Technical Memorandum

Groundwater Quality Sampling, October 2020 Monitoring Event

Date: October 20, 2020
By: Karl Enyeart
Subject: Groundwater Quality Sampling, October 2020 Monitoring Event

This memorandum summarizes the results of groundwater monitoring and sampling conducted in October 2020 for the Mint Farm Regional Water Treatment Plant aquifer as part of the Wellhead Protection Program (WHPP). Untreated groundwater from the aquifer is tested approximately every six months to confirm consistent water quality and monitor potential contaminant migration from nearby industry using a series of wells in and surrounding the Mint Farm for advance detection.

ACTIVITIES CONDUCTED FOR THE OCTOBER 2020 MONITORING EVENT

Activities completed for this sampling event were conducted in accordance with Technical Memorandum 2, Water Quality Sampling Protocol (Kennedy/Jenks, 28 April 2009) and Technical Memorandum, Monitoring Well Analytes and Department of Health Test Panels (Kennedy/Jenks, 1 March 2013), plus supplemental activities identified by staff. Activities included:

- Collecting groundwater samples from sentinel wells DMW-1, DMW-2, DMW-5, DMW-6, DMW-7, DMW-9, and production wells PW-2, PW-3, and PW-4 in October 2020. Wells were purged prior to sample collection to stabilize pH, temperature, conductivity and dissolved oxygen levels. Production well PW-1 was under construction for the variable frequency drive installation project and inoperable during fall 2020 testing. PW-1 will be tested in October 2021.
- Submitting groundwater samples to BSK Associates Vancouver (BSK), an EPA-certified laboratory, to be analyzed for constituents currently regulated by state and federal drinking water standards, unregulated contaminants of interest, and contaminants specific to historical and industrial activity in or near the Mint Farm.
- Reviewing and compiling analytical results into Tableau Software, a live data engine that allows information to be visually displayed, trended and geographically linked such that large volumes of data can be easily interpreted and monitored.
- Preparing this summary memorandum.

DATA QUALITY

For quality assurance, all analyses were performed in accordance with National Environmental Laboratory Accreditation Program standards. Based on review of the laboratory reports, it is my opinion the analytical data received are of acceptable quality for their intended use and appropriate corrective action was taken where needed to prevent

analytical bias.

RESULTS OF GROUNDWATER QUALITY SAMPLING

Wellhead protection sampling includes routine semi-annual testing for 125 analytes, and extended annual testing for 50 additional analytes. Screening levels have been expanded to include 223 analytes and the wellhead protection database includes analytical results for a total of 239 unique analytes. A total of 22,725 analytical tests have been performed to date as part of the WHPP not including investigative sampling and QA/QC sampling for sample contamination, method accuracy and lab error. Test analytes include a full suite of metals, salts, volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), herbicides, pesticides, polynuclear aromatic hydrocarbons, insecticides, carbamates, surfactants, chlorinated phenolics, radionuclides and general chemistry parameters.

Certified lab reports for groundwater samples collected during this sampling event are attached.

Results were reviewed and compared to health-based screening levels for human consumption.

Screening levels are established in accordance with state and federal drinking water rules, guideline, health advisories, and reporting levels based on the following and listed in hierarchical order:

- Regulated contaminants (enforceable standards):
 - Washington State Dept of Health Maximum Contaminant Level (MCL)
 - USEPA Safe Drinking Water Act Maximum Contaminant Level (MCL)
- Regulated contaminants (non-enforceable standards):
 - USEPA Maximum Contaminant Level Goal (MCLG)
 - USEPA Secondary Maximum Contaminant Level (SMCL)
- Unregulated contaminants (non-enforceable standards):
 - USEPA Contaminant Contaminant List Regulatory Determinations (CCL)
 - USEPA Unregulated Contaminant Monitoring Rule (UCMR)
 - USEPA Human Health Benchmarks for Pesticides in Drinking Water (HHBP)
 - USEPA Regional Screening Level for Resident Tapwater (RSL)
 - USEPA Drinking Water Equivalent Level (DWEL)
 - USEPA Health Advisory (HA)
 - Washington State Model Toxics Control Act groundwater clean-up level (MTCA)
 - Washington State Reporting Level (SRL)
 - Washington State Treatment Technique (TT)
 - New York State ambient water quality standard for groundwater sources (NYDEC)

Not all screening levels are health-based – some are based on aesthetic impacts. If no published guidelines exist, no screening level was established.

Because the implications of an “exceedance” can vary widely, a criticality value was assigned to each analyte to establish a basis for the level of importance and degree of concern associated with the detection of an analyte exceeding its screening value. Criticality levels are established as follows:

Critical – compounds with:

- Strong or consistent evidence of carcinogenicity; or
- Legally enforceable MCLs

High – compounds that are or with:

- Weak or mixed evidence of carcinogenicity; or
- Strong evidence of a potential for reproductive or development toxicity at relatively lower exposure levels;
- Threshold carcinogens (i.e., a relatively high dose must be exceeded for a period of time before there is a potential for carcinogenic response); or
- Limited toxicity data

Moderate – compounds that are or with:

- No evidence of carcinogenicity in repeat dose animal studies; or
- Noncarcinogens

Low – compounds that are or with:

- Essential nutrients
- Values based on aesthetic endpoints with no presumed health threat at the screening level

Color was found to exceed its screening level in one of the six sentinel wells and two of the production wells. This parameter relates to general chemistry and the respective screening level is not health-risk based. It does not pose a health threat.

Turbidity was measured above 5 ntu's for two sentinel wells and one production well. This measurement defines the amount of light that can pass through

Iron and manganese were detected at levels exceeding their screening levels in all wells. Neither is regulated for health effects but both have a non-mandatory secondary drinking water standard to prevent undesirable tastes and odors. Arsenic is normally present throughout the Mint Farm aquifer at about 0.006 mg/L but was detected in DW-2 at 0.01 mg/L, equal to the MCL of 0.011 mg/L. The Mint Farm water treatment process consistently removes iron and manganese to one order of magnitude below their respective SMCL's, and removes arsenic to less than half of its MCL.

Due to infrequent use, four of six sentinel wells tested positive for total coliform. Total coliform was not detected in any of the production wells. Coliform bacteria include a large group of bacteria which are naturally present, generally harmless and commonly found in the environment. However, the presence of total coliform has been conservatively defined as "critical" in order to flag the event and ensure additional investigation occurs. In this case, no detections of Escherichia coli (E. coli) or fecal coliform were detected in any wells and, upon further evaluation, the criticality of the total coliform detection for this particular event was downgraded to "low".

No other anomalies were noted and no other analytes were detected above their respective screening levels in any of the wells.

RESULTS OF DATA ANALYSIS

Using Tableau analytical software, updated bar graphs were generated showing every analyte that has been detected in each monitoring well sampled for wellhead protection program starting in 2010. These graphs were reviewed to look for significant changes or general trends in individual contaminant levels that might indicate a potential problem. Wells DMW-1, DMW-7 and DMW-9 are extremely stable with very little change in overall chemistry. Wells DMW-2 and DMW-5 also continue to be stable with just slight increases in alkalinity and/or hardness. Well DMW-6 showed significant increases in hardness, chloride, conductivity and total dissolved solids beginning in 2013 and peaking in 2016; DMW-6 now appears to have plateaued and constituent concentrations are slowly returning to more moderate levels.

Additionally, five year rolling averages were calculated for all analytes detected in each of the wells. Looking at rolling averages is a way to smooth out short-term fluctuations and highlight longer-term trends. The rolling averages were also compared to benchmark values defined by the results of the Nov-2012 sampling event just prior to start-up of the Mint Farm Regional Water Treatment Plant (RWTP). No significant trends or observations are reported at this time.

Reports generated for DMW-1 using Tableau Software are included as attachments. Reports generated for the other sentinel wells will be published on the City's webpage for its wellhead protection program at:

<https://www.mylongview.com/484/Wellhead-Protection-Program>.

GROUNDWATER ELEVATION MONITORING

The sentinel wells are equipped with transducers which continuously collect and record water level information. Transducer data is periodically downloaded and compiled to evaluate the potential for declining water levels and diminished capacity of the Mint Farm aquifer. Transducer data was not analyzed for this report but will be evaluated as part of the next monitoring event.

ATTACHMENTS

- Attachment A: Tableau workbook containing the following reports:
 - o Semi-Annual Sampling Results (DMW-1)
 - o Analyte Screening Levels
 - o Analytes Found Below Screening Levels (DMW-1)
 - o Analytes Found Above Screening Levels (DMW-1)
 - o Criticality of Screening Level Exceedances (DMW-1)
 - o 5-Year Rolling Average Analyte Concentrations (DMW-1)
- Attachment B: Analytical reports from BSK Associates

REFERENCES

- *Kennedy/Jenks Consultants Technical Memorandum 2, Water Quality Sampling Protocol. Kennedy/Jenks Consultants, 28 April 2009*
- *Preliminary Design Report (PDR Part 2) for the City of Longview Mint Farm Regional Water Treatment Plant and Well Field, Part 2A: Hydrogeologic Characterization of the Mint Farm Area. Kennedy/Jenks Consultants 0997003.00, March 2010*
- *2012 Comprehensive Water System Plan, Section 5: Source Water – Wellhead Protection Program. Kennedy/Jenks Consultants 1197009.00, August 2012*
- *Technical Memorandum, Monitoring Well Analytes and Department of Health Test Panels (Kennedy/Jenks 0997003*01, 1 March 2013)*
- *WHPP Analyte List and Screening Levels; Intertox Inc., 18 April 2018.*