Domestic Well Sampling
Heglar-Kronquist Site

Groundwater Testing Results
Well No. 1

February 13, 2009
17524-00

HARTCROWSER

GROUNDWATER TESTING RESULTS
WELL NO. 1

This report presents a summary of the sampling and analysis activities and a brief review of the data generated from the sampling and analysis of the domestic water supply well on this property on December 11, 2008. The field procedures and the Quality Assurance/Quality Control (QA/QC) measures followed during sample collection, analysis, and data review were defined in the Sampling and Analysis Plan (SAP) prepared for this work (Hart Crowser 2008).

Sampling and Analysis Activities

There are two wells on this property. We understand that the older of the two wells is not used as a potable water supply. The well sample from this property was collected from a frost free hydrant next to the newer wellhead that is used as a potable water source. The well was purged for a time period estimated to be sufficient to purge at least one system volume from the wellhead to the sample location prior to sampling.

Following purging of the well system, the flow was slowed as needed and directed to a flow-through cell using dedicated Teflon tubing for the collection of field parameters—temperature and electrical conductivity (EC). Sample bottles for laboratory analysis were filled following parameter collection.

Following collection, sample containers were placed in ZipLock™ bags and placed in a cooler in preparation for shipment. Double-bagged ice was placed in the cooler for sample preservation. Copies of the chain of custody forms were placed in a ZipLock™ bag and taped to the inside cover of each cooler. Custody seals were placed on the front and back of the cooler lid and the lid was taped shut. Sample coolers were shipped via UPS overnight express to Columbia Analytical Services (CAS) located in Kelso, Washington.

Water samples were submitted to CAS for the following chemical analyses:

- Fluoride and Chloride (EPA Method 300.0);
- Nitrate and Nitrite (EPA Method 353.2);
- Total Priority Pollutant List metals including aluminum, antimony, arsenic, beryllium, cadmium, chromium, copper, lead, mercury, nickel, potassium, selenium, silver, sodium, thallium, and zinc (EPA Methods 200.7, 200.8, and 245.1);
- Ammonia (EPA Method 350.1); and
- pH (SM 4500-H^+).

Sample Analytical Results

The analytical results were compared to state and federal drinking water standards for primary and secondary contaminants presented in Table 1.

In Washington State, drinking water standards are promulgated by the Environmental Protection Agency (EPA) under the federal Safe Drinking Water Act (SDWA) (40 CFR parts 141 through 149) and by the Washington State Department of Health Water Systems Regulations (Chapters 246-290 through 246-296 WAC).

These drinking water regulations set standards for the highest levels of contaminants permissible in drinking water and are termed Maximum Contaminant Levels (MCLs). The two classes of established MCLs are Primary MCLs and Secondary MCLs. Primary MCLs are enforceable levels for select contaminants where exceedance of the MCLs would cause adverse public health effects. Secondary MCLs are guidelines for select contaminants related to cosmetic effects (such as tooth or skin discoloration) or aesthetic effects (such as taste, odor, or color) of drinking water. The applicable Primary and Secondary MCLs for the constituents tested on this site are presented in Table 1.

For the chemical constituents analyzed for during this event, only ammonia and potassium do not have any MCLs under state or federal standards. Ammonia was not detected in this sample. Potassium is a naturally occurring element present in groundwater and is generally not a health concern.

Constituents tested for at this residence were below the applicable MCLs with the exception of arsenic. The concentration of arsenic in the Well No. 1 sample was 11.6 µg/L, slightly above the Primary MCL for arsenic of 10 µg/L. A more detailed presentation of the well sampling and analysis program and discussion of the results is provided in the Domestic Wells and Spring Sampling and Analysis, Heglar-Kronquist Site (Hart Crowser 2009).

Definitions

The following definitions will aid the reader in understanding the well sample analytical results:

MCL (Maximum Contaminant Level) is the highest level of a contaminant that is allowed in drinking water.

mg/L or ppm is parts per million (equivalent to one cent in $10,000).

µg/L or ppb is parts per billion (equivalent to one cent in $10,000,000).

Method Detection Limit (MDL). The minimum concentration that can be measured and reported with 99 percent confidence that the concentration is greater than zero, but the exact concentration cannot be reliably quantified. For instance, if the true concentration of an analyte in a sample is equal to the MDL, there is a 50 percent chance that the analyte will be detected.

Reporting Limit (RL). The RL is the lowest concentration at which an analyte can be detected in a sample and its concentration can be reported with a reasonable degree of accuracy and precision.

U Data Qualifier. Analyte was not detected at or above the reported result.

J Data Qualifier. Analyte was positively identified. The reported result is an estimate as quality control criteria were slightly exceeded.

T Data Qualifier. Reported result below the associated reporting limit (RL) but above the Method Detection Limit (MDL).

REFERENCES

Hart Crowser 2008. Sampling and Analysis Plan and Quality Assurance Project Plan, Heglar Kronquist Site, Mead, Washington. December 2008. 17524-00.

Hart Crowser 2009. Domestic Wells and Spring Sampling and Analysis, Heglar-Kronquist Site, Mead, Washington. February 2009. 17524-00.

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Table 1 - Domestic Well Water Sample Analytical Results in Comparison to State and Federal Maximum Contaminant Levels (MCLs) for Primary and Secondary Contaminants

Sample ID Sampling Date	Maximum Contaminant Level (MCL)	Well No. 1 12/11/2008	
Primary MCLs			
Antimony	6	0.098	
Arsenic	10	11.6	
Beryllium	4	0.02	U
Cadmium	5	0.025	
Chromium	100	0.2	U
Copper	**	10	U
Fluoride in mg/L	4 mg/L	0.3	
Lead	**	0.17	
Mercury	2	0.2	U
Nickel	100	0.69	
Nitrate as N in mg/L	10 mg/L	0.05	U
Selenium	50	1	U
Sodium	**	11600	
Thallium	2	0.02	U
Secondary MCLs			
pH	6.5 to 8.5	7.86	
Aluminum	50 to 200	50	U
Chloride in mg/L	250 mg/L	1.9	
Silver	100	0.005	T
Zinc	5000	339	
Substances with no MCLs			
Potassium	Not Applicable	2550	
Ammonia (NH3) as Nitrogen(N) in mg/L	Not Applicable	0.05	U

All concentrations in ug/L (parts per billion) except as noted.
T = Value is between the method detection limit (MDL) and method reporting limit (MRL).
U = Not detected at reporting limit indicated.
** Although the state board of health has not established MCLs for copper, lead, and sodium, there is sufficient public health significance connected with copper, lead, and sodium levels to require inclusion in inorganic chemical and physical source monitoring. For lead and copper, the EPA has established distribution system related levels at which a system is required to consider corrosion control. These levels, called "action levels," are 0.015 mg/L for lead and 1.3 mg/L for copper and are applied to the highest concentration in ten percent of all samples collected from the distribution system. The EPA has also established a recommended level of twenty mg/L for sodium as a level of concern for those consumers that may be restricted for daily sodium intake in their diets (from WAC 246-290-310).

Domestic Well Sampling
Heglar-Kronquist Site

Groundwater Testing Results
Well No. 2

February 13, 2009
17524-00

HARTCROWSER

GROUNDWATER TESTING RESULTS
WELL NO. 2

This report presents a summary of the sampling and analysis activities and a brief review of the data generated from the sampling and analysis of the domestic water supply well on this property on December 11, 2008. The field procedures and the Quality Assurance/Quality Control (QA/QC) measures followed during sample collection, analysis, and data review were defined in the Sampling and Analysis Plan (SAP) prepared for this work (Hart Crowser 2008).

Sampling and Analysis Activities

The well sample from this property was collected from a frost free hydrant next to the wellhead that is used as a potable water source. The well was purged for a time period estimated to be sufficient to purge at least one system volume from the wellhead to the sample location prior to sampling.

Following purging of the well system, the flow was slowed as needed and directed to a flow-through cell using dedicated Teflon tubing for the collection of field parameters—temperature and electrical conductivity (EC). Sample bottles for laboratory analysis were filled following parameter collection.

Following collection, sample containers were placed in ZipLock™ bags and placed in a cooler in preparation for shipment. Double-bagged ice was placed in the cooler for sample preservation. Copies of the chain of custody forms were placed in a ZipLock™ bag and taped to the inside cover of each cooler. Custody seals were placed on the front and back of the cooler lid and the lid was taped shut. Sample coolers were shipped via UPS overnight express to Columbia Analytical Services (CAS) located in Kelso, Washington.

Water samples were submitted to CAS for the following chemical analyses:

- Fluoride and Chloride (EPA Method 300.0);
- Nitrate and Nitrite (EPA Method 353.2);
- Total Priority Pollutant List metals including aluminum, antimony, arsenic, beryllium, cadmium, chromium, copper, lead, mercury, nickel, potassium, selenium, silver, sodium, thallium, and zinc (EPA Methods 200.7, 200.8, and 245.1);
- Ammonia (EPA Method 350.1); and
- pH (SM 4500-H^+).

Sample Analytical Results

The analytical results were compared to state and federal drinking water standards for primary and secondary contaminants presented in Table 1.

In Washington State, drinking water standards are promulgated by the Environmental Protection Agency (EPA) under the federal Safe Drinking Water Act (SDWA) (40 CFR parts 141 through 149) and by the Washington State Department of Health Water Systems Regulations (Chapters 246-290 through 246-296 WAC).

These drinking water regulations set standards for the highest levels of contaminants permissible in drinking water and are termed Maximum Contaminant Levels (MCLs). The two classes of established MCLs are Primary MCLs and Secondary MCLs. Primary MCLs are enforceable levels for select contaminants where exceedance of the MCLs would cause adverse public health effects. Secondary MCLs are guidelines for select contaminants related to cosmetic effects (such as tooth or skin discoloration) or aesthetic effects (such as taste, odor, or color) of drinking water. The applicable Primary and Secondary MCLs for the constituents tested on this site are presented in Table 1.

For the chemical constituents analyzed for during this event, only ammonia and potassium do not have any MCLs under state or federal standards. Ammonia was not detected in this sample. Potassium is a naturally occurring element present in groundwater and is generally not a health concern.

Constituents tested for at this residence were below the applicable MCLs. A more detailed presentation of the well sampling and analysis program and discussion of the results is provided in the Domestic Wells and Spring Sampling and Analysis, Heglar-Kronquist Site (Hart Crowser 2009).

Definitions

The following definitions will aid the reader in understanding the well sample analytical results:

MCL (Maximum Contaminant Level) is the highest level of a contaminant that is allowed in drinking water.

mg/L or ppm is parts per million (equivalent to one cent in $10,000).

µg/L or ppb is parts per billion (equivalent to one cent in $10,000,000).

Method Detection Limit (MDL). The minimum concentration that can be measured and reported with 99 percent confidence that the concentration is greater than zero, but the exact concentration cannot be reliably quantified. For instance, if the true concentration of an analyte in a sample is equal to the MDL, there is a 50 percent chance that the analyte will be detected.

Reporting Limit (RL). The RL is the lowest concentration at which an analyte can be detected in a sample and its concentration can be reported with a reasonable degree of accuracy and precision.

U Data Qualifier. Analyte was not detected at or above the reported result.

J Data Qualifier. Analyte was positively identified. The reported result is an estimate as quality control criteria were slightly exceeded.

T Data Qualifier. Reported result below the associated reporting limit (RL) but above the Method Detection Limit (MDL).

REFERENCES

Hart Crowser 2008. Sampling and Analysis Plan and Quality Assurance Project Plan, Heglar Kronquist Site, Mead, Washington. December 2008. 17524-00.

Hart Crowser 2009. Domestic Wells and Spring Sampling and Analysis, Heglar-Kronquist Site, Mead, Washington. February 2009. 17524-00.

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Table 1 - Domestic Well Water Sample Analytical Results in Comparison to State and Federal Maximum Contaminant Levels (MCLs) for Primary and Secondary Contaminants

Sample ID Sampling Date	Maximum Contaminant Level (MCL)	Well No. 2 12/11/2008	
Primary MCLs			
Antimony	6	0.032	T
Arsenic	10	2.2	
Beryllium	4	0.02	U
Cadmium	5	0.007	T
Chromium	100	0.249	U
Copper	**	10	U
Fluoride in mg/L	4 mg/L	0.13	T
Lead	**	0.064	
Mercury	2	0.2	U
Nickel	100	0.4	
Nitrate as N in mg/L	10 mg/L	0.2	
Selenium	50	1	U
Sodium	**	8970	
Thallium	2	0.02	U
Secondary MCLs			
pH	6.5 to 8.5	7.37	
Aluminum	50 to 200	50	U
Chloride in mg/L	250 mg/L	2.3	
Silver	100	0.02	U
Zinc	5000	57.2	
Substances with no MCLs			
Potassium	Not Applicable	1200	
Ammonia (NH3) as Nitrogen(N) in mg/L	Not Applicable	0.05	U

All concentrations in ug/L (parts per billion) except as noted.
T = Value is between the method detection limit (MDL) and method reporting limit (MRL).
U = Not detected at reporting limit indicated.
** Although the state board of health has not established MCLs for copper, lead, and sodium, there is sufficient public health significance connected with copper, lead, and sodium levels to require inclusion in inorganic chemical and physical source monitoring. For lead and copper, the EPA has established distribution system related levels at which a system is required to consider corrosion control. These levels, called "action levels," are 0.015 mg/L for lead and 1.3 mg/L for copper and are applied to the highest concentration in ten percent of all samples collected from the distribution system. The EPA has also established a recommended level of twenty mg/L for sodium as a level of concern for those consumers that may be restricted for daily sodium intake in their diets (from WAC 246-290-310).

Domestic Well Sampling
Heglar-Kronquist Site

Groundwater Testing Results
Well No. 3

February 13, 2009
17524-00

HARTCROWSER

GROUNDWATER TESTING RESULTS
WELL NO. 3

This report presents a summary of the sampling and analysis activities and a brief review of the data generated from the sampling and analysis of the domestic water supply well on this property on December 11, 2008. The field procedures and the Quality Assurance/Quality Control (QA/QC) measures followed during sample collection, analysis, and data review were defined in the Sampling and Analysis Plan (SAP) prepared for this work (Hart Crowser 2008).

Sampling and Analysis Activities

The well sample from this property was collected from a spigot located next to the front door of the house. It is not known where in the distribution system this spigot is located or whether there is any filtration or conditioner devices installed on this system. The well was purged for a time period estimated to be sufficient to purge at least one system volume from the wellhead to the sample location prior to sampling.

Following purging of the well system, the flow was slowed as needed and directed to a flow-through cell using dedicated Teflon tubing for the collection of field parameters—temperature and electrical conductivity (EC). Sample bottles for laboratory analysis were filled following parameter collection.

Following collection, sample containers were placed in ZipLock™ bags and placed in a cooler in preparation for shipment. Double-bagged ice was placed in the cooler for sample preservation. Copies of the chain of custody forms were placed in a ZipLock™ bag and taped to the inside cover of each cooler. Custody seals were placed on the front and back of the cooler lid and the lid was taped shut. Sample coolers were shipped via UPS overnight express to Columbia Analytical Services (CAS) located in Kelso, Washington.

Water samples were submitted to CAS for the following chemical analyses:

- Fluoride and Chloride (EPA Method 300.0);
- Nitrate and Nitrite (EPA Method 353.2);
- Total Priority Pollutant List metals including aluminum, antimony, arsenic, beryllium, cadmium, chromium, copper, lead, mercury, nickel, potassium, selenium, silver, sodium, thallium, and zinc (EPA Methods 200.7, 200.8, and 245.1);
- Ammonia (EPA Method 350.1); and
- pH (SM 4500-H^+).

Sample Analytical Results

The analytical results were compared to state and federal drinking water standards for primary and secondary contaminants presented in Table 1.

In Washington State, drinking water standards are promulgated by the Environmental Protection Agency (EPA) under the federal Safe Drinking Water Act (SDWA) (40 CFR parts 141 through 149) and by the Washington State Department of Health Water Systems Regulations (Chapters 246-290 through 246-296 WAC).

These drinking water regulations set standards for the highest levels of contaminants permissible in drinking water and are termed Maximum Contaminant Levels (MCLs). The two classes of established MCLs are Primary MCLs and Secondary MCLs. Primary MCLs are enforceable levels for select contaminants where exceedance of the MCLs would cause adverse public health effects. Secondary MCLs are guidelines for select contaminants related to cosmetic effects (such as tooth or skin discoloration) or aesthetic effects (such as taste, odor, or color) of drinking water. The applicable Primary and Secondary MCLs for the constituents tested on this site are presented in Table 1.

For the chemical constituents analyzed for during this event, only ammonia and potassium do not have any MCLs under state or federal standards. Ammonia was not detected in this sample. Potassium is a naturally occurring element present in groundwater and is generally not a health concern.

Constituents tested for at this residence were below the applicable MCLs. A more detailed presentation of the well sampling and analysis program and discussion of the results is provided in the Domestic Wells and Spring Sampling and Analysis, Heglar-Kronquist Site (Hart Crowser 2009).

Definitions

The following definitions will aid the reader in understanding the well sample analytical results:

MCL (Maximum Contaminant Level) is the highest level of a contaminant that is allowed in drinking water.

mg/L or ppm is parts per million (equivalent to one cent in $10,000).

µg/L or ppb is parts per billion (equivalent to one cent in $10,000,000).

Method Detection Limit (MDL). The minimum concentration that can be measured and reported with 99 percent confidence that the concentration is greater than zero, but the exact concentration cannot be reliably quantified. For instance, if the true concentration of an analyte in a sample is equal to the MDL, there is a 50 percent chance that the analyte will be detected.

Reporting Limit (RL). The RL is the lowest concentration at which an analyte can be detected in a sample and its concentration can be reported with a reasonable degree of accuracy and precision.

U Data Qualifier. Analyte was not detected at or above the reported result.

J Data Qualifier. Analyte was positively identified. The reported result is an estimate as quality control criteria were slightly exceeded.

T Data Qualifier. Reported result below the associated reporting limit (RL) but above the Method Detection Limit (MDL).

REFERENCES

Hart Crowser 2008. Sampling and Analysis Plan and Quality Assurance Project Plan, Heglar Kronquist Site, Mead, Washington. December 2008. 17524-00.

Hart Crowser 2009. Domestic Wells and Spring Sampling and Analysis, Heglar-Kronquist Site, Mead, Washington. February 2009. 17524-00.

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Table 1 - Domestic Well Water Sample Analytical Results in Comparison to State and Federal Maximum Contaminant Levels (MCLs) for Primary and Secondary Contaminants

Sample ID Sampling Date	Maximum Contaminant Level (MCL)	Well No. 3 12/11/2008	
Primary MCLs			
Antimony	6	0.009	T
Arsenic	10	0.5	U
Beryllium	4	0.028	
Cadmium	5	0.03	
Chromium	100	0.203	U
Copper	**	18.5	
Fluoride in mg/L	4 mg/L	0.087	T
Lead	**	0.648	
Mercury	2	0.2	U
Nickel	100	0.45	
Nitrate as N in mg/L	10 mg/L	0.58	
Selenium	50	1	U
Sodium	**	7560	
Thallium	2	0.02	U
Secondary MCLs			
pH	6.5 to 8.5	7.2	
Aluminum	50 to 200	50	U
Chloride in mg/L	250 mg/L	6	
Silver	100	0.007	T
Zinc	5000	532	
Substances with no MCLs			
Potassium	Not Applicable	869	
Ammonia (NH3) as Nitrogen(N) in mg/L	Not Applicable	0.05	U

All concentrations in ug/L (parts per billion) except as noted.
T = Value is between the method detection limit (MDL) and method reporting limit (MRL).
U = Not detected at reporting limit indicated.

** Although the state board of health has not established MCLs for copper, lead, and sodium, there is sufficient public health significance connected with copper, lead, and sodium levels to require inclusion in inorganic chemical and physical source monitoring. For lead and copper, the EPA has established distribution system related levels at which a system is required to consider corrosion control. These levels, called "action levels," are 0.015 mg/L for lead and 1.3 mg/L for copper and are applied to the highest concentration in ten percent of all samples collected from the distribution system. The EPA has also established a recommended level of twenty mg/L for sodium as a level of concern for those consumers that may be restricted for daily sodium intake in their diets (from WAC 246-290-310).

Domestic Well Sampling
Heglar-Kronquist Site

Groundwater Testing Results
Well No. 4

February 13, 2009
17524-00

GROUNDWATER TESTING RESULTS
WELL NO. 4

This report presents a summary of the sampling and analysis activities and a brief review of the data generated from the sampling and analysis of the domestic water supply well on this property on December 11, 2008. The field procedures and the Quality Assurance/Quality Control (QA/QC) measures followed during sample collection, analysis, and data review were defined in the Sampling and Analysis Plan (SAP) prepared for this work (Hart Crowser 2008).

Sampling and Analysis Activities

The well sample from this property was collected from a frost free hydrant approximately 50 feet from the wellhead. This sample location is upstream of the household distribution system. The well was purged for a time period estimated to be sufficient to purge at least one system volume from the wellhead to the sample location prior to sampling.

Following purging of the well system, the flow was slowed as needed and directed to a flow-through cell using dedicated Teflon tubing for the collection of field parameters—temperature and electrical conductivity (EC). Sample bottles for laboratory analysis were filled following parameter collection.

Following collection, sample containers were placed in ZipLock™ bags and placed in a cooler in preparation for shipment. Double-bagged ice was placed in the cooler for sample preservation. Copies of the chain of custody forms were placed in a ZipLock™ bag and taped to the inside cover of each cooler. Custody seals were placed on the front and back of the cooler lid and the lid was taped shut. Sample coolers were shipped via UPS overnight express to Columbia Analytical Services (CAS) located in Kelso, Washington.

Water samples were submitted to CAS for the following chemical analyses:

- Fluoride and Chloride (EPA Method 300.0);
- Nitrate and Nitrite (EPA Method 353.2);
- Total Priority Pollutant List metals including aluminum, antimony, arsenic, beryllium, cadmium, chromium, copper, lead, mercury, nickel, potassium, selenium, silver, sodium, thallium, and zinc (EPA Methods 200.7, 200.8, and 245.1);
- Ammonia (EPA Method 350.1); and
- pH (SM 4500-H^+).

Sample Analytical Results

The analytical results were compared to state and federal drinking water standards for primary and secondary contaminants presented in Table 1.

In Washington State, drinking water standards are promulgated by the Environmental Protection Agency (EPA) under the federal Safe Drinking Water Act (SDWA) (40 CFR parts 141 through 149) and by the Washington State Department of Health Water Systems Regulations (Chapters 246-290 through 246-296 WAC).

These drinking water regulations set standards for the highest levels of contaminants permissible in drinking water and are termed Maximum Contaminant Levels (MCLs). The two classes of established MCLs are Primary MCLs and Secondary MCLs. Primary MCLs are enforceable levels for select contaminants where exceedance of the MCLs would cause adverse public health effects. Secondary MCLs are guidelines for select contaminants related to cosmetic effects (such as tooth or skin discoloration) or aesthetic effects (such as taste, odor, or color) of drinking water. The applicable Primary and Secondary MCLs for the constituents tested on this site are presented in Table 1.

For the chemical constituents analyzed for during this event, only ammonia and potassium do not have any MCLs under state or federal standards. Ammonia was not detected in this sample. Potassium is a naturally occurring element present in groundwater and is generally not a health concern.

Constituents tested for at this residence were below the applicable MCLs. A more detailed presentation of the well sampling and analysis program and discussion of the results is provided in the Domestic Wells and Spring Sampling and Analysis, Heglar-Kronquist Site (Hart Crowser 2009).

Definitions

The following definitions will aid the reader in understanding the well sample analytical results:

MCL (Maximum Contaminant Level) is the highest level of a contaminant that is allowed in drinking water.

mg/L or ppm is parts per million (equivalent to one cent in $10,000).

µg/L or ppb is parts per billion (equivalent to one cent in $10,000,000).

Method Detection Limit (MDL). The minimum concentration that can be measured and reported with 99 percent confidence that the concentration is greater than zero, but the exact concentration cannot be reliably quantified. For instance, if the true concentration of an analyte in a sample is equal to the MDL, there is a 50 percent chance that the analyte will be detected.

Reporting Limit (RL). The RL is the lowest concentration at which an analyte can be detected in a sample and its concentration can be reported with a reasonable degree of accuracy and precision.

U Data Qualifier. Analyte was not detected at or above the reported result.

J Data Qualifier. Analyte was positively identified. The reported result is an estimate as quality control criteria were slightly exceeded.

T Data Qualifier. Reported result below the associated reporting limit (RL) but above the Method Detection Limit (MDL).

REFERENCES

Hart Crowser 2008. Sampling and Analysis Plan and Quality Assurance Project Plan, Heglar Kronquist Site, Mead, Washington. December 2008. 17524-00.

Hart Crowser 2009. Domestic Wells and Spring Sampling and Analysis, Heglar-Kronquist Site, Mead, Washington. February 2009. 17524-00.

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Table 1 - Domestic Well Water Sample Analytical Results in Comparison to State and Federal Maximum Contaminant Levels (MCLs) for Primary and Secondary Contaminants

Sample ID Sampling Date	Maximum Contaminant Level (MCL)	Well No. 4 12/11/2008	
Primary MCLs			
Antimony	6	0.058	
Arsenic	10	1.4	
Beryllium	4	0.033	
Cadmium	5	0.024	
Chromium	100	0.2	U
Copper	**	5.4	T
Fluoride in mg/L	4 mg/L	0.2	
Lead	**	0.989	
Mercury	2	0.2	U
Nickel	100	0.73	
Nitrate as N in mg/L	10 mg/L	2.18	
Selenium	50	1	U
Sodium	**	9660	
Thallium	2	0.02	U
Secondary MCLs			
pH	6.5 to 8.5	7.07	
Aluminum	50 to 200	36	T
Chloride in mg/L	250 mg/L	6	
Silver	100	0.02	U
Zinc	5000	68	
Substances with no MCLs			
Potassium	Not Applicable	3880	
Ammonia (NH3) as Nitrogen(N) in mg/L	Not Applicable	0.05	U

All concentrations in ug/L (parts per billion) except as noted.
T = Value is between the method detection limit (MDL) and method reporting limit (MRL).
U = Not detected at reporting limit indicated.
** Although the state board of health has not established MCLs for copper, lead, and sodium, there is sufficient public health significance connected with copper, lead, and sodium levels to require inclusion in inorganic chemical and physical source monitoring. For lead and copper, the EPA has established distribution system related levels at which a system is required to consider corrosion control. These levels, called "action levels," are 0.015 mg/L for lead and 1.3 mg/L for copper and are applied to the highest concentration in ten percent of all samples collected from the distribution system. The EPA has also established a recommended level of twenty mg/L for sodium as a level of concern for those consumers that may be restricted for daily sodium intake in their diets (from WAC 246-290-310).

Domestic Well Sampling
Heglar-Kronquist Site

Groundwater Testing Results
Well No. 5

February 13, 2009
17524-00

HARTCROWSER

GROUNDWATER TESTING RESULTS
WELL NO. 5

This report presents a summary of the sampling and analysis activities and a brief review of the data generated from the sampling and analysis of the domestic water supply well on this property on December 11, 2008. The field procedures and the Quality Assurance/Quality Control (QA/QC) measures followed during sample collection, analysis, and data review were defined in the Sampling and Analysis Plan (SAP) prepared for this work (Hart Crowser 2008).

Sampling and Analysis Activities

There are two wells that supply the household on this property. The sample from this property was collected from a frost free hydrant downstream from the two well collection tank and, therefore, represents a composite of the two wells. This sample location is upstream of the household distribution system. The well was purged for a time period estimated to be sufficient to purge at least one system volume from the wellhead to the sample location prior to sampling.

Following purging of the well system, the flow was slowed as needed and directed to a flow-through cell using dedicated Teflon tubing for the collection of field parameters—temperature and electrical conductivity (EC). Sample bottles for laboratory analysis were filled following parameter collection.

Following collection, sample containers were placed in ZipLock™ bags and placed in a cooler in preparation for shipment. Double-bagged ice was placed in the cooler for sample preservation. Copies of the chain of custody forms were placed in a ZipLock™ bag and taped to the inside cover of each cooler. Custody seals were placed on the front and back of the cooler lid and the lid was taped shut. Sample coolers were shipped via UPS overnight express to Columbia Analytical Services (CAS) located in Kelso, Washington.

Water samples were submitted to CAS for the following chemical analyses:

- Fluoride and Chloride (EPA Method 300.0);
- Nitrate and Nitrite (EPA Method 353.2);
- Total Priority Pollutant List metals including aluminum, antimony, arsenic, beryllium, cadmium, chromium, copper, lead, mercury, nickel, potassium, selenium, silver, sodium, thallium, and zinc (EPA Methods 200.7, 200.8, and 245.1);
- Ammonia (EPA Method 350.1); and
- pH (SM 4500-H^+).

Sample Analytical Results

The analytical results were compared to state and federal drinking water standards for primary and secondary contaminants presented in Table 1.

In Washington State, drinking water standards are promulgated by the Environmental Protection Agency (EPA) under the federal Safe Drinking Water Act (SDWA) (40 CFR parts 141 through 149) and by the Washington State Department of Health Water Systems Regulations (Chapters 246-290 through 246-296 WAC).

These drinking water regulations set standards for the highest levels of contaminants permissible in drinking water and are termed Maximum Contaminant Levels (MCLs). The two classes of established MCLs are Primary MCLs and Secondary MCLs. Primary MCLs are enforceable levels for select contaminants where exceedance of the MCLs would cause adverse public health effects. Secondary MCLs are guidelines for select contaminants related to cosmetic effects (such as tooth or skin discoloration) or aesthetic effects (such as taste, odor, or color) of drinking water. The applicable Primary and Secondary MCLs for the constituents tested on this site are presented in Table 1.

For the chemical constituents analyzed for during this event, only ammonia and potassium do not have any MCLs under state or federal standards. Ammonia was not detected in this sample. Potassium is a naturally occurring element present in groundwater and is generally not a health concern.

Constituents tested for at this residence were below the applicable MCLs. A more detailed presentation of the well sampling and analysis program and discussion of the results is provided in the Domestic Wells and Spring Sampling and Analysis, Heglar-Kronquist Site (Hart Crowser 2009).

Definitions

The following definitions will aid the reader in understanding the well sample analytical results:

MCL (Maximum Contaminant Level) is the highest level of a contaminant that is allowed in drinking water.

mg/L or ppm is parts per million (equivalent to one cent in $10,000).

µg/L or ppb is parts per billion (equivalent to one cent in $10,000,000).

Method Detection Limit (MDL). The minimum concentration that can be measured and reported with 99 percent confidence that the concentration is greater than zero, but the exact concentration cannot be reliably quantified. For instance, if the true concentration of an analyte in a sample is equal to the MDL, there is a 50 percent chance that the analyte will be detected.

Reporting Limit (RL). The RL is the lowest concentration at which an analyte can be detected in a sample and its concentration can be reported with a reasonable degree of accuracy and precision.

U Data Qualifier. Analyte was not detected at or above the reported result.

J Data Qualifier. Analyte was positively identified. The reported result is an estimate as quality control criteria were slightly exceeded.

T Data Qualifier. Reported result below the associated reporting limit (RL) but above the Method Detection Limit (MDL).

REFERENCES

Hart Crowser 2008. Sampling and Analysis Plan and Quality Assurance Project Plan, Heglar Kronquist Site, Mead, Washington. December 2008. 17524-00.

Hart Crowser 2009. Domestic Wells and Spring Sampling and Analysis, Heglar-Kronquist Site, Mead, Washington. February 2009. 17524-00.

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Table 1 - Domestic Well Water Sample Analytical Results in Comparison to State and Federal Maximum Contaminant Levels (MCLs) for Primary and Secondary Contaminants

Sample ID Sampling Date	Maximum Contaminant Level (MCL)	Well No. 5 12/11/2008	
Primary MCLs			
Antimony	6	0.044	T
Arsenic	10	0.46	T
Beryllium	4	0.028	
Cadmium	5	0.047	
Chromium	100	0.2	U
Copper	**	10	U
Fluoride in mg/L	4 mg/L	0.163	T
Lead	**	1.76	
Mercury	2	0.2	U
Nickel	100	0.99	
Nitrate as N in mg/L	10 mg/L	7.04	
Selenium	50	3.1	
Sodium	**	13600	
Thallium	2	0.002	T
Secondary MCLs			
pH	6.5 to 8.5	7.14	
Aluminum	50 to 200	50	U
Chloride in mg/L	250 mg/L	12.5	
Silver	100	0.02	U
Zinc	5000	1190	
Substances with no MCLs			
Potassium	Not Applicable	2560	
Ammonia (NH3) as Nitrogen(N) in mg/L	Not Applicable	0.05	U

All concentrations in ug/L (parts per billion) except as noted.
T = Value is between the method detection limit (MDL) and method reporting limit (MRL).
U = Not detected at reporting limit indicated.
** Although the state board of health has not established MCLs for copper, lead, and sodium, there is sufficient public health significance connected with copper, lead, and sodium levels to require inclusion in inorganic chemical and physical source monitoring. For lead and copper, the EPA has established distribution system related levels at which a system is required to consider corrosion control. These levels, called "action levels," are 0.015 mg/L for lead and 1.3 mg/L for copper and are applied to the highest concentration in ten percent of all samples collected from the distribution system. The EPA has also established a recommended level of twenty mg/L for sodium as a level of concern for those consumers that may be restricted for daily sodium intake in their diets (from WAC 246-290-310).

Domestic Well Sampling
Heglar-Kronquist Site

Groundwater Testing Results
Well No. 6

February 13, 2009

17524-00

HARTCROWSER

GROUNDWATER TESTING RESULTS
WELL NO. 6

This report presents a summary of the sampling and analysis activities and a brief review of the data generated from the sampling and analysis of the domestic water supply well on this property on December 12, 2008. The field procedures and the Quality Assurance/Quality Control (QA/QC) measures followed during sample collection, analysis, and data review were defined in the Sampling and Analysis Plan (SAP) prepared for this work (Hart Crowser 2008).

Sampling and Analysis Activities

The well sample from this property was collected from a spigot on the house. It is not known where in the distribution system this spigot is located but the homeowner stated that there is no water filtration or conditioners installed on this distribution system. The well was purged for a time period estimated to be sufficient to purge at least one system volume from the wellhead to the sample location prior to sampling.

Following purging of the well system, the flow was slowed as needed and directed to a flow-through cell using dedicated Teflon tubing for the collection of field parameters—temperature and electrical conductivity (EC). Sample bottles for laboratory analysis were filled following parameter collection.

Following collection, sample containers were placed in ZipLock™ bags and placed in a cooler in preparation for shipment. Double-bagged ice was placed in the cooler for sample preservation. Copies of the chain of custody forms were placed in a ZipLock™ bag and taped to the inside cover of each cooler. Custody seals were placed on the front and back of the cooler lid and the lid was taped shut. Sample coolers were shipped via UPS overnight express to Columbia Analytical Services (CAS) located in Kelso, Washington.

Water samples were submitted to CAS for the following chemical analyses:

- Fluoride and Chloride (EPA Method 300.0);
- Nitrate and Nitrite (EPA Method 353.2);
- Total Priority Pollutant List metals including aluminum, antimony, arsenic, beryllium, cadmium, chromium, copper, lead, mercury, nickel, potassium, selenium, silver, sodium, thallium, and zinc (EPA Methods 200.7, 200.8, and 245.1);
- Ammonia (EPA Method 350.1); and
- pH (SM 4500-H^+).

Sample Analytical Results

The analytical results were compared to state and federal drinking water standards for primary and secondary contaminants presented in Table 1.

In Washington State, drinking water standards are promulgated by the Environmental Protection Agency (EPA) under the federal Safe Drinking Water Act (SDWA) (40 CFR parts 141 through 149) and by the Washington State Department of Health Water Systems Regulations (Chapters 246-290 through 246-296 WAC).

These drinking water regulations set standards for the highest levels of contaminants permissible in drinking water and are termed Maximum Contaminant Levels (MCLs). The two classes of established MCLs are Primary MCLs and Secondary MCLs. Primary MCLs are enforceable levels for select contaminants where exceedance of the MCLs would cause adverse public health effects. Secondary MCLs are guidelines for select contaminants related to cosmetic effects (such as tooth or skin discoloration) or aesthetic effects (such as taste, odor, or color) of drinking water. The applicable Primary and Secondary MCLs for the constituents tested on this site are presented in Table 1.

For the chemical constituents analyzed for during this event, only ammonia and potassium do not have any MCLs under state or federal standards. Ammonia was not detected in this sample. Potassium is a naturally occurring element present in groundwater and is generally not a health concern.

Constituents tested for at this residence were below the applicable MCLs. A more detailed presentation of the well sampling and analysis program and discussion of the results is provided in the Domestic Wells and Spring Sampling and Analysis, Heglar-Kronquist Site (Hart Crowser 2009).

Definitions

The following definitions will aid the reader in understanding the well sample analytical results:

MCL (Maximum Contaminant Level) is the highest level of a contaminant that is allowed in drinking water.

mg/L or ppm is parts per million (equivalent to one cent in $10,000).

µg/L or ppb is parts per billion (equivalent to one cent in $10,000,000).

Method Detection Limit (MDL). The minimum concentration that can be measured and reported with 99 percent confidence that the concentration is greater than zero, but the exact concentration cannot be reliably quantified. For instance, if the true concentration of an analyte in a sample is equal to the MDL, there is a 50 percent chance that the analyte will be detected.

Reporting Limit (RL). The RL is the lowest concentration at which an analyte can be detected in a sample and its concentration can be reported with a reasonable degree of accuracy and precision.

U Data Qualifier. Analyte was not detected at or above the reported result.

J Data Qualifier. Analyte was positively identified. The reported result is an estimate as quality control criteria were slightly exceeded.

T Data Qualifier. Reported result below the associated reporting limit (RL) but above the Method Detection Limit (MDL).

REFERENCES

Hart Crowser 2008. Sampling and Analysis Plan and Quality Assurance Project Plan, Heglar Kronquist Site, Mead, Washington. December 2008. 17524-00.

Hart Crowser 2009. Domestic Wells and Spring Sampling and Analysis, Heglar-Kronquist Site, Mead, Washington. February 2009. 17524-00.

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Table 1 - Domestic Well Water Sample Analytical Results in Comparison to State and Federal Maximum Contaminant Levels (MCLs) for Primary and Secondary Contaminants

Sample ID Sampling Date	Maximum Contaminant Level (MCL)	Well No. 6 12/12/2008	
Primary MCLs			
Antimony	6	0.04	T
Arsenic	10	0.77	
Beryllium	4	0.02	U
Cadmium	5	0.02	U
Chromium	100	0.275	U
Copper	**	43.6	
Fluoride in mg/L	4 mg/L	0.3	
Lead	**	0.27	
Mercury	2	0.2	U
Nickel	100	6.23	
Nitrate as N in mg/L	10 mg/L	0.76	
Selenium	50	0.9	T
Sodium	**	15200	
Thallium	2	0.02	U
Secondary MCLs			
pH	6.5 to 8.5	6.78	
Aluminum	50 to 200	50	U
Chloride in mg/L	250 mg/L	2.7	
Silver	100	0.02	U
Zinc	5000	15.2	
Substances with no MCLs			
Potassium	Not Applicable	4900	
Ammonia (NH3) as Nitrogen(N) in mg/L	Not Applicable	0.05	U

All concentrations in ug/L (parts per billion) except as noted.
T = Value is between the method detection limit (MDL) and method reporting limit (MRL).
U = Not detected at reporting limit indicated.

** Although the state board of health has not established MCLs for copper, lead, and sodium, there is sufficient public health significance connected with copper, lead, and sodium levels to require inclusion in inorganic chemical and physical source monitoring. For lead and copper, the EPA has established distribution system related levels at which a system is required to consider corrosion control. These levels, called "action levels," are 0.015 mg/L for lead and 1.3 mg/L for copper and are applied to the highest concentration in ten percent of all samples collected from the distribution system. The EPA has also established a recommended level of twenty mg/L for sodium as a level of concern for those consumers that may be restricted for daily sodium intake in their diets (from WAC 246-290-310).

Domestic Well Sampling
Heglar-Kronquist Site

Groundwater Testing Results
Well No. 7

February 13, 2009
17524-00

HARTCROWSER

GROUNDWATER TESTING RESULTS
WELL NO. 7

This report presents a summary of the sampling and analysis activities and a brief review of the data generated from the sampling and analysis of the domestic water supply well on this property on December 12, 2008. The field procedures and the Quality Assurance/Quality Control (QA/QC) measures followed during sample collection, analysis, and data review were defined in the Sampling and Analysis Plan (SAP) prepared for this work (Hart Crowser 2008).

Sampling and Analysis Activities

The well sample from this property was collected from a frost free hydrant next to the wellhead. This sample location is upstream of the household distribution system. The well was purged for a time period estimated to be sufficient to purge at least one system volume from the wellhead to the sample location prior to sampling.

Following purging of the well system, the flow was slowed as needed and directed to a flow-through cell using dedicated Teflon tubing for the collection of field parameters—temperature and electrical conductivity (EC). Sample bottles for laboratory analysis were filled following parameter collection.

Following collection, sample containers were placed in ZipLock™ bags and placed in a cooler in preparation for shipment. Double-bagged ice was placed in the cooler for sample preservation. Copies of the chain of custody forms were placed in a ZipLock™ bag and taped to the inside cover of each cooler. Custody seals were placed on the front and back of the cooler lid and the lid was taped shut. Sample coolers were shipped via UPS overnight express to Columbia Analytical Services (CAS) located in Kelso, Washington.

Water samples were submitted to CAS for the following chemical analyses:

- Fluoride and Chloride (EPA Method 300.0);
- Nitrate and Nitrite (EPA Method 353.2);
- Total Priority Pollutant List metals including aluminum, antimony, arsenic, beryllium, cadmium, chromium, copper, lead, mercury, nickel, potassium, selenium, silver, sodium, thallium, and zinc (EPA Methods 200.7, 200.8, and 245.1);
- Ammonia (EPA Method 350.1); and
- pH (SM 4500-H^+).

Sample Analytical Results

The analytical results were compared to state and federal drinking water standards for primary and secondary contaminants presented in Table 1.

In Washington State, drinking water standards are promulgated by the Environmental Protection Agency (EPA) under the federal Safe Drinking Water Act (SDWA) (40 CFR parts 141 through 149) and by the Washington State Department of Health Water Systems Regulations (Chapters 246-290 through 246-296 WAC).

These drinking water regulations set standards for the highest levels of contaminants permissible in drinking water and are termed Maximum Contaminant Levels (MCLs). The two classes of established MCLs are Primary MCLs and Secondary MCLs. Primary MCLs are enforceable levels for select contaminants where exceedance of the MCLs would cause adverse public health effects. Secondary MCLs are guidelines for select contaminants related to cosmetic effects (such as tooth or skin discoloration) or aesthetic effects (such as taste, odor, or color) of drinking water. The applicable Primary and Secondary MCLs for the constituents tested on this site are presented in Table 1.

For the chemical constituents analyzed for during this event, only ammonia and potassium do not have any MCLs under state or federal standards. Ammonia was not detected in this sample. Potassium is a naturally occurring element present in groundwater and is generally not a health concern.

Constituents tested for at this residence were below the applicable MCLs. A more detailed presentation of the well sampling and analysis program and discussion of the results is provided in the Domestic Wells and Spring Sampling and Analysis, Heglar-Kronquist Site (Hart Crowser 2009).

Definitions

The following definitions will aid the reader in understanding the well sample analytical results:

MCL (Maximum Contaminant Level) is the highest level of a contaminant that is allowed in drinking water.

mg/L or ppm is parts per million (equivalent to one cent in $10,000).

µg/L or ppb is parts per billion (equivalent to one cent in $10,000,000).

Method Detection Limit (MDL). The minimum concentration that can be measured and reported with 99 percent confidence that the concentration is greater than zero, but the exact concentration cannot be reliably quantified. For instance, if the true concentration of an analyte in a sample is equal to the MDL, there is a 50 percent chance that the analyte will be detected.

Reporting Limit (RL). The RL is the lowest concentration at which an analyte can be detected in a sample and its concentration can be reported with a reasonable degree of accuracy and precision.

U Data Qualifier. Analyte was not detected at or above the reported result.

J Data Qualifier. Analyte was positively identified. The reported result is an estimate as quality control criteria were slightly exceeded.

T Data Qualifier. Reported result below the associated reporting limit (RL) but above the Method Detection Limit (MDL).

REFERENCES

Hart Crowser 2008. Sampling and Analysis Plan and Quality Assurance Project Plan, Heglar Kronquist Site, Mead, Washington. December 2008. 17524-00.

Hart Crowser 2009. Domestic Wells and Spring Sampling and Analysis, Heglar-Kronquist Site, Mead, Washington. February 2009. 17524-00.

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Table 1 - Domestic Well Water Sample Analytical Results in Comparison to State and Federal Maximum Contaminant Levels (MCLs) for Primary and Secondary Contaminants

Sample ID Sampling Date	Maximum Contaminant Level (MCL)	Well No. 7 12/12/2008	
Primary MCLs			
Antimony	6	0.032	T
Arsenic	10	0.51	
Beryllium	4	0.02	U
Cadmium	5	0.016	T
Chromium	100	0.897	
Copper	**	10	U
Fluoride in mg/L	4 mg/L	0.3	
Lead	**	0.639	
Mercury	2	0.2	U
Nickel	100	0.17	T
Nitrate as N in mg/L	10 mg/L	0.05	U
Selenium	50	0.5	T
Sodium	**	7810	
Thallium	2	0.004	T
Secondary MCLs			
pH	6.5 to 8.5	6.86	
Aluminum	50 to 200	50	U
Chloride in mg/L	250 mg/L	0.9	
Silver	100	0.019	T
Zinc	5000	50.6	
Substances with no MCLs			
Potassium	Not Applicable	3480	
Ammonia (NH3) as Nitrogen(N) in mg/L	Not Applicable	0.05	U

All concentrations in ug/L (parts per billion) except as noted.
T = Value is between the method detection limit (MDL) and method reporting limit (MRL).
U = Not detected at reporting limit indicated.
** Although the state board of health has not established MCLs for copper, lead, and sodium, there is sufficient public health significance connected with copper, lead, and sodium levels to require inclusion in inorganic chemical and physical source monitoring. For lead and copper, the EPA has established distribution system related levels at which a system is required to consider corrosion control. These levels, called "action levels," are 0.015 mg/L for lead and 1.3 mg/L for copper and are applied to the highest concentration in ten percent of all samples collected from the distribution system. The EPA has also established a recommended level of twenty mg/L for sodium as a level of concern for those consumers that may be restricted for daily sodium intake in their diets (from WAC 246-290-310).

Domestic Well Sampling
Heglar-Kronquist Site

Groundwater Testing Results
Well No. 8

February 13, 2009
17524-00

HARTCROWSER

GROUNDWATER TESTING RESULTS
WELL NO. 8

This report presents a summary of the sampling and analysis activities and a brief review of the data generated from the sampling and analysis of the domestic water supply well on this property on December 12, 2008. The field procedures and the Quality Assurance/Quality Control (QA/QC) measures followed during sample collection, analysis, and data review were defined in the Sampling and Analysis Plan (SAP) prepared for this work (Hart Crowser 2008).

Sampling and Analysis Activities

The well sample from this property was collected from a frost free hydrant next to the wellhead. This sample location is upstream of the household distribution system. The well was purged for a time period estimated to be sufficient to purge at least one system volume from the wellhead to the sample location prior to sampling.

Following purging of the well system, the flow was slowed as needed and directed to a flow-through cell using dedicated Teflon tubing for the collection of field parameters—temperature and electrical conductivity (EC). Sample bottles for laboratory analysis were filled following parameter collection.

Following collection, sample containers were placed in ZipLock™ bags and placed in a cooler in preparation for shipment. Double-bagged ice was placed in the cooler for sample preservation. Copies of the chain of custody forms were placed in a ZipLock™ bag and taped to the inside cover of each cooler. Custody seals were placed on the front and back of the cooler lid and the lid was taped shut. Sample coolers were shipped via UPS overnight express to Columbia Analytical Services (CAS) located in Kelso, Washington.

Water samples were submitted to CAS for the following chemical analyses:

- Fluoride and Chloride (EPA Method 300.0);
- Nitrate and Nitrite (EPA Method 353.2);
- Total Priority Pollutant List metals including aluminum, antimony, arsenic, beryllium, cadmium, chromium, copper, lead, mercury, nickel, potassium, selenium, silver, sodium, thallium, and zinc (EPA Methods 200.7, 200.8, and 245.1);
- Ammonia (EPA Method 350.1); and
- pH (SM 4500-H^+).

Sample Analytical Results

The analytical results were compared to state and federal drinking water standards for primary and secondary contaminants presented in Table 1.

In Washington State, drinking water standards are promulgated by the Environmental Protection Agency (EPA) under the federal Safe Drinking Water Act (SDWA) (40 CFR parts 141 through 149) and by the Washington State Department of Health Water Systems Regulations (Chapters 246-290 through 246-296 WAC).

These drinking water regulations set standards for the highest levels of contaminants permissible in drinking water and are termed Maximum Contaminant Levels (MCLs). The two classes of established MCLs are Primary MCLs and Secondary MCLs. Primary MCLs are enforceable levels for select contaminants where exceedance of the MCLs would cause adverse public health effects. Secondary MCLs are guidelines for select contaminants related to cosmetic effects (such as tooth or skin discoloration) or aesthetic effects (such as taste, odor, or color) of drinking water. The applicable Primary and Secondary MCLs for the constituents tested on this site are presented in Table 1.

For the chemical constituents analyzed for during this event, only ammonia and potassium do not have any MCLs under state or federal standards. Ammonia was not detected in this sample. Potassium is a naturally occurring element present in groundwater and is generally not a health concern.

Constituents tested for at this residence were below the applicable MCLs. A more detailed presentation of the well sampling and analysis program and discussion of the results is provided in the Domestic Wells and Spring Sampling and Analysis, Heglar-Kronquist Site (Hart Crowser 2009).

Definitions

The following definitions will aid the reader in understanding the well sample analytical results:

MCL (Maximum Contaminant Level) is the highest level of a contaminant that is allowed in drinking water.

mg/L or ppm is parts per million (equivalent to one cent in $10,000).

µg/L or ppb is parts per billion (equivalent to one cent in $10,000,000).

Method Detection Limit (MDL). The minimum concentration that can be measured and reported with 99 percent confidence that the concentration is greater than zero, but the exact concentration cannot be reliably quantified. For instance, if the true concentration of an analyte in a sample is equal to the MDL, there is a 50 percent chance that the analyte will be detected.

Reporting Limit (RL). The RL is the lowest concentration at which an analyte can be detected in a sample and its concentration can be reported with a reasonable degree of accuracy and precision.

U Data Qualifier. Analyte was not detected at or above the reported result.

J Data Qualifier. Analyte was positively identified. The reported result is an estimate as quality control criteria were slightly exceeded.

T Data Qualifier. Reported result below the associated reporting limit (RL) but above the Method Detection Limit (MDL).

REFERENCES

Hart Crowser 2008. Sampling and Analysis Plan and Quality Assurance Project Plan, Heglar Kronquist Site, Mead, Washington. December 2008. 17524-00.

Hart Crowser 2009. Domestic Wells and Spring Sampling and Analysis, Heglar-Kronquist Site, Mead, Washington. February 2009. 17524-00.

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Table 1 - Domestic Well Water Sample Analytical Results in Comparison to State and Federal Maximum Contaminant Levels (MCLs) for Primary and Secondary Contaminants

Sample ID Sampling Date	Maximum Contaminant Level (MCL)	Well No. 8 12/12/2008	
Primary MCLs			
Antimony	6	0.034	T
Arsenic	10	0.35	T
Beryllium	4	0.02	T
Cadmium	5	0.027	
Chromium	100	0.2	U
Copper	**	10	U
Fluoride in mg/L	4 mg/L	0.3	
Lead	**	0.237	
Mercury	2	0.2	U
Nickel	100	0.3	
Nitrate as N in mg/L	10 mg/L	0.09	
Selenium	50	0.6	T
Sodium	**	7630	
Thallium	2	0.007	T
Secondary MCLs			
pH	6.5 to 8.5	7.47	
Aluminum	50 to 200	50	U
Chloride in mg/L	250 mg/L	0.7	
Silver	100	0.015	T
Zinc	5000	66.8	
Substances with no MCLs			
Potassium	Not Applicable	1460	
Ammonia (NH3) as Nitrogen(N) in mg/L	Not Applicable	0.05	U

All concentrations in ug/L (parts per billion) except as noted.
T = Value is between the method detection limit (MDL) and method reporting limit (MRL).
U = Not detected at reporting limit indicated.

** Although the state board of health has not established MCLs for copper, lead, and sodium, there is sufficient public health significance connected with copper, lead, and sodium levels to require inclusion in inorganic chemical and physical source monitoring. For lead and copper, the EPA has established distribution system related levels at which a system is required to consider corrosion control. These levels, called "action levels," are 0.015 mg/L for lead and 1.3 mg/L for copper and are applied to the highest concentration in ten percent of all samples collected from the distribution system. The EPA has also established a recommended level of twenty mg/L for sodium as a level of concern for those consumers that may be restricted for daily sodium intake in their diets (from WAC 246-290-310).

Domestic Well Sampling
Heglar-Kronquist Site

Groundwater Testing Results
Well No. 9

February 13, 2009
17524-00

HARTCROWSER

GROUNDWATER TESTING RESULTS
WELL NO. 9

This report presents a summary of the sampling and analysis activities and a brief review of the data generated from the sampling and analysis of the domestic water supply well on this property on December 12, 2008. The field procedures and the Quality Assurance/Quality Control (QA/QC) measures followed during sample collection, analysis, and data review were defined in the Sampling and Analysis Plan (SAP) prepared for this work (Hart Crowser 2008).

Sampling and Analysis Activities

The well sample from this property was collected from a spigot located on the upstream side of the pressure tank in the well house. The well was purged for a time period estimated to be sufficient to purge at least one system volume from the wellhead to the sample location prior to sampling.

Following purging of the well system, the flow was slowed as needed and directed to a flow-through cell using dedicated Teflon tubing for the collection of field parameters—temperature and electrical conductivity (EC). Sample bottles for laboratory analysis were filled following parameter collection.

Following collection, sample containers were placed in ZipLock™ bags and placed in a cooler in preparation for shipment. Double-bagged ice was placed in the cooler for sample preservation. Copies of the chain of custody forms were placed in a ZipLock™ bag and taped to the inside cover of each cooler. Custody seals were placed on the front and back of the cooler lid and the lid was taped shut. Sample coolers were shipped via UPS overnight express to Columbia Analytical Services (CAS) located in Kelso, Washington.

Water samples were submitted to CAS for the following chemical analyses:

- Fluoride and Chloride (EPA Method 300.0);
- Nitrate and Nitrite (EPA Method 353.2);
- Total Priority Pollutant List metals including aluminum, antimony, arsenic, beryllium, cadmium, chromium, copper, lead, mercury, nickel, potassium, selenium, silver, sodium, thallium, and zinc (EPA Methods 200.7, 200.8, and 245.1);
- Ammonia (EPA Method 350.1); and
- pH (SM 4500-H^+).

Sample Analytical Results

The analytical results were compared to state and federal drinking water standards for primary and secondary contaminants presented in Table 1.

In Washington State, drinking water standards are promulgated by the Environmental Protection Agency (EPA) under the federal Safe Drinking Water Act (SDWA) (40 CFR parts 141 through 149) and by the Washington State Department of Health Water Systems Regulations (Chapters 246-290 through 246-296 WAC).

These drinking water regulations set standards for the highest levels of contaminants permissible in drinking water and are termed Maximum Contaminant Levels (MCLs). The two classes of established MCLs are Primary MCLs and Secondary MCLs. Primary MCLs are enforceable levels for select contaminants where exceedance of the MCLs would cause adverse public health effects. Secondary MCLs are guidelines for select contaminants related to cosmetic effects (such as tooth or skin discoloration) or aesthetic effects (such as taste, odor, or color) of drinking water. The applicable Primary and Secondary MCLs for the constituents tested on this site are presented in Table 1.

For the chemical constituents analyzed for during this event, only ammonia and potassium do not have any MCLs under state or federal standards. Ammonia was not detected in this sample. Potassium is a naturally occurring element present in groundwater and is generally not a health concern.

Constituents tested for at this residence were below the applicable MCLs. A more detailed presentation of the well sampling and analysis program and discussion of the results is provided in the Domestic Wells and Spring Sampling and Analysis, Heglar-Kronquist Site (Hart Crowser 2009).

Definitions

The following definitions will aid the reader in understanding the well sample analytical results:

MCL (Maximum Contaminant Level) is the highest level of a contaminant that is allowed in drinking water.

mg/L or ppm is parts per million (equivalent to one cent in $10,000).

µg/L or ppb is parts per billion (equivalent to one cent in $10,000,000).

Method Detection Limit (MDL). The minimum concentration that can be measured and reported with 99 percent confidence that the concentration is greater than zero, but the exact concentration cannot be reliably quantified. For instance, if the true concentration of an analyte in a sample is equal to the MDL, there is a 50 percent chance that the analyte will be detected.

Reporting Limit (RL). The RL is the lowest concentration at which an analyte can be detected in a sample and its concentration can be reported with a reasonable degree of accuracy and precision.

U Data Qualifier. Analyte was not detected at or above the reported result.

J Data Qualifier. Analyte was positively identified. The reported result is an estimate as quality control criteria were slightly exceeded.

T Data Qualifier. Reported result below the associated reporting limit (RL) but above the Method Detection Limit (MDL).

REFERENCES

Hart Crowser 2008. Sampling and Analysis Plan and Quality Assurance Project Plan, Heglar Kronquist Site, Mead, Washington. December 2008. 17524-00.

Hart Crowser 2009. Domestic Wells and Spring Sampling and Analysis, Heglar-Kronquist Site, Mead, Washington. February 2009. 17524-00.

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Table 1 - Domestic Well Water Sample Analytical Results in Comparison to State and Federal Maximum Contaminant Levels (MCLs) for Primary and Secondary Contaminants

Sample ID Sampling Date	Maximum Contaminant Level (MCL)	Well No. 9 12/12/2008	
Primary MCLs			
Antimony	6	0.038	T
Arsenic	10	1.6	
Beryllium	4	0.02	U
Cadmium	5	0.016	T
Chromium	100	0.2	U
Copper	**	10	U
Fluoride in mg/L	4 mg/L	0.4	
Lead	**	0.048	
Mercury	2	0.2	U
Nickel	100	0.46	
Nitrate as N in mg/L	10 mg/L	0.05	U
Selenium	50	1	U
Sodium	**	19400	
Thallium	2	0.005	T
Secondary MCLs			
pH	6.5 to 8.5	7.07	
Aluminum	50 to 200	50	U
Chloride in mg/L	250 mg/L	1.6	
Silver	100	0.007	T
Zinc	5000	15.1	
Substances with no MCLs			
Potassium	Not Applicable	5440	
Ammonia (NH3) as Nitrogen(N) in mg/L	Not Applicable	0.05	U

All concentrations in ug/L (parts per billion) except as noted.
T = Value is between the method detection limit (MDL) and method reporting limit (MRL).
U = Not detected at reporting limit indicated.
** Although the state board of health has not established MCLs for copper, lead, and sodium, there is sufficient public health significance connected with copper, lead, and sodium levels to require inclusion in inorganic chemical and physical source monitoring. For lead and copper, the EPA has established distribution system related levels at which a system is required to consider corrosion control. These levels, called "action levels," are 0.015 mg/L for lead and 1.3 mg/L for copper and are applied to the highest concentration in ten percent of all samples collected from the distribution system. The EPA has also established a recommended level of twenty mg/L for sodium as a level of concern for those consumers that may be restricted for daily sodium intake in their diets (from WAC 246-290-310).

Domestic Well Sampling
Heglar-Kronquist Site

Groundwater Testing Results
Well No. 10

February 13, 2009
17524-00

HARTCROWSER

GROUNDWATER TESTING RESULTS
WELL NO. 10

This report presents a summary of the sampling and analysis activities and a brief review of the data generated from the sampling and analysis of the domestic water supply well on this property on December 12, 2008. The field procedures and the Quality Assurance/Quality Control (QA/QC) measures followed during sample collection, analysis, and data review were defined in the Sampling and Analysis Plan (SAP) prepared for this work (Hart Crowser 2008).

Sampling and Analysis Activities

The well sample from this property share a common well located on the Well No. 9 property. The sample from Well No. 9 was collected from a spigot located on the upstream side of the pressure tank in the well house. A separate sample was collected from a frost free hydrant located on this property downstream of the pressure tanks in the Well No. 9 well house. The well was purged for a time period estimated to be sufficient to purge at least one system volume from the wellhead to the sample location prior to sampling.

Following purging of the well system, the flow was slowed as needed and directed to a flow-through cell using dedicated Teflon tubing for the collection of field parameters—temperature and electrical conductivity (EC). Sample bottles for laboratory analysis were filled following parameter collection.

Following collection, sample containers were placed in ZipLock™ bags and placed in a cooler in preparation for shipment. Double-bagged ice was placed in the cooler for sample preservation. Copies of the chain of custody forms were placed in a ZipLock™ bag and taped to the inside cover of each cooler. Custody seals were placed on the front and back of the cooler lid and the lid was taped shut. Sample coolers were shipped via UPS overnight express to Columbia Analytical Services (CAS) located in Kelso, Washington.

Water samples were submitted to CAS for the following chemical analyses:

- Fluoride and Chloride (EPA Method 300.0);
- Nitrate and Nitrite (EPA Method 353.2);
- Total Priority Pollutant List metals including aluminum, antimony, arsenic, beryllium, cadmium, chromium, copper, lead, mercury, nickel, potassium, selenium, silver, sodium, thallium, and zinc (EPA Methods 200.7, 200.8, and 245.1);
- Ammonia (EPA Method 350.1); and
- pH (SM 4500-H^+).

Sample Analytical Results

The analytical results were compared to state and federal drinking water standards for primary and secondary contaminants presented in Table 1.

In Washington State, drinking water standards are promulgated by the Environmental Protection Agency (EPA) under the federal Safe Drinking Water Act (SDWA) (40 CFR parts 141 through 149) and by the Washington State Department of Health Water Systems Regulations (Chapters 246-290 through 246-296 WAC).

These drinking water regulations set standards for the highest levels of contaminants permissible in drinking water and are termed Maximum Contaminant Levels (MCLs). The two classes of established MCLs are Primary MCLs and Secondary MCLs. Primary MCLs are enforceable levels for select contaminants where exceedance of the MCLs would cause adverse public health effects. Secondary MCLs are guidelines for select contaminants related to cosmetic effects (such as tooth or skin discoloration) or aesthetic effects (such as taste, odor, or color) of drinking water. The applicable Primary and Secondary MCLs for the constituents tested on this site are presented in Table 1.

For the chemical constituents analyzed for during this event, only ammonia and potassium do not have any MCLs under state or federal standards. Ammonia was not detected in this sample. Potassium is a naturally occurring element present in groundwater and is generally not a health concern.

Constituents tested for at this residence were below the applicable MCLs. A more detailed presentation of the well sampling and analysis program and discussion of the results is provided in the Domestic Wells and Spring Sampling and Analysis, Heglar-Kronquist Site (Hart Crowser 2009).

Definitions

The following definitions will aid the reader in understanding the well sample analytical results:

MCL (Maximum Contaminant Level) is the highest level of a contaminant that is allowed in drinking water.

mg/L or ppm is parts per million (equivalent to one cent in $10,000).

µg/L or ppb is parts per billion (equivalent to one cent in $10,000,000).

Method Detection Limit (MDL). The minimum concentration that can be measured and reported with 99 percent confidence that the concentration is greater than zero, but the exact concentration cannot be reliably quantified. For instance, if the true concentration of an analyte in a sample is equal to the MDL, there is a 50 percent chance that the analyte will be detected.

Reporting Limit (RL). The RL is the lowest concentration at which an analyte can be detected in a sample and its concentration can be reported with a reasonable degree of accuracy and precision.

U Data Qualifier. Analyte was not detected at or above the reported result.

J Data Qualifier. Analyte was positively identified. The reported result is an estimate as quality control criteria were slightly exceeded.

T Data Qualifier. Reported result below the associated reporting limit (RL) but above the Method Detection Limit (MDL).

REFERENCES

Hart Crowser 2008. Sampling and Analysis Plan and Quality Assurance Project Plan, Heglar Kronquist Site, Mead, Washington. December 2008. 17524-00.

Hart Crowser 2009. Domestic Wells and Spring Sampling and Analysis, Heglar-Kronquist Site, Mead, Washington. February 2009. 17524-00.

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Table 1 - Domestic Well Water Sample Analytical Results in Comparison to State and Federal Maximum Contaminant Levels (MCLs) for Primary and Secondary Contaminants

Sample ID Sampling Date	Maximum Contaminant Level (MCL)	Well No. 10 12/12/2008	
Primary MCLs			
Antimony	6	0.034	T
Arsenic	10	1.4	
Beryllium	4	0.02	U
Cadmium	5	0.018	T
Chromium	100	0.2	U
Copper	**	6.3	T
Fluoride in mg/L	4 mg/L	0.4	
Lead	**	3.19	
Mercury	2	0.2	U
Nickel	100	0.54	
Nitrate as N in mg/L	10 mg/L	0.05	U
Selenium	50	1	U
Sodium	**	18500	
Thallium	2	0.006	T
Secondary MCLs			
pH	6.5 to 8.5	7.07	
Aluminum	50 to 200	50	U
Chloride in mg/L	250 mg/L	1.6	
Silver	100	0.02	U
Zinc	5000	40.6	
Substances with no MCLs			
Potassium	Not Applicable	5300	
Ammonia (NH3) as Nitrogen(N) in mg/L	Not Applicable	0.05	U

All concentrations in ug/L (parts per billion) except as noted.
T = Value is between the method detection limit (MDL) and method reporting limit (MRL).
U = Not detected at reporting limit indicated.
** Although the state board of health has not established MCLs for copper, lead, and sodium, there is sufficient public health significance connected with copper, lead, and sodium levels to require inclusion in inorganic chemical and physical source monitoring. For lead and copper, the EPA has established distribution system related levels at which a system is required to consider corrosion control. These levels, called "action levels," are 0.015 mg/L for lead and 1.3 mg/L for copper and are applied to the highest concentration in ten percent of all samples collected from the distribution system. The EPA has also established a recommended level of twenty mg/L for sodium as a level of concern for those consumers that may be restricted for daily sodium intake in their diets (from WAC 246-290-310).

Domestic Well Sampling
Heglar-Kronquist Site

Groundwater Testing Results
Well No. 11

February 13, 2009
17524-00

HARTCROWSER

GROUNDWATER TESTING RESULTS
WELL NO. 11

This report presents a summary of the sampling and analysis activities and a brief review of the data generated from the sampling and analysis of the domestic water supply well on this property on December 12, 2008. The field procedures and the Quality Assurance/Quality Control (QA/QC) measures followed during sample collection, analysis, and data review were defined in the Sampling and Analysis Plan (SAP) prepared for this work (Hart Crowser 2008).

Sampling and Analysis Activities

The well sample from this property was collected from a frost free hydrant next to the wellhead. This sample location is upstream of the household distribution system. We were informed that this well had not been in use for some period of time due to the homeowner's absence. Considerable turbidity was noted in the water upon initial purging of this well. The well was purged for approximately 15 minutes before the water began to clear. The water sample from this well was collected after the water became clear.

Following purging of the well system, the flow was slowed as needed and directed to a flow-through cell using dedicated Teflon tubing for the collection of field parameters—temperature and electrical conductivity (EC). Sample bottles for laboratory analysis were filled following parameter collection.

Following collection, sample containers were placed in ZipLock™ bags and placed in a cooler in preparation for shipment. Double-bagged ice was placed in the cooler for sample preservation. Copies of the chain of custody forms were placed in a ZipLock™ bag and taped to the inside cover of each cooler. Custody seals were placed on the front and back of the cooler lid and the lid was taped shut. Sample coolers were shipped via UPS overnight express to Columbia Analytical Services (CAS) located in Kelso, Washington.

Water samples were submitted to CAS for the following chemical analyses:

- Fluoride and Chloride (EPA Method 300.0);
- Nitrate and Nitrite (EPA Method 353.2);
- Total Priority Pollutant List metals including aluminum, antimony, arsenic, beryllium, cadmium, chromium, copper, lead, mercury, nickel, potassium, selenium, silver, sodium, thallium, and zinc (EPA Methods 200.7, 200.8, and 245.1);
- Ammonia (EPA Method 350.1); and
- pH (SM 4500-H^+).

Sample Analytical Results

The analytical results were compared to state and federal drinking water standards for primary and secondary contaminants presented in Table 1.

In Washington State, drinking water standards are promulgated by the Environmental Protection Agency (EPA) under the federal Safe Drinking Water Act (SDWA) (40 CFR parts 141 through 149) and by the Washington State Department of Health Water Systems Regulations (Chapters 246-290 through 246-296 WAC).

These drinking water regulations set standards for the highest levels of contaminants permissible in drinking water and are termed Maximum Contaminant Levels (MCLs). The two classes of established MCLs are Primary MCLs and Secondary MCLs. Primary MCLs are enforceable levels for select contaminants where exceedance of the MCLs would cause adverse public health effects. Secondary MCLs are guidelines for select contaminants related to cosmetic effects (such as tooth or skin discoloration) or aesthetic effects (such as taste, odor, or color) of drinking water. The applicable Primary and Secondary MCLs for the constituents tested on this site are presented in Table 1.

For the chemical constituents analyzed for during this event, only ammonia and potassium do not have any MCLs under state or federal standards. Ammonia was not detected in this sample. Potassium is a naturally occurring element present in groundwater and is generally not a health concern.

Constituents tested for at this residence were below the applicable MCLs. A more detailed presentation of the well sampling and analysis program and discussion of the results is provided in the Domestic Wells and Spring Sampling and Analysis, Heglar-Kronquist Site (Hart Crowser 2009).

Definitions

The following definitions will aid the reader in understanding the well sample analytical results:

MCL (Maximum Contaminant Level) is the highest level of a contaminant that is allowed in drinking water.

mg/L or ppm is parts per million (equivalent to one cent in $10,000).

µg/L or ppb is parts per billion (equivalent to one cent in $10,000,000).

Method Detection Limit (MDL). The minimum concentration that can be measured and reported with 99 percent confidence that the concentration is greater than zero, but the exact concentration cannot be reliably quantified. For instance, if the true concentration of an analyte in a sample is equal to the MDL, there is a 50 percent chance that the analyte will be detected.

Reporting Limit (RL). The RL is the lowest concentration at which an analyte can be detected in a sample and its concentration can be reported with a reasonable degree of accuracy and precision.

U Data Qualifier. Analyte was not detected at or above the reported result.

J Data Qualifier. Analyte was positively identified. The reported result is an estimate as quality control criteria were slightly exceeded.

T Data Qualifier. Reported result below the associated reporting limit (RL) but above the Method Detection Limit (MDL).

REFERENCES

Hart Crowser 2008. Sampling and Analysis Plan and Quality Assurance Project Plan, Heglar Kronquist Site, Mead, Washington. December 2008. 17524-00.

Hart Crowser 2009. Domestic Wells and Spring Sampling and Analysis, Heglar-Kronquist Site, Mead, Washington. February 2009. 17524-00.

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Table 1 - Domestic Well Water Sample Analytical Results in Comparison to State and Federal Maximum Contaminant Levels (MCLs) for Primary and Secondary Contaminants

Sample ID Sampling Date	Maximum Contaminant Level (MCL)	Well No. 11 12/12/2008	
Primary MCLs			
Antimony	6	0.006	T
Arsenic	10	0.5	
Beryllium	4	0.02	U
Cadmium	5	0.011	T
Chromium	100	0.2	U
Copper	**	10	U
Fluoride in mg/L	4 mg/L	0.5	
Lead	**	0.092	
Mercury	2	0.2	U
Nickel	100	0.32	
Nitrate as N in mg/L	10 mg/L	0.05	U
Selenium	50	1	U
Sodium	**	10900	
Thallium	2	0.02	U
Secondary MCLs			
pH	6.5 to 8.5	6.89	
Aluminum	50 to 200	50	U
Chloride in mg/L	250 mg/L	1.8	
Silver	100	0.02	U
Zinc	5000	45.3	
Substances with no MCLs			
Potassium	Not Applicable	5010	
Ammonia (NH3) as Nitrogen(N) in mg/L	Not Applicable	0.05	U

All concentrations in ug/L (parts per billion) except as noted.
T = Value is between the method detection limit (MDL) and method reporting limit (MRL).
U = Not detected at reporting limit indicated.
** Although the state board of health has not established MCLs for copper, lead, and sodium, there is sufficient public health significance connected with copper, lead, and sodium levels to require inclusion in inorganic chemical and physical source monitoring. For lead and copper, the EPA has established distribution system related levels at which a system is required to consider corrosion control. These levels, called "action levels," are 0.015 mg/L for lead and 1.3 mg/L for copper and are applied to the highest concentration in ten percent of all samples collected from the distribution system. The EPA has also established a recommended level of twenty mg/L for sodium as a level of concern for those consumers that may be restricted for daily sodium intake in their diets (from WAC 246-290-310).

Domestic Well Sampling
Heglar-Kronquist Site

Groundwater Testing Results
Well No. 12

February 13, 2009
17524-00

HARTCROWSER

GROUNDWATER TESTING RESULTS
WELL NO. 12

This report presents a summary of the sampling and analysis activities and a brief review of the data generated from the sampling and analysis of the domestic water supply well on this property on December 12, 2008. The field procedures and the Quality Assurance/Quality Control (QA/QC) measures followed during sample collection, analysis, and data review were defined in the Sampling and Analysis Plan (SAP) prepared for this work (Hart Crowser 2008).

Sampling and Analysis Activities

The well sample from this property was collected from a frost free hydrant next to the wellhead. This sample location is upstream of the household distribution system. The well was purged for a time period estimated to be sufficient to purge at least one system volume from the wellhead to the sample location prior to sampling.

Following purging of the well system, the flow was slowed as needed and directed to a flow-through cell using dedicated Teflon tubing for the collection of field parameters—temperature and electrical conductivity (EC). Sample bottles for laboratory analysis were filled following parameter collection.

Following collection, sample containers were placed in ZipLock™ bags and placed in a cooler in preparation for shipment. Double-bagged ice was placed in the cooler for sample preservation. Copies of the chain of custody forms were placed in a ZipLock™ bag and taped to the inside cover of each cooler. Custody seals were placed on the front and back of the cooler lid and the lid was taped shut. Sample coolers were shipped via UPS overnight express to Columbia Analytical Services (CAS) located in Kelso, Washington.

Water samples were submitted to CAS for the following chemical analyses:

- Fluoride and Chloride (EPA Method 300.0);
- Nitrate and Nitrite (EPA Method 353.2);
- Total Priority Pollutant List metals including aluminum, antimony, arsenic, beryllium, cadmium, chromium, copper, lead, mercury, nickel, potassium, selenium, silver, sodium, thallium, and zinc (EPA Methods 200.7, 200.8, and 245.1);
- Ammonia (EPA Method 350.1); and
- pH (SM 4500-H^+).

Sample Analytical Results

The analytical results were compared to state and federal drinking water standards for primary and secondary contaminants presented in Table 1.

In Washington State, drinking water standards are promulgated by the Environmental Protection Agency (EPA) under the federal Safe Drinking Water Act (SDWA) (40 CFR parts 141 through 149) and by the Washington State Department of Health Water Systems Regulations (Chapters 246-290 through 246-296 WAC).

These drinking water regulations set standards for the highest levels of contaminants permissible in drinking water and are termed Maximum Contaminant Levels (MCLs). The two classes of established MCLs are Primary MCLs and Secondary MCLs. Primary MCLs are enforceable levels for select contaminants where exceedance of the MCLs would cause adverse public health effects. Secondary MCLs are guidelines for select contaminants related to cosmetic effects (such as tooth or skin discoloration) or aesthetic effects (such as taste, odor, or color) of drinking water. The applicable Primary and Secondary MCLs for the constituents tested on this site are presented in Table 1.

For the chemical constituents analyzed for during this event, only ammonia and potassium do not have any MCLs under state or federal standards. Ammonia was not detected in this sample. Potassium is a naturally occurring element present in groundwater and is generally not a health concern.

Constituents tested for at this residence were below the applicable MCLs. A more detailed presentation of the well sampling and analysis program and discussion of the results is provided in the Domestic Wells and Spring Sampling and Analysis, Heglar-Kronquist Site (Hart Crowser 2009).

Definitions

The following definitions will aid the reader in understanding the well sample analytical results:

MCL (Maximum Contaminant Level) is the highest level of a contaminant that is allowed in drinking water.

mg/L or ppm is parts per million (equivalent to one cent in $10,000).

µg/L or ppb is parts per billion (equivalent to one cent in $10,000,000).

Method Detection Limit (MDL). The minimum concentration that can be measured and reported with 99 percent confidence that the concentration is greater than zero, but the exact concentration cannot be reliably quantified. For instance, if the true concentration of an analyte in a sample is equal to the MDL, there is a 50 percent chance that the analyte will be detected.

Reporting Limit (RL). The RL is the lowest concentration at which an analyte can be detected in a sample and its concentration can be reported with a reasonable degree of accuracy and precision.

U Data Qualifier. Analyte was not detected at or above the reported result.

J Data Qualifier. Analyte was positively identified. The reported result is an estimate as quality control criteria were slightly exceeded.

T Data Qualifier. Reported result below the associated reporting limit (RL) but above the Method Detection Limit (MDL).

REFERENCES

Hart Crowser 2008. Sampling and Analysis Plan and Quality Assurance Project Plan, Heglar Kronquist Site, Mead, Washington. December 2008. 17524-00.

Hart Crowser 2009. Domestic Wells and Spring Sampling and Analysis, Heglar-Kronquist Site, Mead, Washington. February 2009. 17524-00.

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Table 1 - Domestic Well Water Sample Analytical Results in Comparison to State and Federal Maximum Contaminant Levels (MCLs) for Primary and Secondary Contaminants

Sample ID Sampling Date	Maximum Contaminant Level (MCL)	Well No. 12 12/12/2008	
Primary MCLs			
Antimony	6	0.05	U
Arsenic	10	0.32	T
Beryllium	4	0.02	U
Cadmium	5	0.02	U
Chromium	100	0.2	U
Copper	**	10	U
Fluoride in mg/L	4 mg/L	0.4	
Lead	**	0.051	
Mercury	2	0.2	U
Nickel	100	0.2	T
Nitrate as N in mg/L	10 mg/L	0.05	U
Selenium	50	1	U
Sodium	**	8150	
Thallium	2	0.02	U
Secondary MCLs			
pH	6.5 to 8.5	6.85	
Aluminum	50 to 200	50	U
Chloride in mg/L	250 mg/L	1.3	
Silver	100	0.02	U
Zinc	5000	110	
Substances with no MCLs			
Potassium	Not Applicable	4390	
Ammonia (NH3) as Nitrogen(N) in mg/L	Not Applicable	0.05	U

All concentrations in ug/L (parts per billion) except as noted.

T = Value is between the method detection limit (MDL) and method reporting limit (MRL).

U = Not detected at reporting limit indicated.

** Although the state board of health has not established MCLs for copper, lead, and sodium, there is sufficient public health significance connected with copper, lead, and sodium levels to require inclusion in inorganic chemical and physical source monitoring. For lead and copper, the EPA has established distribution system related levels at which a system is required to consider corrosion control. These levels, called "action levels," are 0.015 mg/L for lead and 1.3 mg/L for copper and are applied to the highest concentration in ten percent of all samples collected from the distribution system. The EPA has also established a recommended level of twenty mg/L for sodium as a level of concern for those consumers that may be restricted for daily sodium intake in their diets (from WAC 246-290-310).

Domestic Well Sampling
Heglar-Kronquist Site

Groundwater Testing Results
Well No. 13

February 13, 2009
17524-00

HARTCROWSER

GROUNDWATER TESTING RESULTS
WELL NO. 13

This report presents a summary of the sampling and analysis activities and a brief review of the data generated from the sampling and analysis of the domestic water supply well on this property on December 12, 2008. The field procedures and the Quality Assurance/Quality Control (QA/QC) measures followed during sample collection, analysis, and data review were defined in the Sampling and Analysis Plan (SAP) prepared for this work (Hart Crowser 2008).

Sampling and Analysis Activities

The well sample from this property was collected from a spigot located on the deck. This sample location is upstream of the household distribution system. The well was purged for a time period estimated to be sufficient to purge at least one system volume from the wellhead to the sample location prior to sampling.

Following purging of the well system, the flow was slowed as needed and directed to a flow-through cell using dedicated Teflon tubing for the collection of field parameters—temperature and electrical conductivity (EC). Sample bottles for laboratory analysis were filled following parameter collection.

Following collection, sample containers were placed in ZipLock™ bags and placed in a cooler in preparation for shipment. Double-bagged ice was placed in the cooler for sample preservation. Copies of the chain of custody forms were placed in a ZipLock™ bag and taped to the inside cover of each cooler. Custody seals were placed on the front and back of the cooler lid and the lid was taped shut. Sample coolers were shipped via UPS overnight express to Columbia Analytical Services (CAS) located in Kelso, Washington.

Water samples were submitted to CAS for the following chemical analyses:

- Fluoride and Chloride (EPA Method 300.0);
- Nitrate and Nitrite (EPA Method 353.2);
- Total Priority Pollutant List metals including aluminum, antimony, arsenic, beryllium, cadmium, chromium, copper, lead, mercury, nickel, potassium, selenium, silver, sodium, thallium, and zinc (EPA Methods 200.7, 200.8, and 245.1);
- Ammonia (EPA Method 350.1); and
- pH (SM 4500-H^+).

Sample Analytical Results

The analytical results were compared to state and federal drinking water standards for primary and secondary contaminants presented in Table 1.

In Washington State, drinking water standards are promulgated by the Environmental Protection Agency (EPA) under the federal Safe Drinking Water Act (SDWA) (40 CFR parts 141 through 149) and by the Washington State Department of Health Water Systems Regulations (Chapters 246-290 through 246-296 WAC).

These drinking water regulations set standards for the highest levels of contaminants permissible in drinking water and are termed Maximum Contaminant Levels (MCLs). The two classes of established MCLs are Primary MCLs and Secondary MCLs. Primary MCLs are enforceable levels for select contaminants where exceedance of the MCLs would cause adverse public health effects. Secondary MCLs are guidelines for select contaminants related to cosmetic effects (such as tooth or skin discoloration) or aesthetic effects (such as taste, odor, or color) of drinking water. The applicable Primary and Secondary MCLs for the constituents tested on this site are presented in Table 1.

For the chemical constituents analyzed for during this event, only ammonia and potassium do not have any MCLs under state or federal standards. Ammonia was not detected in this sample. Potassium is a naturally occurring element present in groundwater and is generally not a health concern.

Constituents tested for at this residence were below the applicable MCLs. A more detailed presentation of the well sampling and analysis program and discussion of the results is provided in the Domestic Wells and Spring Sampling and Analysis, Heglar-Kronquist Site (Hart Crowser 2009).

Definitions

The following definitions will aid the reader in understanding the well sample analytical results:

MCL (Maximum Contaminant Level) is the highest level of a contaminant that is allowed in drinking water.

mg/L or ppm is parts per million (equivalent to one cent in $10,000).

µg/L or ppb is parts per billion (equivalent to one cent in $10,000,000).

Method Detection Limit (MDL). The minimum concentration that can be measured and reported with 99 percent confidence that the concentration is greater than zero, but the exact concentration cannot be reliably quantified. For instance, if the true concentration of an analyte in a sample is equal to the MDL, there is a 50 percent chance that the analyte will be detected.

Reporting Limit (RL). The RL is the lowest concentration at which an analyte can be detected in a sample and its concentration can be reported with a reasonable degree of accuracy and precision.

U Data Qualifier. Analyte was not detected at or above the reported result.

J Data Qualifier. Analyte was positively identified. The reported result is an estimate as quality control criteria were slightly exceeded.

T Data Qualifier. Reported result below the associated reporting limit (RL) but above the Method Detection Limit (MDL).

REFERENCES

Hart Crowser 2008. Sampling and Analysis Plan and Quality Assurance Project Plan, Heglar Kronquist Site, Mead, Washington. December 2008. 17524-00.

Hart Crowser 2009. Domestic Wells and Spring Sampling and Analysis, Heglar-Kronquist Site, Mead, Washington. February 2009. 17524-00.

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Table 1 - Domestic Well Water Sample Analytical Results in Comparison to State and Federal Maximum Contaminant Levels (MCLs) for Primary and Secondary Contaminants

Sample ID Sampling Date	Maximum Contaminant Level (MCL)	Well No. 13 12/12/2008	
Primary MCLs			
Antimony	6	0.05	U
Arsenic	10	0.21	T
Beryllium	4	0.02	U
Cadmium	5	0.02	U
Chromium	100	0.2	U
Copper	**	20.7	
Fluoride in mg/L	4 mg/L	0.4	
Lead	**	0.045	
Mercury	2	0.2	U
Nickel	100	0.39	
Nitrate as N in mg/L	10 mg/L	0.05	U
Selenium	50	1	U
Sodium	**	11100	
Thallium	2	0.02	U
Secondary MCLs			
pH	6.5 to 8.5	6.95	
Aluminum	50 to 200	50	U
Chloride in mg/L	250 mg/L	1.8	
Silver	100	0.02	U
Zinc	5000	5.4	T
Substances with no MCLs			
Potassium	Not Applicable	5370	
Ammonia (NH3) as Nitrogen(N) in mg/L	Not Applicable	0.05	U

All concentrations in ug/L (parts per billion) except as noted.
T = Value is between the method detection limit (MDL) and method reporting limit (MRL).
U = Not detected at reporting limit indicated.

** Although the state board of health has not established MCLs for copper, lead, and sodium, there is sufficient public health significance connected with copper, lead, and sodium levels to require inclusion in inorganic chemical and physical source monitoring. For lead and copper, the EPA has established distribution system related levels at which a system is required to consider corrosion control. These levels, called "action levels," are 0.015 mg/L for lead and 1.3 mg/L for copper and are applied to the highest concentration in ten percent of all samples collected from the distribution system. The EPA has also established a recommended level of twenty mg/L for sodium as a level of concern for those consumers that may be restricted for daily sodium intake in their diets (from WAC 246-290-310).

Domestic Well Sampling
Heglar-Kronquist Site

Groundwater Testing Results
Well No. 14

February 13, 2009
17524-00

HARTCROWSER

GROUNDWATER TESTING RESULTS
WELL NO. 14

This report presents a summary of the sampling and analysis activities and a brief review of the data generated from the sampling and analysis of the domestic water supply well on this property on December 12, 2008. The field procedures and the Quality Assurance/Quality Control (QA/QC) measures followed during sample collection, analysis, and data review were defined in the Sampling and Analysis Plan (SAP) prepared for this work (Hart Crowser 2008).

Sampling and Analysis Activities

The well sample from this property was collected from a frost free hydrant next to the wellhead. This sample location is upstream of the household distribution system. The well was purged for a time period estimated to be sufficient to purge at least one system volume from the wellhead to the sample location prior to sampling.

Following purging of the well system, the flow was slowed as needed and directed to a flow-through cell using dedicated Teflon tubing for the collection of field parameters—temperature and electrical conductivity (EC). Sample bottles for laboratory analysis were filled following parameter collection.

Following collection, sample containers were placed in ZipLock™ bags and placed in a cooler in preparation for shipment. Double-bagged ice was placed in the cooler for sample preservation. Copies of the chain of custody forms were placed in a ZipLock™ bag and taped to the inside cover of each cooler. Custody seals were placed on the front and back of the cooler lid and the lid was taped shut. Sample coolers were shipped via UPS overnight express to Columbia Analytical Services (CAS) located in Kelso, Washington.

Water samples were submitted to CAS for the following chemical analyses:

- Fluoride and Chloride (EPA Method 300.0);
- Nitrate and Nitrite (EPA Method 353.2);
- Total Priority Pollutant List metals including aluminum, antimony, arsenic, beryllium, cadmium, chromium, copper, lead, mercury, nickel, potassium, selenium, silver, sodium, thallium, and zinc (EPA Methods 200.7, 200.8, and 245.1);
- Ammonia (EPA Method 350.1); and
- pH (SM 4500-H^+).

Sample Analytical Results

The analytical results were compared to state and federal drinking water standards for primary and secondary contaminants presented in Table 1.

In Washington State, drinking water standards are promulgated by the Environmental Protection Agency (EPA) under the federal Safe Drinking Water Act (SDWA) (40 CFR parts 141 through 149) and by the Washington State Department of Health Water Systems Regulations (Chapters 246-290 through 246-296 WAC).

These drinking water regulations set standards for the highest levels of contaminants permissible in drinking water and are termed Maximum Contaminant Levels (MCLs). The two classes of established MCLs are Primary MCLs and Secondary MCLs. Primary MCLs are enforceable levels for select contaminants where exceedance of the MCLs would cause adverse public health effects. Secondary MCLs are guidelines for select contaminants related to cosmetic effects (such as tooth or skin discoloration) or aesthetic effects (such as taste, odor, or color) of drinking water. The applicable Primary and Secondary MCLs for the constituents tested on this site are presented in Table 1.

For the chemical constituents analyzed for during this event, only ammonia and potassium do not have any MCLs under state or federal standards. Ammonia was not detected in this sample. Potassium is a naturally occurring element present in groundwater and is generally not a health concern.

Constituents tested for at this residence were below the applicable MCLs. A more detailed presentation of the well sampling and analysis program and discussion of the results is provided in the Domestic Wells and Spring Sampling and Analysis, Heglar-Kronquist Site (Hart Crowser 2009).

Definitions

The following definitions will aid the reader in understanding the well sample analytical results:

MCL (Maximum Contaminant Level) is the highest level of a contaminant that is allowed in drinking water.

mg/L or ppm is parts per million (equivalent to one cent in $10,000).

µg/L or ppb is parts per billion (equivalent to one cent in $10,000,000).

Method Detection Limit (MDL). The minimum concentration that can be measured and reported with 99 percent confidence that the concentration is greater than zero, but the exact concentration cannot be reliably quantified. For instance, if the true concentration of an analyte in a sample is equal to the MDL, there is a 50 percent chance that the analyte will be detected.

Reporting Limit (RL). The RL is the lowest concentration at which an analyte can be detected in a sample and its concentration can be reported with a reasonable degree of accuracy and precision.

U Data Qualifier. Analyte was not detected at or above the reported result.

J Data Qualifier. Analyte was positively identified. The reported result is an estimate as quality control criteria were slightly exceeded.

T Data Qualifier. Reported result below the associated reporting limit (RL) but above the Method Detection Limit (MDL).

REFERENCES

Hart Crowser 2008. Sampling and Analysis Plan and Quality Assurance Project Plan, Heglar Kronquist Site, Mead, Washington. December 2008. 17524-00.

Hart Crowser 2009. Domestic Wells and Spring Sampling and Analysis, Heglar-Kronquist Site, Mead, Washington. February 2009. 17524-00.

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Table 1 - Domestic Well Water Sample Analytical Results in Comparison to State and Federal Maximum Contaminant Levels (MCLs) for Primary and Secondary Contaminants

Sample ID Sampling Date	Maximum Contaminant Level (MCL)	Well No. 14 12/12/2008	
Primary MCLs			
Antimony	6	0.082	
Arsenic	10	2.4	
Beryllium	4	0.02	U
Cadmium	5	0.034	
Chromium	100	1.49	
Copper	**	10	U
Fluoride in mg/L	4 mg/L	0.2	
Lead	**	2.49	
Mercury	2	0.2	U
Nickel	100	0.81	
Nitrate as N in mg/L	10 mg/L	6.77	
Selenium	50	0.9	T
Sodium	**	13400	
Thallium	2	0.02	U
Secondary MCLs			
pH	6.5 to 8.5	7.5	
Aluminum	50 to 200	50	U
Chloride in mg/L	250 mg/L	1.6	
Silver	100	0.02	U
Zinc	5000	573	
Substances with no MCLs			
Potassium	Not Applicable	6040	
Ammonia (NH3) as Nitrogen(N) in mg/L	Not Applicable	0.05	U

All concentrations in ug/L (parts per billion) except as noted.
T = Value is between the method detection limit (MDL) and method reporting limit (MRL).
U = Not detected at reporting limit indicated.

** Although the state board of health has not established MCLs for copper, lead, and sodium, there is sufficient public health significance connected with copper, lead, and sodium levels to require inclusion in inorganic chemical and physical source monitoring. For lead and copper, the EPA has established distribution system related levels at which a system is required to consider corrosion control. These levels, called "action levels," are 0.015 mg/L for lead and 1.3 mg/L for copper and are applied to the highest concentration in ten percent of all samples collected from the distribution system. The EPA has also established a recommended level of twenty mg/L for sodium as a level of concern for those consumers that may be restricted for daily sodium intake in their diets (from WAC 246-290-310).

Domestic Well Sampling
Heglar-Kronquist Site

Groundwater Testing Results
Well No. 15

February 13, 2009
17524-00

HARTCROWSER

GROUNDWATER TESTING RESULTS
WELL NO. 15

This report presents a summary of the sampling and analysis activities and a brief review of the data generated from the sampling and analysis of the domestic water supply well on this property on December 12, 2008. The field procedures and the Quality Assurance/Quality Control (QA/QC) measures followed during sample collection, analysis, and data review were defined in the Sampling and Analysis Plan (SAP) prepared for this work (Hart Crowser 2008).

Sampling and Analysis Activities

The well sample from this property was collected from a frost free hydrant next to the wellhead. This sample location is upstream of the household distribution system. The well was purged for a time period estimated to be sufficient to purge at least one system volume from the wellhead to the sample location prior to sampling.

Following purging of the well system, the flow was slowed as needed and directed to a flow-through cell using dedicated Teflon tubing for the collection of field parameters—temperature and electrical conductivity (EC). Sample bottles for laboratory analysis were filled following parameter collection.

Following collection, sample containers were placed in ZipLock™ bags and placed in a cooler in preparation for shipment. Double-bagged ice was placed in the cooler for sample preservation. Copies of the chain of custody forms were placed in a ZipLock™ bag and taped to the inside cover of each cooler. Custody seals were placed on the front and back of the cooler lid and the lid was taped shut. Sample coolers were shipped via UPS overnight express to Columbia Analytical Services (CAS) located in Kelso, Washington.

Water samples were submitted to CAS for the following chemical analyses:

- Fluoride and Chloride (EPA Method 300.0);
- Nitrate and Nitrite (EPA Method 353.2);
- Total Priority Pollutant List metals including aluminum, antimony, arsenic, beryllium, cadmium, chromium, copper, lead, mercury, nickel, potassium, selenium, silver, sodium, thallium, and zinc (EPA Methods 200.7, 200.8, and 245.1);
- Ammonia (EPA Method 350.1); and
- pH (SM 4500-H^+).

Sample Analytical Results

The analytical results were compared to state and federal drinking water standards for primary and secondary contaminants presented in Table 1.

In Washington State, drinking water standards are promulgated by the Environmental Protection Agency (EPA) under the federal Safe Drinking Water Act (SDWA) (40 CFR parts 141 through 149) and by the Washington State Department of Health Water Systems Regulations (Chapters 246-290 through 246-296 WAC).

These drinking water regulations set standards for the highest levels of contaminants permissible in drinking water and are termed Maximum Contaminant Levels (MCLs). The two classes of established MCLs are Primary MCLs and Secondary MCLs. Primary MCLs are enforceable levels for select contaminants where exceedance of the MCLs would cause adverse public health effects. Secondary MCLs are guidelines for select contaminants related to cosmetic effects (such as tooth or skin discoloration) or aesthetic effects (such as taste, odor, or color) of drinking water. The applicable Primary and Secondary MCLs for the constituents tested on this site are presented in Table 1.

For the chemical constituents analyzed for during this event, only ammonia and potassium do not have any MCLs under state or federal standards. Ammonia was not detected in this sample. Potassium is a naturally occurring element present in groundwater and is generally not a health concern.

Constituents tested for at this residence were below the applicable MCLs. A more detailed presentation of the well sampling and analysis program and discussion of the results is provided in the Domestic Wells and Spring Sampling and Analysis, Heglar-Kronquist Site (Hart Crowser 2009).

Definitions

The following definitions will aid the reader in understanding the well sample analytical results:

MCL (Maximum Contaminant Level) is the highest level of a contaminant that is allowed in drinking water.

mg/L or ppm is parts per million (equivalent to one cent in $10,000).

µg/L or ppb is parts per billion (equivalent to one cent in $10,000,000).

Method Detection Limit (MDL). The minimum concentration that can be measured and reported with 99 percent confidence that the concentration is greater than zero, but the exact concentration cannot be reliably quantified. For instance, if the true concentration of an analyte in a sample is equal to the MDL, there is a 50 percent chance that the analyte will be detected.

Reporting Limit (RL). The RL is the lowest concentration at which an analyte can be detected in a sample and its concentration can be reported with a reasonable degree of accuracy and precision.

U Data Qualifier. Analyte was not detected at or above the reported result.

J Data Qualifier. Analyte was positively identified. The reported result is an estimate as quality control criteria were slightly exceeded.

T Data Qualifier. Reported result below the associated reporting limit (RL) but above the Method Detection Limit (MDL).

REFERENCES

Hart Crowser 2008. Sampling and Analysis Plan and Quality Assurance Project Plan, Heglar Kronquist Site, Mead, Washington. December 2008. 17524-00.

Hart Crowser 2009. Domestic Wells and Spring Sampling and Analysis, Heglar-Kronquist Site, Mead, Washington. February 2009. 17524-00.

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Table 1 - Domestic Well Water Sample Analytical Results in Comparison to State and Federal Maximum Contaminant Levels (MCLs) for Primary and Secondary Contaminants

Sample ID Sampling Date	Maximum Contaminant Level (MCL)	Well No. 15 12/12/2008		Kronquist Rd Site 9 12/12/2008 Dup of Well No. 15	
Primary MCLs					
Antimony	6	0.007	T	0.008	T
Arsenic	10	0.23	T	0.25	T
Beryllium	4	0.02	U	0.02	U
Cadmium	5	0.009	T	0.014	T
Chromium	100	0.2	U	0.2	U
Copper	**	7.2	T	6.7	T
Fluoride in mg/L	4 mg/L	0.4		0.4	
Lead	**	0.159		0.256	
Mercury	2	0.2	U	0.2	U
Nickel	100	0.23		0.28	
Nitrate as N in mg/L	10 mg/L	0.05	U	0.05	UJ
Selenium	50	1	U	1	U
Sodium	**	8800		8540	
Thallium	2	0.02	U	0.02	U
Secondary MCLs					
pH	6.5 to 8.5	6.81		6.64	
Aluminum	50 to 200	50	U	50	U
Chloride in mg/L	250 mg/L	2		1.9	
Silver	100	0.02	U	0.02	U
Zinc	5000	115		118	
Substances with no MCLs					
Potassium	Not Applicable	4520		4480	
Ammonia (NH3) as Nitrogen(N) in mg/L	Not Applicable	0.05	U	0.05	U

All concentrations in ug/L (parts per billion) except as noted.
T = Value is between the method detection limit (MDL) and method reporting limit (MRL).
U = Not detected at reporting limit indicated.
** Although the state board of health has not established MCLs for copper, lead, and sodium, there is sufficient public health significance connected with copper, lead, and sodium levels to require inclusion in inorganic chemical and physical source monitoring. For lead and copper, the EPA has established distribution system related levels at which a system is required to consider corrosion control. These levels, called "action levels," are 0.015 mg/L for lead and 1.3 mg/L for copper and are applied to the highest concentration in ten percent of all samples collected from the distribution system. The EPA has also established a recommended level of twenty mg/L for sodium as a level of concern for those consumers that may be restricted for daily sodium intake in their diets (from WAC 246-290-310).

Domestic Well Sampling
Heglar-Kronquist Site

Groundwater Testing Results
Well No. 16

February 13, 2009
17524-00

HARTCROWSER

GROUNDWATER TESTING RESULTS
WELL NO. 16

This report presents a summary of the sampling and analysis activities and a brief review of the data generated from the sampling and analysis of the domestic water supply well on this property on December 12, 2008. The field procedures and the Quality Assurance/Quality Control (QA/QC) measures followed during sample collection, analysis, and data review were defined in the Sampling and Analysis Plan (SAP) prepared for this work (Hart Crowser 2008).

Sampling and Analysis Activities

The well sample from this property was collected from a frost free hydrant next to the wellhead. This sample location is upstream of the household distribution system. The well was purged for a time period estimated to be sufficient to purge at least one system volume from the wellhead to the sample location prior to sampling.

Following purging of the well system, the flow was slowed as needed and directed to a flow-through cell using dedicated Teflon tubing for the collection of field parameters—temperature and electrical conductivity (EC). Sample bottles for laboratory analysis were filled following parameter collection.

Following collection, sample containers were placed in ZipLock™ bags and placed in a cooler in preparation for shipment. Double-bagged ice was placed in the cooler for sample preservation. Copies of the chain of custody forms were placed in a ZipLock™ bag and taped to the inside cover of each cooler. Custody seals were placed on the front and back of the cooler lid and the lid was taped shut. Sample coolers were shipped via UPS overnight express to Columbia Analytical Services (CAS) located in Kelso, Washington.

Water samples were submitted to CAS for the following chemical analyses:

- Fluoride and Chloride (EPA Method 300.0);
- Nitrate and Nitrite (EPA Method 353.2);
- Total Priority Pollutant List metals including aluminum, antimony, arsenic, beryllium, cadmium, chromium, copper, lead, mercury, nickel, potassium, selenium, silver, sodium, thallium, and zinc (EPA Methods 200.7, 200.8, and 245.1);
- Ammonia (EPA Method 350.1); and
- pH (SM 4500-H^+).

Sample Analytical Results

The analytical results were compared to state and federal drinking water standards for primary and secondary contaminants presented in Table 1.

In Washington State, drinking water standards are promulgated by the Environmental Protection Agency (EPA) under the federal Safe Drinking Water Act (SDWA) (40 CFR parts 141 through 149) and by the Washington State Department of Health Water Systems Regulations (Chapters 246-290 through 246-296 WAC).

These drinking water regulations set standards for the highest levels of contaminants permissible in drinking water and are termed Maximum Contaminant Levels (MCLs). The two classes of established MCLs are Primary MCLs and Secondary MCLs. Primary MCLs are enforceable levels for select contaminants where exceedance of the MCLs would cause adverse public health effects. Secondary MCLs are guidelines for select contaminants related to cosmetic effects (such as tooth or skin discoloration) or aesthetic effects (such as taste, odor, or color) of drinking water. The applicable Primary and Secondary MCLs for the constituents tested on this site are presented in Table 1.

For the chemical constituents analyzed for during this event, only ammonia and potassium do not have any MCLs under state or federal standards. Ammonia was not detected in this sample. Potassium is a naturally occurring element present in groundwater and is generally not a health concern.

Constituents tested for at this residence were below the applicable MCLs with the exception of nitrate. The concentration of nitrate in Well No. 16 was 13.5 mg/L, compared to the Primary MCL for nitrate of 10 mg/L. A more detailed presentation of the well sampling and analysis program and discussion of the results is provided in the Domestic Wells and Spring Sampling and Analysis, Heglar-Kronquist Site (Hart Crowser 2009).

Definitions

The following definitions will aid the reader in understanding the well sample analytical results:

MCL (Maximum Contaminant Level) is the highest level of a contaminant that is allowed in drinking water.

mg/L or ppm is parts per million (equivalent to one cent in $10,000).

µg/L or ppb is parts per billion (equivalent to one cent in $10,000,000).

Method Detection Limit (MDL). The minimum concentration that can be measured and reported with 99 percent confidence that the concentration is greater than zero, but the exact concentration cannot be reliably quantified. For instance, if the true concentration of an analyte in a sample is equal to the MDL, there is a 50 percent chance that the analyte will be detected.

Reporting Limit (RL). The RL is the lowest concentration at which an analyte can be detected in a sample and its concentration can be reported with a reasonable degree of accuracy and precision.

U Data Qualifier. Analyte was not detected at or above the reported result.

J Data Qualifier. Analyte was positively identified. The reported result is an estimate as quality control criteria were slightly exceeded.

T Data Qualifier. Reported result below the associated reporting limit (RL) but above the Method Detection Limit (MDL).

REFERENCES

Hart Crowser 2008. Sampling and Analysis Plan and Quality Assurance Project Plan, Heglar Kronquist Site, Mead, Washington. December 2008. 17524-00.

Hart Crowser 2009. Domestic Wells and Spring Sampling and Analysis, Heglar-Kronquist Site, Mead, Washington. February 2009. 17524-00.

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Table 1 - Domestic Well Water Sample Analytical Results in Comparison to State and Federal Maximum Contaminant Levels (MCLs) for Primary and Secondary Contaminants

Sample ID Sampling Date	Maximum Contaminant Level (MCL)	Well No. 16 12/12/2008	
Primary MCLs			
Antimony	6	0.064	
Arsenic	10	1.1	
Beryllium	4	0.02	U
Cadmium	5	0.034	
Chromium	100	1.03	
Copper	**	4.1	T
Fluoride in mg/L	4 mg/L	0.5	
Lead	**	0.442	
Mercury	2	0.2	U
Nickel	100	1.07	
Nitrate as N in mg/L	10 mg/L	13.5	
Selenium	50	0.8	T
Sodium	**	35500	
Thallium	2	0.004	T
Secondary MCLs			
pH	6.5 to 8.5	7.41	
Aluminum	50 to 200	50	U
Chloride in mg/L	250 mg/L	19.3	
Silver	100	0.011	T
Zinc	5000	43	
Substances with no MCLs			
Potassium	Not Applicable	3930	
Ammonia (NH3) as Nitrogen(N) in mg/L	Not Applicable	0.05	U

All concentrations in ug/L (parts per billion) except as noted.
T = Value is between the method detection limit (MDL) and method reporting limit (MRL).
U = Not detected at reporting limit indicated.

** Although the state board of health has not established MCLs for copper, lead, and sodium, there is sufficient public health significance connected with copper, lead, and sodium levels to require inclusion in inorganic chemical and physical source monitoring. For lead and copper, the EPA has established distribution system related levels at which a system is required to consider corrosion control. These levels, called "action levels," are 0.015 mg/L for lead and 1.3 mg/L for copper and are applied to the highest concentration in ten percent of all samples collected from the distribution system. The EPA has also established a recommended level of twenty mg/L for sodium as a level of concern for those consumers that may be restricted for daily sodium intake in their diets (from WAC 246-290-310).

Domestic Well Sampling
Heglar-Kronquist Site

Groundwater Testing Results
Heglar Spring

February 13, 2009
17524-00

HARTCROWSER

GROUNDWATER TESTING RESULTS
HEGLAR SPRING

This report presents a summary of the sampling and analysis activities and a brief review of the data generated from the sampling and analysis of the spring on this property on January 22, 2009. The field procedures and the Quality Assurance/Quality Control (QA/QC) measures followed during sample collection, analysis, and data review were defined in the Sampling and Analysis Plan (SAP) prepared for this work (Hart Crowser 2008).

Sampling and Analysis Activities

The sample at this location was collected from the discharge of the spring impoundment adjacent to the roadside approximately 1,000 feet south-southwest of the landfill. The spring impoundment is a man-made feature assumed to be intended to provide a source of water for livestock or other non-potable uses. The sample was collected from the water that is discharging through a corrugated pipe, which drains the overflow from the spring impoundment to a roadside ditch.

The spring sample was collected with a peristaltic pump using dedicated Teflon tubing. The inlet line to the pump was inserted into the flow of water discharging from a culvert at the outlet of the spring impoundment. The water flow was directed to the flow through cell for field parameter reading of temperature, EC, and pH. Sample bottles for laboratory analysis were then filled following parameter collection.

Following collection, sample containers were placed in ZipLock™ bags and placed in a cooler in preparation for shipment. Double-bagged ice was placed in the cooler for sample preservation. Copies of the chain of custody forms were placed in a ZipLock™ bag and taped to the inside cover of each cooler. Custody seals were placed on the front and back of the cooler lid and the lid was taped shut. Sample coolers were shipped via UPS overnight express to Columbia Analytical Services (CAS) located in Kelso, Washington.

Water samples were submitted to CAS for the following chemical analyses:

- Fluoride and Chloride (EPA Method 300.0);
- Nitrate and Nitrite (EPA Method 353.2);
- Total Priority Pollutant List metals including aluminum, antimony, arsenic, beryllium, cadmium, chromium, copper, lead, mercury, nickel, potassium, selenium, silver, sodium, thallium, and zinc (EPA Methods 200.7, 200.8, and 245.1);

- Ammonia (EPA Method 350.1); and
- pH (SM 4500-H^+).

Sample Analytical Results

The analytical results were compared to state and federal drinking water standards for primary and secondary contaminants presented in Table 1.

In Washington State, drinking water standards are promulgated by the Environmental Protection Agency (EPA) under the federal Safe Drinking Water Act (SDWA) (40 CFR parts 141 through 149) and by the Washington State Department of Health Water Systems Regulations (Chapters 246-290 through 246-296 WAC).

These drinking water regulations set standards for the highest levels of contaminants permissible in drinking water and are termed Maximum Contaminant Levels (MCLs). The two classes of established MCLs are Primary MCLs and Secondary MCLs. Primary MCLs are enforceable levels for select contaminants where exceedance of the MCLs would cause adverse public health effects. Secondary MCLs are guidelines for select contaminants related to cosmetic effects (such as tooth or skin discoloration) or aesthetic effects (such as taste, odor, or color) of drinking water. The applicable Primary and Secondary MCLs for the constituents tested on this site are presented in Table 1.

For the chemical constituents analyzed for during this event, only ammonia and potassium do not have any MCLs under state or federal standards. Ammonia was not detected in this sample. Potassium is a naturally occurring element present in groundwater and is generally not a health concern.

Constituents tested for at this spring were below the applicable MCLs with the exception of nitrate. The concentration of nitrate in the Heglar Spring sample was 15.9 mg/L, compared to the Primary MCL for nitrate of 10 mg/L. A more detailed presentation of the well sampling and analysis program and discussion of the results is provided in the Domestic Wells and Spring Sampling and Analysis, Heglar-Kronquist Site (Hart Crowser 2009).

Definitions

The following definitions will aid the reader in understanding the well sample analytical results:

MCL (Maximum Contaminant Level) is the highest level of a contaminant that is allowed in drinking water.

mg/L or ppm is parts per million (equivalent to one cent in $10,000).

µg/L or ppb is parts per billion (equivalent to one cent in $10,000,000).

Method Detection Limit (MDL). The minimum concentration that can be measured and reported with 99 percent confidence that the concentration is greater than zero, but the exact concentration cannot be reliably quantified. For instance, if the true concentration of an analyte in a sample is equal to the MDL, there is a 50 percent chance that the analyte will be detected.

Reporting Limit (RL). The RL is the lowest concentration at which an analyte can be detected in a sample and its concentration can be reported with a reasonable degree of accuracy and precision.

U Data Qualifier. Analyte was not detected at or above the reported result.

J Data Qualifier. Analyte was positively identified. The reported result is an estimate as quality control criteria were slightly exceeded.

T Data Qualifier. Reported result below the associated reporting limit (RL) but above the Method Detection Limit (MDL).

REFERENCES

Hart Crowser 2008. Sampling and Analysis Plan and Quality Assurance Project Plan, Heglar Kronquist Site, Mead, Washington. December 2008. 17524-00.

Hart Crowser 2009. Domestic Wells and Spring Sampling and Analysis, Heglar-Kronquist Site, Mead, Washington. February 2009. 17524-00.

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Table 1 - Domestic Well Water Sample Analytical Results in Comparison to State and Federal Maximum Contaminant Levels (MCLs) for Primary and Secondary Contaminants

Sample ID Sampling Date	Maximum Contaminant Level (MCL)	Heglar Spring 1/22/2009	
Primary MCLs			
Antimony	6	0.074	
Arsenic	10	2	
Beryllium	4	0.02	U
Cadmium	5	0.005	B
Chromium	100	5	U
Copper	**	0.65	
Fluoride in mg/L	4 mg/L	0.3	
Lead	**	0.014	B
Mercury	2	0.2	U
Nickel	100	20	U
Nitrate in mg/L	10 mg/L	15.9	
Nitrite in mg/L	1 mg/L	0.023	T
Selenium	50	0.9	B
Sodium	**	106000	
Thallium	2	0.009	B
Secondary MCLs			
pH	6.5 to 8.5		
Aluminum	50 to 200	8.8	
Chloride in mg/L	250 mg/L	242	
Silver	100	10	U
Zinc	5000	3.1	B
Substances with no MCLs			
Potassium	Not Applicable	10900	
Ammonia (NH3) as Nitrogen(N) in mg/L	Not Applicable	0.08	

All concentrations in ug/L (parts per billion) except as noted.
T = Value is between the method detection limit (MDL) and method reporting limit (MRL).
U = Not detected at reporting limit indicated.
** Although the state board of health has not established MCLs for copper, lead, and sodium, there is sufficient public health significance connected with copper, lead, and sodium levels to require inclusion in inorganic chemical and physical source monitoring. For lead and copper, the EPA has established distribution system related levels at which a system is required to consider corrosion control. These levels, called "action levels," are 0.015 mg/L for lead and 1.3 mg/L for copper and are applied to the highest concentration in ten percent of all samples collected from the distribution system. The EPA has also established a recommended level of twenty mg/L for sodium as a level of concern for those consumers that may be restricted for daily sodium intake in their diets (from WAC 246-290-310).