CITY OF OLYMPIA

Coliform Monitoring Plan

ID Number 634506

December 2014
System Information

The City of Olympia water system, ID# 634506, located in Thurston County, obtains 77 percent of its supply from McAllister Wellfield (S16) and uses up to six wells for additional supply in the summer months. There are seven pressure zones, nine booster stations, 10 pressure reducing valves (PRVs), 11 storage tanks and source treatment, which includes both disinfection and corrosion control. Table 1 provides an inventory of the utility’s sources, treatments, and their capacities.

Table 1 – Sources, Capacities, and Treatments

<table>
<thead>
<tr>
<th>Source</th>
<th>DOH Source Number</th>
<th>Type of Treatment</th>
<th>Maximum Capacity*</th>
<th>Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>McAllister Wellfield</td>
<td>S16</td>
<td>Gas chlorination</td>
<td>18,100 gpm</td>
<td>Permanent</td>
</tr>
<tr>
<td>Kaiser Well #1</td>
<td>S03</td>
<td>Gas chlorination</td>
<td>360 gpm</td>
<td>Emergency</td>
</tr>
<tr>
<td>Hoffman</td>
<td>S08</td>
<td>None</td>
<td>1,000 gpm</td>
<td>Seasonal</td>
</tr>
<tr>
<td>Allison Springs #13</td>
<td>S09</td>
<td>Gas chlorination and corrosion control (aeration)</td>
<td>650 gpm</td>
<td>Permanent</td>
</tr>
<tr>
<td>Shana Park #11</td>
<td>S10</td>
<td>Gas chlorination and corrosion control (aeration)</td>
<td>1,000 gpm</td>
<td>Permanent</td>
</tr>
<tr>
<td>Allison Springs #19</td>
<td>S11</td>
<td>Gas chlorination and corrosion control (aeration)</td>
<td>900 gpm</td>
<td>Permanent</td>
</tr>
<tr>
<td>Indian Summer #20</td>
<td>S12</td>
<td>On-site generation</td>
<td>850 gpm</td>
<td>Permanent</td>
</tr>
</tbody>
</table>

*Data source: 2015-2020 Water System Plan. Reflects water right, installed pump capacity could be less.

McAllister Wellfield and Allison Springs Well #13 and Well #19, are the primary groundwater source used throughout the year, depending on the water use demand. Additional groundwater sources including Shana Park Well #11 and Indian Summer Well #20 are brought online as demand increases during the spring and summer months. The number of metered service connections is 19,699 serving a population of approximately 62,000. Currently the City is required to take 70 routine coliform samples per month. Table 2 indicates the sources, storage, locations, and pressure zones of the water system.

Table 2 – Sources, Storage Locations, and Pressure Zones Served

<table>
<thead>
<tr>
<th>Facility Name</th>
<th>Physical Address</th>
<th>Pressure Zones Served</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allison Springs Well #13</td>
<td>205 Delphi Road SE</td>
<td>298</td>
</tr>
<tr>
<td>Allison Springs Well #19</td>
<td>205 Delphi Road SE</td>
<td>298</td>
</tr>
<tr>
<td>Boulevard Storage Tank</td>
<td>147 Boulevard Road SE</td>
<td>338</td>
</tr>
<tr>
<td>Bush Street Storage Tank</td>
<td>2618 Bush Street NW</td>
<td>298</td>
</tr>
<tr>
<td>Eastside Storage Tank</td>
<td>700 Fir Street NE</td>
<td>347</td>
</tr>
<tr>
<td>Elliot Storage Tank</td>
<td>3700 20th Street NW</td>
<td>298</td>
</tr>
<tr>
<td>Elliot Storage Tank (standpipe)</td>
<td>3700 20th Street NW</td>
<td>298 and 380</td>
</tr>
<tr>
<td>Fir Street Storage Tank - North</td>
<td>700 Fir Street SE</td>
<td>226, 298, 347, and 380</td>
</tr>
<tr>
<td>Fir Street Storage Tank – South</td>
<td>700 Fir Street SE</td>
<td>226, 298, 347, and 380</td>
</tr>
<tr>
<td>Hoffman Well and Storage Tank</td>
<td>3920 Hoffman CT SE</td>
<td>338 and 417</td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th>Facility Name</th>
<th>Physical Address</th>
<th>Pressure Zones Served</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indian Summer Well #20</td>
<td>3830 Prestwick Lane SE</td>
<td>338 and 417</td>
</tr>
<tr>
<td>Kaiser Road Well #1</td>
<td>812 Kaiser Road NW</td>
<td>298</td>
</tr>
<tr>
<td>Meridian Storage Tank #1</td>
<td>9621 Pacific Avenue SE</td>
<td>226, 264, 298, 338, 347, 380, and 417</td>
</tr>
<tr>
<td>Meridian Storage Tank #2</td>
<td>9621 Pacific Avenue SE</td>
<td>226, 264, 298, 338, 347, 380, and 417</td>
</tr>
<tr>
<td>Shana Park Well #11</td>
<td>5625 Normandy Drive SE</td>
<td>338 and 417</td>
</tr>
<tr>
<td>Stevens Field Storage Tank</td>
<td>2400 South Washington SE</td>
<td>264</td>
</tr>
</tbody>
</table>

The water storage capacity is 30.88 million gallons in 11 storage tanks. There are nine booster stations which supply water and uniform system pressure to all our pressure zones. These booster stations are: Fones Road, South Sound, West Bay, Elliot, Eastside, Shana Park Corrosion, Allison Springs Corrosion, Goldcrest, and Percival. At the far end of the 417 pressure zone there are five pressure reducing valves set to reduce the pressure from 80 pounds per square inch (PSI) to 65 psi. The west side of the 380 zone has four pressure reducing valves (PRVs) to reduce the pressure as the terrain drops in elevation to near sea level.

The 2015 – 2020 Water System Plan provides detailed information on the system’s operational, technical, managerial, and financial capability to achieve and maintain compliance with relevant local, state, and federal plans and regulations.

**Treatment**

As Table 1 shows, McAllister Wellfield, Shana Park Well #11, Kaiser Rd Well #1 and Allison Springs Well #13 and #19 have gas chlorination treatment while Indian Summer Well #20 has on-site chlorine generation. The chlorinator at McAllister Wellfield utilizes flow for controlling the feed rate of the chlorine gas. Shana Park Well #11, Allison Springs Well #13 and Well #19, and Indian Summer Well #20 are chlorinated upon demand with feed controlled by flow. Chlorine residuals are measured with each system coliform sample collected throughout the distribution system, assuring detectable chlorine residuals are maintained. McAllister Wellfield, Shana Park Well #11, Allison Springs Well #13 and Well #19 are treated for low pH, utilizing an air stripper to remove CO₂ and raise the pH.

The telemetry system captures continuous water quality measurements including: temperature, pH, and chlorine residuals at Allison Springs, Shana Park, McAllister Wellfield and Meridian Storage Tank site.

In prolonged power outages at McAllister Wellfield, a backup generator can power the chlorination equipment, telemetry, and chlorine analyzer. If the chlorinator or booster pump fails, a backup chlorinator and pump is available.
Required Routine Sampling

The City of Olympia is required to collect a minimum of 70 coliform samples per month. DOH certified staff collects approximately 18 samples weekly throughout the distribution system from samples stations shown on Attachment 1. The distribution system samples are specifically chosen to represent each pressure zone and the far ends of the system. This allows monitoring of pH, temperature, chlorine residual, and total coliform bacteria. The number of samples collected is in compliance with the Department of Health regulations WAC 246-290-300.

The City of Olympia owns, uses, and maintains 90 dedicated sample stations. Sample rotation is based on four routes of 22 system samples. Sites are rotated using a 52-week schedule, taking four weeks to fully achieve coliform sampling of the 90 coliform sampling stations. The 22 system samples represent the seven pressure zones, far ends of the system and random representation throughout the distribution system. Results from pH, temperature, free chlorine residual, and coliform samples are entered into the water quality database. The results are analyzed for statistical trends or to detect areas with stagnant water.

Repeat Samples

Repeat samples are collected for a confirmed positive coliform bacteria test result. Following Department of Health requirements, a repeat sample is collected at the original site, at an upgradient and downgradient location, which are within five service connections, if possible, of the original sample site. All repeat, upgradient and downgradient samples must be collected within 24 hours of receiving the positive test results from the laboratory. The locations of original and repeat samples are stored in the City of Olympia water quality database. Attachment 2 is an example of how the water quality database presents the location of repeat sample locations. Details for coordinating repeat samples with Dragon Analytical laboratory can be found in SOP #35 entitled Procedures for Collecting Repeat Coliform Samples, see Attachment 3.

Sampling Consecutive Water Systems

The City of Olympia provides The City of Lacey, McAllister Well field (S16), water through an intertie at 8002 Pacific Hwy. If, the City of Lacey receives a positive coliform sample in their distribution system, that receives McAllister Well field water, they will notify the City of Olympia within 24 hours. The City of Olympia will sample the Well field within 24 hours according to this plan. Contact phone numbers, including personal phone numbers, have been provided to City of Lacey Operations and Water Resources.

The City of Olympia also provides McAllister Well field water to Thurston County PUD. The PUD is currently not using City of Olympia water and has given a 9 month notice to terminate the current water use agreement. As of June 1, 2015 The City of Olympia will no longer provide water to Thurston County PUD.
Special Purpose Samples
Special purpose samples are samples collected for reasons other than the compliance monitoring requirements specified in the federal and state drinking water regulations. To provide enhanced customer service and ensure our customers receive safe drinking water, the City:

- Collects a bacteria sample from all new water and fire mains over 20 feet. This sample must be satisfactory before the water main is attached to the City of Olympia water distribution system.
- Collects a bacteria sample from all seasonal sources. This sample must be satisfactory before the source is brought on line.
<table>
<thead>
<tr>
<th>Site Location</th>
<th>Zone</th>
<th>Type</th>
<th>Date</th>
<th>Time</th>
<th>Site Code</th>
<th>pH</th>
<th>Temp</th>
<th>CL2 Residual</th>
</tr>
</thead>
<tbody>
<tr>
<td>1077 Franklin St SE</td>
<td>226</td>
<td>Station</td>
<td></td>
<td></td>
<td>1077 Fr</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>208 11th Ave SE</td>
<td></td>
<td>Up</td>
<td></td>
<td></td>
<td>1077 FrU</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1076 Franklin St SE</td>
<td></td>
<td>Down</td>
<td></td>
<td></td>
<td>1077 FrD</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
City of Olympia
Water Resources
Procedure for Collecting Repeat Coliform Samples

Section 1
Purpose
This procedure provides direction for the City of Olympia’s Water Quality Program and coordination with Dragon Analytical laboratory staff by:
1. Identifying the steps necessary for collecting repeat samples due to a positive routine coliform sample.
2. Coordinating with Dragon Analytical laboratory staff in notification of sample results.
3. Outlining the process for implementing this procedure.

Section 2
Background
Department of Health (DOH) regulations, WAC 246-290-320(2)(a)(i), states repeat sampling is required when a routine coliform sample shows the presence of total or fecal coliform or E. coli, unless the sample is invalidated under WAC 246-290-320(2)(d). A set of three repeat samples must be taken within 24 hours of receiving laboratory notification of an unsatisfactory result. The location of the repeat samples will be:
- The same tap as the original unsatisfactory routine sample
- An active service within 5 services upstream from where the original unsatisfactory sample was taken if possible.
- An active service within 5 services downstream from where the original unsatisfactory samples was taken, if possible.

Dragon Analytical laboratory staff currently notifies Water Quality staff either with personal contact or leaving a voice message of unsatisfactory coliform monitoring results associated with both new construction and compliance monitoring. They also notify DOH of unsatisfactory results for compliance monitoring only.

Section 3
Notification Procedure
Dragon Analytical laboratory staff is to make personal contact with City of Olympia staff for every unsatisfactory compliance coliform monitoring sample. Unsatisfactory sample results are not to be left on voice mail due to the possibility of staff being out of office because of illness, vacation, and flex schedule or because of an unscheduled absence. Satisfactory repeat sample results can be left as a voice mail.

Dragon Analytical laboratory staff is to contact City staff in the following order:
1. The sample collector. Generally this will be Daisy Curley and her contact information is:
   - Nextel (360) 239-0160
   - Work desk (360) 753-8167
   - Personal cell (360) 556-0224

2. Cheri Reimers and her contact information is:
   - Work desk (360) 709-2774
   - Nextel (360) 239-6540
   - Home (253) 435-7781
   - Personal cell (253) 576-3657

3. Meliss Maxfield and her contact information is:
   - Work desk (360) 753-8202
   - Nextel (360) 507-9486

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4. Steve Coke and his contact information is:
   - Nextel  (360) 507-5949
   - Work desk  (360) 753-8161
   - Personal cell  (360) 701-9963

5. Mike Vessey and his contact information is:
   - Nextel  (360) 507-5953
   - Work desk  (360) 753-8318
   - Home  (360) 264-7009

Section 4
Collecting the Repeat Samples - During the Work Week

Upon notification from the laboratory of unsatisfactory results, a set of repeat samples (3) must be collected and submitted to the laboratory within 24 hours of being notified. It is recommended that two Water Quality staff conduct repeat sampling. If a second Water Quality staff is not available contact the Water Operations section for assistance or proceed on your own. If you cannot sample as outlined in Section 2 above, contact the Southwest Regional Office DOH and speak to their coliform monitoring specialist, currently Sandy Brentlinger at (360) 236-3044. Samples stations with insect infestations will need to be torn down to the ball valve and disinfected. See Standard Operating Procedures (SOP) #36 titled Disinfecting a Sampling Stations Procedure for details.

Do not leave a voice message with DOH staff if the sample result is positive for fecal coliform or E. coli. Zero out, speak to the DOH receptionist and stay on the line until you speak with Sandy or other designated staff should she be unavailable.

Log into the Water Quality Database to generate a Repeat Monitoring field sheet. See SOP #36 titled Generating a Repeat Monitoring Sampling List for generating this sheet.

Prior to leaving the office and collecting the repeat samples, verify the sample locations using the most current Water Utility Maps located in hard copy in the Water Section Bay or electronically at:\Calvin\pw water resources\DOW Quality\Utility Maps. Consult with Water Operations staff if there are any questions regarding water flow direction. Also make up a fresh chlorine solution which will be used to disinfect the repeat sampling taps. With the exception of the location of the unsatisfactory sample result, the repeat samples will need to be collected from outside hose bibs of privately owned residences or businesses.

Once in the field, determine if the repeat locations listed on the field sheet have good sample taps. Use an outside hose bib which has good access (in the front or side of the home or business) when collecting the samples. These hose bibs are generally threaded and are not ideal, so a thorough disinfection of the tap will be necessary prior to collecting a sample. Try not to collect a sample from:
   - Frost-free yard hydrants
   - Faucets below or near the ground level
   - Faucets wrapped in cloth or other material in direct contact with the hose bib.
   - Faucets with hose bib vacuum breakers which can not be removed.

Disinfect the sample tap before sampling by spraying the outside and inside of the hose bib first with de-ionized water then with a fresh solution of bleach water, then rising with de-ionized water. Follow SOP #2 titled System Bacteriological Compliance Sampling for collecting the sample as well as recording field readings for pH, temperature and residual chlorine. Also instead of marking the laboratory as a routine sample, mark it as a repeat sample; write down the date of the unsatisfactory sample result; write in the laboratory sample number of the unsatisfactory result (this number is provided by the laboratory); and note the current chlorine residual of the repeat sample.
Section 5
Collecting the Repeat Samples – During the Weekend
Repeat samples taken on a Friday will have results ready on Saturday. If any of the results are unsatisfactory, Dragon Analytical laboratory staff are to call the numbers referenced above and make personal contact with City staff so they can come into work and collect another set of repeat samples. Coordination with Dragon Analytical laboratory staff on when samples can be brought to the laboratory will be necessary. Follow Section 4 for collecting the set of repeat samples.

Section 6
Monitoring Violations
There are two types of maximum contamination level (MCL) violations that can occur: an acute and non-acute violation.

Acute Violation
A single sample with a coliform presence, an E. coli presence, or a fecal coliform presence DOES NOT result in an acute MCL violation. The acute MCL violation is determined based on the results of BOTH the routine sample and the related set of repeat samples collected as follow-up to the unsatisfactory routine sample. For an acute MCL violation to occur a sample and at least one related repeat sample must BOTH have coliform bacteria present AND one of the samples must show the presence of E. coli or fecal coliform bacteria. If this occurs, contamination is confirmed in the water supply and requires a Tier 1 Notification (immediate notice to the public) must be done within 24 hours and generally a boil water advisory is issued. See the City of Olympia Public Notification Handbook for Tier 1 Water Violations on specific actions which must occur. Failure to collect the required set of repeat samples is also an acute violation.

Non-Acute Violation
The non-acute violation occurs when there is total coliform presence and no fecal coliform or E. coli. The presence of total coliform bacteria in a water system generally indicates contamination from the environment such as soils and plants. Non-acute violations require a Tier 2 Notification (notice within 30 days). This notice is generally mailed to all customers.

Non-acute violations are calculated on a monthly basis. As with the acute MCL violations, a single sample with a coliform presence DOES NOT result in a violation. All routine and repeat samples collected for a specific month count towards determining compliance with the non-acute MCL. A violation occurs when the total number of positive samples taken in a month (routine and repeat samples) is greater than 5.0 percent.

Other Types of Coliform Violations
There are two other types of coliform violations related to monitoring requirements:

Major Repeat Violation
A Major Repeat Violation is when a system fails to collect repeat samples in response to an unsatisfactory routine sample(s). A Major Repeat Violation is considered a water quality violation since the routine sample showed the presence of bacteria and Tier 2 Notification is required.

Major Monitoring Violation
A Major Monitoring Violation is when no samples are collected during the month. A Tier 3 Notification (notify using the consumer confidence report) is required.
Section 7
The Month after an Unsatisfactory Sample
Follow the regular sampling schedule for the month.

Section 8
Significant Non-Compliance (SNC)
DOH will pursue enforcement actions when a system is classified as a SNC. SNC designation occurs within a 12-month period if there are:
- Four water quality violations (MCL and or major repeat)
- Six major monitoring violations
- A combined total of six water quality and monitoring violations

Section 9
Contact Information
City of Olympia Staff – see above

Dragon Analytical Staff:
- Work desk (360) 866-0543
- Robert Lewis (Owner)
  - Personal cell – (360) 970-5770
  - Home – (360) 866-4825
- Tim (Lab Manager)
  - (360) – 951-1709

DOH SW Regional Office:
- Sandy Brentlinger – (360) 236-3044
- Main office number – (360) 236-3030
- After hours number – 1-877-481-4901