

Panhandle Health District Drinking Water Supply Report

System: Conkling Marina & Resort

Date of Survey: July 21, 2015

System Representative Present at Survey: George Erdmann, Caretaker

Surveyed by: Jamie Barton, PHD and Anna Moody, DEQ

Source: Groundwater

Water System Type: Transient Non-Community

PWS#: 1280125

County: Kootenai

Connections: 17

Conkling Marina & Resort Water System Overview



The Conkling Marina and Resort (Resort) water system is a privately owned transient non-community public drinking water system located near the southwest end of Lake Coeur d'Alene in Worley, ID. The drinking water system is supplied by a single groundwater well. Disinfection is provided with contact time in a 10,000 gallon storage tank. Treated water discharges via gravity to the distribution system serving 17 connections (cottage, restaurant, store/marina, and 14 RV hookups).

History

The Resort is reported as having been in existence for over 100 years. The original ground water source of drinking water may have been a dug well located behind the restaurant which has since been converted to a distribution valve vault.

In the late 1970's plans for a new system were approved to serve the Resort and six homes within in the Nebel's Addition to Conkling Park. This system included well #1 and the existing 10,000 gallon horizontal steel tank which is located within the existing pump house. The system was first surveyed in 1985.

In 1986, well #2 was drilled as a result of well #1 going dry. Well #1 has been filled in and abandoned. In 1999, the Nebel's Addition to Conkling Park disconnected from the system leaving the well to serve the Resort only. A sanitary survey conducted in 2002 indicated well #2 pumped to a partially buried 3,300 gallon steel tank and the 10,000 gallon tank was not connected. The 3,300 gallon tank has reportedly been abandoned and the 10,000 gallon tank is currently the sole storage for the system.

Source

The water system currently receives its water supply exclusively from well #2. The well site is located on Lot 8A, Block 3 of Nebel's Addition to Conkling Park off Florida Circle but does not have the required 50 foot radius from the neighboring property to the south. However, the neighboring property to the south is under the same ownership and is utilized for boat storage. At the time of the survey, it appeared no boats were being stored within 50 feet of the well. The well is located within the fenced area of the boat storage property between the boat storage building and the pump house. Tires are placed around the well for added protection.

Well #2 is a 6-inch cased well drilled June 25, 1986 to a total depth of 325 feet as indicated in the well driller's report on file with the Panhandle Health District (PHD). The casing extends from two feet above ground, fitted with a watertight vented well cap, to 320 feet below ground. The well features a 115 foot bentonite surface seal. At the time of drilling, well production was approximately 40 gallons per minute (gpm) and the static water level was at 150 feet. The well is equipped with a 3 horsepower submersible pump discharging to the storage tank following disinfection. Following the sanitary survey the Resort owner, Tim Kirkpatrick, reported the well produces 25 gpm.

The well discharge line enters the pump house approximately 10 feet northwest of the well and includes a single check valve, flow switch, threaded sample taps, sodium hypochlorite injection point, and an isolation gate valve. The flow switch was added since the last sanitary survey to de-activate the chlorine metering pump if the well failed to produce flow; however, the flow switch has quit working and must be repaired or replaced. The threaded sample tap prior to the injection point is the first available tap where a raw water source sample may be collected. The threaded sample tap after the injection point is utilized for make-up water in the sodium hypochlorite solution tank. Threaded taps must be provided with atmospheric vacuum breakers (AVB) whenever a hose will be connected. Discharge piping did not include a pressure gauge or a means to pump the volume of the well to waste; both have been noted as a deficiency on previous sanitary surveys. A standard pressure gauge must be installed on the well discharge

line and valves and appurtenances must be installed to allow the well to be pumped to waste via an approved air gap.

Treatment

Historic contamination issues initiated the requirement for disinfection with contact time. The source was determined to be contaminated with E.coli bacteria in 2005. Plans and specifications for disinfection with contact time were submitted to the Idaho Department of Environmental Quality (DEQ) and approved in May 2005. Plans included a chemical metering pump with the injection point on the well discharge line prior to the 10,000 gallon storage tank. The storage tank serves the purpose of maintaining pressure, storage capacity, and disinfection contact time.

The metering pump was installed in 2006 and is a Stenner, model 45MHP2, which comes attached to a 15 gallon solution tank. The pump has a maximum output of 3 gallons per day at 100 psi. The sodium hypochlorite utilized by the system is 12.5% Multi-Chlor brand, manufactured by Hasa, and certified to meet the ANSI/NSF 60 standard. The solution is stored undiluted in the original 1 gallon containers inside the pump house. As reported during the survey, approximately 1 cup of sodium hypochlorite is mixed with 10 gallons of water to make up the solution in the 15 gallon tank. The metering pump is activated when the well pump is energized. The automatic flow cut off switch must be repaired or replaced on the water line where sodium hypochlorite is injected to cease the injection of chemical if the well is energized but fails to produce flow. Standby equipment must be available on-site if the current equipment stops working.

Disinfection contact time has historically been calculated through the 10,000 gallon storage tank, with an effective volume of 5,000 gallons for contact time based on peak summer usage. A baffling factor was credited at 10% to the storage tank due to the piping configuration of inflow at the top of one end of the tank with the outflow out the bottom of the other end of the tank. Chlorine Contact Time (CT) has been calculated using the reported well output of 40 gallons per minute (gpm). Disinfection compliance monitoring has been collected at a sink in the restaurant. For adequate disinfection and 4-log viral inactivation, the Resort has been required to provide at least 12 minutes of chlorine contact time.

However based on information gathered and operations observed during the sanitary survey, the historical contact time calculations are not current and appear to be inadequate to provide disinfection treatment. In addition, the free chlorine residual has not been measured daily nor has the chlorine contact time been calculated, and neither has been reported monthly as required. At the time of the survey the storage tank was operating at approximately a 75% capacity (7,500 gallons), and it could not be determined what the pump capacity of the well was. The owner of the water system was able to perform a well production test using a five gallon bucket and stop watch while the well was running; the current well production was determined to be 25 gpm. During the survey PHD and DEQ staff measured free chlorine residuals at the entry point to distribution and in distribution, they were 0.06 mg/L and 0.14 mg/L respectively, which is not adequate under historical or current CT calculations to provide disinfection treatment. This is a significant deficiency and follow-up action is required.

Due to operating conditions having changed since the last sanitary survey, required disinfection contact time has been updated. At the reported well pump flow rate of 25 gpm and a baffling factor of 10%, a contact time of 30 minutes is required prior to the first service connection. The following equation was used to determine the contact time:

$$[Volume \text{ (gallons)} \times Baffle \text{ Factor}] \div [Contact \text{ Flow Rate (gpm)}] = Contact \text{ Time (minutes)}$$
$$(7500 \text{ gallons} \times 10\%) \div 25 \text{ gpm} = 30 \text{ minutes}$$

A Chlorination and Contact Time Report form will be provided to you with built in calculations which will require daily meter readings to determine peak hourly flow as well as daily free chlorine residual monitoring. The report form must be submitted to PHD monthly by the 10th of the following month. It is important to accurately read the meter; the solid zeros must be read from the red needle. For example; in the picture to the right, the flow meter reading at the time of the survey was 9,759,941 gallons.



The following equation is used to determine peak hourly flow:

$$(Gallons \text{ used} \div 1440 \text{ minutes in a day}) \times 3 \text{ (standard used for extra caution)} = \text{peak hourly flow}$$

In order to achieve adequate disinfection and 4-log viral inactivation, a free chlorine residual of 0.85 mg/L must be met at the entry point to distribution; PHD recommends a target free chlorine residual of 1.0 mg/L. Resort staff had previously been measuring “total” chlorine residual with a DPD kit that had expired reagents. A one week supply of reagents for measuring free chlorine residual was left with Resort staff for immediate use.

Pump House

The pump house is a wood framed structure located on the well lot and is provided with a locking door, drained concrete floor, insulation, heat, and light. Ventilation likely occurs through openings in the walls; daylight could be seen under the sill plate in various locations. During the survey rodent or bat feces was noted within the pump house; as well as a raccoon. The pump house must be sealed to eliminate access to vermin. The Resort does have plans to reinsulate the pump house this year and any needed repairs to the pump house should be considered at that time. Although light is provided, it is recommended the lighting be increased for overall better visibility of all features within the pump house.

Located within the pump house are the well discharge line, chlorinator, storage tank, flow meter, and the pump control panel. The flow meter is a 2-inch Hersey meter located after the storage tank and is reportedly being read daily. The meter must continue to be read daily in order to determine disinfection contact time daily. Also contained in the pump house is the abandoned well #1 and three unused pressure tanks.

Storage

A 10,000 gallon above ground steel tank, used to store finished water for distribution, is located in the pump house and provides the pressure and gravity flow to the service connections. A float switch in the tank activates the well pump.

A screened overflow must be provided on the storage tank. This has been an outstanding requirement noted on previous surveys. The tank access is bolted shut and watertight. A properly screened vent exists on top of the tank and a screened drain is provided, day-lighting outside the pump house. There was no evidence of leakage from the tank at the time of the survey. It is recommended that all storage tanks be inspected annually for integrity and silt build up, and be cleaned every five years.

Distribution

The distribution system is gravity fed through 2-inch PVC main. A distribution valve vault is located behind the cottage allowing for the system to be isolated in sections. The valves are exercised twice a year through start-up and shut-down procedures. The lines serving the RV Park, store/marina, and cottage are drained and winterized in the fall at the close of the season. Prior to opening in the spring, the lines are heavily disinfected twice with a flushing in between. Please provide a copy of the water system start-up procedures to PHD.

Drinking water taps serve 14 RV connections and are not provided with backflow prevention devices. AVB's must be provided prior to connecting hoses to service taps within the RV Park.

A chemical dispenser is provided in the kitchen for a variety of services and must be provided with adequate backflow protection of the drinking water supply; this was not verified during the survey.

Water service is provided to the marina through hoses that are not suitable for public water system use, run underwater in some locations, were observed to be leaking at the time of the survey and are considered a cross connection. All materials used by the public drinking water system must meet applicable NSF standards. All cross connections must be eliminated or isolated from the potable supply by an approved backflow prevention device, such as a reduced pressure zone backflow preventer (RPZ). RPZ's are required to be tested annually by a certified backflow assembly tester. Because the service connections throughout the marina are provided by hoses not approved for public water systems, all taps should be labeled as non-potable.

At the time of the survey, it was reported depressurization events have occurred this year and the system has been flushed and disinfected following the events. Any time the distribution system drops below 20 psi; in addition to disinfecting and flushing the system, PHD must be notified, public notification must be provided to all water users, and total coliform samples must be collected. Once sampling and corrective procedures have been completed, the affected customers may be notified that the water is safe for consumption.

Monitoring

The water system has been required to collect total coliform samples quarterly throughout its seasonal operation period of April 1 thru October 31; however, with the systems frequent

depressurization events and the lack of chlorine residual reporting, it will be necessary to increase the monitoring frequency to one sample per month beginning September 1, 2015. A sample site plan must be developed which is representative of the entire distribution and a copy submitted to PHD; please consult with PHD regarding sample site locations. Once sample sites have been determined, it will be necessary to rotate between sample sites each month.

The water system is also required to monitor for nitrate annually and nitrite once every nine years. A nitrate sample has not been submitted for 2015 and must be completed prior to December 31st.

In addition, the system must monitor the free chlorine residual daily in order to calculate disinfection contact time. The chlorine residual must be measured and reported on the lab form at the time compliance total coliform samples are drawn. Monthly contact time forms must be submitted to PHD by the 10th of the following month.

Managerial Capacity

The Conkling Marina and Resort water system is owned by Thomas and Timothy Kirkpatrick, and operates as part of a business. A designated licensed operator is not required for this transient water system. George Erdmann is in charge of daily monitoring and maintenance on the system.

If an operation and maintenance manual has not been provided for the water system, it is recommended the owner develop a simple operation and maintenance manual that would be easy to follow. The manual should include daily operating instructions; any safety procedures; location of valves and other key system features; parts list and parts order form; and contact information for the owner, PHD and DEQ.

Compliance

A written corrective action plan that addresses the deficiencies and additional requirements listed below must be submitted to PHD, following consultation with PHD. The consultation with PHD must be completed within 30 days of receiving this written notification.

Significant Deficiencies

1. The chemical feeder must be provided with an automatic flow cut off switch on the water line where sodium hypochlorite is injected to cease the injection of chemical if the well is energized but fails to produce flow.
2. The system must have a means of measuring the free chlorine residual and must measure daily at the entry point to distribution.
3. The hoses used for marina connections are not approved construction materials, run under water in some locations, were observed to be leaking at the time of the survey, and are considered a cross connection. Cross connections must be eliminated or isolated from the potable supply by an adequate backflow prevention device which must be tested annually by a certified backflow assembly tester.
4. At the time of the survey, it could not be demonstrated that chlorine contact time is being achieved during each day of operation. CT must be met and recorded daily according to instructions provided in this report and during follow-up consultation.

Deficiencies

1. All threaded taps must be equipped with appropriate backflow prevention devices if ever a hose is connected.
2. A pressure gauge must be provided on the well discharge line.
3. Valves and appurtenances must be installed on the discharge line from the well to allow the well to be pumped to waste via an approved air gap
4. The pump house must be cleaned and sealed to eliminate entry points for vermin.
5. A screened overflow must be provided on the storage tank, which is brought down to an elevation between 12 and 24 inches above the ground surface.
6. Backup chlorinator pump and parts must be available on site.
7. The free chlorine residual must be recorded on the lab form at the time compliance total coliform samples are being taken.
8. A written total coliform sampling plan which is representative of the entire distribution system must be developed and a copy submitted to PHD for review and approval.

Additional Requirements

1. Beginning September 1, 2015, the water system will be required to submit monthly total coliform compliance samples throughout the seasonal operation of April 1 through October 31.
2. The monthly Chlorination and Contact Time Report form must be submitted to PHD by the 10th of the following month.
3. Please submit a copy of the water system start-up procedures.
4. Verify backflow protection is provided between the chemical dispenser in the kitchen and the drinking water supply.
5. Because the service connections throughout the marina are provided by hoses not approved for public water systems, all taps should be labeled as non-potable.
6. During unplanned or emergency situations, when water pressure within the system is known to have fallen below twenty (20) psi, the water supplier must notify PHD, provide public notice to the affected customers within twenty-four (24) hours, and disinfect or flush the system as appropriate. When sampling and corrective procedures have been conducted and after determination by PHD that the water is safe, the water supplier may re-notify the affected customers that the water is safe for consumption. The water supplier shall notify the affected customers if the water is not safe for consumption.
7. Submit annual nitrate sample prior to water system closure.

Recommendations

1. Recommend putting additional lighting in the pump house.
2. Recommend producing an operation and maintenance manual for the water system.



Jamie Barton, Sr. Environmental Health Specialist

August 11, 2015

Date