Idaho Department of Environmental Quality
2013 Drinking Water Supply Report

County: **Kootenai** PWS #: **1280039** Date: **June 11, 2013**
System: **Carlin Bay Property Owners Association**
System Representative: **Dave Banks**
Surveyed by: **Suzanne Scheidt**
Source**: Lake Coeur d'Alene**
Population/Connections: **94/57** Water System Type: **Community Water System**

The Carlin Bay Property Owners Association public drinking water system is a small community system located on the east shoreline of Coeur d'Alene Lake, approximately 6 miles north of Harrison, Idaho. The water system was constructed between 1980 and 1982 by developer Parker Hanson; ownership was then transferred to the Carlin Bay Property Owners Association, Inc. The service area encompasses the Sunset Shores, Edgewater Estates, Lakeview Ridge Estates, and Parkwood Acres developments located above Carlin Bay.

Total anticipated build-out of the combined developments is 175 residential connections. Based on operator calculations, the average water user per customer is 250 gallons per day. According to the current average daily use calculation provided by the operator, the total projected water use at total build out is 43,750 gallons per day. Current maximum water production per day is 120,000 gallons, provided the plant is operating continuously for a period of 20 hours.

Source

The Carlin Bay water system utilizes Lake Coeur d'Alene as its sole source. The intake is located in the Association's marina approximately 175 feet off shore at an estimated depth of 30 feet. The intake pumps are comprised of two Red Jacket 15 hp 3-phase pumps equipped with variable frequency drive motors. The VFD's operate based on level set points in the clear well/contact chamber. The raw water pumps are equipped with an override to allow for manual operation. The discharge rate of each pump is 100 gallons per minute (gpm) at 340 feet total dynamic head; the pumps operate in an alternating lead/lag mode. The pumps were installed in 1980 and are likely nearing the end of their useful life. The Association may wish to set aside funds for pump replacement if this has not already been considered.

The water system renewed their water right from the Idaho Department of Water Resources during the recent adjudication process. The water right was approved for 0.5 cubic feet per second and an annual use of 240 acre feet.

The intake is constructed at a depth of 30 feet on a 2.5-foot by 3-foot concrete pad just off the Carlin Bay marina dock. The raw water pumps are enclosed within 4-inch sections of PVC pipe which tee to a common 4-inch PVC manifold line lifting raw water to the treatment building. The system operator believes the intake is fitted with a screen and reports no regular maintenance of the intake has been required. It is recommended the intake be inspected by a diver to assess the construction and current condition.

A source water assessment report was completed in November of 2000. The Assessment concluded that the Carlin Bay intake had a low potential for contamination. However, the assessment does not take into account the Carlin Bay Marina as a potential contamination source. The marina is owned and maintained by the Association and, therefore, potential contamination could be prevented by education of marina users. Other potential sources of

contamination include private residences, the Carlin Bay Resort, Carlin Creek which enters the bay approximately ¼-mile to the south of the intake, and residential non-permitted aquatic herbicide treatments.

Due to the susceptibility of the intake to contamination, the Department recommends the Association contact Yvonne Pettit, Drinking Water Source Protection Coordinator at the DEQ Coeur d'Alene Regional Office to discuss the benefits of implementation of a Drinking Water Protection Plan. Additionally, Source Water Protection Grants are also administered annually by DEQ. Grant funding is available to water systems to implement source water protection activities. Source Water Protection Grant applications will become available in August of this year. Please contact Yvonne Pettit to discuss development of a Drinking Water Protection Plan, or for additional information regarding Source Water Protection grants at 208-666-4620.

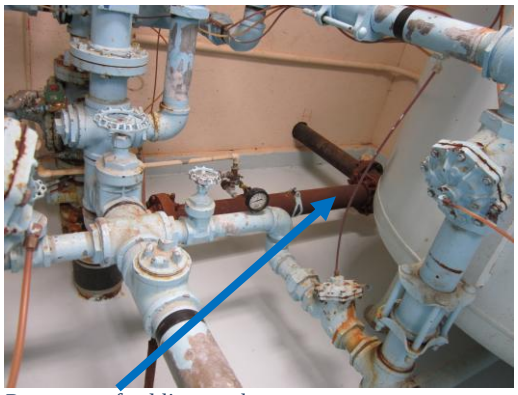
Treatment

Approved surface water filtration treatment consists of pre-chlorination, rapid mix coagulation, two filtration trains which operate in parallel consisting of pre filtration (clarifiers) and final direct filtration. Following filtration, corrosion control treatment and disinfection through contact time is provided. The treatment building can be reached by taking South Carlin Bay Road to East Sunset Shores circle to South Edgewater Drive. The treatment building is approximately 0.2 miles north of the intersection of East Sunset Shores Circle and South Edgewater Drive.

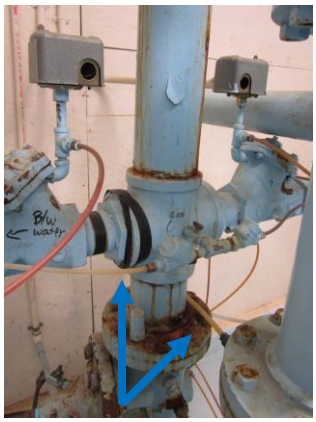
Filtration treatment building (contact chamber below)

Pre-chlorination and Coagulation

As previously mentioned, raw water is pumped via two alternating 15 hp intake pumps equipped with variable frequency drive motors. A 4-inch ductile iron pipe discharges water to the plant where pre-chlorination is provided. Pre-chlorination consists of injection of a 1:6 dilution of 12.5% Hasachlor sodium hypochlorite solution; the operator maintains an average free chlorine residual of 0.8 mg/L post filtration. Sodium hypochlorite (NSF 60 approved Hasachlor) is fed through a Chem-tech XP peristaltic chlorine electronic metering pump operating off a flow switch on the final filtration effluent line. The electronic metering pump draws from a 35 gallon sodium hypochlorite day tank which is vented with 24 mesh screen to the outside. A calibration cylinder on the chlorination system is used to verify dosage rates on a weekly basis.



Raw water feed line to plant



Alum and chlorine injection

Following chlorination, raw water is injected with aluminum sulfate (alum). Alum dosage rates are adjusted based on raw water turbidity fluctuations to provide effective coagulation. Alum dosages range from 12-24 mg/L and are based on a feed rate of 73 ml/min with an alum solution of 0.5 lbs/gal. Alum injection is accomplished through an LMI electronic metering pump which operates based on a flow sensing device on the filtration line. The metering pump is set at 70 speed and 80 stroke which is optimal to maintain pump life. A calibration cylinder is provided on the injection system and is utilized weekly to calibrate appropriate alum feed rates. The alum solution tank is equipped with a mixer that activates when the raw water pumps start.

After injection of sodium hypochlorite and alum, treated water flows through a rapid mixer to ensure even distribution of the chemical coagulant prior to flocculation through the clarifiers. Adequate coagulation is a critical component of the treatment process to ensure effective removal of microbial pathogens is achieved through filtration.

NaClO day tank and metering pump
1720E individual effluent turbidimeters

Raw water connection with pre-filtration feed line

A gate valve is installed between the raw water line and the pre-filtration line. The connection, however, does not pose a health risk as it does not allow raw water to co-mingle with final filtrate, and is not considered a cross connection as the raw water supply is not physically connected to the finished water supply.

Filtration

The properly operated direct filtration system utilized by Carlin Bay is credited by the Idaho Rules for Public Drinking Water Systems as providing two log removal for giardia and cryptosporidium cysts. An additional one log inactivation must be provided for giardia cysts through disinfection and contact time. By achieving one log inactivation requirements for giardia, the system also meets four log viral inactivation requirements. The water system utilizes continuous turbidity monitoring as an indicator to ensure adequate filtration is provided. The filtration system also operates within the head loss (pressure differential) set by the manufacturer to ensure the filters are not subject to turbidity break-through.

The filtration system consists of a Kisco brand pressure filtration system. In September of 1996, Kisco became a part of US Filter, which is now owned by Siemens. Each train consists of a pressure clarifier in series with a pressure filter. Pressure vessels are 5 feet in diameter and approximately 8 feet tall. Prefilter #1 and final filter #3 consist of the original filter media. The clarifier (Prefilter #2) was re-bedded in 2009 and final filter #4 was re-bedded in October of 2009 and again in May of 2011. Prefilter #2 (clarifier) was re-bedded with ½- to ¼-inch gravel media overlain by 1/4- to 1/8-inch gravel, 1/8- to 1/16-inch gravel overlain by a filter aggregate material. Final filter #4 was re-bedded with 3 inches of ½- x ¼-inch gravel, overlain by 3 inches of 1/4- x 1/8-inch gravel media, overlain by 4 inches of 1/8- x 1/16-inch media, overlain by 3 inches of garnet (A-12), overlain by 4 inches of 3040 garnet, overlain by 7 inches of sand, and overlain 12 inches of anthracite. The operator stores samples of the filter media at the plant. The specific gravity of the anthracite is utilized to set the backwash flow rate. The operator reports that media levels in the filter vessels are inspected annually, and levels are recorded for future reference.

Clarifier media – pre filter #2


Final filter media – filter #4

Filter #4 media
12 inches anthracite
7 inches filter sand
4 inches 3040 garnet
3 inches A-12 garnet
4 inches 1/8-1/16 inch gravel
3 inches 1/4-1/8 inch gravel
3 inches 1/2-1/4 inch gravel

A 20 minute filter to waste cycle is conducted prior to each filter run. Wasted water is discharged via an air gap screened with 24 stainless steel mesh outside the treatment building to the backwash pond.

Each train produces 50-60 gpm at a filtration (loading) rate of 2.5 gpm/ft^2. Continuous individual effluent turbidity monitoring is provided through Hach 1720E turbidimeters. Turbidimeters are calibrated quarterly by the operator

according to manufacturer specifications to ensure accurate operation of the monitoring equipment. Turbidity readings are downloaded to the SCADA system, and an automated shut down of the treatment plant will occur if filtered turbidity levels exceed 0.25 NTU for a period of 10 minutes.

Automated control valves regulate flows through the treatment system and are maintained and rebuilt as necessary to prevent filtration breakthrough and introduction of microbial pathogens to the water supply. Reliable functioning of the automated control valves is a key component in ensuring adequate filtration is provided.

Corrosion control treatment is injected following filtration and prior to discharge to the baffled contact chamber below the treatment building. Filtered water is injected with sodium carbonate (soda ash Univar 732781). NSF 60 approval is granted for maximum use of 150 mg/L. A 0.5 lbs/gal soda ash concentration is fed at a dosage rate of 7.6 mg/L. An LMI electronic metering pump automatically injects the soda ash solution upon receiving a signal from the flow sensing device on the filtered water line. The pump is set to operate at a 35 speed/25 stroke setting. The pump draws from a 60 gallon day tank equipped with a calibration cylinder. The cylinder is used weekly to ensure chemical injection rates remain consistent. The soda ash tank is equipped with a mixer which turns on when raw water pumps are energized. As soda ash is prone to fall out of suspension, the mixer is an essential component to ensure homogenous injection of the chemical into the water supply.

Soda ash injection system

Alum injection system

Filter Backwash

Automated backwash cycles are controlled by the Supervisory Control and Data Acquisition (SCADA) system and are set to start after midnight; the raw water lake pumps are disabled (midnight thru 5 am) during the backwash cycle. Backwash run times are approximately 20 minutes per vessel with a 3 minute settling cycle and a 4 minute rinse cycle. Optimal backwash flow rate is 18 gpm/ft^2; at this rate the bed is adequately fluidized to accomplish backwash without filter media loss to the backwash pond.

The filters are manually backwashed by the operators when a pressure differential of 8 psi is reached between the raw and final filter effluent. During periods of increased raw water turbidity filters backwash automatically every 10 hours.

The operator reports that different backwash flow rates are achieved through each filter train with a reduced backwash flow rate through filter (clarifier) #2. This may be due to a plugging of the flow restrictor orifices with filter media. Over time, this may contribute to shorter filter runs or increases in filtered turbidity levels. In order to ensure successful operation, the valve must be inspected and if necessary replaced.

Backwash water is gravity fed from distribution via the Midway reservoir via water main that runs below the treatment building floor and through the clear well. Backwash water enters the plant at a pressure of 130 psi and is routed through a pressure reducing valve manually adjusted to reduce pressure between 40 and 50 psi in order to provide backwash flow rates between 180 and 190 gallons per minute.

The operator has done an excellent job maintaining the PRV, which is a critical component of the backwash cycle. Automated control valves have also been well maintained in order to preclude backwash water from comingling with the potable water supply.

Backwash water PRV

Backwash water is fed through the base of each vessel to sprayers which discharge horizontally. Spray nozzles were inspected at the time filters 2 and 4 were re-bedded and found to be in good working condition.

Backwash water is discharged to a pond located below the water plant. After settling, the water is pumped into the sewer lift station to the wastewater lagoons. The backwash pond was dredged during the summer of 2008 and provides adequate capacity for backwash and filter to waste discharge water from the plant.

The operator has successfully remedied previous issues with turbidity spikes following filter to waste. A review of recent records indicate turbidity levels remain below 0.3 NTU following filter to waste cycles. As previously stated, an automated shut down of the plant occurs when filtered turbidity levels exceed 0.25 NTU for greater than 10 minutes.

Disinfection and Contact Time

As previously stated, the water system must provide one log giardia inactivation and four log viral inaction through disinfection and contact time. Sodium hypochlorite is injected prior to filtration as described in the treatment section of this report.

A 30,000 gallon baffled concrete contact chamber (also referred to as the clear well) is located under the treatment building. Baffles were installed in the clearwell to provide for additional contact time and efficiency, at that time a diffuser was installed on the filter effluent discharge. The current configuration yields a length to width ratio of 22:1[1]. The length to width ratio in combination with the diffuser provides a chlorine contact efficiency credit of 60%. The minimum level of the contact chamber is 3.5 feet which provides a minimum total contact volume available of 17,500 gallons. A maximum discharge rate of 100 gpm is accomplished via two alternating 7.5 hp pumps. The pumps will operate only in lead lag if one pump fails.

Based on the minimum contact volume of 17,500 gallons, contact efficiency credit of 0.6 and 100 gpm maximum pumping rate, a contact time value of 105 minutes should be used to represent a worst case scenario on future Monthly Operating Reports.

In the event the contact chamber reaches a level below 3.5 feet, the raw water pumps turn on automatically. An autodialer alarm is triggered if water levels decrease below 2 feet in the clear well or the midway or upper reservoir.

The contact chamber is equipped with a drain which discharges to the waste pond as well as a combined vent/overflow under the steps into the treatment building.


Contact chamber with adequate gasket on reservoir hatch and contact chamber opening

Free chlorine residual and pH are analyzed at the sample tap in the treatment building laboratory which draws from the discharge line from the contact chamber. Prior to sampling, the operator manually turns on the booster pumps drawing from the contact chamber for 15 minutes. Free chlorine residual and pH are analyzed using a Hach DR820 colorimeter. The Hach DR820 is approved for free chlorine residual monitoring but is not approved for pH monitoring:
http://www.hach.com/dr-820-portable-colorimeter/product-parameter-reagent?id=7640439039&callback=qs

Please obtain USEPA compliant pH monitoring equipment for this purpose. The Hach HQ11D or HQ411D are portable pH monitors which are certified as USEPA compliant for drinking water monitoring purposes. A mercury thermometer is used to measure water temperature with a range of -10 to 260 degrees Celsius.

[1] AWWA Research Foundation, Improving Clearwell Design for CT Compliance Figure 7.7, page 55

A raw water sample tap is also plumbed into the lab room and is utilized to monitor raw water turbidity using a benchtop Hach 2100Q turbidimeter.

Surface Water Treatment Monitoring

Oversight of the treatment plant is conducted daily by the system operators. In order to maintain compliance with the Surface Water Treatment Rules, 95% of all filtered turbidity measurements must be below 0.3 NTU, and at no time may filtered turbidity exceed 1.0 NTU. Contact time ratios must always be greater than 1.0, and at no time may free chlorine residual (measured at the discharge from the contact chamber) be below 0.2 mg/L. A detectable residual must be maintained throughout distribution at all times to ensure inactivation to all water users.

The Department must be contacted within 24 hours if any of the above treatment requirements are not met.

Distribution

From the contact chamber water is lifted to the 30,000 gallon ground level Midway reservoir via 6-inch C-900 main. The reservoir is located approximately 0.4 miles north of the treatment building on South Edgewater Drive. Four service connections receive pressurized water from the contact chamber/gravity fed water from the Midway reservoir. Demand from the four service connections is not expected to exceed the 100 gpm discharge rates of the booster pump and were not included in contact time calculations.

Midway Reservoir

The reservoir roof coating was found to be bubbling in some areas and operator Dave Banks reports the reservoir is scheduled to be recoated. The reservoir is equipped with a drain and a shared vent/overflow found to be adequately screened with 24 stainless steel mesh. The interior gasket of the Midway reservoir hatch was found to be in good repair. The interior of the reservoir was found to be well maintained; no accumulations of sediment were observed on the reservoir floor.

30,000 gallon Midway reservoir

Midway reservoir floats and pressure transducer

Leak repair of the northwest corner of the reservoir has been completed since the time of the last survey. As part of the repair, the corner was reinforced with a steel brace. Bolts for the brace do not extend through the concrete to potable water.

Drain valve *Midway reservoir steel corner brace*

Water level controls are regulated by a pressure sensing transducer via the SCADA system to the contact chamber pumps; a call for water from the contact chamber pumps is initiated when the Midway reservoir level reaches 3.5 feet.

From the midway reservoir, two 7.5 hp pumps lift water (alternate) to the Upper reservoir via 6-inch C-900 main to Carlin Bay Road. From Carlin Bay Road, 4-inch PVC main carries water to the Upper reservoir. The remaining water services receive gravity fed water from the Upper reservoir/pressurized water from the Midway reservoir.

Upper Reservoir

The Upper reservoir is also a 30,000 ground level concrete reservoir. A pressure sensing transducer in the reservoir regulates the call for water from the Midway reservoir booster pumps when the upper reservoir level is below 3.5 feet. The pressure transducer will generate an autodialer alarm in the event water level reaches two feet.

30,000 gallon upper reservoir

Upper reservoir interior

Upper reservoir vent/overflow

The reservoir roof was recently recoated with MACoat manufactured by Westcoat Specialty Coating Systems www.westcoat.com and was found to be in excellent condition at the time of the survey. The reservoir is adequately vented and fitted with 24 mesh stainless steel screen through a combination vent and overflow. The reservoir is also equipped with a drain.

The reservoir hatch was found to be secure. The interior of the reservoir was found to be well maintained; no accumulations of sediment were observed on the reservoir floor.

During the previous survey, a suspected leak was observed on the northeast side of the tank. Shortly after the inspection, the reservoir was inspected and the leak was confirmed and repaired with an exterior crystalline material, Xypex (www.xypex.com).

The northeast corner of the reservoir appears to have been broken off by excavation equipment and requires repair.

The Midway and Upper reservoirs are inspected every five years by LiquiVision Technology, Inc. based out of Klamath Falls, Oregon.

Distribution System

The distribution system consists of primarily 4- and 6-inch C-900 main. While some fire flow is provided, it is carefully utilized due to the system limitations. The local fire authority is aware of the volume limitations and has also utilized water from the Johnson Meadows Development when necessary. The water system operator, Dave Banks also works for the local fire department and is able to effectively coordinate fire protection efforts when necessary.

There are no air vacuum relief valves within the distribution system with the exception of two adequately screened air vacuum relief valves provided on the shared influent/effluent line of the Midway and Upper reservoirs. Dead end mains on the distribution system are equipped with flushing hydrants; flushing is conducted at a minimum of twice per year as required. There are three pressure reducing valves on the system: two in distribution and one on the 2-inch line fed off the 6-inch line between the contact chamber and reservoir. The valves are inspected annually by Marty Walker as is strongly recommended by the Department.

All isolation valves in distribution are exercised annually by the operator as is strongly recommended by the Department.

The operators have implemented an advanced leak detection program and are able to determine water leaks as small as 4 gallons per minute. This is accomplished by observing demand in the late evening hours. Additionally, all services are metered and are read three times per year.

SCADA System

In 2005, the water association installed a SCADA system providing radio telemetry from the reservoirs and the filter plant. Computer terminals are located at the water plant and operators are able to access the SCADA system from their home computers. The SCADA system currently is set up to monitor pump hours of operation, turbidity, reservoir levels, number of backwashes, alum, and hypochlorite solution tank levels. The system will also notify the operators if the alum or alum solution tanks or reservoir levels are low, or if turbidity is exceeded in the filtered water. An auto-dialer notifies operators if an alarm on the system has been triggered.

Monitoring

Monitoring requirements from the entry point to distribution:

The water system is required to collect a nitrate and sodium sample annually. Nitrite sampling is required once per nine years. The water system has qualified, based on a combination of an excellent monitoring history and low risk of contamination, for monitoring reductions and waivers for arsenic, inorganic, synthetic organic and volatile organic contaminants. Inorganic sampling is reduced to once per nine years. Synthetic and volatile organic sampling requirements have been waived with the exception of 2,4-D which is required to be monitored annually. 2,4-D monitoring was required following detections of the contaminant at the treatment plant in 2008 (0.51 ug/L) and 2010 (0.71 ug/L). The maximum contaminant level for 2,4-D in drinking water is 70 ug/L. Radiological monitoring requirements for alpha, radium 226/228 and uranium sampling are reduced to once per nine years. The system's current monitoring requirements may be accessed at: http://www.deq.idaho.gov/water-quality/drinking-water/pws-switchboard.aspx

Distribution monitoring requirements:

The system is required to collect one routine total coliform sample per month. The free chlorine residual is analyzed and recorded on the coliform sample form at the time the coliform sample is collected as required. As part of the Total Coliform Rule requirements, the water system is required to collect coliform samples from five rotating locations throughout the distribution system. Those five locations must represent the entire distribution system. The water system has developed a total coliform sampling plan which is posted in the treatment plant and followed accordingly.

One disinfection by product sample analyzed for total trihalomethane and haloacetic acid group 5 is collected annually from the designated point of longest retention time between the months of July 1 and September 30. Disinfection by product results are consistently below the MCL, with the last round collected in August 2012. Haloacetic Acid Group 5 results were analyzed at 0.262 mg/L and Total Trihalomethane results were analyzed at 0.0397 mg/L. In the event disinfection by product results indicate elevated levels in the future, the system may wish to consider moving their point of chlorine injection post filtration and prior to the contact chamber to achieve a reduction in disinfection by product formation.

Five lead and copper samples are collected from specified locations in the distribution system once per three years. Samples are drawn from the residential cold water tap following a period in which water has stood motionless in service plumbing for at least six hours. Lead results collected from five locations in distribution on September 1, 2011 were below minimum detection levels for the contaminant. Copper results collected from the same five locations in distribution ranged between 0.024 mg/L to 0.22 mg/L. The maximum contaminant level for copper in distribution is 1.3 mg/L. Sampling results indicate the current soda ash corrosion control system is operating at an

optimized level when finished water pH is maintained between 7.4 and 7.8. Finished water pH must continue to be maintained within this range.

Long Term 2 Enhanced Surface Water Treatment Rule monitoring:

The Association has met the raw water E.coli requirements of the Long Term 2 Enhanced Surface Water Treatment Rule. This rule required bi-monthly raw water monitoring for E.coli beginning in October 2008 for one year. Results indicated that the source is not susceptible to significant fecal contamination; therefore, no additional treatment was required. Average E.coli quantitray results were 1 colony/100 ml. Additional surface water treatment would have been required if the annual average was greater than 10 colonies/100 ml.

Cross Connection Control

As per the Idaho Rules for Public Drinking Water Systems, the water system purveyor is responsible for implementation of a Cross Connection Control Program. The water system purveyor is defined as "the person, company, association who provides or intends to provide drinking water to the customers and is ultimately responsible for the public water system operation." In the case of Carlin Bay, the Association Board is considered the purveyor ultimately responsible for implementation of the program. The water system licensed operator is defined in the Rules as the operating personnel making process control/system integrity decisions about water quality or quantity that affect public health. With regard to implementation of Cross Connection Control, the licensed operators must report to the Board regarding inadequate protection of cross connections on the system. The Board is then required to implement their authority as per the Idaho Rules to ensure cross connection control issues are addressed in accordance with the Rules.

Specific Cross Connection Control Requirements are set forth in IDAPA 58.01.08.552.06 and are referenced as follows:

> *Cross Connection Control Program - Community Water Systems. The water purveyor is responsible through its cross connection control program to take reasonable and prudent measures to protect the water system against contamination and pollution from cross connections through premises isolation, internal or in-plant isolation, fixture protection, or some combination of premises isolation, internal isolation, and fixture protection. Pursuant to Section 543, all suppliers of water for community water systems shall implement a cross connection control program to prevent the entrance to the system of materials known to be toxic or hazardous. The water purveyor is responsible to enforce the systems cross connection control program. The program will at a minimum include:*
>
> ***a.*** *An inspection program to locate cross connections and determine required suitable protection. For new connections, suitable protection must be installed prior to providing water service.*
> ***b.*** *Required installation and operation of adequate backflow prevention assemblies. Appropriate and adequate backflow prevention assembly types for various facilities, fixtures, equipment, and uses of water should be selected from the AWWA Pacific Northwest Section Cross Connection Control Manual, the Uniform Plumbing Code, the AWWA Recommended Practice for Backflow Prevention and Cross Connection Control (M14), the USC Foundation Manual of Cross Connection Control, or other sources deemed acceptable by the Department. The assemblies must meet the requirements of Section 543 and comply with local ordinances.*
> ***c.*** *Annual inspections and testing of all installed backflow prevention assemblies by a tester licensed by a licensing authority recognized by the Department. Testing shall be done in accordance with the test procedures published by the University of Southern California Foundation for Cross-Connection Control and Hydraulic Research. See the USC Foundation Manual of Cross-Connection Control referenced in Subsection 002.02.*

d. *Discontinuance of service to any structure, facility, or premises where suitable backflow protection has not been provided for a cross connection.*
e. *Assemblies that cannot pass annual tests or those found to be defective shall be repaired, replaced, or isolated within ten (10) business days. If the failed assembly cannot be repaired, replaced, or isolated within ten (10) business days, water service to the failed assembly shall be discontinued.*

Carlin Bay Property Owners Association has adopted as of June 2007 a Cross Connection Control Resolution, as per Fourth Amendment, C51.00. The resolution meets the requirements of the Rule to allow for inspection of services for cross connections, require installation of approved backflow protection as necessary, require annual testing of backflow assemblies by a licensed backflow assembly tester, and provide the system authority to discontinue service when adequate backflow protection is not provided.

The document does not appear to provide the Association with the authority to discontinue service to the connection when a failed assembly cannot be repaired, replaced or isolated within ten business days as per IDAPA 58.01.552.06.e. The resolution must be amended in order to provide the Association Board with the authority to discontinue service if necessary. Please note this ten day period is considered to begin at the time the system operator is made aware of the assembly failure.

The water system operators have diligently worked to provide an inventory of cross connections at all service connections. A copy of the operators' cross connection control inventory records was provided as part of the survey process. Upon review of these records it is evident that the operators have done an excellent job moving toward full implementation of the program. However, in order to fully implement the requirement of the cross connection control program the following actions are required:

1. Initial site surveys by the licensed operators must be completed at the remaining 10 service connections identified. Adequate backflow protection must be installed and tested by a backflow assembly tester in accordance with Idaho Rules for Public Drinking Water Systems.
2. Thirteen residences require follow up inspections to determine if inadequately protected cross connections have been resolved with installation of adequate backflow protection.
3. As a requirement of the Cross Connection Control Program, the Association must ensure all backflow prevention assemblies are tested annually. Test reports must be reviewed by the licensed operator and failed assemblies must be repaired, replaced or isolated within ten days.
4. The operators have documented an auxiliary water supply at the 13778 S Timber Lane residence is not adequately protected from a cross connection with the potable supply. Due to the elevated potential for contamination created by this unprotected cross connection, this issue has been evaluated as a significant deficiency which requires prompt correction.

Administration/Management

The Association is governed by a board of directors that manage the water and sewer system as well as the roads. Association members are charged $15/month for 10,000 gallons of water; overage rates apply for usage greater than 10,000 gallons. Association members also pay an additional $20 per month to a general fund which may be used to fund drinking water improvements. Current water rates are low in comparison to most water rates in the region. The Department strongly recommends current water rates be evaluated to ensure adequate funds are collected in preparation for future water system capital improvement costs. Existing water infrastructure including the raw water pumps, surface water treatment system, booster pumps, main and reservoirs have been utilized for over 30 years. It is strongly recommended the Association evaluate set aside funds to ensure water rates are set accordingly to provide for water system component replacement in the future.

Operator Licensing

The water system is currently under the direct supervision of Water Treatment Level II certified operators, Dave Banks and Terry Crawford. There are four additional unlicensed operators who assist with the water system and work under the direct supervision of Dave Banks and Terry Crawford.

Conclusion

The Carlin Bay Community Water System was found to be well operated and managed and is in substantial compliance with the Idaho Rules for Public Drinking Water Systems. The system will be considered to be operating in full compliance with the Rules once the items listed below are addressed. The Carlin Bay pressure sand direct filtration plant is the only remaining treatment plant of its type in the northern Idaho region. This is in large part due to the complexity of this type of filtration. The designated licensed operators in charge, Dave Banks and Terry Crawford are to be highly commended for their continued successful operation of the plant. The entire system was found to be run in a highly professional and organized manner. The operators take their responsibility of providing safe drinking water to the Carlin Bay Property Owners Association seriously, and their efforts are much appreciated by the Department.

Please find summarized below the significant deficiency, deficiencies, additional requirements and recommendations noted at the time of the field inspection. Within 45 days of receipt of this report, please contact me to discuss options for correction of issues identified below. Within 120 days of receipt of this report, please submit a written timeline in which the water system intends to address these issues.

Significant Deficiency

1. The service connection at 13778 S Timber Lane has an unapproved auxiliary service plumbed to the potable drinking water supply. Adequate approved backflow protection is not provided. This poses a significant health hazard which requires correction within 30 days of receipt of the survey report.

Deficiencies

1. Initial site surveys by the licensed operators must be completed at the remaining 10 service connections identified. Adequate backflow protection must be installed and tested by a backflow assembly tester in accordance with Idaho Rules for Public Drinking Water Systems.
2. Thirteen residences require follow up inspections to determine if inadequately protected cross connections have been resolved with installation of adequate backflow protection.
3. As a requirement of the Cross Connection Control Program, the Association must ensure all backflow prevention assemblies are tested annually. Test reports must be reviewed by the licensed operator and failed assemblies must be repaired, replaced or isolated within ten days.

Additional Requirements

1. Automated control valves must continue to be maintained and replaced as necessary.
2. The flow restrictor on the backwash feed line for filter train #2 and #4 must be inspected and if necessary repaired or replaced.
3. An EPA approved pH meter must be used to record pH levels entering distribution.
4. Future contact time calculations must be based on 105 minutes of minimum available contact time.
5. The Midway reservoir roof must be recoated to ensure the reservoir remains water tight.
6. The Upper reservoir corner requires repair.
7. The water system must continue to flush dead end mains at a frequency no less than twice per year.

8. Sampling results indicate the current soda ash corrosion control system is operating at an optimized level when finished water pH is maintained between 7.4 and 7.8. Finished water pH must continue to be maintained within this range.
9. The Association's cross connection control resolution must be modified to provide authority to discontinue service to a service connection when a failed assembly cannot be repaired, replaced or isolated within ten business days.

Recommendations

1. The raw water intake pumps and other water system components identified in the report have been in service for over thirty years and are likely approaching the end of their useful life. The Department recommends the Association review their current rate structure to ensure it allows for set aside of adequate funding for future capital improvements.
2. It is recommended the intake be inspected by a diver to assess the construction and current condition.
3. It is recommended the Association contact Yvonne Pettit to discuss source water protection measures which may be implemented at the intake.
4. The system may wish to consider moving sodium hypochlorite injection to post filtration and prior to the contact chamber in order to achieve a reduction in disinfection by product formation.
5. All system valves must be exercised at a frequency of no less than once per year.

July 8, 2013

Drinking Water Program Supervisor | Date