State of Utah

GARY R. HERBERT
Governor

SPENCER J. COX
Lieutenant Governor

Department of
Environmental Quality

L. Scott Baird
Executive Director

DIVISION OF DRINKING WATER
Marie E. Owens, P.E.
Director

August 20, 2020

Rodger Smith
Highland Subdivision Water System
5880 North Highland Drive
Mountain Green, Utah 84050

Subject: **Inspection Report**, Johnson Well No. 1 (WS005) Inspection and 160K Tank (ST002) and 250K Gordon Creek No. 1 (ST003) Tank Repair Inspection;
Highland Subdivision Water System, System #15005, File #7100

This report is not Plan Approval for construction nor is it an Operation Permit for operating approval.

Mr. Smith:

The Division of Drinking Water (the Division) conducted a final site inspection for the Johnson Well No. 1 (labeled as WS005 within the Division database) and inspection of recent tank repairs to 160K Tank (labeled as ST002 within the Division database) and 250K Gordon Creek No. 1 (labeled as ST003 within the Division database) on August 4, 2020.

Whisper Ridge Booster Pump Station (PF001)

This site inspection also included review of the outstanding Whisper Ridge Booster Pump Station, reviewed under Division File #7267. The Whisper Ridge Booster Pump Station Plan Approval has expired and Highland Subdivision water system must resubmit plans and specification if they wish to complete this project in the future.

System Source Capacity

The Division also discussed the outstanding Source Capacity deficiency (S094) associated with the water system. Details were discussed with Highland Subdivision water system staff on how the Division would be reanalyzing the capacity calculations for the water system utilizing Division of Water Rights (DWRi) water use data. Subsequent to these discussions, Rodger Smith requested and the Division agreed to use ten years of recorded water data to account for

annual hydrologic variations of the springs. Rule stipulates a minimum of three years of monthly flow is required but more can be used to justify drought and seasonal conditions as needed. The Division received copies of the DWRi information for the past 10 years on August 6, 2020, from Rodger.

This topic is being reviewed under a separate Division File #12203.

Chlorination Discussion

A system's pathogen treatment effectiveness is typically expressed in terms of log10 removal or inactivation. For example, primary disinfection of a groundwater source is demonstrated by meeting a 4-log10 inactivation for virus. The level of inactivation by disinfection is calculated by taking the disinfection residual concentration (C) multiplied by the contact time (T), and is referred to in terms of CT. For groundwater sources that must have continuous disinfection, a minimum CT of 12 is required for 4-log virus inactivation for water pH ranges between 6 and 9 and a worst-case scenario of water temperature of 0.5°C.

In light of recent water quality sampling the Division will be reviewing the CT calculations for the Gordon Creek Chlorinator, known as TP002 within the Division's database. The Division viewed the Gordon Creek Chlorinator (TP002), seen in the attached photos 16 through 18, located near the Gordon Creek Tanks. The flow meter shown in Photo 17 was identified as the point where DWRi flow data for all the current Highland Subdivision's sources is recorded. This flow meter measures the flow of water treated by the Gordon Creek Chlorinator (TP002) and delivered to the water system's tanks in parallel.

Please note that the Division's review of estimated CT information is limited to the disinfection CT that can be achieved in a worst-case scenario based on the current system configuration. The worst-case scenario disinfection CT estimate does not reflect the actual CT achieved during ongoing operation.

Highland Subdivision water system may be required to monitor and report the actual CT achieved when Gordon Creek Chlorinator (TP002) is in operation in the event Highland Subdivision water system wishes to continue to use Spring 5 of the Gordon Creek Spring 7 (WS003). The actual CT values are compared to the CT associated with the required log treatment to determine compliance.

The Division estimated worst-case scenario disinfection CT in 2010 before the chlorinated water reaches the "Point of Entry (POE) to distribution system" or the samples site 002 as 16.4 which meets the 4-log virus inactivation goal. See the attached CT letter for further details on the how the Division arrived at this estimate.

Staff met with Kent Wilkerson on August 14, 2020 and an updated disinfection CT sheet was provided on August 17, 2020. The updated calculation reduced the storage of the clear well resulting in a CT of 12 according to the water system.

Discussion during the site visit indicated that the water system is installing SCADA which will provide the water system the data necessary to continuously monitor the CT calculations. The Division will be contacting Highland Subdivision to request additional information on instantaneous peak demand data, tank elevation data, and water characteristics (pH and temperature) to be able to re-evaluate and update the CT calculations information for the water system. This information will be reviewed under Division File #12204.

While the Division gathers this data and completes our review, **we are requesting you to turn out all spring flow from Spring Box 5 which is one of seven springs that are identified as Gordon Creek Spring 7 (WS003)** within the Division's database. Spring Box 5 was the location of an *E. coli* positive water sample collected on May 28, 2020. Until the Division can verify sufficient disinfection (CT) is being achieved, the use of water from Spring Box 5 is putting the public at risk of potentially unsafe drinking water.

The Division's recommendation is for the System to continue sampling Spring Box 5 even when the flows are not being utilized by the drinking water system. It is believed that this action will help establish additional data to verify water quality of this portion of Gordon Creek Spring 7 (WS003) source water. A separate investigation will be completed by the vulnerable source committee to determine the finding and requirements for Spring Box 5.

<u>Johnson Well No. 1 (WS005)</u>

The history of the Johnson Well No. 1 Division review is described below:

- The Division issued the original well equipping approval for Johnson Well #1 on June 16, 2015. The approved design in 2015 included a gas chlorinator in the well house. This proposed well is identified as WS005 in the Division's inventory database.
- The Division issued Amended Plan Approval for the equipping of Johnson Well No. 1 on July 5, 2017. The proposed design submitted to the Division in 2017 did not include a gas chlorinator.
- The Division issued a Plan Approval Extension on July 5, 2018 for one year.
- In July 2019, Highland Subdivision water system requested and was granted a second extension of the Johnson Well No.1 Plan Approval for one year. The second extension included documentation, that due to the time lapse of the original approval in 2015, the Division may need to re-evaluate the well's safe yield and approved capacity.
- An Operating Permit was requested on July 21, 2020.

The Division's understanding of the Johnson Well No. 1 project was for the water system to develop a second ground water source. Johnson Well No 1. was equipped with a 265-gallon-per-minute (gpm) 40-horsepower (HP) submersible Grundfos pump. The constant rate aquifer drawdown test of the Johnson Well #1 was conducted at 2,150 gpm. The Preliminary Evaluation Report considered a maximum pump rate of 500 gpm.

Based on the discussions regarding the operations of the well, additional documentation regarding what depth the Grundfos pump will be set at during operations is required.

The proposed well pump will pump directly to the lower zone distribution system (currently fed by the existing Gordon Creek Springs 1 & 2, WS002 & WS003). Approximately 100 linear feet of 12-inch Schedule 80 PVC water line was constructed to connect the well to the existing system lowest pressure zone. Photos 19 through 38, of the attached photo log, document the Johnson Well No. 1.

We have received the following information for the Johnson Well No 1. project:

1. Certification of Rule Conformance with plan approval conditions by a professional engineer and changes made during construction were in conformance with rules R309-500 through 550.
2. As-built or record drawings.
3. Satisfactory bacteriological results as evidence of proper disinfection and flushing.
4. Evidence of O&M manual delivery.
5. Legal representative for the water system Wendy Crowther's update on pending litigation regarding the Johnson Well No. 1.

The site inspection identified several deficiencies regarding the well head:

1. Well head casing vent capped
    a. Photo 23 shows the well head casing vent bolted at the time of the inspection. Division staff recommended the installation of a casing vent to ensure more efficient pumping of the well.
    b. Photos 25 and 26 show the installation of a well casing vent per Division recommendation. This photo documentation was supplied to the Division on 8/5/20.
2. Transducer piping not secured on well head
    a. Photo 24 shows the temporary piping and taping placed on the well head transducer slot of the well head that was witnessed by Division staff at the time of the inspection.
    b. Photos 36 through 38 show the transducer installed on the well head and all the connections sealed appropriately per photo documentation supplied on 8/7/20.
3. Inadequate venting on discharge piping
    a. Photo 29 shows the single vent cap that had inadequate spacing that was witnessed by Division staff at the time of the inspection.
    b. Photos 27 and 28 show the replacement made per staff recommendation on 8/5/20 by email photo documentation

The site inspection identified the following items that the Division needed further information on before we can issue an Operating Permit for the Johnson Well No. 1 (WS005):

- Documentation showing the Johnson Well No. 1 is clear of litigation
- Additional documentation detailing the SCADA set points and what controls will be defined to control the function of the Johnson Well No. 1.

Emails from Marjalee Smith from the water system, Kent Wilkerson, and Wendy Crowther provided the additional clarification on the operations of the Johnson Well No 1. regarding the existing system and pressure controls and documentation on the litigation as of August 12, 2020.

The Division will complete the review of the Johnson Well No. 1 Operating Permit request.

Compliance

Division staff inspected the Gordon Creek Chlorinator (TP002) during the August 4, 2020 site inspection. Staff witnessed the installed automatic switch over on the chlorinator, see photo 16. The installation of this equipment addresses the existing IPS deficiency TD001, for lacking continuous disinfection automatic switch over.

Tank Repairs 160k Tank (ST002) and 250K Gordon Creek No. 1 (ST003)

The Highland Subdivision water system submitted photo documentation of the surface repairs to the 160k Tank (ST002) and 250K Gordon Creek No. 1 (ST003) on July 10, 2020. These surface repairs were identified in the 2018 Sanitary Survey by Elden Olsen.

Photos 1 through 12 of the attached photo log detail the before photos of various cracks supplied to the Division and the site photos taken by Division staff on the August 4, 2020 inspection.

The majority of the cracks on 160k Tank (ST002) appear to have been correctly repaired. Photo number 3 shows the southern corner of the tank where surface cracks have reappeared on the recent patch. Division staff discussed with water system staff how the cracks should be repaired with a more elastic patch to ensure a proper seal is maintained over the crack.

The repairs on 250K Gordon Creek No. 1 (ST003) were already showing signs of seepage stains. Division staff discussed how these stains are clear evidence that surface repairs from the outside are insufficient to repair cracks and that these cracks must be repaired from inside the tank. See photos 8 through 12 for photo documentation of the repairs as witnessed by Division staff on August 4, 2020.

Division staff detailed how any repairs inside the tank met the definition of a Drinking Water Project as defined in Rule R309-500-5(1) as any of the project that includes the construction of, addition to, or modification of a public drinking water facility that may affect the quality or quantity of water delivered. Drinking Water projects must have Division plan approval before construction and receive an Operating Permit from the Division before being placed into service.

The Division cannot recommend the removal of IPS points associated with surface repairs to the 160k Tank (ST002) and 250K Gordon Creek No. 1 (ST003) as the tanks need additional repairs before drinking water is fully protected.

In addition, the Division will be modifying the IPS violation code for 250K Gordon Creek No. 1 (ST003) to V017 [STORAGE TANK SUBJECT TO CONTAMINATION DUE TO UNSEALED

OPENINGS ON TANK ROOF OR SIDEWALLS] per R309-545-6(1) and 545-9(1) due to the excessive seepage documented at the site during the August 4, 2020 inspection.

If you have any questions regarding this report, you can contact me either by phone at (385) 271-7039, or at chparker@utah.gov

Sincerely,

Cheryl Parker, P.E.
Environmental Engineer III

cp/mdb

attached: Photo log, 2-1-2010 CT, inspection questions

cc: Rodger Smith, Highland Subdivision water system, rodgersmithone@hotmail.com
Nate Hadley, Highland Water Company, highlandsn8@gmail.com
Marjalee Smith, Highland Water Company, marjaleesmith@hotmail.com
Kent Wilkerson, Cascade, cascadecivil@outlook.com
Lance Evans, Morgan-Weber County, levans@morgan-county.net
Michelle Cook, Morgan-Weber County Health Department, mcooke@co.weber.ut.us
Marie Owens, Division of Drinking Water, mowens@utah.gov
Bret Randall, State of Utah Attorney General Office, bfrandall@agutah.gov
Cheryl Parker, Division of Drinking Water, chparker@utah.gov
Jennifer Yee, Division of Drinking Water, jyee@utah.gov
Ryan Dearing, Division of Drinking Water, rdearing@utah.gov
Colt Smith, Division of Drinking Water, acsmith@utah.gov
Michael Newberry, Division of Drinking Water, mnewberry@utah.gov
Luke Treutel, Division of Drinking Water, ltreutel@utah.gov

DDW-2020-018968

	
Photo 1 Tanks cracks prior to patch (ST002)	**Photo 2** Repairs with fresh cracks (ST002)
	
Photo 3 Repairs with fresh cracks (ST002)	**Photo 4** Repairs with fresh cracks (ST002)

Photo 5
Repairs with fresh cracks (ST002)

Photo 6
Repairs with fresh cracks (ST002)

Photo 7
Repairs with fresh cracks (ST002)

Photo 8
Repairs with fresh seepage signs (ST003)

	
Photo 9 Repairs with fresh seepage signs (ST003)	**Photo 10** Repairs with fresh seepage signs (ST003)
	
Photo 11 Repairs with fresh seepage signs (ST003)	**Photo 12** Gordon Creek 250k No 1(ST003)

	
Photo 13 160k Tank (ST002)	**Photo 14** 160k Tank (ST002) Overflow (white) and Drain (green)
	
Photo 15 160k Tank (ST002) Drain screened	**Photo 16** Gordon Creek Chlorinator (TP002) new automatic switch over

	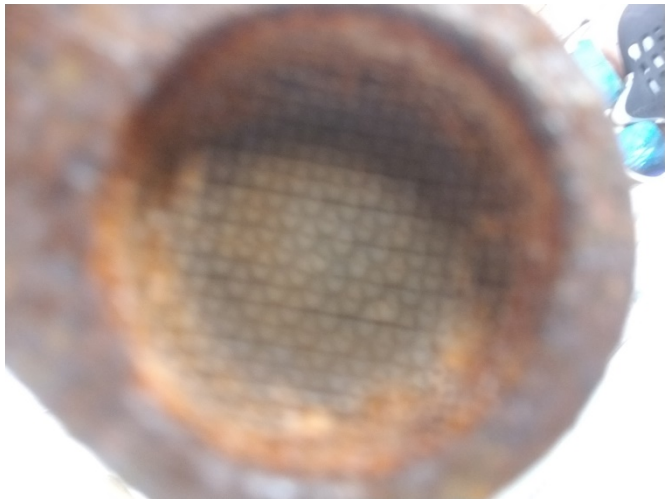
Photo 17 Gordon Creek Chlorinator (TP002) flow meter and dosing point	**Photo 18** Gordon Creek Chlorinator (TP002) air vac screen
	
Photo 19 Johnson Well No1 (WS005) building	**Photo 20** Johnson Well No1 (WS005) gate

	
Photo 21 Johnson Well No1 (WS005)	**Photo 22** Johnson Well No1 (WS005) wellhead
	
Photo 23 Johnson Well No1 (WS005) well head casing vent recommendation	**Photo 24** Johnson Well No1 (WS005) transducer piping not secure

	
Photo 25 Johnson Well No1 (WS005) well head casing installed (8/5/20)	**Photo 26** Well casing vent screen (8/5/20)
	
Photo 27 Johnson Well No1 (WS005) discharge line vent (8/5/20)	**Photo 28** Discharge vent line replaced (8/5/20)

	
Photo 29 Original Johnson Well No1 (WS005) discharge line vent, needed vent gap cleared	**Photo 30** Johnson Well No1 (WS005) discharge line/ check valve
	
Photo 31 Discharge Line air vac	**Photo 32** Johnson Well No1 (WS005) pump to waste

	
Photo 33 Johnson Well No1 (WS005) vfd controls	**Photo 34** Johnson Well No1 (WS005) pump to waste screened
	
Photo 35 Johnson Well No1 (WS005) pump to waste air gap	**Photo 36** Johnson Well No1 (WS005) Transducer installed 8/7/20

	
Photo 37 Johnson Well No1 (WS005) Transducer installed 8/7/20	**Photo 38** Johnson Well No1 (WS005) Transducer installed 8/7/20