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www.healthoregon.org/dws

January 17, 2024 – **Revised 2-27-2024**

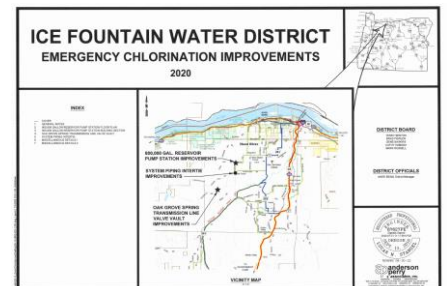
Lucas Stangel
lstangel@andersonperry.com
Anderson Perry
1901 N. Fir Street
La Grande, Oregon 97850

Letter sent by email only.

Re: **Emergency Chlorinator & Oak Grove Spring Intertie – PR# 13-2021**
Ice Fountain Water District – PWS # 00387
Final Approval

Dear Mr. Stangel

Plans and bidding/contract documents related to the above project were submitted to our office on January 28, 2021 and an \$825 plan review fee payment was received on January 25, 2021. On January 15, 2024, I received the *Project Final Approval Request Form* verifying that the above emergency chlorination system and related intertie work was completed March 2, 2021, and has been operational since February 16, 2021, however, has not yet needed to be used. This verification completes the plan review requirements.



Final approval is issued at this time, and the emergency disinfection system for the Oak Grove spring is approved for emergency use. Since the project involved valve and intertie connections to allow the emergency connection of the Oak Grove spring (having a history of e-coli detections **and partial 2013 reconstruction that does not exclude surface water**), **our office should be notified prior to use and the spring needs to be disconnected when emergency use is no longer needed. Additionally, the services served prior to the chlorination system the entire system** will need to be on a boil notice during emergency use and you will need to coordinate with our office to ensure flushing, disinfection, and testing is done prior to lifting the boil water notice and stopping emergency chlorination (I recommend a procedure be developed for this). Refer to the contact time and CT calculations on page 2 of this letter and contact me at 971-200-0288 if you have questions.

Sincerely,

Evan Hofeld, Regional Engineer, evan.e.hofeld@oha.oregon.gov
OHA-Drinking Water Services
CC: Chris True, Ice Fountain Water District: ctrue@hrecn.net

Contact Time & CT Calculations:

There are several services and distribution piping between the spring source and the point of chlorine injection at the emergency chlorinator system. Although, the emergency chlorinator system affords a higher level of protection for the bulk of the water system, the **distribution piping and services prior to disinfection whole system** would be exposed to potentially e-coli contaminated **surface water** and would therefore, need to be on a boil water notice. **That line the system** would also need to be flushed and tested prior to allowing that system to be placed into normal operation, even though the 800,000-gallon reservoir provides adequate contact time for **4.0-log viral** disinfection under most scenarios (refer to CT calculations table). **This was discussed with the District during the design and on 2/27/2024, and they are aware of needing to place those customers all customers on a boil notice in the event they use the Oak Grove spring.**

Hofeld Evan E

From: Lucas Stangel <lstangel@andersonperry.com>
Sent: Thursday, September 9, 2021 10:47 AM
To: Hofeld Evan E
Cc: Ice Fountain Water District
Subject: Ice Fountain Call
Attachments: IceFountain.zip

Think twice before clicking on links or opening attachments. This email came from outside our organization and might not be safe. If you are not expecting an attachment, contact the sender before opening it.

Evan,
 As a follow up to our call, I have attached the existing water system mapping for Ice Fountain. I was also able to find that the capacity of the pump at the 800,000-gallon reservoir that pumps water to the York Hill Reservoir is 200 gpm. Based on the contact time calculations sent in January, that leaves approximately 1,693 gpm available for the rest of the system fed by gravity from the 800,000-gallon reservoir.

As mentioned on the call, the Emergency Chlorination System is for a significant emergency where both the Ice Fountain Spring and the City of Hood River's supply are not useable. The Oak Grove Spring and emergency chlorination system will not be used on a regular basis and hopefully will never be used.

Let us know if there is anything else that you need from us.

Thanks,
 Lucas

Lucas Stangel, P.E.
 Project Engineer
 Anderson Perry & Associates, Inc
 1901 N Fir Street/PO Box 1107
 La Grande, OR 97850
 541-963-8309(Office)
 541-805-9381(Call/Text)

Ice Fountain - Oak Grove Spring Emergency Disinfection (boil water notice is still needed for services along supply line between the Oak Grove Spring (SRC-CA) and the point of disinfection. The spring supply line would also need to be isolated, disinfected, and tested for coliform bacteria once emergency use is concluded and prior to placing the main back into normal service). Oak Grove Spring should be physically disconnected when not in use.						WTP-C	WTP-C - calcium hypochlorite applied at the Inlet to the 0.8 MG York Tank	
System Name:	Ice Fountain Water District	ID#: 41	00387	Month/Year:	Sep-21	4.0-log viral and 0.5-log Giardia inactivation	0.5	
Tank Volume:	666,660 gallons @ 20-ft	York Tank (0.8 MG @ 24-ft)	Baffling:	0.1	Estimated	Effective Volume:	66,666	
	Minimum Cl ₂ Residual at 1st User (C) ³ [ppm or mg/L]	Contact Time (T) [minutes]	Actual CT C X T	Temp [° C]	pH	Required CT formula	CT Met? ³ Yes / No	Peak Hourly Demand Flow [GPM]
	0.68	33	22.7	7.0	7.00	22.7	YES	2,000
	0.65	35	22.8	7.0	7.00	22.6	YES	1,900
	0.61	37	22.6	7.0	7.00	22.5	YES	1,800
	0.58	39	22.7	7.0	7.00	22.4	YES	1,700
	0.54	42	22.5	7.0	7.00	22.3	YES	1,600
	0.5	44	22.2	7.0	7.00	22.2	YES	1,500

The CT calculations table shown → used the following assumptions:

- ✓ 33,330 gallons/ft of depth in tank (800,000 gallons / 24-ft max tank level)
- ✓ 20-ft level in the 800,000-gallon tank (The low-level point at which the altitude valve is set to allow filling the tank)
- ✓ 10% baffling factor
- ✓ 0.5-log Giardia inactivation requirement (also achieves 4.0-log viral disinfection).
- ✓ pH = 7.0
- ✓ Water temperature = 7°C

anderson perry & associates, inc.

Client: Ice Fountain Water District Job No. 28-13
 Project: Emergency Chlorination Improvements
 Designed By: LS Ck. By: DW Date: 01/28/21 Page 1 of 1

Determine: Ability of 800,000 gal reservoir to achieve adequate CT for Oak Grove Spring

Given:

- Existing reservoir has a volume of 800,000 gallons.
- A 3.0 log removal for giardia also meets the 4.0 log removal for viruses.
- Recorded water temperatures are greater than 7°C (45°F).
- Peak Flow from the Oak Grove Spring is 200 gpm.
- Use table E-2 and E-3 from EPA's Guidance Manual Disinfection Profiling and Benchmarking to determine required CT value.

Assumptions:

- Water pH is 7.0
- Chlorine residuals maintained at a minimum of 0.5 mg/L prior to entering 800,000 Reservoir.
- The inlet/outlet piping in the reservoir will provide adequate mixing conditions based on the 1998 Ice Fountain Water District Reservoir and Control Building record drawings. Use a conservative reservoir baffling factor of 0.6.

Calculations:

A) Interpolate CT value for 3.0 log removal of giardia with 0.5 mg/L chlorine concentration at 7° C

Chlorine Concentration	pH=7.0 @ 5°C	pH=7.0 @ 7°C	pH=7.0 @ 10°C
	3 log inactivation	3 log inactivation	3 log inactivation
<= 0.4	139	125	104
0.5	141	126.8	105.5
0.6	143	128.6	107

CT required to achieve 3.0 log inactivation = 126.8

B) Equations: $\frac{Volume (V)}{Flow Rate (Q)} = Time (T)$ $Time (T) * 0.5 \frac{mg}{L} = CT$

Calculations (Back Calculate to Find Max Flowrate to Achieve Adequate CT):

Reservoir Volume = 800,000 gal * 0.6 (baffling factor) = 480,000 gal

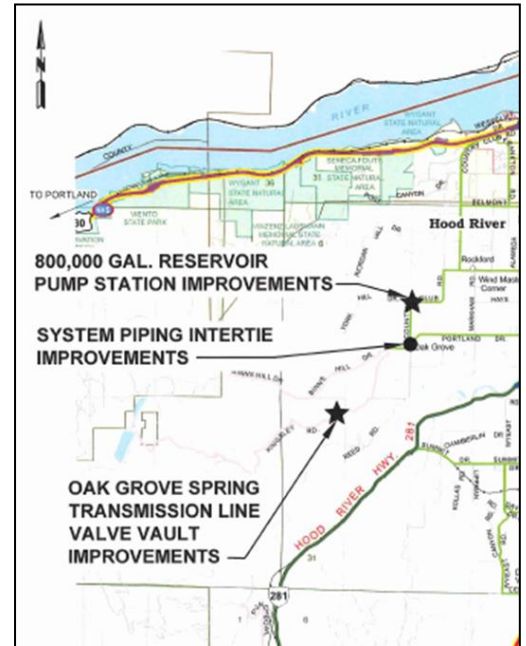
T = 126.8 / 0.5 mg/L = 254 min

254 min = 480,000 gal / 254 min = 1,893 gpm

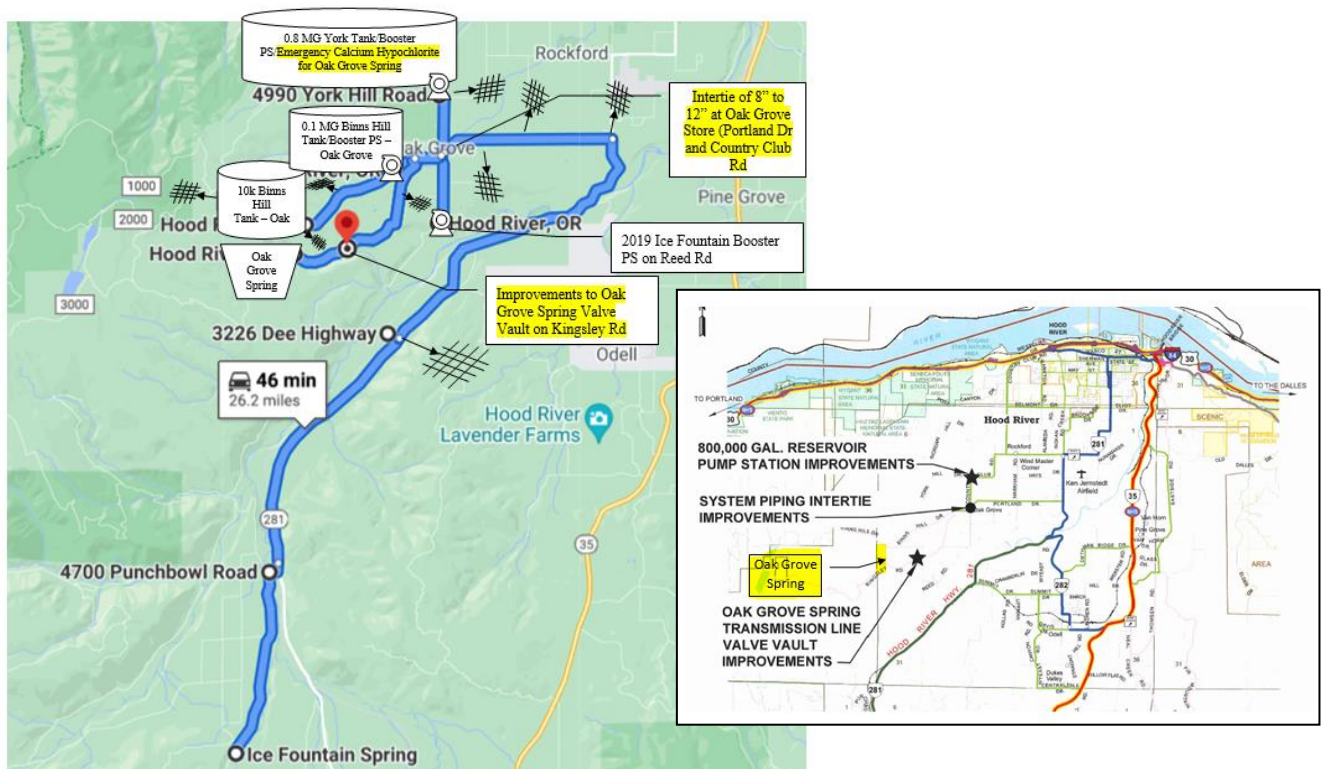
Conclusion: Knowing that the 800,000 reservoir can provide adequate CT in order to achieve 3.0 log inactivation of Giardia at a flowrate of 1,893 gpm, there is high confidence that the reservoir will provide adequate CT at the proposed flowrate from the Oak Grove Spring of 200 gpm.

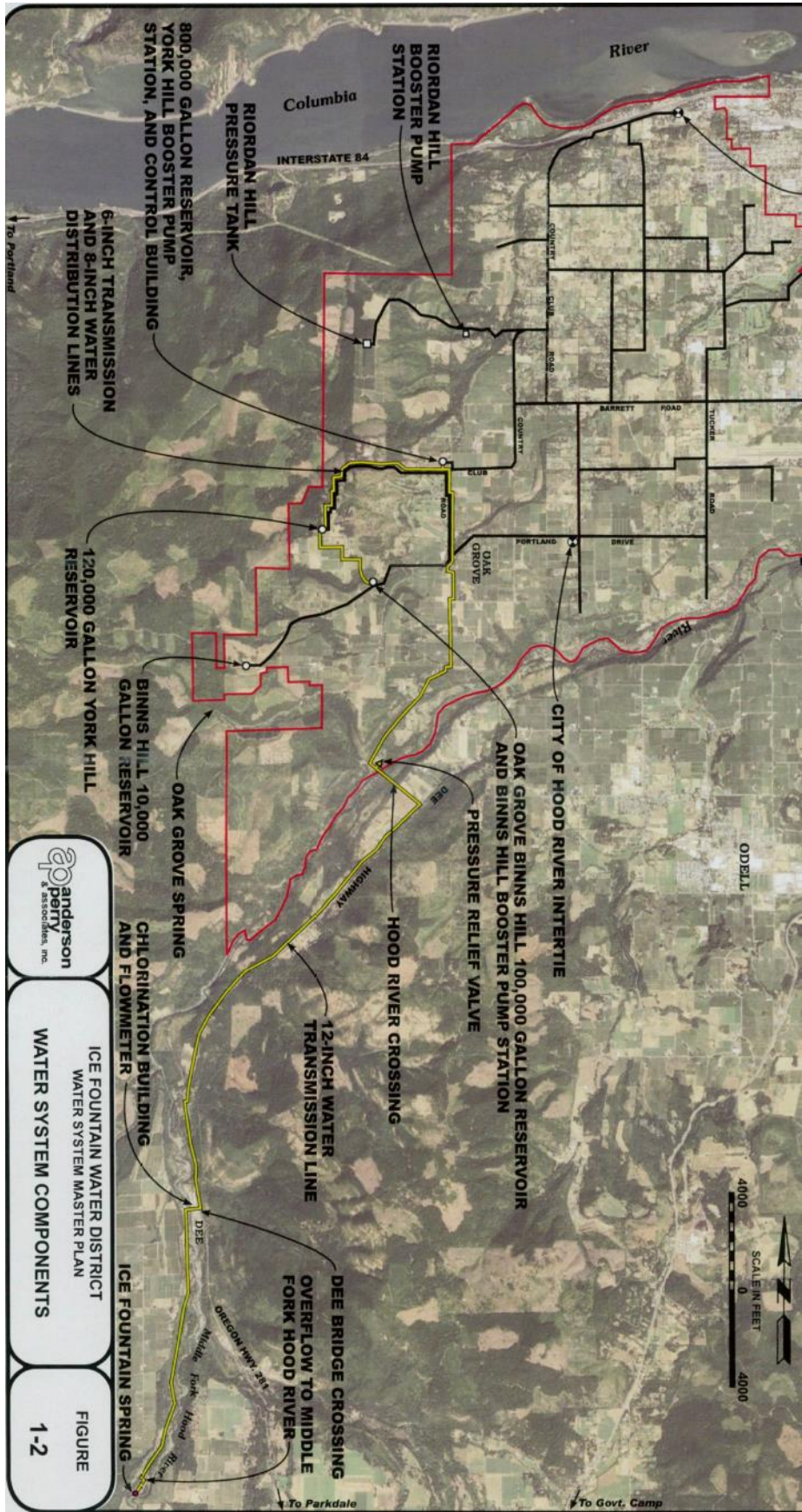
Project description:


The project consisted of the following 3 elements designed to enable the use and chlorination of water from the Oak Grove Springs (previously disconnected due to the presence of e-coli contamination **and failed attempts to reconstruct to exclude surface water**) for emergency use only:



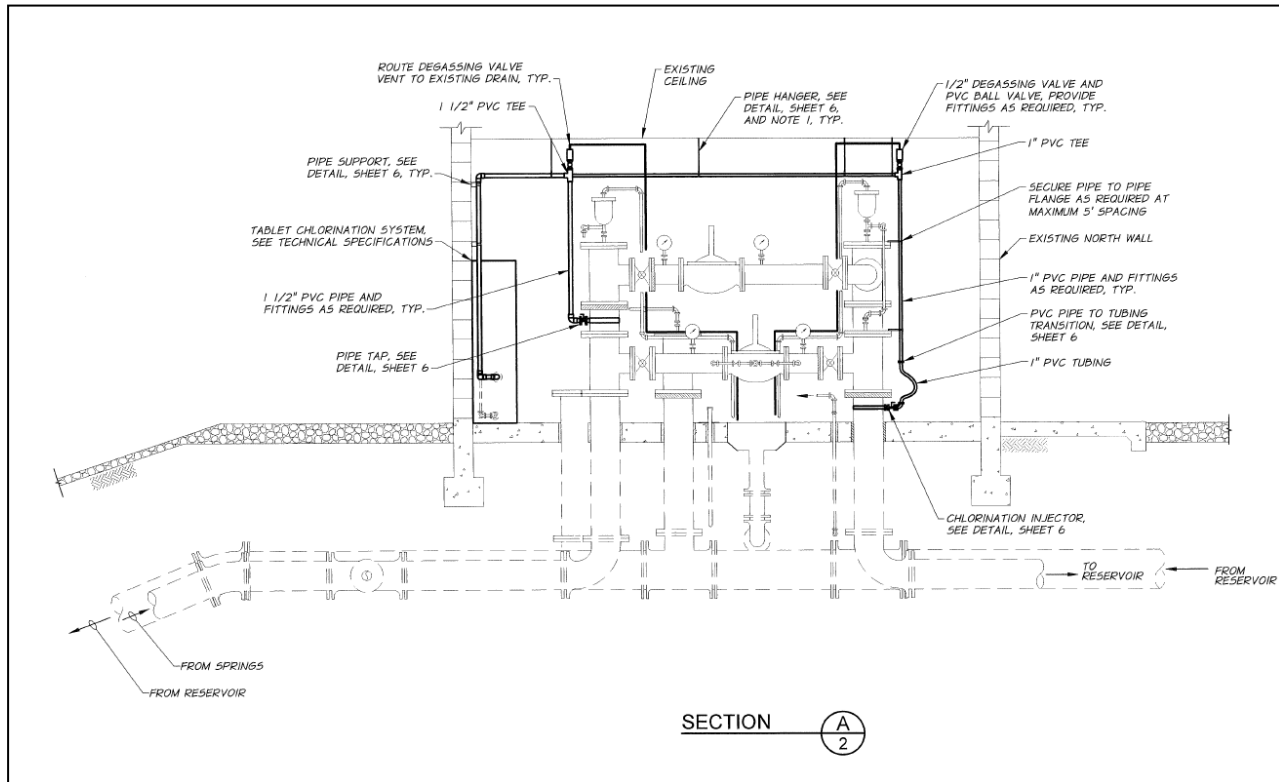
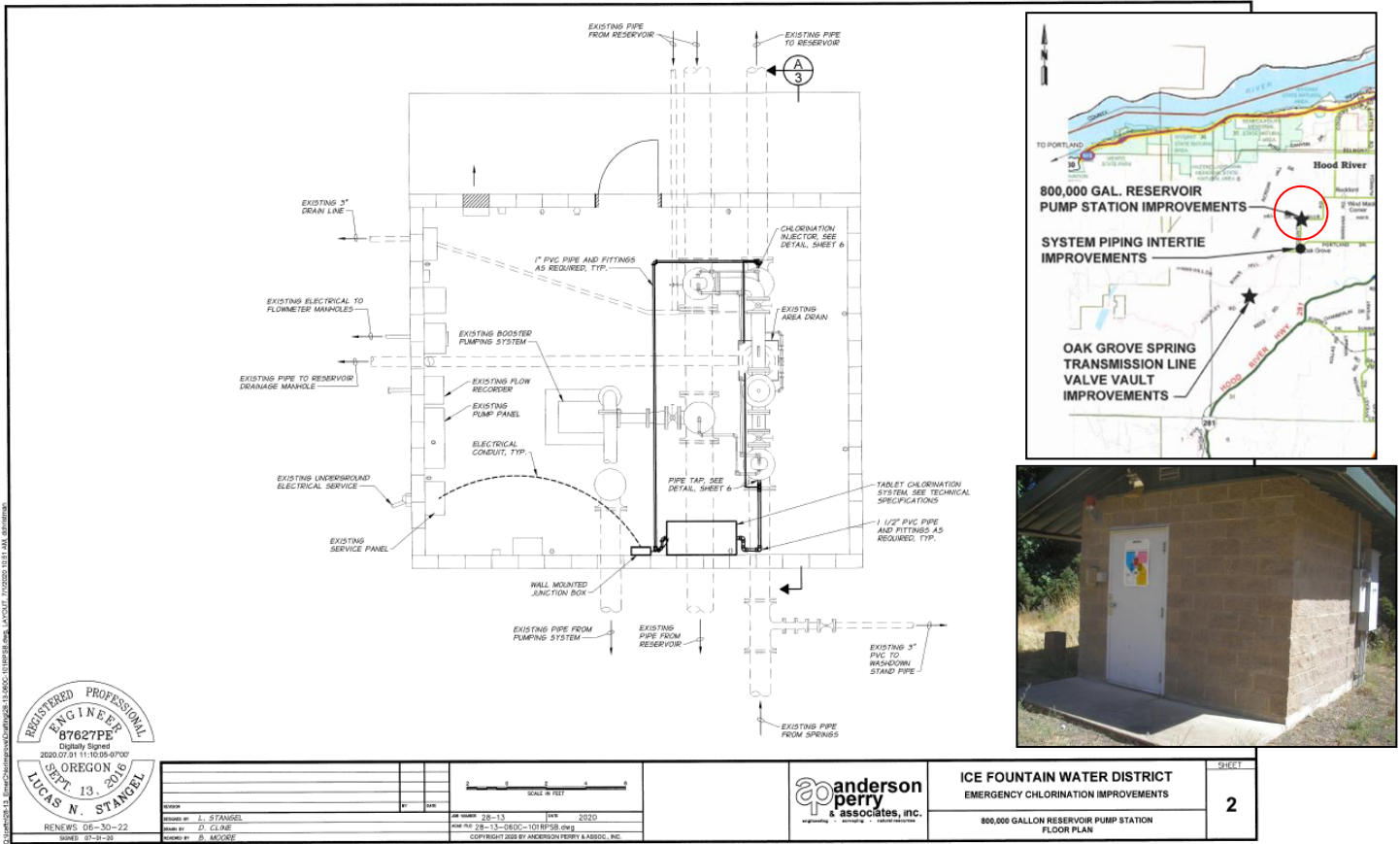
- 1) 800,000-Gal reservoir pump station improvements consist of installing a calcium hypochlorite tablet chlorinator system within the existing booster pump station that pumps water from the 800,000-gallon reservoir to the existing 120,000-gallon York Hill Reservoir). The chlorinator system pulls carrier water from the spring supply to dissolve the chlorine tablets and injects chlorine in the downstream piping as water flows to fill the 800,000-gallon reservoir. Chlorinated water from the reservoir then flows back to the same pump station and either flows to via gravity to distribution or uses the two 200-gpm pumps to fill the 120,000-gallon York Hill Reservoir. Altitude valves are set to allow filling at 20-ft and stop filling at 23-ft in the 800,000-gallon reservoir, which has a max water level of 24-ft (800,000 gallons/24-ft is roughly 33,330 gallons/ft, yielding a minimum volume of 666,660 gallons at 20-ft).
- 2) System piping intertie improvements consist of installing an intertie between the waterlines running in front of the oak grove store at the intersection of Portland Dr. and Country Club Rd. to better enable flow from the Oak Grove Springs to supply the system.
- 3) Improvements to the Oak Grove Spring transmission line valve vault on Kingsley Rd include adding two butterfly valves to enable water from the Oak Grove Springs to supply the system during an emergency. When not in use, the pipe between the valves is separated by blind flanges.



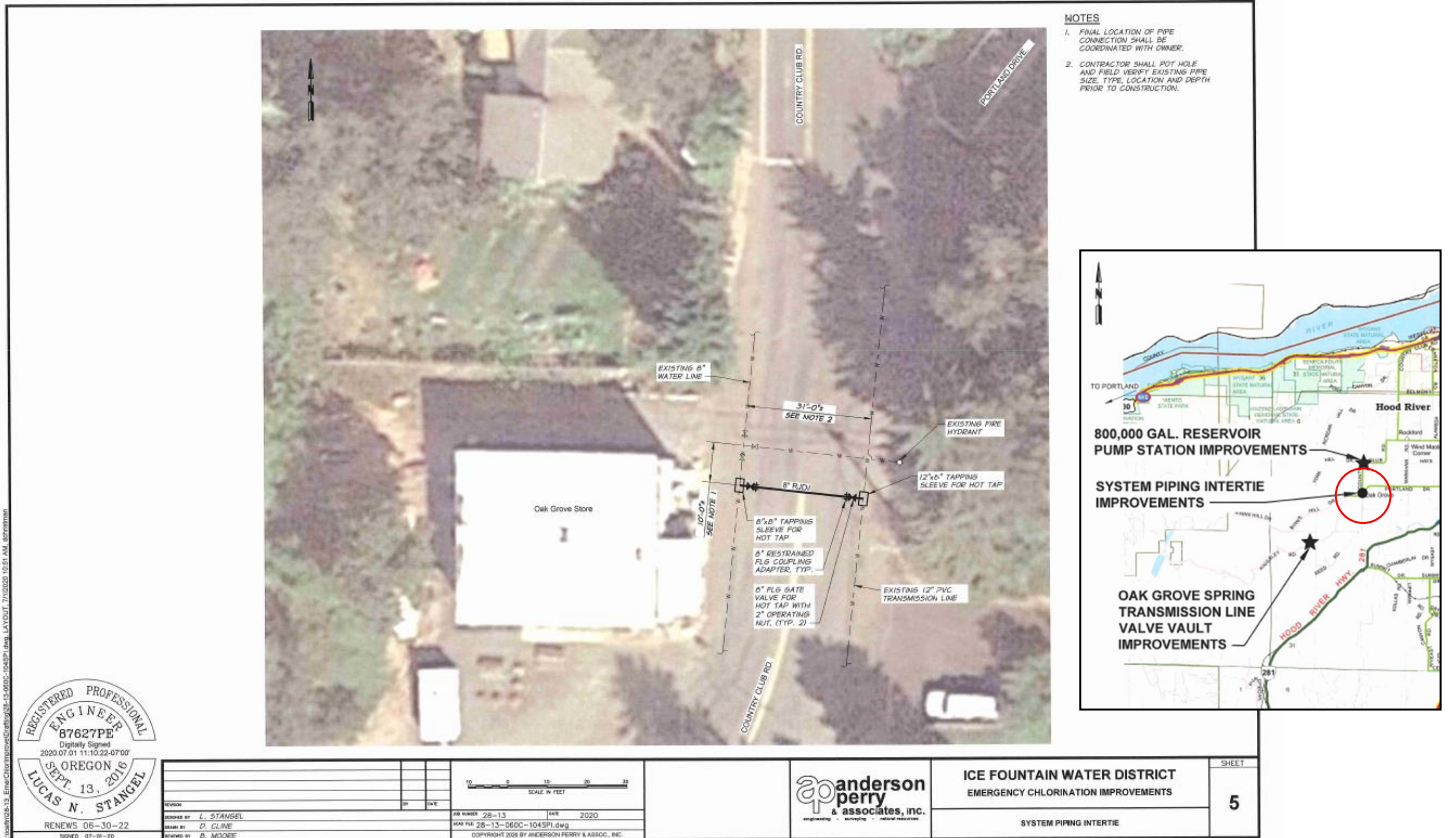



 ICE FOUNTAIN WATER DISTRICT
 WATER SYSTEM MASTER PLAN
 WATER SYSTEM COMPONENTS
 FIGURE
 1-2

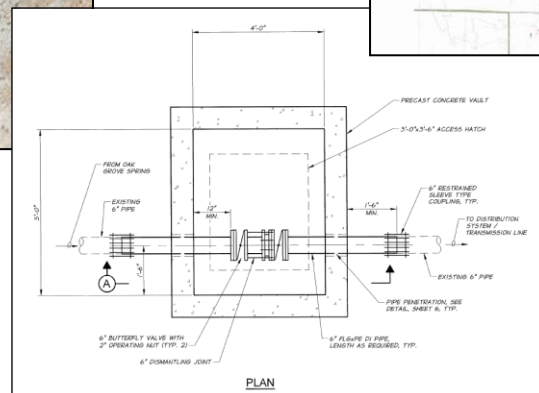
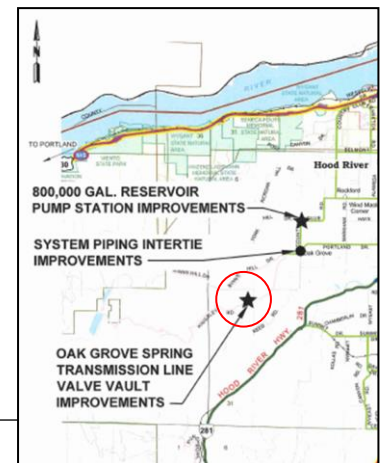
1) 800,000-Gal reservoir pump station chlorination system plans received January 28, 2021:



2) System piping intertie:





3) Oak Grove Spring Valve Vault (see clarification on final configuration on last page):



The changes to the vault include moving the butterfly valves outside of the vault and changing the vault to a manhole. However, the constructed improvements provide the same intent as what is shown in the submitted plans shown to the right.





Project Final Plan Approval Request form received January 15, 2024:

	<p>Drinking Water Services Project Final Approval Request Form</p>	<div style="background-color: #0070C0; color: white; padding: 5px; display: inline-block; border-radius: 3px;">Print</div>																										
<p>Project Name <u>Emergency Chlorination Improvements - 2020</u></p>		<p>PR# <u>13-2021</u></p>																										
<p>Public Water System ID# <u>41- 387</u></p>		<div style="background-color: #0070C0; color: white; padding: 2px; font-size: 0.8em;">Click to locate PWS ID#</div>																										
<p>PWS Name <u>Ice Fountain Water District</u></p>																												
<p>1. Was the project undertaken? If so, what was the starting date?</p> <p>2. If project was not undertaken, has the project been abandoned?</p> <p>3. Was the project completed? If so, when? If project not complete, estimated completion date: _____</p> <p>4. If completed, was the work accomplished in conformance with all conditions listed in the Conditional Approval letter and DWS Construction Standards, Oregon Administrative Rule (OAR) 61-0050?In the comments below or on a separate sheet please make clear how all conditions specified in the Conditional Approval letter were met.</p> <p>5. If the project was completed, were there any differences between what is shown on the plans and what was actually installed?</p> <p>6. If the completed project is different from what is shown on the plans, were the plans modified to show as-built conditions?</p> <p>7. Have as-builts been sent to Drinking Water Services? NOTE: As-builts are not required if there were no significant changes noted in 5.</p> <p>8. Are the facilities operating? If so, starting when?</p>	<table border="0" style="width: 100%;"> <thead> <tr> <th style="width: 30%;">YES</th> <th style="width: 30%;">NO</th> <th style="width: 40%;">DATE</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;"><input checked="" type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><u>08/05/2020</u></td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td></td> </tr> <tr> <td style="text-align: center;"><input checked="" type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><u>03/02/2021</u></td> </tr> <tr> <td style="text-align: center;"><input checked="" type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td></td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input checked="" type="checkbox"/></td> <td></td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td></td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input checked="" type="checkbox"/></td> <td></td> </tr> <tr> <td style="text-align: center;"><input checked="" type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><u>2/16/21</u></td> </tr> </tbody> </table>	YES	NO	DATE	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<u>08/05/2020</u>	<input type="checkbox"/>	<input type="checkbox"/>		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<u>03/02/2021</u>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input checked="" type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<u>2/16/21</u>
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<p>Signature of Engineer <u></u></p>		<p>Date <u>01/15/2024</u></p>																										
<p>Name <u>Lucas Stangel, P.E.</u></p>		<p>OR PE# <u>87627PE</u></p>																										
<p>Firm <u>Anderson Perry & Associates, Inc.</u></p>		<p>Phone <u>(541) 963-8309</u></p>																										
<p>Comments</p> <p>The emergency chlorination system has been capable of operating since substantial completion in February 2021. However, the system is intended for emergency use only and has not operated to chlorinate the system since its completion.</p>																												

Clarification on physical separation of Oak Grove spring in valve vault & conditions for boil water notice in valve vault received 1/16/24:

RE: Update on emergency chlorinator for Ice Fountain (PR#13-2021)

 Lucas Stangel <lstangel@andersonperry.com>
To:  Hofeld Evan E
Cc:  ctrue@hrecn.net

 Reply  Reply All  Forward  

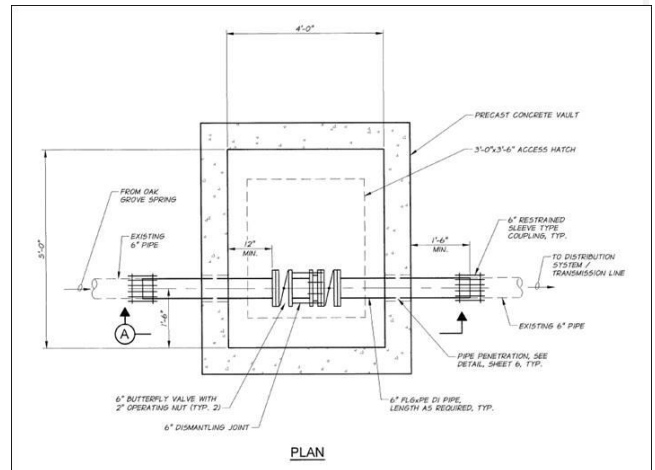
Tue 1/16/2024 4:47 PM

 Click here to download pictures. To help protect your privacy, Outlook prevented automatic download of some pictures in this message.

Evan,

Please see below for responses to your questions/comments in red.

The below photo is of the Oak Grove connection vault during construction. See below for additional information regarding the vault in red. To my knowledge, when this picture was taken is the only time that the dismantling joint has been installed. After everything was fit together, the dismantling joint was removed, and a blind flange installed on each pipe, and there is an air gap between the source and the system. Chris may be able to provide a photo of the current configuration, I couldn't find one in our records.



From: Hofeld Evan E <EVAN.E.HOFELD@oha.oregon.gov>

Sent: Tuesday, January 16, 2024 11:56 AM

To: Lucas Stangel <lstangel@andersonperry.com>

Cc: ctrue@hrecn.net

Subject: RE: Update on emergency chlorinator for Ice Fountain (PR#13-2021)

**This email contains an attachment from outside of the organization.
Please exercise caution when opening this attachment.**

Hi Lucas,

I have a couple of questions and am hoping you can clarify:

- 1) From what I can tell, the Oak Grove spring (an e-coli contaminated source) is connected to the distribution system with two butterfly valves preventing the flow of water from Oak Grove spring from entering the distribution system with a dismantling joint in between (no blind flange). Does the dismantling joint between the two valves enable them to install a blind plate flange? We do not allow this type of connection without such a blind plate or air gap. I cannot approve the spring connection/emergency chlorination without a blind plate or air gap. **I guess I misspoke in a previous email when I said nothing changed during construction from what was shown on the design drawings. The design of Oak Grove connection vault did change. I believe everything else generally was constructed as shown on the drawings. The changes to the vault include moving the butterfly valves outside of the vault and changing the vault to a manhole. However, the constructed improvements provide the same intent as what is shown in the below drawing. The drawing shows what the system would look like when the District is using the Oak Grove spring during an emergency. During normal operating conditions, the dismantling joint is removed providing an air gap between the Oak Grove spring and the system. There are blind flanges installed on the ends of both pipes that protrude into the manhole that must be removed prior to the dismantling joint being installed to allow use of the Oak Grove spring.**
- 2) As I understand it, there are also services and distribution piping between the spring source and the point of chlorine injection from the emergency chlorinator system. Although, the emergency chlorinator system affords a higher level of protection for the bulk of the water system, the distribution piping and a few services would be exposed to potentially e-coli contaminated water and would therefore, need to be on a boil water notice and that line would need to be flushed and tested prior to allowing that system to be placed into service, even though the 600,000 gallon provides adequate contact time for disinfection. This does not affect the plan review, but is something that will be mentioned in the plan review letter and I want to be sure we are in agreement. **Understood. This was discussed with the District during the design, and they are aware of needing to place those customers on a boil notice in the event that they use the Oak Grove spring. During design, we looked at placing the chlorinator closer to the source. However, due to the pipe size, it appeared there wouldn't be sufficient contact time between the injection point and the customers that you note above that will have to be on a boil notice. Thus, the noted customers would still have to be on a boil notice if the chlorinator had been installed at the source. Additionally, if I remember correctly, there isn't any existing infrastructure (i.e., power, buildings, etc.) near the Oak Grove spring and constructing the chlorinator at the spring would have been significantly more expensive with little to no gain since the same number (or more) customers would still be on a boil notice.**

Systems that have emergency sources will typically cut and cap these connections and place a removable spool in between to maintain the bolt alignment. Then when needed, they remove the spool and insert a pipe to make the connection, at which time, the entire system would be on a boil water notice until the connection is removed, system disinfected and flushed, and coliform sampling results are absent of bacteria.

Please let me know if I'm misunderstanding something.

Thanks Lucas!

Evan Hofeld
Regional Engineer
OREGON HEALTH AUTHORITY - Public Health Division - Drinking Water Services
evan.e.hofeld@oha.oregon.gov
Cell: 971-200-0288