

July 26, 2022

William Pavlich, PE.

billp@paceengrs.com

PACE Engineers

4500 Kruse Way | Suite 250

Lake Oswego OR 97035

**Re: Wheeler Water System (PWS ID #00952) Disinfection Improvements
Conditional Approval - PR #110-2022**

Dear Mr. Pavlich,

On July 26, 2022, Dan Weitzel submitted the “Manzanita Disinfection System Replacement Feasibility Study” outlining the replacement of the current on-site generated chlorine with a liquid sodium hypochlorite disinfection system. The \$825 review fee payment was received on July 6, 2022.

The project involves replacing the current Miox on-site generated sodium hypochlorite system with a new ProMinent® disinfection pump skid housed in an existing building to feed a HASA low-salt 12.5% liquid sodium hypochlorite for 4-log viral disinfection. The project is approved with the following conditions as per [OAR 333-061-0050\(5\)](#):

- 1) The sodium hypochlorite meets ANSI/NSF Standard 60 for use in potable water and materials in contact with potable water meet ANSI/NSF Standard 61.
- 2) The disinfection system and available contact time can provide 99.99% (4.0-log) inactivation of viral pathogens with a minimum of 30 minutes of contact time and a free chlorine residual of at least 0.2 mg/l (-0050(5)(d));
- 3) Provisions are made to alert the operator to when the chlorine supply needs to be replenished (-0050(5)(e));
- 4) Raw water (pre-disinfection) and treated (post-disinfection) sample taps are provided (-0050(5)(f));
- 5) Testing equipment is provided to allow the operator to measure the chlorine residual (-0050(5)(g));
- 6) Chlorinator piping is designed to prevent the contamination of the potable water system by backflow of untreated water or water having excessive concentrations of chlorine (-0050(5)(h)). A reduced pressure principle backflow prevention device should protect the potable supply from the make-up water used to dilute the sodium hypochlorite should this dilution water be hard piped into the chlorine solution tank without an air gap; and
- 7) The disinfection dose is proportional to the flow of water being treated (-0050(5)(i)).

In addition to the conditions listed on page 1 of this letter, the submitted *Manzanita Disinfection System Replacement Feasibility Study* may need some clarification and/or correction in the following areas:

- i. Chlorine use calculations in Appendix A did not seem to account for duplex pumping (750 gpm) with a dose of 1 mg/l for the higher summer demands (11,764,000) as shown below:

Volume:

Winter (based on January 2018 production; 4,820,000 gal.)

$$4,820,000 \text{ gal} \left(\frac{1}{500 \text{ gpm}} \right) \left(\frac{\text{hr}}{60 \text{ min}} \right) (0.072 \text{ gph}) = 11.6 \frac{\text{gal}}{\text{mo}} @ 0.3 \text{ ppm}$$

$$= 38.6 \frac{\text{gal}}{\text{mo}} @ 1.0 \text{ ppm}$$

Summer?

Winter (based on January 2018 production; 4,820,000 gal.)

$$11,764,000 \text{ gal} \left(\frac{1}{500 \text{ gpm}} \right) \left(\frac{\text{hr}}{60 \text{ min}} \right) (0.072 \text{ gph}) = 28.2 \frac{\text{gal}}{\text{mo}} @ 0.3 \text{ ppm}$$

$$= 38.6 \frac{\text{gal}}{\text{mo}} @ 1.0 \text{ ppm}$$

If $Q_S = 750 \text{ gpm}$ and $C_S = 1.0 \text{ ppm}$, then $Q_F = 0.36 \text{ gph}$

$$11,764,000 \times (1/750 \text{ gpm}) \times (\text{hr}/60 \text{ min}) \times (0.36 \text{ gph}) = 94 \text{ gallons/month @ } 1.0 \text{ ppm}$$

$$C_F \times Q_F = C_S \times Q_S$$

$C_F = \text{feed concentration}$

$$= 12.5\% \left(\frac{10,000 \text{ ppm}}{\%} \right) = 125,000 \text{ ppm}$$

$Q_F = \text{feed flow}$

$$Q_F = \frac{C_S \times Q_S}{C_F}$$

$C_S = \text{system chlorine dose}$

- ii. The MSDS sheet in Appendix B showing the NSF-60 certification from Allied Universal Corporation appears to be for standard 12.5% sodium hypochlorite (a Sp. Gravity of 1.2) and not the low-salt sodium hypochlorite (Sp. Gravity 1.2).

(545138)

ALLIED UNIVERSAL CORPORATION

Headquarters: 3901 NW 115th Avenue, Miami, Florida 33178 Phone: (305) 888 - 2623

MATERIAL SAFETY DATA SHEET

May be used to comply with OSHA's Hazard Communication Standard, 29 CFR § 1910.1200.

TODAY'S DATE: 09/06/07 MSDS NUMBER: 0001

24 HOUR EMERGENCY CHEMICAL SPILL OR RELEASE PHONE NUMBERS:
 Allied Universal Corp. at 1-305-483-7732 (Digital Beeper) and/or CHEMTREC at 1-800-424-9300

SECTION 1 CHEMICAL PRODUCT/COMPANY IDENTIFICATION

Sodium Hypochlorite

Product Names: Aqua Guard Chlorinating Sanitizer, Aqua Guard Bleach, Liquid Chlorine Solution, Liquid Bleach, Hypochlorite, Hypo and Chlorine Bleach.
Listed Strengths: 10.5%, 12.5% and 15% **CAS Number:** 7681-52-9
Date MSDS Revised: August 2007 (previous revision 11/04)
Product Use: Disinfectant and sanitizer, see product label for all approved uses & instructions.
NSF Approval: Yes. Certified to NSF/ANSI Standard 60. Maximum use in Potable Water is 84 mg/L for 12.5% bleach and 100 mg/L for 10.5% bleach.
NSF Non-Food Compounds Approval: Yes

SECTION 2 HAZARD INGREDIENTS/IDENTIFICATION

Hazardous Ingredient(s): % (w/w) as Sodium Hypochlorite
Exposure Standards: None established for Sodium Hypochlorite
PEL (OSHA): 1 ppm as Cl₂
TLV (ACGIH): 0.5 ppm as Cl₂
WEEL (AIHA): 2 mg/m³, 15 minute TWA
Emergency Overview: May cause burns to the eyes

SECTION 3 PHYSICAL/CHEMICAL CHARACTERISTICS

Alternate Name(s):	Bleach
Chemical Name:	Sodium Hypochlorite
Chemical Family:	Oxidizing Agent
Molecular Formula:	Na-O-Cl
Form:	Liquid
Appearance:	Water clear to a slight green
Odor:	Chlorine odor
pH:	11-14, dependent upon strength
Vapor Pressure:	Not available
Vapor Density (Air=1):	Not available
Boiling Point:	Approximately 230° F (110° C)
Freezing Point:	14 F (8° w/w Cl ₂ solution)
Solubility (Water):	Completely Soluble
Solubility (Other):	Reacts with Many Organics
Density:	Appx. 10 lbs. per gallon
Evaporation Rate:	Not Available
Specific Gravity:	1.128 (8% w/w Cl ₂ solution) 1.25 (15% w/w Cl ₂ solution)
Molecular Weight:	74.5

SECTION 4 STABILITY & REACTIVITY DATA

Chemical Stability	Stable
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Incompatibility (Conditions to Avoid): Stability decreases with heat and light exposure.
Incompatibility (Materials to Avoid): May react violently with strong acids. Other incompatibles include strong caustics, ammonia, urea, reducing agents, organics, ether and oxidizable materials. Reaction with metals (nickel, iron, cobalt and copper) may produce oxygen gas, which supports combustion. May react with organohalogen compounds to produce toxic gases.

Traditional Sodium Hypo

Wt % NaOCl	Wt % NaCl	SG
16.5%	13.0%	1.2622
15.0%	11.9%	1.2382
13.0%	10.4%	1.2052
10.5%	8.30%	1.1610
8.0%	6.30%	1.1210
6.0%	4.70%	1.0920
3.0%	2.40%	1.0490

Low Salt Sodium Hypo

Wt % NaOCl	Wt % NaCl	SG
16.5%	4.7%	1.1997
15.0%	4.3%	1.1824
13.0%	3.7%	1.1592
10.5%	3.0%	1.1296
8.0%	2.3%	1.0994
6.0%	1.7%	1.0750
3.0%	0.9%	1.0376

Wheeler Water System (PWS #00952) Disinfection Improvements – Sodium Hypochlorite
 Conditional Approval (PR#110-2022)
 July 26, 2022

iii. The ProMinent® drawing in Appendix C indicated it was for an alum feed system

REV	DATE	DESCRIPTION	BY	APPD	REV
A	12/12/18	RELEASED FOR PRODUCTION	ALS		
0	09/05/18	FIRST ISSUE	ALS		
REVISIONS					
CUSTOMER MANZANITA, OR - SODIUM HYPOCHLORITE SYSTEM GENERAL ARRANGEMENT					
JOB No 3020102848			PURCHASE ORDER No C201806MC29		
TITLE ALUM FEED SYSTEM GENERAL ARRANGEMENT					
THIS DRAWING IS THE PROPERTY OF PROMINENT FLUID CONTROLS INC. AND SHALL NOT BE COPIED OR TRANSFERRED WITHOUT THE WRITTEN CONSENT OF PROMINENT FLUID CONTROLS INC.					
ENGINEER'S SEAL					
PITTSBURGH, PA USA			WWW.PROMINENT.US		
PROMINENT FLUID CONTROLS LTD. 490 SOUTHGATE DRIVE, GUELPH, ONTARIO, CANADA N1H 6J3 TEL 519 836 5692 FAX 519 836 5226			PROMINENT FLUID CONTROLS INC. RIOC PARK WEST 136 INDUSTRY DRIVE, PITTSBURGH P.A., USA, 15275 TEL 412 767 3484 FAX 412 767 0704		
DESIGNED ALS		APPROVED CM			
DRAWN ALS		SCALE N.T.S.			
CHECKED SK		DATE 09/05/18			
MAXIMUM TESTING PRESSURE = 145 PSI		DWG No 3018800395-200		REV A	
MAXIMUM OPERATING PRESSURE = 145 PSI				PAGE 1/1	
CHEMICAL SERVICE = ALUM					

NETWORK #1070862

iv. The Prominent® pump model indicated in section 8.3 differs slightly from the model # provided in the TMG estimate in Appendix C as shown below:

Quality Products - Excellent Service

3216 E. Portland Avenue
Tacoma, WA 98404
253-779-4160
tmginc@tmgservices.net

August 4, 2020
QUOTATION

PACE Engineers
Attn: Bill Pavlich
4500 Kruse Way, Suite 250
Lake Oswego, OR 97035

Dear Bill,

TMG Services is pleased to offer you a QUOTATION on a Prominent Dual Gamma X Chemical Feed Panel for your Manzanita, OR application. Please do not hesitate to contact me if you have any questions.

(1) Prominent Dual Pump Panel Consists of the Following:

- Skid Type: Black polypropylene wall panel
- Chemical Inlet: (1) 0.5" and Solution Outlet: (1) 0.5"

8.3 Chemical Feed Assembly

The City has expressed a preference for a prefabricated duplex chemical feed pumping assembly. The unit is Prominent Dual Gamma X Chemical Feed Panel that includes two Prominent Gamma X Pumps (GMXA1604NPTV000UDC1300EN). Appendix C includes a drawing of the chemical feed assembly and a list of components and system data.

- 120vac power
- (2) Prominent Gamma X Pumps; GMXA1604NPTV000UDC1300EN
- 0.41 GPH @ 145 PSI
- Liquid End Materials: Acrylic/PVC (PVDF Degassing)

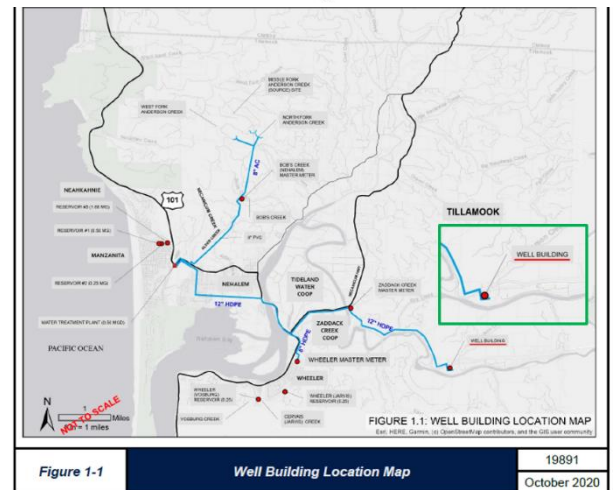
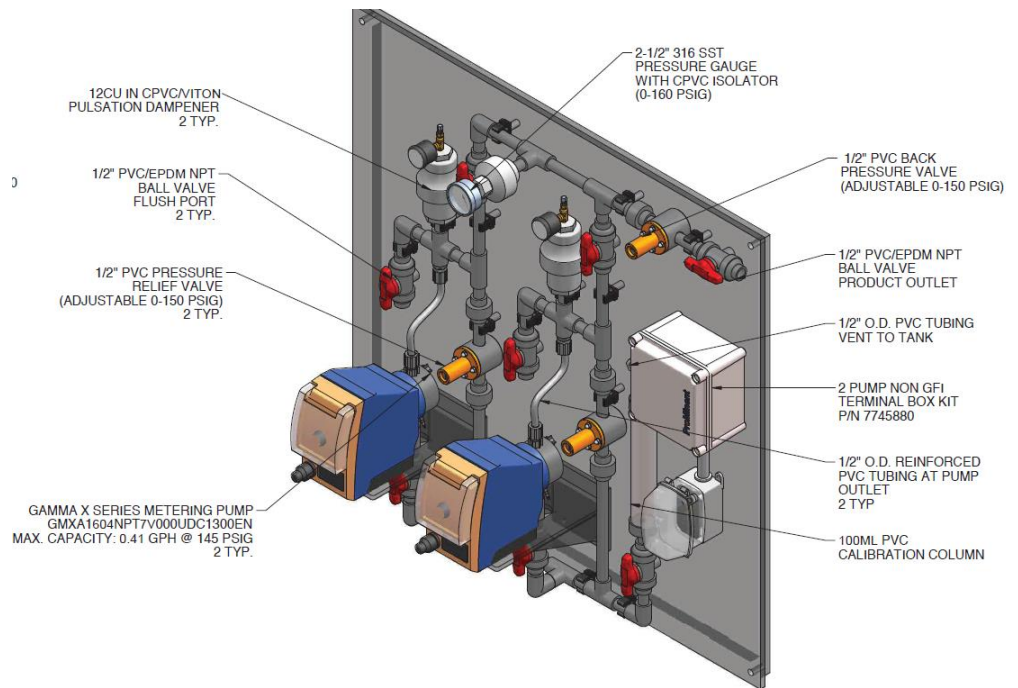
Proposed ProMinent® disinfection system to be installed in the existing well building =>

When the project is complete, please respond if the project was completed as planned and according to the conditions listed above.

A [Request for Project Final Approval](#) is also required to be submitted.

Written correspondence should reference plan review #110-2022 and water system ID #00952 and can be e-mailed to me at evan.e.hofeld@dhsoha.state.or.us.

Until we receive verification that the project was completed with the conditions listed above met and we have granted Final Approval for the project, improvements may not be placed into use. If you have any questions or would like this information in an alternate format, please feel free to contact me at any time at 971-200-0288 or via e-mail at evan.e.hofeld@dhsoha.state.or.us.



Sincerely,

Evan Hofeld, Regional Engineer
Oregon Health Authority – Drinking Water Service

- Cc: Tim Grossnickle, Wheeler Water District
tingrossnickle@ci.wheeler.or.us
- Dan Weitzel, Manzanita Water Department
dweitzel@ci.manzanita.or.us
- Jaime Craig, Tillamook County Public Health
jcraig@co.tillamook.or.us