



March 6, 2012

Mr. Martin Suuberg
Regional Director
MassDEP Central Regional Office
627 Main Street
Worcester, Massachusetts 01608

Re: Millis Chlorination System Improvements
BRP WS 29 Chemical Addition Retrofit Permit Application

Dear Mr. Suuberg:

On behalf of the Town of Millis we are submitting a BRP WS 29 Chemical Addition Retrofit Permit Application for chlorination system improvements at two of the community's well sites. Attached for review are copies of the plans and specifications for the proposed improvements.

INTRODUCTION

Well 3 (Village Street Water Treatment Facility; source 03G)

Well 3 (also recognized as the Village Street Water Treatment Facility by the MassDEP) is located approximately 1,300 feet off Birch Street. The site includes a well house containing the well pump, auxiliary drive, flow meter and chemical injection points. An adjacent structure houses the chemical feed equipment, consisting of pH control (NaOH) and fluoridation (NaF), with provisions for emergency disinfection. The well pump and chemical feed systems are controlled through the SCADA system. The operation of the pump (running) is normally selected by the operator, and the on/off cycle is controlled by the level in the two distribution storage standpipes. There is no emergency generator at this well site.

At Well 3, the Town proposes to add a permanent sodium hypochlorite system to provide disinfection for the well water. The improvements at the station will also provide at least 4-log virus inactivation of the well water before or at the first customer so that the Town will not be subject to triggered source water monitoring. To achieve this, the following improvements are proposed:

1. Upgrade the existing disinfection feed system to provide a permanent sodium hypochlorite system with containment, analyzers and controls.
2. Install a new, large diameter pipeline loop outside of the well pump station to provide the required disinfection contact time to obtain 4-log inactivation of viruses as required by the Ground Water Rule.

The Town also proposes to remove the existing standby engine drive on the well pump, and replace it with a new propane generator to supply standby power to entire well station.

The Town proposes to phase the work at this well station, with construction of the chemical feed facilities and standby generator this summer and fall, and the pipeline loop later in 2013.



Well 4 (South End Pond Water Treatment Facility; source 04G)

Well 4 (also recognized as the South End Pond Water Treatment Facility) is located on the western shore of South End Pond, approximately 2000 feet from Orchard Street. The site includes a well house containing the well pump, standby generator, flow meter, and chemical feed systems. The chemical feed systems included pH adjustment (NaOH) and fluoridation (NaF) with the provision for emergency disinfection. The well pump and chemical feed systems are controlled through the SCADA system. The operation of the pump (running) is normally selected by the operator, and the on/off cycle is controlled by the level in the two distribution storage standpipes.

Well 4 is utilized by the Town during the peak demand periods of the year to supplement the other wells in the system. Elevated levels of manganese in the well will on occasion cause water quality problems in the distribution system. Introduction of sodium hypochlorite on a permanent basis would exacerbate the manganese water quality problems. Therefore, at the present time, the Town proposes to install an upgraded emergency sodium hypochlorite feed system at Well 4 which would only be used on an as needed basis with a bacterial problem.

Ground Water Rule: Log Credit Determination at Well 3

The Environmental Protection Agency (EPA) promulgated the final Ground Water Rule (GWR) in October 2006 to reduce the risk of exposure to fecal contamination that may be present in public water systems (PWS's) that use ground water sources. The GWR applies to PWS's that use a ground water source that is added directly to the distribution system and provided to consumers without treatment equivalent to surface water treatment.

According to the rule, PWS's that provide at least 4-log virus inactivation before or at the first customer through compliance monitoring, are not subject to triggered source water monitoring. Triggered source water monitoring requires the PWS to collect at least one ground water sample from each source in use each time the PWS is notified of a total coliform-positive sample collected under the Total Coliform Rule (TCR). Providing the 4-log treatment would also minimize the potential for a disruption in service resulting from a Tier 1 notification or a Boil Water Order associated with the bacterial testing program.

Based on the proposed well field improvements, the sample point for disinfection residual will be after a new contact loop installed outside of the well station that would include approximately 500 feet of 16-inch diameter water main. This would provide the appropriate contact time (CT) for proper 4-log virus inactivation.

The log credit determination for this site was based on using sodium hypochlorite and guidelines contained on Form GWR A – Log Credit under the Massachusetts Department of Environmental Protection (MassDEP) Drinking Water Program. The well field parameters used to calculate the CT value are summarized in Table 1. These parameters were based on the proposed improvements at the well station.

Table 1 shows that with a chlorine residual of 0.63 mg/l, the calculated system CT value based on the proposed well station improvements (6.4 mg/l*min), will meet the required CT value (6.4 mg/l*min) for 4-log inactivation of viruses by free chlorine between pH 6.0 and 9.0, and a cold water temperature of 9°C.



PROCESS EQUIPMENT

Well 3 - Basic Design Criteria

The basic design criteria for the chemical storage and feed equipment at Well 3 is shown on Table 2 and is based on the following system pumping rates:

Current Maximum Pumping Rate:	510 gpm
Current Average Day Pumping Rate:	510 gpm

The new chemical feed pumps will be activated when the well pump is activated, and will be paced from the existing flow meter, and trimmed to maintain a required chlorine residual. A new chlorine analyzer will be installed in the station on the existing sample line. The existing sample line currently continuously monitors pH when the well pump is running. The chlorine analyzer will be connected to the existing station SCADA panel, and will provide local and remote monitoring of chlorine residual levels, as well as high and low chlorine alarms. The chlorine analyzer will be interlocked with the chemical feed pumps, and will shut down the station on low and high chlorine residual levels.

Well 4 - Basic Design Criteria

The basic design criteria for the chemical storage and feed equipment at Well 4 is shown on Table 3 and is based on the following system pumping rates:

Current Maximum Pumping Rate:	600 gpm
Current Average Day Pumping Rate:	600 gpm

PROJECT SCHEDULE

The Town would like to have bids received on this project prior to the Annual Town Meeting scheduled for May 7, 2012. In order to meet this schedule, the project would have to go out to bid no later than March 30, 2012. Any assistance in meeting this schedule would be appreciated by the Town.

If you have any questions, please contact us.
Sincerely,

WOODARD & CURRAN, INC.

James F. Finegan, P.E.
Senior Project Manager

Attachments

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Table 1: System Parameters for Log Credit Determination – Well 3

Condition	Peak Flow Rate (gpm)	Pipe Length and Diameter	Pipe Volume (gal)	Time (min)	Coldest Source Water Temp (°C)	Required CT Value (mg/l*min)	Chlorine Residual (mg/l)	Calculated CT Value (mg/l*min)
Proposed	510	500 ft: 16-inch	16-inch: 5,220	10.2	9	6.4	0.63	6.4



Table 2: Chemical Storage and Feed Equipment – Well 3

Parameter	Sodium Hypochlorite
% Strength (Bulk delivery)	12.5
Average Dose at 510 gpm	
Average Dose (mg/l)	0.75
Average Usage (gpd)	3.75
Average Usage (gph)	0.16
Maximum Dose at 510 gpm	
Maximum Dose (mg/l)	1.5
Maximum Usage (gpd)	7.5
Maximum Usage (gph)	0.32
Pumps and Storage Tanks	
Max. Feed Pump Capacity (gph)	0.33
Number of Bulk Storage Tanks	1
Bulk Storage Tank Outside Diam. (ft.)	4'-0"
Bulk Storage Tank Shell Hgt. (ft.)	4'-8"
Nominal Tank Capacity, (gals.)	325
Days of Bulk Storage at Average Dose and a Flow of 510 gpm	86
Day Tank - Nominal Capacity (gals)	35
Required Containment Volume (ft ³)	59
Provided Containment Volume (ft ³)	63



Table 3: Chemical Storage and Feed Equipment – Well 4

Parameter	Sodium Hypochlorite
% Strength (Bulk delivery)	12.5
Average Dose at 600 gpm	
Average Dose (mg/l)	0.75
Average Usage (gpd)	4.41
Average Usage (gph)	0.18
Maximum Dose at 510 gpm	
Maximum Dose (mg/l)	1.5
Maximum Usage (gpd)	8.82
Maximum Usage (gph)	0.36
Pumps and Storage Tanks	
Max. Feed Pump Capacity (gph)	0.8
Number of Bulk Storage Tanks	1
Bulk Storage Tank Outside Diam. (ft.)	1'-11"
Bulk Storage Tank Shell Hgt. (ft.)	2'-10"
Nominal Tank Capacity, (gals.)	50
Days of Bulk Storage at Average Dose and a Flow of 600 gpm	11
Day Tank - Nominal Capacity (gals)	NA
Required Containment Volume (ft ³)	7.4
Provided Containment Volume (ft ³)	8