



Commonwealth of Massachusetts
Executive Office of Energy & Environmental Affairs

Department of Environmental Protection

Northeast Regional Office • 205B Lowell Street, Wilmington MA 01887 • 978-694-3200

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July 23, 2021

Mr. Donald Vaughan
Colonial Water Company
37 Northwest Drive
Plainville, CT. 06062

RE: **City/Town:** Dover
PWS Name: Colonial Water Company
PWS ID#: 3078006
Program: Drinking Water Program, Water Discoloration/Complaints Corrective Action Plan (CAP)
Action: DWP Response; Statement of Deficiency

Dear Mr. Vaughan:

The Northeast Regional Office of the Massachusetts Department of Environmental Protection (MassDEP) has received the Colonial Water Company's (CWC) proposed corrective action plan (CAP) to address discoloration in CWC's drinking water. The CAP was submitted on July 7, 2021 in response to MassDEP requirements discussed during a June 29, 2021 meeting between MassDEP and CWC representatives regarding customer complaints specific to water discoloration.

After completing a comprehensive review of historical Public Water System (PWS) records in addition to the CAP, as well as current water treatment and customer complaints, MassDEP has determined that the CAP is technically deficient. A further explanation on the deficiencies, along with instructions on how CWC will be required to respond, is attached.

With the issuance of this notification, CWC must address the issues identified by MassDEP according to the schedule set forth below and submit a revised CAP within seven (7) days of receipt.

Please note that a signature on this cover letter indicates formal issuance of the attached document. If you have any questions, please contact Kristin Divris at 978-694-3260.

Sincerely,

Kristin Divris
Drinking Water Section Chief

for Eric Worrall
Regional Director

This information is available in alternate format. Contact Michelle Waters-Ekanem, Director of Diversity/Civil Rights at 617-292-5751.

TTY# MassRelay Service 1-800-439-2370
MassDEP Website: www.mass.gov/dep

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PWS Description

CWC is a small, community Public Water System (PWS) serving a population of 1,890 through 637 service connections and approximately ten (10) miles of water mains. CWC reported in their 2020 Annual Statistical Report (ASR) the use of seven (7) active groundwater sources that receive varying levels of treatment at each of four (4) active treatment plants, including:

- Francis Street Plant (3078006-05T), which treats three sources known as Well A (08G), Well B (09G) and Well C (10G), with potassium hydroxide for corrosion control and sodium hypochlorite for disinfection with MassDEP-approved 4-log inactivation of viruses.
- Chickering Drive Plant (3078006-02T), which treats one source known as Chickering Dr. Wells (02G) with potassium hydroxide for corrosion control.
- Knollwood Drive Plant (3078006-03T), which treats one source known as Knollwood Dr. Wells (03G) with potassium hydroxide for corrosion control.
- Draper Road Plant (3078006-04T), which treats two sources known as Draper Rd. Well 1 (04G) and Draper Rd. Well 2 (05G), with potassium hydroxide for corrosion control and sodium hypochlorite for disinfection.

CWC maintains one booster station known as the Cedar Hill Booster Station and each of the above noted treatment plants maintain hydropneumatic/bladder storage tanks only; there is no atmospheric storage within the distribution system.

Event Background

On June 21, 2021, MassDEP received a complaint regarding discoloration at a residence located at 45 Draper Road in Dover, which receives public drinking water through the privately owned CWC. The complainant identified concerns regarding discoloration in the water ranging from brown to green for several years noting that the CWC has been responsive to his concerns over the last three years; but the discoloration has not improved despite a sedimentation filter installed as a point of entry (POE) at the residence. The sedimentation filter was paid for and is maintained by CWC.

In response to this report, MassDEP consulted with the CWC primary operator on June 21, 2021 to review customer complaints, increased demand/water use, water conservation efforts, distribution pipe material, distribution flushing practices, leak detection, source operation, distribution pressure status, and water quality sampling, specifically bacteriological sampling results. Required bacteriological sampling was performed the week of June 14, 2021 and no positive results were reported by the laboratory.

As a result of the Town of Dover's online alert system that encouraged residents to report water discoloration to MassDEP, additional reports were received and tracked by MassDEP beginning on June 23 through June 27, totaling 29 complaints. On June 24, 2021, MassDEP staff conducted a site visit to further review CWC treatment plant records with the primary operator, source operation, as well as complaint locations throughout the distribution system. MassDEP determined the following:

- pH throughout the distribution system was within normal range between 7.2 – 7.9;
- chlorine residuals leaving the Draper Road and Francis Street Plants were within regulatory requirements;
- records identified a significant increase in water demand from approximately 100,000 gallons per day (gpd) to over 200,000 gpd from early May into June; and,

- CWC had purchased and was awaiting delivery of a HACH DR900 multiparameter portable colorimeter, which will allow additional monitoring to be performed throughout the distribution system to better ascertain operational distribution water quality.

MassDEP staff visited two locations of received complaints at 27 Bretton Rd and 45 Draper Rd, where pictures were taken of water samples collected from inside the homes which showed evidence of slight discoloration. On June 25, 2021, MassDEP provided a summary of findings and actions taken to date to the Dover Town Administrator as well as the State Representative's office.

On June 28, 2021, MassDEP required CWC to conduct additional sampling at all finished water plant taps to ensure the water continued to meet Massachusetts Drinking Water regulatory standards. Sampling was conducted at all operating sources including the Francis St. Wells (08G, 09G, 10G – 05T), Chickering Dr. Well (02G), Knollwood Dr. Well (03G), and the Draper Rd. Wells (04G/05G – 04T). MassDEP required CWC to sample and have analyzed by a state-certified laboratory all acute contaminants, as well as the secondary standards listed below, no later than June 30, 2021, with an expedited turnaround time (TAT):

Acute Contaminants:

- 1) Bacteria (total coliform/E.coli) and disinfectant residual measurement.
- 2) Perchlorate
- 3) Nitrate
- 4) Nitrite

Secondary Contaminants:

- 1) Iron
- 2) Manganese
- 3) Color
- 4) Total dissolved solids

On June 29, 2021, MassDEP met with CWC representatives regarding corrective actions being taken to address the complaints of discoloration, and required CWC to provide a corrective action plan by July 7, 2021, including additional information and all laboratory results. All required information was submitted to MassDEP on the dates listed below:

- On June 30, 2021, CWC submitted two storage tank feasibility studies, conducted in 2012 and 2014.
- On July 1, 2021, MassDEP contact information on the Town of Dover website was replaced with CWC contact information.
- On July 6, 2021, CWC submitted laboratory results for required monitoring with the exception of perchlorate results.
- On July 7, 2021, CWC submitted full laboratory results including perchlorate, bacteriological results, recommended customer service language to ensure consistency, a copy of mailed correspondence to all CWC customer distributed on July 7th, and the required CAP.

MassDEP reviewed all laboratory results and determined there were no exceedances of any primary drinking water regulatory standard. Results did indicate an increase in manganese (Mn), which is

considered a secondary contaminant, at the Francis St. and the Draper Rd. Wells. While both results remain below MassDEP's Office of Research and Standards Guideline (ORSG) of 0.3 mg/L, results do indicate an increase that does not align with the past six to eight years of historical annual data that show Mn levels ranging from 0 mg/L to 0.128 mg/L. Results of the required monitoring, collected on June 30, 2021, are provided below in Table A.

Contaminant	Unit of Measure	Maximum Contaminant Level (MCL) or Secondary MCL (SMCL)	Finished Water Treatment Plants			
			Francis St. (05T or 10025)	Chickering Dr. (02T or 10000)	Knollwood Dr. (03T or 10001)	Draper Rd. (04T or 10008)
Acute contaminants		MCL				
Nitrate	mg/L	10.	1.41	4.60	2.68	1.49
Nitrite	mg/L	1.0	No Detect	No Detect	No Detect	No Detect
Perchlorate	µg/L	2.0	0.14	0.15	0.11	0.11
Secondary contaminants		SMCL				
Color	Color Units (C.U.)	15	<5	<5	<5	<5
Iron	mg/L	0.3	No Detect	No Detect	No Detect	No Detect
Manganese	mg/L	0.05*	0.237	No Detect	No Detect	0.110
Total Dissolved Solids (TDS)	mg/L	500	272	312	300	256

*MassDEP ORS has established an ORSG of 0.3 mg/L for the general population over a lifetime exposure period; 1.0 mg/l for the general population over a 10-day exposure period; and, 0.3 mg/L for infants/children less than 1 year of age at <10 days exposure period (address within 10 days or sooner if possible).

On July 9, 2021, MassDEP provided an update to the Dover Town Administrator as well as the State Representative's office regarding the additional required monitoring results as well as the requirement for CWC to increase iron and manganese monitoring to quarterly for both Francis St. and Draper Rd. treatment facilities to evaluate seasonal and operational influences that may contribute to periodic water discoloration. In addition, MassDEP indicated that it was in the process of reviewing the tank feasibility studies as well as the corrective action plan for additional measures that may be required.

On July 13, 2021, CWC submitted to MassDEP a letter providing additional data, specifically iron and manganese operational sampling results (i.e., internal data results using the HACH DR1900 spectrophotometer) performed on July 8-9, 2021 for the three raw water sources at the Francis Street plant. The letter included a proposed interim plan for a blended phosphate chemical addition accompanied by preliminary phosphate dosage calculations and request for emergency approval by MassDEP. MassDEP notified CWC that emergency chemical treatment approval for a secondary contaminant would not be approved without the completed permit application required for chemical addition.

On July 20, 2021, MassDEP met with the Dover Town Administrator as well as House and Senate Representatives' offices to provide an update on MassDEP's review and response to the CWC CAP.

MassDEP CAP Review

MassDEP has reviewed the CWC CAP, which briefly identified system information, demand and irrigation impacts, water quality specific to Mn levels of raw and finished water at the Francis Street treatment plant from April 2019 through July 2021, and proposed immediate and long-term corrective actions.

Corrective actions for immediate and long-term implementation proposed by CWC in the CAP included the following:

- 1) Continue to flush the system during times when demand is typically lowest.
- 2) Install bleeder hoses at hydrants in areas where customer complaints appear to be concentrated.
- 3) Provide frequent messaging to customers via automated reminders and website postings on the need for conservation of water and adherence to restrictions on irrigation.
- 4) Partner with the Town of Dover to provide messaging on the Town's social media and website, consistent with CWC's messaging.
- 5) A request to install a temporary polyphosphate injection system at the Francis Street treatment plant for sequestration of Mn and trace iron.
- 6) An extension of 45 days to engage an engineering consultant to perform a study on the cause of discoloration and provide recommendations for long-term corrective measures that may include permanent polyphosphate treatment.

MassDEP Determination & Action Schedule

By July 30, 2021, CWC shall submit a revised CAP and schedule that addresses all actions required below:

By July 30, 2021, CWC shall submit a written account of corrective actions immediately implemented including the dates, times, location and volumes of water flushed from the distribution system and the location of bleeder installations during 2021.

By July 30, 2021, CWC shall retain the services of an independent third party to inspect the Francis Street and Draper Road wells for clogging or incrustation of the well screens to determine if increased Mn levels are resulting from well cleaning, maintenance or rehabilitation needs. Well inspection reports must be submitted to MassDEP for review immediately upon receipt by CWC. CWC shall implement recommendations from the well inspections in accordance with a schedule established by MassDEP.

By August 16, 2021, CWC shall retain the services of a third-party Massachusetts registered Professional Engineer (PE) with experience in drinking water treatment and operations to perform a comprehensive assessment of PWS operations, maintenance and management practices to determine the cause(s) of discoloration within the sources and distribution system and recommended short-term and long-term corrective actions for resolution including, but not limited to:

- 1) Identification and analysis of all water quality data, including iron and manganese historical results for both operational and MassDEP-required sampling;
- 2) Efficacy review and evaluation of phosphate blend sequestration with respect to system stabilization timeframe, impact on corrosion control, and alternative and/or additional treatment including filtration;
- 3) Evaluation and analysis of pumping capacity in relation to system demand and Water Management Act (WMA) permit requirements that addresses cause(s) of inadequate and/or excess distribution system pressure and water quality complaints;

- 4) System-wide flushing practices and performance measurement evaluation for both proactive and reactive (emergency) flushing that identifies systematic valve inspection, operation and maintenance, pipe diameters and C-factors to achieve desired flows. The evaluation shall include an updated hydraulic model and assessment of atmospheric water storage required for effective flushing.
- 5) Review and evaluation of system resiliency including, but not limited to emergency power capabilities at all treatment facilities and water system redundancy pursuant to 310 CMR 22.21(3)(a), which states:

“Any person who obtains Department approval for a community public water system that relies entirely upon groundwater sources shall provide additional wells, wellfield, or springs and pumping equipment, or the equivalent, capable of producing the same volumes and quality of water as the system’s primary well, wellfield, or spring at all times, or shall provide the storage capacity equivalent to the demand of at least two average days if approved by Department, unless an interconnection with another public water system has been provided which can adequately provide the quantity and quality of water needed.”