Standard Operating Procedure:
Dechlorination

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Scope

Any time a discharge of a significant volume of potable water is being directed to the environment or a storm drain in a short period of time (e.g., during water line flushing), dechlorination efforts are required. Water line flushing is periodically required as part of fire hydrant or building sprinkler system maintenance and as part of standpipe and sprinkler system flushing/testing or disinfecting new water lines associated with construction, renovation, or planned repair projects. Dechlorination and erosion control measures are required any time discharges of water used for flushing is directed to the environment or a storm drain. Dechlorination involves the use of dechlorination tablets, powders, or liquids to react with the chlorine/chloramines in potable water.

The procedures described in this SOP are intended to manage discharges of chlorinated water in order to avoid an instream impact. Please note that the handling of dechlorination chemicals may have a requirement for the use of PPE that is not included in the scope of this SOP. For building fire sprinkler system flushing associated with routine building maintenance, follow the Building Fire Sprinkler System Flushing SOP. For building washing activities, follow the Exterior Surfaces Washing SOP.

Responsibility

Anyone performing any activities described in the scope, or otherwise performing an activity where large volumes of chlorinated water will potentially be discharged on UVA property, must comply with this procedure. The Associate Director for Utility Systems Distribution or their designee must be consulted on all activities involving discharges of super-chlorinated water. Consultation must be conducted a minimum of two weeks in advance of the anticipated start date.

Procedures

1. **Potable Water Dechlorination**
    a. Discharging to the sanitary sewer is the preferred method for disposing of potable water. There may be restrictions on the sanitary line capacity or other needs that must be addressed. Consult with the Associate Director for Utility Systems Distribution prior to any discharge of large volumes of potable water to the sanitary sewer.
    b. When disposal via the sanitary sewer is not available, dechlorinating diffusers are the preferred means of dechlorination and can be installed on a fire hydrant or fire hose. Tablets are placed in the diffuser itself to dechlorinate as the water flows through the diffuser. Diffusers are designed to handle a large volume of water that is generated rapidly from a source. Be sure to follow operating instructions for the diffuser being used so as not to exceed its flow rate capacity and to ensure an adequate supply of dechlorination tablets are on hand.

c. Dechlorination mats and bags are an alternative when dechlorinating diffusers are not a viable option. The dechlorination mats or bags are laid on the ground or on a storm drain where the discharge water can pond and have adequate contact time with the dechlorination tablets contained in the bags or mats. Dechlorination mats and bags are ideal for low flow situations and in water main breaks or other emergency situations, as they can be installed quickly with minimal set up. These should not be used as a primary means of treatment in planned situations where a large volume of water will be rapidly discharged due to concerns about contact time with the tablets.

d. Increasing distance between the discharge point and the storm sewer/stream can benefit dechlorination efforts. Sunlight, warm temperatures, and aeration can help break down chlorine in the water. Increasing the distance between the discharge point and the receiving point is not acceptable as a primary means of treatment, but may be beneficial in some situations where there are large volumes of water being discharged and dechlorinating diffusers are not a viable option.

e. The personnel performing the dechlorination shall be responsible for identifying, implementing, and monitoring appropriate dechlorination methods. Follow dosing guidelines applicable to the dichlorination chemicals being used.

f. The personnel performing the dechlorination shall take care to ensure that any discharge of dechlorinated water to the environment or storm sewer does not create any adverse instream impacts, including, but not limited to erosion, water volumes that abnormally raise the height or temperature of the receiving stream, or velocities which adversely affect aquatic life in the receiving water bodies.

g. In cases where the sanitary sewer is not being used for disposal, lines should be briefly flushed before the start of any flow testing to wash out any pollutants (dirt, oil, metals) that may have accumulated in the lines. The water from this brief flushing will likely be discolored and must be collected for disposal in the sanitary sewer. The first flush water may require filtering before disposal in the sanitary sewer. Contact the Associate Director for Utility Systems Distribution with questions about sanitary sewer disposal.

2. **Super-Chlorinated Water**

a. When disinfecting water lines, a high concentration of chlorine is added to the water to ensure complete disinfection. Standard dechlorination efforts, such as tablets and diffusers, are not designed to treat such high concentrations of chlorine. As a result, super-chlorinated must be directed as a slow discharge to the sanitary sewer or captured for further treatment.

b. When discharges will be directed to the sanitary sewer, a discharge plan must be submitted to the Associate Director for Utility Systems Distribution for approval.

i. The plan shall include the date and time of anticipated operations, receiving sewer manhole, anticipated discharge rate (gallons per minute - gpm), backflow prevention between the wastewater and water systems, methods and equipment to be used, and information on the mitigation of any anticipated vehicular or pedestrian impacts.

ii. Plan approval is contingent on approval from the City of Charlotteville and Rivanna Water and Sewer Authority. The Associate Director for Utility Systems Distribution will make the necessary communication. The acceptable discharge

rate to the sanitary sewer (gpm) will depend on the location of the discharge. Discharges to the sanitary sewer must not exceed 200 gallons per minute.

iii. The Associate Director for Utility Systems Distribution or their designee must approve the discharge operations set up on site prior to commencing the discharge.

iv. Discharges to the sanitary sewer must be monitored at all times to ensure there are no cross connections, overflows or other adverse impacts caused by the operation.

c. When water is captured and retained on site for treatment, water must be dechlorinated to levels less than 0.1 mg/L prior to discharge to the sanitary sewer. Personnel performing the dechlorination must conduct testing and receive approval of results from the Associate Director of Utility Systems Distribution or Environmental Resources or their designee prior to discharge.

d. Water may be captured and hauled off site for disposal with permission of the UVA project manager. The UVA project manager must be informed of the planned disposal method and location.

3. **Exceptions**

a. Unpreventable or unplanned water line discharges, such as a water main break, are exempt from dechlorination effort in emergency situations. Whenever possible, dechlorination should be undertaken even in emergency situations.

b. Other potable water discharges as specified in 9VAC25-890-20.

Rationale

Potable water generally has concentrations of chlorine between 0.2 mg/L and 4.0 mg/L of total chlorine. Super chlorinated water is used to disinfect water lines before they are placed into service and often has chlorine concentrations in excess of 10 mg/L. Concentrations can be significantly higher since failing a disinfection test due to inadequate chlorine can be time consuming and expensive.

Chlorine is toxic to fish and many kinds of aquatic life. Discharges of water containing chlorine can lead to fish kills, as well as regulatory enforcement action. These procedures are intended to mitigate and prevent aquatic impacts caused by uncontrolled discharges of chlorinated water.