



# **SODIUM HYPOCHLORITE ADDITION AT CONTROL STATION 2 SOP**

SOP #131

Rev: 0.0

Date: 01/31/2018

### SOP VERSION CONTROL

Revision No	Revision Date	Page No(s)	Description	Approved by

### STAFF ACKNOWLEDGEMENT

I certify that the requirements of this SOP have been communicated to me and that I am trained in its use. A copy of this page will be distributed to the employee training record file.

Name	Date

## APPROVAL SIGNATURES

Prepared by: Arcadis U.S., Inc. Date: 01/31/2018

Approved by: \_\_\_\_\_ Date: \_\_\_\_\_

## 1 DEFINITIONS AND ACRONYMS

CSII	Control Station 2
GLWA	Great Lakes Water Authority
gph	gallons per hour
lb/gal	pounds per gallon
MGD	million gallons per day
mg/L	milligrams per liter
mL	milliliter
mL/min	milliliters per minute
mL/hr	milliliters per hour
NaOCl	sodium hypochlorite
PPE	personal protective equipment

## 2 KEY PERSONNEL AND RESPONSIBILITIES

- Operator:
  - Complete daily check of chlorine dose and pumping equipment, including metering pumps, tote, and hose fittings for drips and leaks.
  - Adjust feed rate to achieve target chlorine residual concentration.

## 3 SCOPE/PURPOSE

The purpose of this SOP is to operate and adjust (as needed) the sodium hypochlorite feed system flowrate at Control Station 2 to achieve the target finished water free chlorine concentration.

## 4 HEALTH AND SAFETY

The following PPE is required while inside the building where the bulk sodium hypochlorite is stored:

- Chemical resistant apron
- Chemical resistant gloves
- Face shield

Additionally, the facility is equipped with an emergency eyewash station.

## 5 PROCEDURE

### Equipment Required:

- One 220-gallon tote of 12.2 percent sodium hypochlorite with containment
- Two 4 gph LMI feed pumps (one in service, one on standby)
- One 1000 mL calibration column
- Two digital timers (one is needed for the procedure, plus one spare)
- Daily record sheet

### Procedure:

1. Prior to traveling to CSII, read the free chlorine residual (in mg/L) from the online analyzer (i.e., Hach CL17) in the water treatment plant basement. Record the free chlorine residual on the daily sheet. **Note that the target free chlorine residual leaving CSII may vary seasonally.**
2. Read the influent supply flow from control panel in CSII. Record the flow on the daily sheet.
3. Calculate the dosage needed to reach the target residual:
  - a.  $(\text{dosage needed}) = (\text{target residual}) - (\text{residual at basement analyzer})$
4. If a change in dosage is needed, calculate the new settings using the CHEAT SHEET and adjust the feed pumps accordingly.
5. Check stroke and speed on feed pump. Record stroke and speed on the daily sheet.
6. Determine feed rate in milliliters per minute (mL/min):
  - a. Open the fill valve on the calibration column, fill calibration column to slightly above the 1000 mL mark and close the fill valve.
  - b. Close the valve on the supply line from the tote and reopen the valve to the calibration column.
  - c. Watch the level drop in the calibration column. When it reaches the 1000 mL mark, start the timer.
  - d. After one minute, close the valve to the calibration column and open the valve to the tote. Read the liquid level (in mL) in the calibration column. Subtract the liquid level reading from 1000 mL. The difference is the feed rate in mL/min.
  - e. Record the feed rate on the daily sheet.
7. Determine the feed concentration in mg/L (or parts per million, ppm):
  - a. Multiply the influent supply flow rate (MGD) by 8.34 to obtain million pounds of water being treated. Divide this result by 24 to obtain million pounds of water treated in one hour.
  - b. Take the mL/min calculated above, multiply by 60 to get mL/hour, then divide by 3785 to convert to gallons of sodium hypochlorite solution fed per hour. Multiply by the weight of bleach (10.15 lb/gal), and multiply by the percent strength of the

chlorine solution (for example, for 12.2% strength, multiply by 0.122). This gives the pounds of pure chlorine fed per hour.

- c. Divide the pounds of pure chlorine by the million pounds of water, and this gives the feed rate for the hour in mg/L.
8. Adjust the pump feed rate as needed. If the free chlorine residual concentration from the online analyzer in the water treatment plant basement is outside of the target residual concentration, adjust the pump feed rate and repeat steps 3 through 7.
9. Record the free chlorine residual (in mg/L) from the online analyzer (i.e., Hach CL17) in the water treatment plant basement.

## **6 DATA RECORDING AND MANAGEMENT**

Following the procedure, record the following data on the daily log sheet:

- Initial and final sodium hypochlorite pump feed rate in mL/min and lb/hr
- Influent flow rate (MGD)
- Initial and final free chlorine residual concentration

## **7 REFERENCES**

None.