



NITRIFICATION CONTROL PLAN (NCP)

HOUMA WATER TREATMENT PLANT SYSTEM

PWS LA1109001

REVISED JANUARY 2019

OBJECTIVE

The nitrification control plan (NCP) as developed is a requirement to the Louisiana Department of Health & Hospitals Emergency Rule that became effective on November 6, 2013. Several facets of the Emergency Rule include: increased coliform sampling, increased disinfectant residual monitoring sites, higher minimum disinfectant residuals, daily measurement of the systems maximum residence time location (for residuals), disinfection residual measurement methodology, increased record keeping, and a nitrification control plan for systems that utilize continuous chloramination. The nitrification control plan conforms to section 367.G of the Emergency Rule.

The Emergency Rule mandates that the entire system shall maintain a **0.5 mg/l of free chlorine or chloramine** at all times. If measurements indicate that the residual is below 0.5 mg/l of disinfectant, the system operator must implement steps to get the residual up to the 0.5 mg/l residual. Consolidated Waterworks District No. 1's plan is to control nitrification in the distribution system by conforming to the state's Emergency Rule and maintain a 0.5 mg/l level of disinfection.

TREATMENT GOALS

The Houma Treatment Plant achieves a **4.1:1** (Cl₂:NH₃) ratio using an online analyzer to determine free chlorine residual. Based on the free chlorine residual and flow, ammonia dose is then calculated and injected using the Programmable Logic Computer (PLC). The Houma plants goal is to keep free ammonia at *POE-051 (Munson Pump Station #2)* between **0.05 and 0.15 ppm** as it enters the distribution system. A small amount of free ammonia is necessary for the plant operator to determine which side of the break point he is on.

DISTRIBUTION SYSTEM MONITORING

The Houma system has 5 elevated storage tanks. Tank grab samples are routinely collected monthly. All distribution Tanks are cycled a minimum of once daily to reduce water age.

Routine TCR and ACR grab samples are also collected monthly. While collecting these routine samples, extra parameters are collected via hand held Hach SL1000 analyzer as per the Nitrification

Action Plan. All the data is collected, documented and trended in computer programs such as Microsoft Access and Sedaru.

As routine samples are collected, low residuals are reported. Depending on the location of the low residuals, operators are dispatched to investigate and take actions such as flushing to increase residuals in low flow areas, or drain or clean tanks where necessary.

GRAB SAMPLE SITES AND SCHEDULES

Every 4 hours, grab samples from *POE- 051 (Munson Pump Station #2)* are collected and evaluated by water plant operators. This information is logged in the operators daily log sheet.

On a weekly basis, grab samples are collected at the following locations:

1. *POE-051 (Munson Pump Station #2)*-The plant's entrance to the distribution system
2. *MRT-052 (Lower Dulac Tank)*-The site of maximum residence time

Nitrification grab samples are collected at a minimum of 4 locations.

On a monthly basis, grab samples are collected at the following locations:

1. *POE-051 (Munson Pump Station #2)*-The plant's entrance to the distribution system
2. *TCR-030-880 Belanger Street*-mid system
3. *TCR-039-Four Point Master Meter*-mid system
4. *MRT-052 (Lower Dulac Tank)*-The site of maximum residence time

The Louisiana State Certified Laboratory owned and operated by the District, collects these grab samples and performs these analyses.

CONTINUOUS MONITORING

The District monitors water quality at 7 locations throughout the Houma distribution system using SCADA.

At these 7 locations, Chlorine residuals, system pressure, tank levels, and pump operations at *MRT-052 (Lower Dulac Tank)* are monitored and trended 24 hours a day via SCADA.

SCADA is reviewed every morning. Action plans are then developed and implemented. SCADA Technicians monitor SCADA on weekends and holidays. A report is generated and emailed to key personnel. Action is taken when necessary. The first action will be to confirm the accuracy of the online analyzer with a grab sample using the hand held Hach SL1000 analyzer. Online analyzers are routinely validated weekly.

ALERT LEVELS AND TRIGGER RESPONSES

*See the Nitrification Action Plan Chart

Nitrification Action Plan

Site		Chemical	Goal	Yellow Flag		Red Flag	
				Trigger	Actions	Trigger	Actions
Entry Point	Total / Mono	4.0 / 3.6	3.5 / 3.1	1) Verify results 2) Check and adjust dose → Till levels return to normal	3.3 / 3.0	1) Verify results 2) Adjust dose → Till levels return to normal	
	Free ammonia	0.05 - 0.15	0.2		0.25		
Average Water Age	Total / Mono	2.0 / 1.6	1.5 / 1.2	1) Verify results 2) Measure nitrite and nitrate 3) Adjust dose 4) Identify affected area (check upstream and downstream) 5) Flush area and/or tank 6) Increase monitoring 7) Flush dead ends → Till levels return to normal	1.0 / 0.8	1) Verify results 2) Measure nitrite and nitrate 3) Adjust dose 4) Identify affected area (check upstream and downstream) 5) Flush area and/or tank 6) Flush dead ends 7) Consider boosting 8) Convert to Free Chlorine → Till levels return to normal	
	Free ammonia	0.2	± 25%		± 50%		
High Water Age	Total / Mono	1.0 / 0.8	0.7 / 0.5		0.5 / 0.4		
	Free ammonia	0.25	± 25%		± 50%		
Nitrite/Nitrate							
Site		Chemical	Baseline	Yellow Flag		Red Flag	
				Trigger	Actions	Trigger	Actions
Entry Point	Nitrite	0.025	>0.03	1) Verify results 2) Increase monitoring 3) Identify source changes IF confirmed-modify BL 4) Identify area 5) Flush area and/or tank → Till levels return to normal	>0.05	1) Verify results 2) Identify affected area 3) Flush 4) Drain or Disinfect tank 5) Perform free chlorine burn → Till levels return to normal	
	Nitrate	1.5	>1.7		>2.0		
Source water(s)	Nitrite	0.025	>0.03		>0.05		
	Nitrate	1.5	>1.7		>2.0		
Blended water	Nitrite	0.025	>0.03		>0.05		
	Nitrate	1.5	>1.7		>2.0		