

Location	Parameter	Goal	Yellow Flag Action Level	Red Flag Action Level
WTP Tap	Total Residual Chlorine (mg/L)	4.25 ± 0.25	< 3.0	< 2.5
	Monochloramine (mg/L)	> 3.4	< 2.4	< 1.9
	Free Available Ammonia (mg/L)	< 0.10	> 0.2	> 0.3
	Nitrite-N (mg/L)	< 0.01	>0.02	>0.035
	Chlorine to Ammonia Ratio	4.9 : 1	N/A	N/A
	pH	8.3 ± 0.1	N/A	N/A
Response Time		Plant Operations Response: If one (1) parameter exceeds yellow flag action level at any given time following re-sampling.		Plant Operations Response: If one (1) parameters exceed red flag action level for more than 4 consecutive hours.
		Administrative Response: If one (1) parameter exceeds yellow flag action level for more than 6 consecutive hours.		Administrative Response: If one (1) parameters exceeds red flag action level for more than 4 consecutive hours.
Plant Operations Responses		<ol style="list-style-type: none"> Repeat sampling to check parameters and ensure accuracy. Verify periodic calibration has been performed on the instrument and if necessary, recalibrate handheld or online instrument. Re-adjust chemical injection doses accordingly. Increase monitoring frequency to 1 hr. intervals until resolved. 		<ol style="list-style-type: none"> Confirm raw water parameters have not changed. Re-adjust chemical injection doses accordingly. Increase monitoring frequency to 1 hr. intervals until resolved. As much as is feasible, drain Clearwell(s) to waste and refill.
		Administrative Responses		<ol style="list-style-type: none"> Evaluate trends and historical data to determine when action level was triggered. Evaluate and trend effectiveness of Plant Operations responses to see if parameters are back to target levels. Communicate findings to Water Treatment Plant Staff, Operating Supervisor, Assistant Superintendent, and Superintendent. Communicate findings to Utilities Department Director, Assistant Director, Distribution System Assistant Superintendent & Superintendent, and Engineering. Prepare for a red flag response.

Location	Parameter	Goal	Yellow Flag	Red Flag
			Action Level	Action Level
Distribution System (Avg Water Age)	Total Residual Chlorine (mg/L)	> 2.5	< 2.0	< 1.5
	Monochloramine (mg/L)	> 1.9	< 1.4	< 1.0
	Free Available Ammonia (mg/L)	< 0.2	> 0.35	> 0.45
	Nitrite-N (mg/L)	< 0.01	> 0.02	> 0.04
	Nitrate-N (mg/L)*	< 10% increase from WTP Levels	N/A	N/A
Distribution System (High Water Age)	Total Residual Chlorine (mg/L)	> 2.0	< 1.5	< 1.0
	Monochloramine (mg/L)	> 1.4	< 0.9	< 0.4
	Free Available Ammonia (mg/L)	< 0.2	> 0.45	> 0.55
	Nitrite-N (mg/L)	< 0.02	> 0.035	> 0.05
	Nitrate-N (mg/L)*	< 10% increase from WTP Levels	N/A	N/A
Response Time			Distribution System Responses: Site has two (2) parameters at yellow flag at any given time following re-sampling. Administrative Responses: Site has two (2) parameters at yellow flag for two (2) consecutive days.	Distribution System Responses: Site has one (1) parameter at red flag at any given time following re-sampling. Administrative Responses: Site has one (1) parameters at red flag for two (2) consecutive days.
Distribution System Responses			<ol style="list-style-type: none"> Repeat sampling to check parameters and ensure accuracy. Flush site until parameter levels reach levels of next closest site. Verify parameters at nearest upstream storage tank(s) or transmission main. If the response is triggered at a tank, the tank may be drained and refilled. Increase monitoring frequency at the site(s) to 6 hr. intervals. 	<ol style="list-style-type: none"> Increase both duration and # of conventional flushing sites in the area. Sample parameters both upstream and downstream in at least 3 locations within 1/2 mile. Verify parameters at nearest upstream storage tank(s) or transmission main. Valve sweep: Verify valves in the vicinity of the site are open. As much as is practical, isolate, drain and refill tanks located near site(s) of concern. Increase monitoring frequency at the site(s) to 6 hr. intervals. If red flag action levels are widespread and not showing improvement, prepare for and initiate a free chlorine conversion.
Administrative Responses			<ol style="list-style-type: none"> Evaluate trends and review historical data for site in question and adjacent sites to determine the extent of affected area. Evaluate and trend effectiveness of Distribution System Responses to see if parameters are back to target levels. Communicate findings to Distribution System Supervisors, Assistant Superintendent, and Superintendent. Communicate findings to Utilities Director, Assistant Director, Utilities Engineering, and Water Plant Superintendent. Prepare for a Red Flag response 	<ol style="list-style-type: none"> Evaluate and trend effectiveness of Distribution System Responses to see if parameters are back to target levels. Communicate findings to Distribution System Supervisors, Assistant Superintendent, and Superintendent. Communicate findings to Utilities Engineering, Water Plant Superintendent, Assistant Director, Director, Assistant City Manager, and City Manager. If red flag responses are widespread, prepare for a Free chlorine conversion. If widespread nitrification is identified in the distribution system, a WTP service area wide free chlorine conversion may be performed to control nitrification. The following items will be completed prior to a chlorine conversion: <ol style="list-style-type: none"> Coordination with treatment plant staff and SOP communication TCEQ notification (Regional and State office) Notify local hospitals, medical facilities, and large volume users Release/publish FAQ list for customers