

Heber Public Utility District

Report to the Board of Directors

MEETING DATE: August 17, 2017

FROM: Laura Fischer, General Manager

INFORMATION ONLY: Regarding: Disinfection By-Product Test Result Data from Water Treatment Plant and Distribution Collection Points

ISSUE:

Disinfection By-Product Test Result Data from Samples at Water Treatment Plant and Distribution Collection Points.

BACKGROUND:

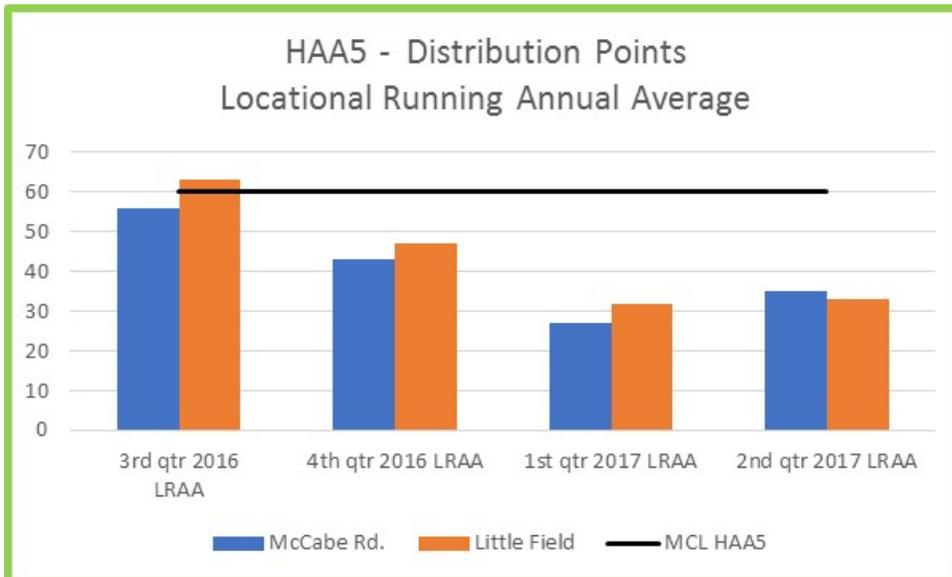
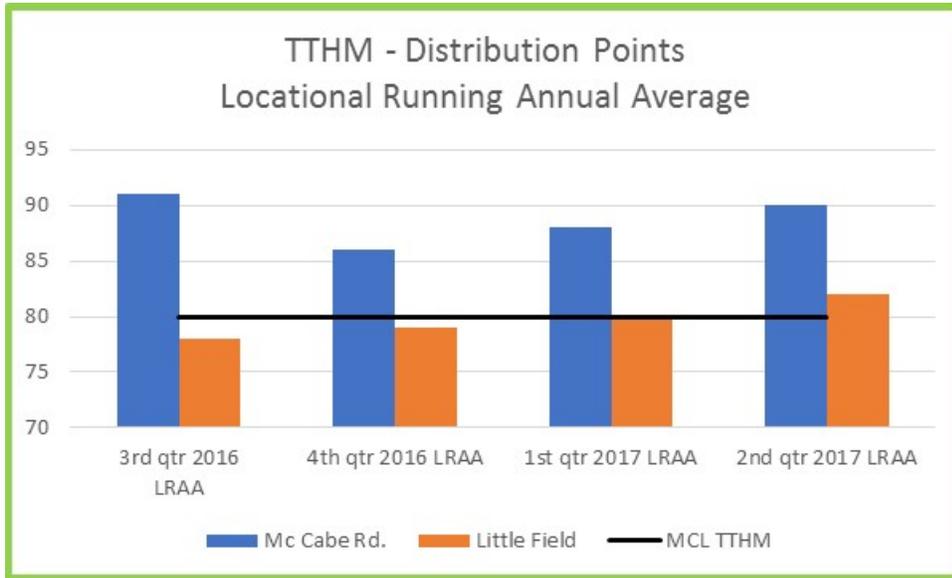
In order to ensure that tap water is safe to drink the U.S. Environmental Protection Agency (U.S. EPA) and the State Water Resources Control Board (Water Board) prescribe regulations that limit the amount of certain contaminants in water provided by public water systems.

To reduce contaminants certain disinfectants, such as chlorine are used to treat water. However, disinfectants themselves can react with naturally-occurring materials in the water to form byproducts, which may pose health risks. The U.S. EPA and State Water Board have established State 2 Disinfectants and Disinfection Byproducts Rule, which the Heber Public Utility District must follow. The State 2 Disinfection Byproduct Rule tightened compliance monitoring requirements for two groups of byproducts, trihalomethanes (TTHM) and haloacetic acids (HAA5). These two byproducts must be sampled and tested at a certified laboratory quarterly, and the locational running annual average must be determined and reported to the State Water Board. The State Water Board and U.S. EPA have established the Maximum Contaminant Level (MCL) for the trihalomethanes (TTHM) at 80 micrograms per liter and for the haloacetic acids (HAA5) at 60 micrograms per liter.

HISTORICAL VIOLATIONS OF DISINFECTION BYPRODUCT RULE:

The Heber Public Utility District has been in violation of the MCL for TTHM at the McCabe Road sampling location for the past four quarters, and at the Little Field sampling location for the past one quarter.

The Charts below shows the Location Running Annual Average for the two sampling locations in our distribution system over the past four quarters. The black line charts the MCL. Keep in mind that the water treatment plant has been under construction for the past year and during these testing periods we have had our ponds out of service, our pretreatment chemicals off line, and our tanks and clarifiers were rehabilitated. This caused our contaminant levels to rise during construction.



RESULTS AFTER INSTALLATION OF TRIHALOMETHANE REMOVAL SYSTEM:

As part of our water treatment plant improvement project, we installed a trihalomethanes removal system (TRS) in the 3 MG water tank to remove volatile trihalomethanes from the water. The TRS includes four mixers in the tank, a spray system to strip out the volatile THM, and a ventilation system to remove the stripped THM chemicals. The THM concentration is checked by testing samples into and out of the water tanks and in the distribution system.

In order to establish a base level of concentrated THM going into the 3 MG tank, staff began testing the disinfection byproducts at various location at the water plant as well as at the two distribution testing locations. Staff tested not only the THM, but also the HAA5 contaminants. Samples were collected every two weeks beginning on March 22, 2017 and we are still collecting and testing at that interval. Staff collected samples of water as it leaves

all three tanks and at the two distribution locations. The table below is a sample of the data collected and the results from the July 12, 2017 tests.

As you can see, we tested the chlorine residual, PH, turbidity, temperature and noted the tank elevations. Staff also noted any treatment components that may have been off line or under construction during the test period.

LOCATION	DATE	TTHM (ug/l)	HAA5 (ug/l)	CL2	PH	TURBIDITY	TEMP	TANK ELEVATION
	TIME			Residual				
0.75 MG Tank	7/12/2017 7:30am	44.9	18.8	2.68	7.72	0.12	28.6	18.2
1.7 MG Tank	7/12/2017 7:20am	79.1	35.7	2.22	7.73	0.12	29.7	18.2
3.0 MG Tank	7/12/2017 7:00am	37.3	40.7	1.44	8.24	0.12	29	18.2
Little Field	7/12/2017 8:30am	50.9	42.6	0.86	8.24	0.16	31.1	
Mc Cabe Road	7/12/2017 8:00am	55.1	46.4	0.82	8.23	0.14	30.6	
Water Usage for 7/12/2017: 1,360,000 Gallons, Turn Over Rate: 40%								
Clarifier #3 in operation, all 3 pond in series and 75% full								
TTHM system running on three air strippers								

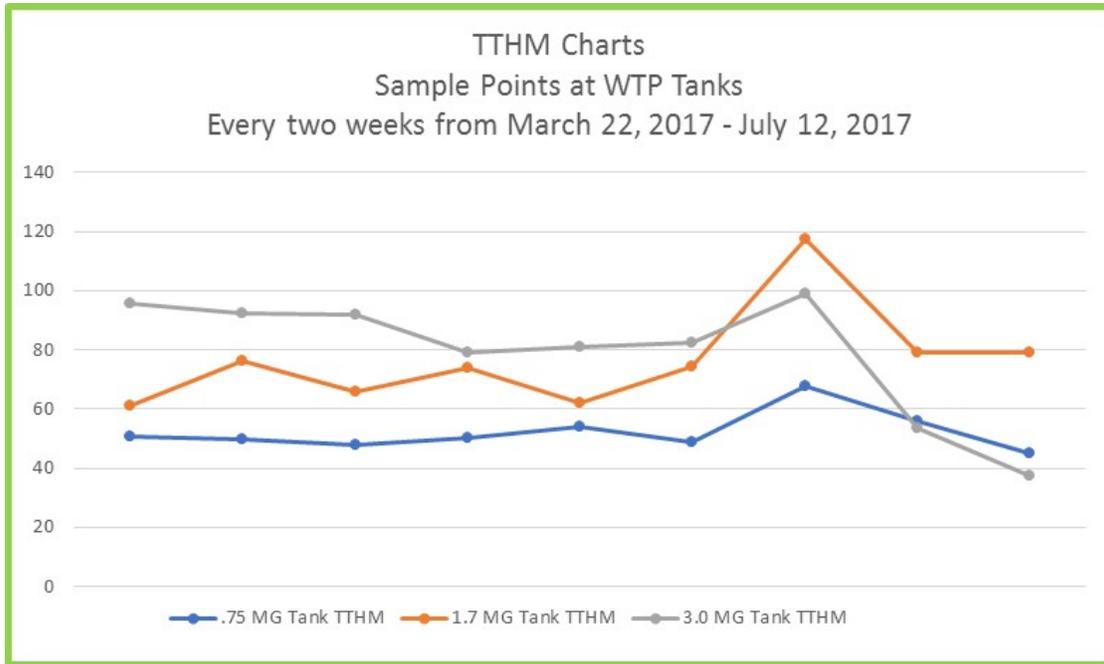
With this data collected over the past five months during construction, we can measure the reduction of TTHM and HAA5 in the 3MG tank and our distribution sampling points.

The TTHM system was placed on line June 14, 2017. However the system is not fully operational as of our last test on July 12, 2017. There were some glitches with the electrical service that caused the motors to trip. The system has four mixers in the 3 MG tank, but due to the issue with the electrical service only three motors are running at this time. Our electrician is working on correcting the breaker and panel. Even with only three motors running the TRS removed 53% of the TTHM in the 3MG tank. This was calculated by testing the water going into tank 3 and the water exiting tank 3.

The three water storage tanks are now “in series” which means that finished water from the clarifier enters into tank 1 (.75 MG) where additional chlorine is injected. The finished water and the chlorine are cycled through baffles, which are inside the tank. The baffles ensure that the chlorine is blended with all of the water in the tank and that there are no areas where the water is not circulated. After the water is disinfected in tank 1 by the injection of chlorine, the TTHM and HAA5 byproducts are generated. The water then moves into tank 2 (1.7 MG) where it is stored, and where more TTHM and HAA5 are generated as the water temperature rises. Then the water cycles into tank 3 (3 MG). Once in tank 3 the Trihalomethane Removal System circulates water from the bottom of the tank to the top where it is sprayed out into the air in the tank. This spraying action strips the TTHM into the air and they are then vented out of the tank. The water leaving tank 3 (3 MG) will have lower TTHM. The water then is pumped into our distribution system until customers use it. Our water is tested at the end of the longest distribution runs from the water plant. These testing locations are at Mc Cabe Road and Little Field Avenue.

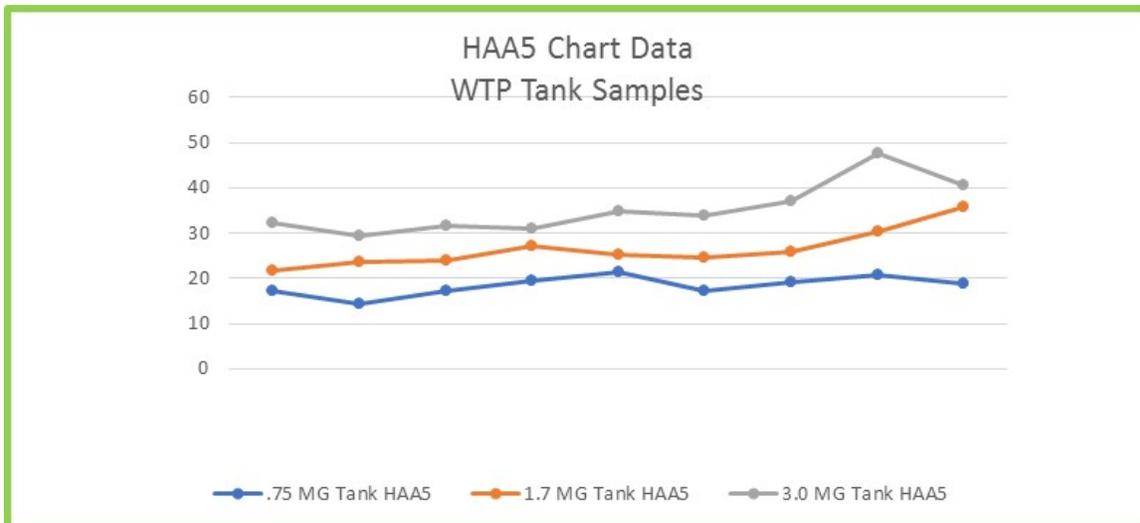
The chart below shows the THM levels as it moves through the three tanks over a five month period. As you can see there is a drastic reduction in TTHM in the water leaving tank 3 after the TRS was placed on line. Even with the TRS system not being fully operational.

Notice the gray line, which represents the TTHM in tank 3. After the TRS was placed on line the TTHM in tank 3 were reduced 53% from the TTHM entering into tank 3.

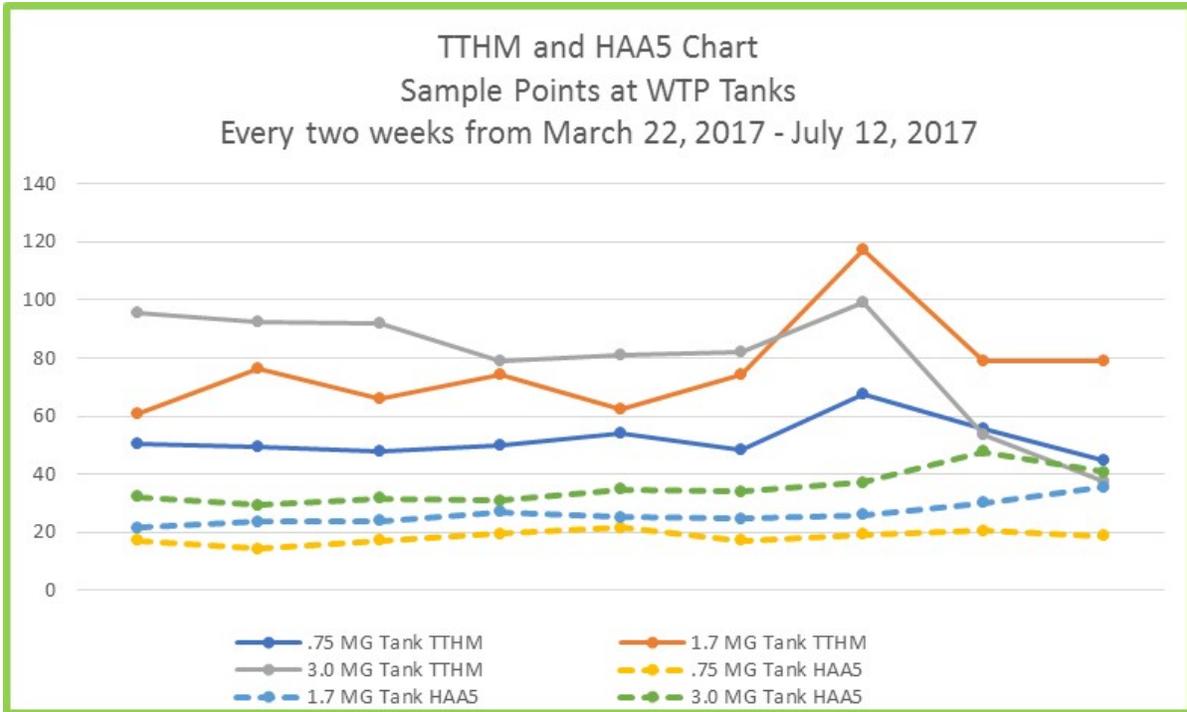


The other disinfectant byproduct that is generated in tank 1 is HAA5, which are not volatile and cannot be removed by the TRS. The only way to lower the HAA5 is to reduce the amount of organic matter in the finished water. We have installed a mixing station to assist in reducing organic matter as well as making significant improvements to our clarifiers and filters.

The following chart shows the HAA5 test results at the three tanks over the past five months. As you can see the HAA5 were trending up, but we did experience a reduction after the static mixing station was placed on line. The HAA5 are within acceptable levels and under the MCL.

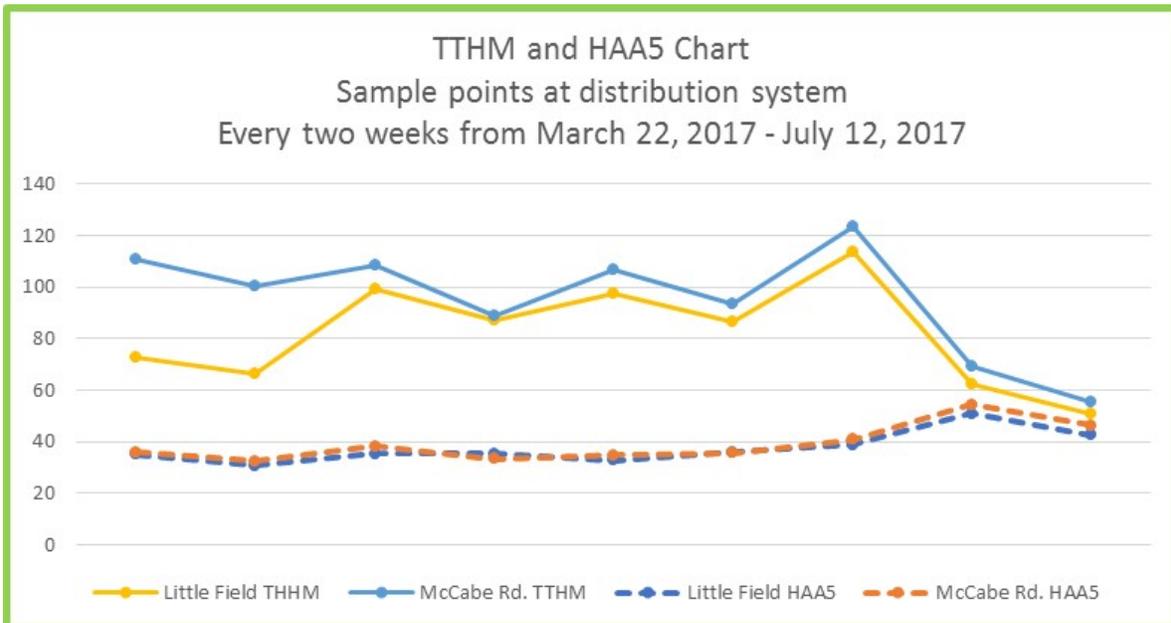


The chart below has both the TTHM and HAA5 data as it is important to know if our treatment methods for TTHM effects HAA5 results. The water exiting tank 3 (3 MG) has a TTHM level of 37.3 and an HAA5 level of 40.7.



However, the TTHM and HAA5 results from our water tanks are not the sample points that must be reported to the State Water Board according to the Stage 2 Disinfectant Byproduct Regulation. These sample points are at the furthest location from our water treatment plant.

This means that the water has been sitting longer in underground pipes, getting hot and depending upon demand, could be stagnant. The charts below show the TTHM and HAA5 test results at the two distribution sampling points over a five month period.

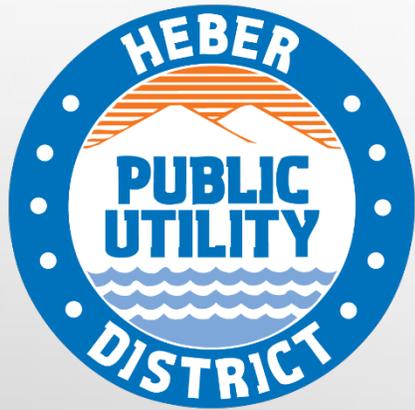


From the sample data collected, we can conclude that the TTHM Removal System is successfully removing TTHM from our finished water, and that the HAA5 results continue to be well under the MCL. We will continue to test our water every two weeks and HPUD staff and our engineers will ensure that the TRS meets the removal requirements stated in our construction agreement.

We anticipate that our water quality will continue to improve and that we will not violate the Stage 2 Disinfectant Byproduct Rule in the future.

Respectfully Submitted,

Laura Fischer, General Manager



HEBER PUBLIC UTILITY DISTRICT

WATER TREATMENT PLANT
TTHM REMOVAL SYSTEM ANALYSIS

TTHM AND HAA5 SAMPLING PLAN

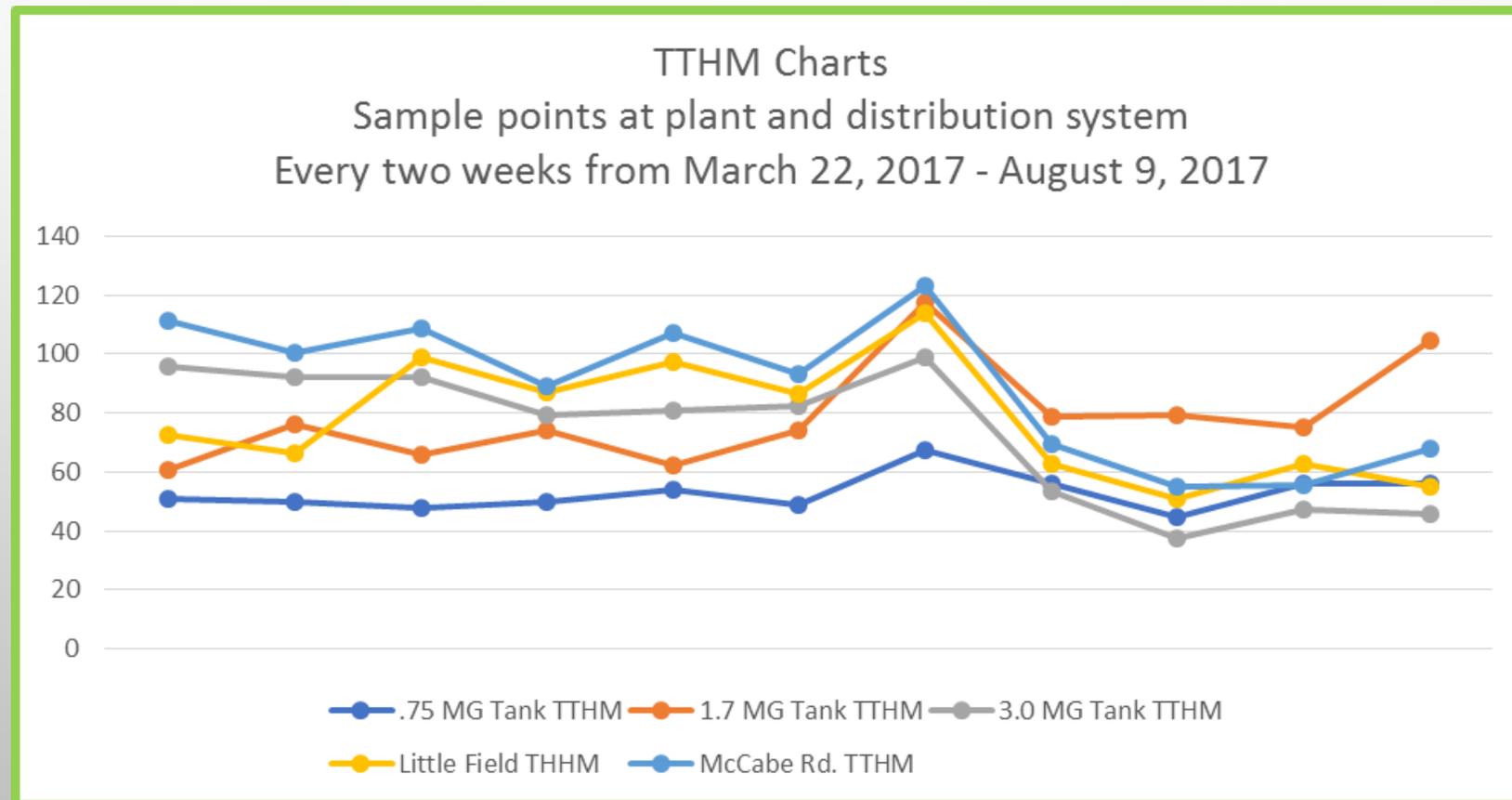
- COLLECT WATER SAMPLES EVERY TWO WEEKS STARTING MARCH 22, 2017
- GATHER SAMPLES TO ESTABLISH BASELINE TTHM AND HAA5 DATA TO:
 - DETERMINE HOW PLANT IMPROVEMENTS EFFECT DISINFECTION BYPRODUCT DEVELOPMENT.
 - STATIC MIXING STATION
 - POND CIRCULATION AND WATER MOVEMENT
 - NEW CLARIFIER AND BACKWASH BASIN
 - TREATED WATER STORAGE TANKS IN SERIES
 - TTHM REMOVAL SYSTEM
 - SAMPLES WERE TESTED EVERY TWO WEEKS BEGINNING MARCH 22, 2017
 - DISCHARGE OF .75 MG TANK
 - DISCHARGE OF 1.7 MG TANK
 - DISCHARGE OF 3MG TANK
 - SAMPLING POINT AT LITTLEFIELD AVENUE
 - SAMPLING POINT AT MCCABE ROAD

TTHM AND HAA5 SAMPLING PLAN

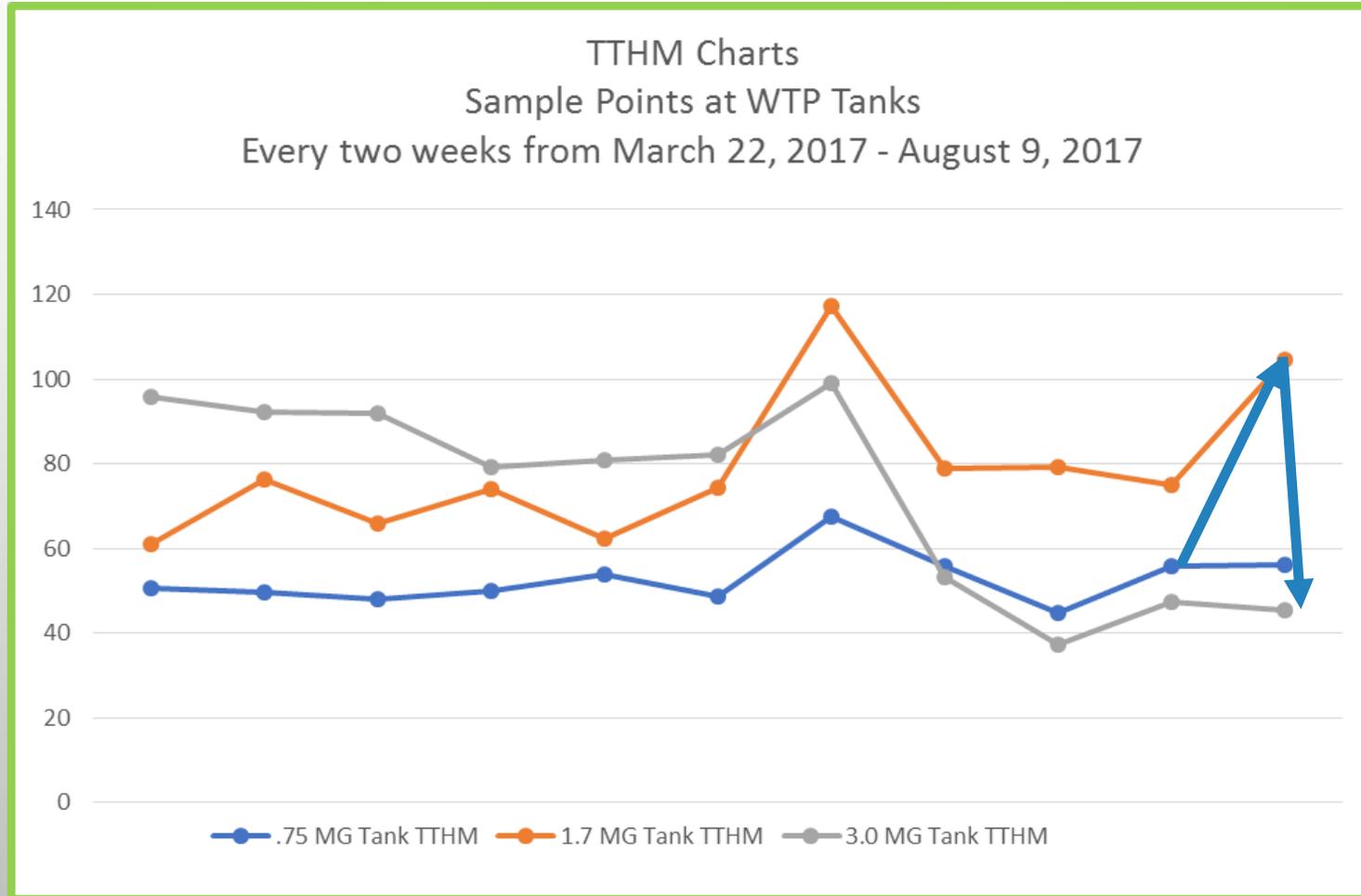
- ADDITIONAL DATA COLLECTED:

- CHLORINE RESIDUAL WAS COLLECTED AT ALL LOCATIONS
- PH LEVELS WERE COLLECTED AT ALL LOCATIONS
- TURBIDITY LEVELS WERE COLLECTED AT AL LOCATIONS
- TEMPERATURE OF WATER WAS COLLECTED AT ALL LOCATIONS
- TANK ELEVATION LEVELS WERE COLLECTED AT THE THREE TANKS
 - THIS INFORMATION GAVE US THE WATER TURNOVER RATE AND WE CAN TELL HOW LONG THE WATER WAS HELD IN EACH TANK
- CONSTRUCTION ACTIVITY AT THE WATER PLANT WAS NOTED
 - EXAMPLES INCLUDE: PONDS OUT OF SERVICE – TANKS NOT IN USE – CHLORINE GENERATOR OFF LINE

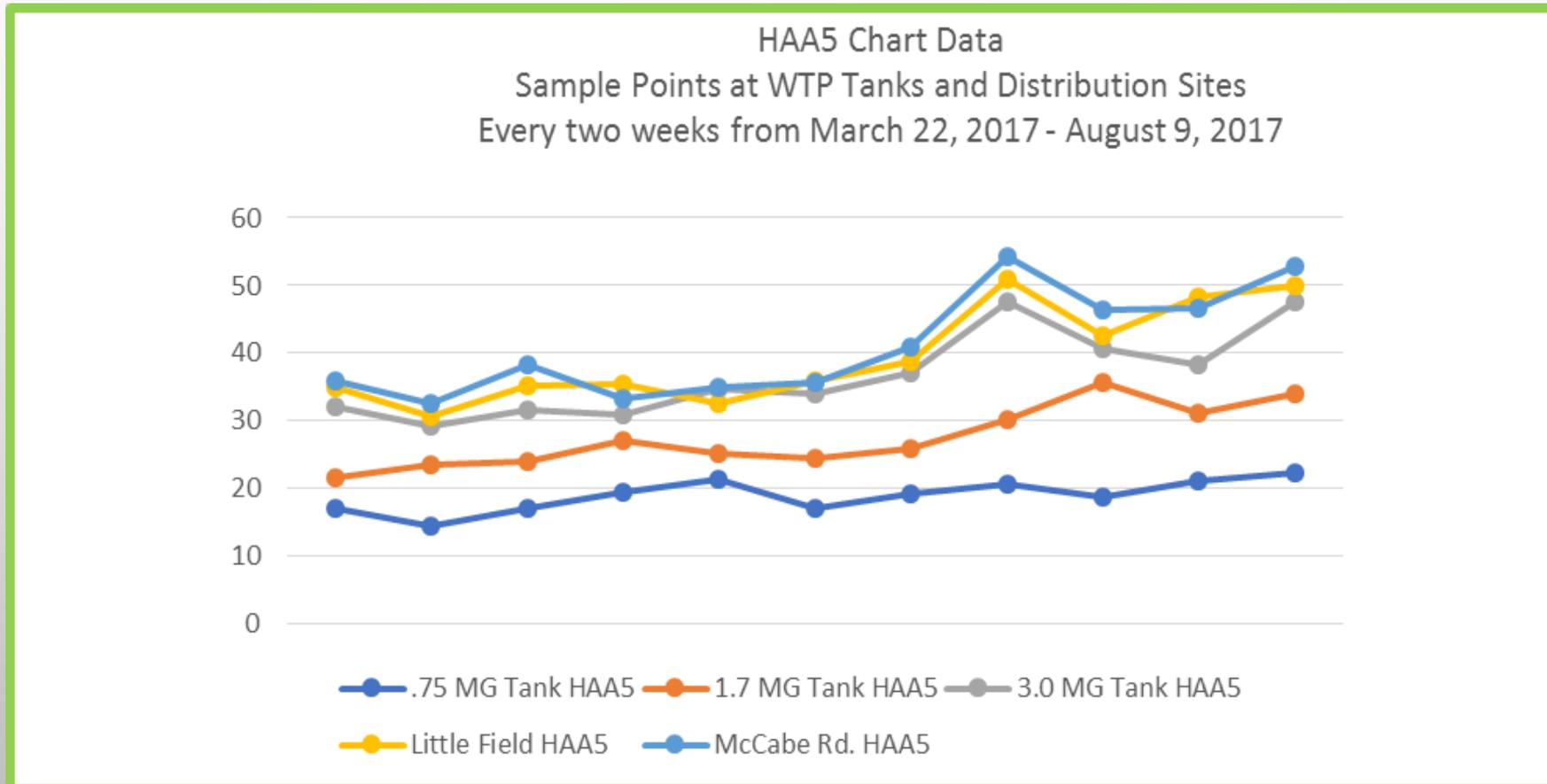
TEST RESULTS FOR TRIHALOMETHANES TTHM



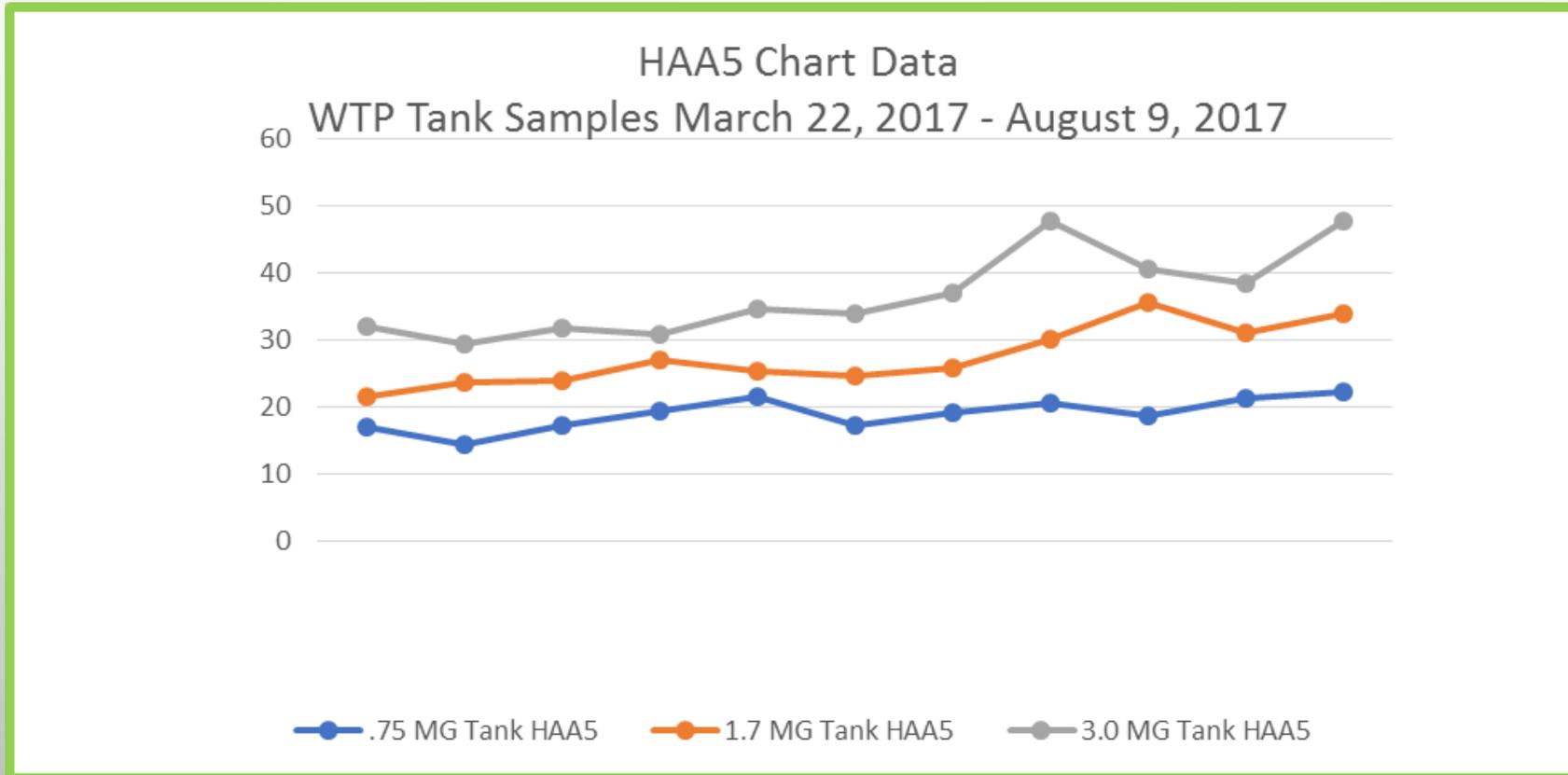
TEST RESULTS FOR TTHM AT WTP TANKS



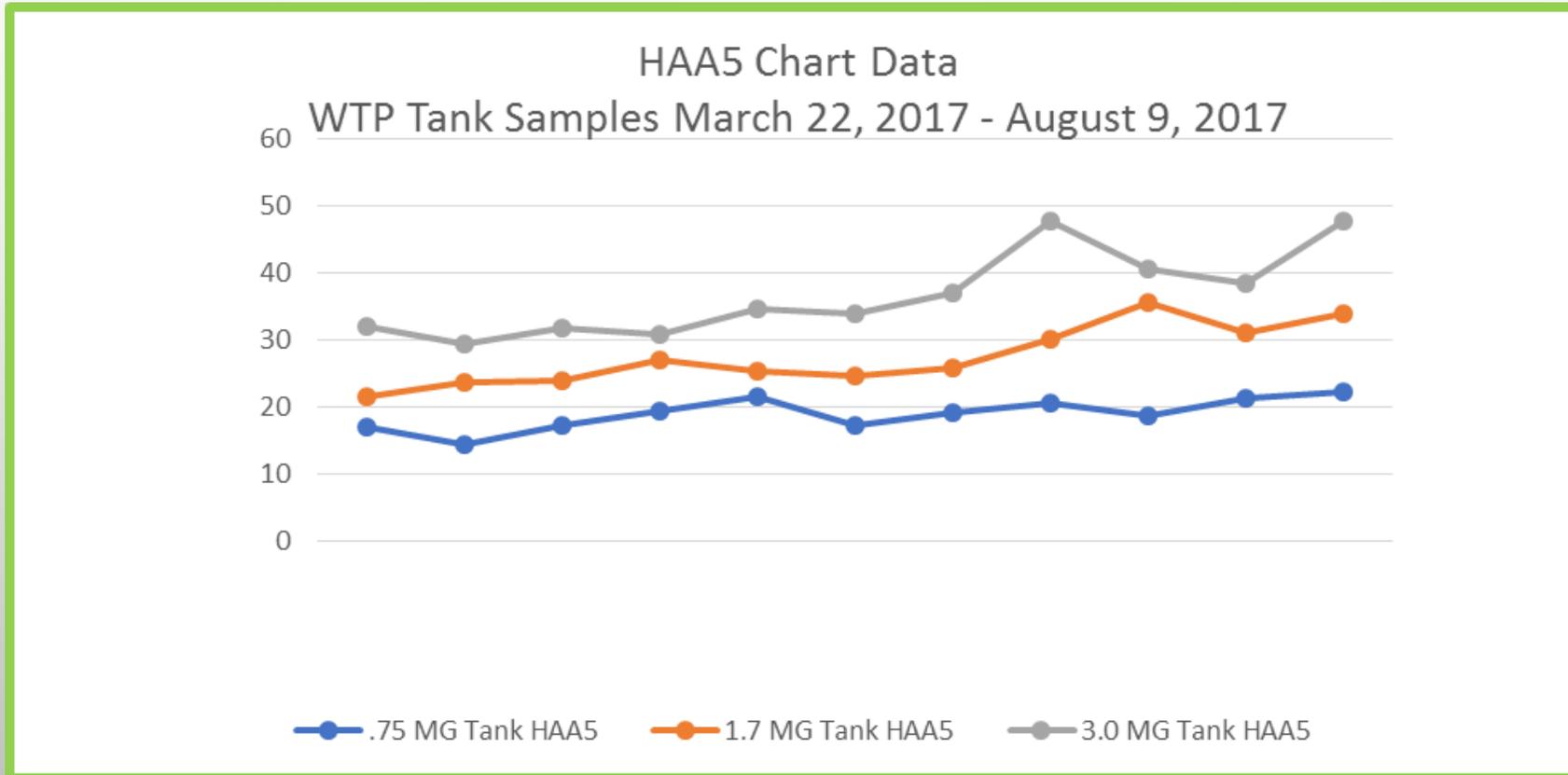
TEST RESULTS FOR HAA5 AT ALL LOCATIONS



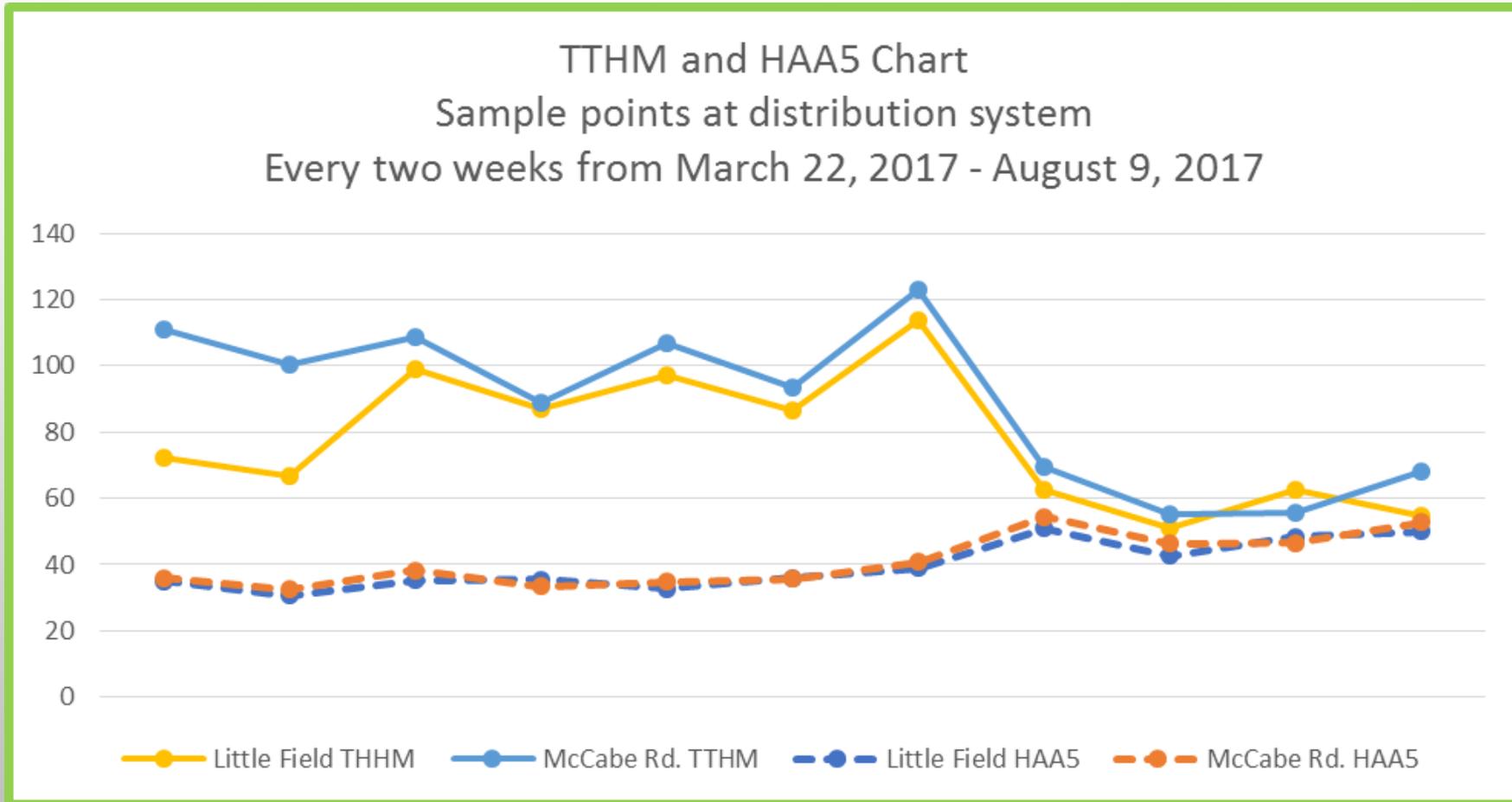
TEST RESULTS FOR HAA5 AT WTP TANKS



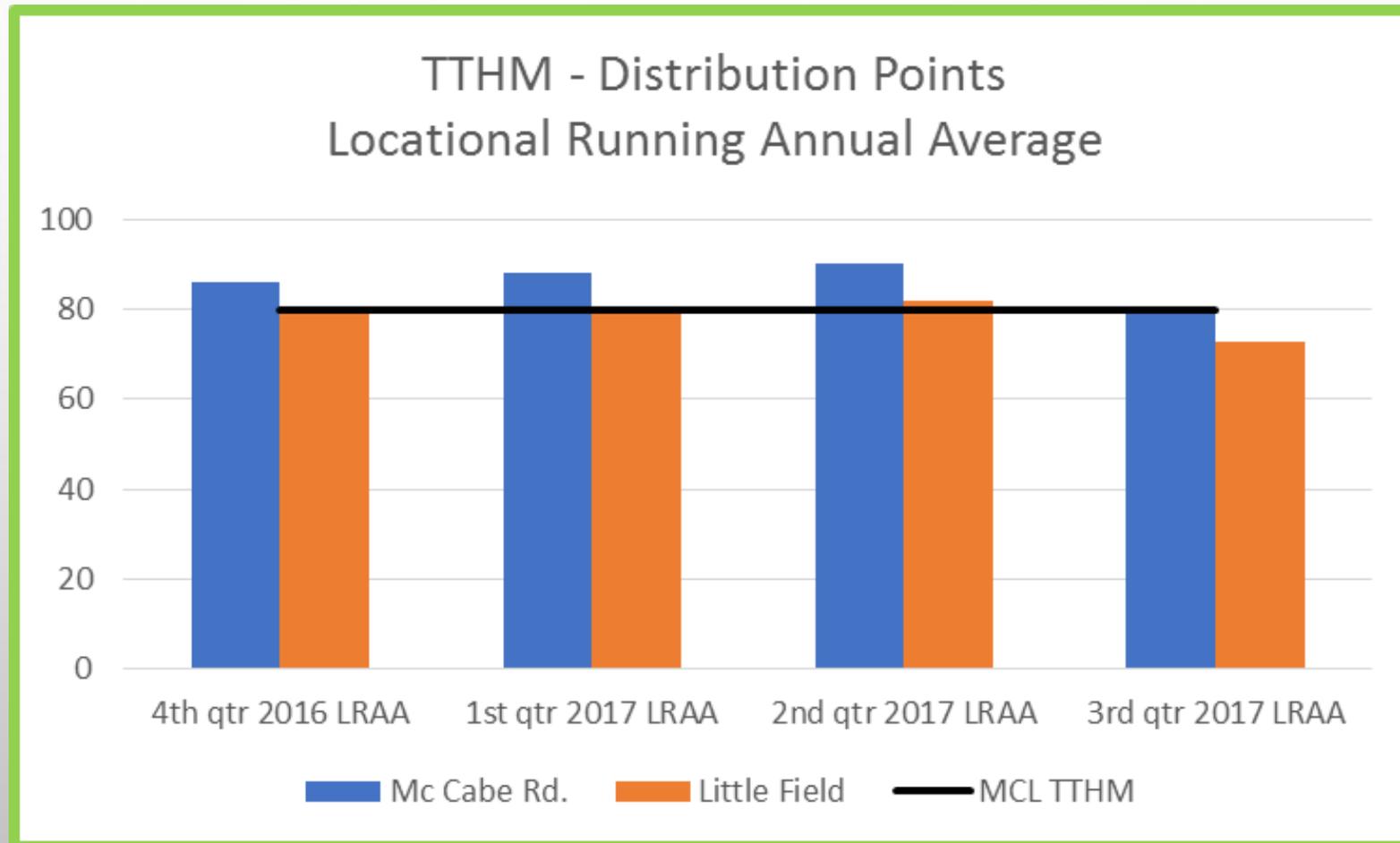
TEST RESULTS FOR HAA5 AT WTP TANKS



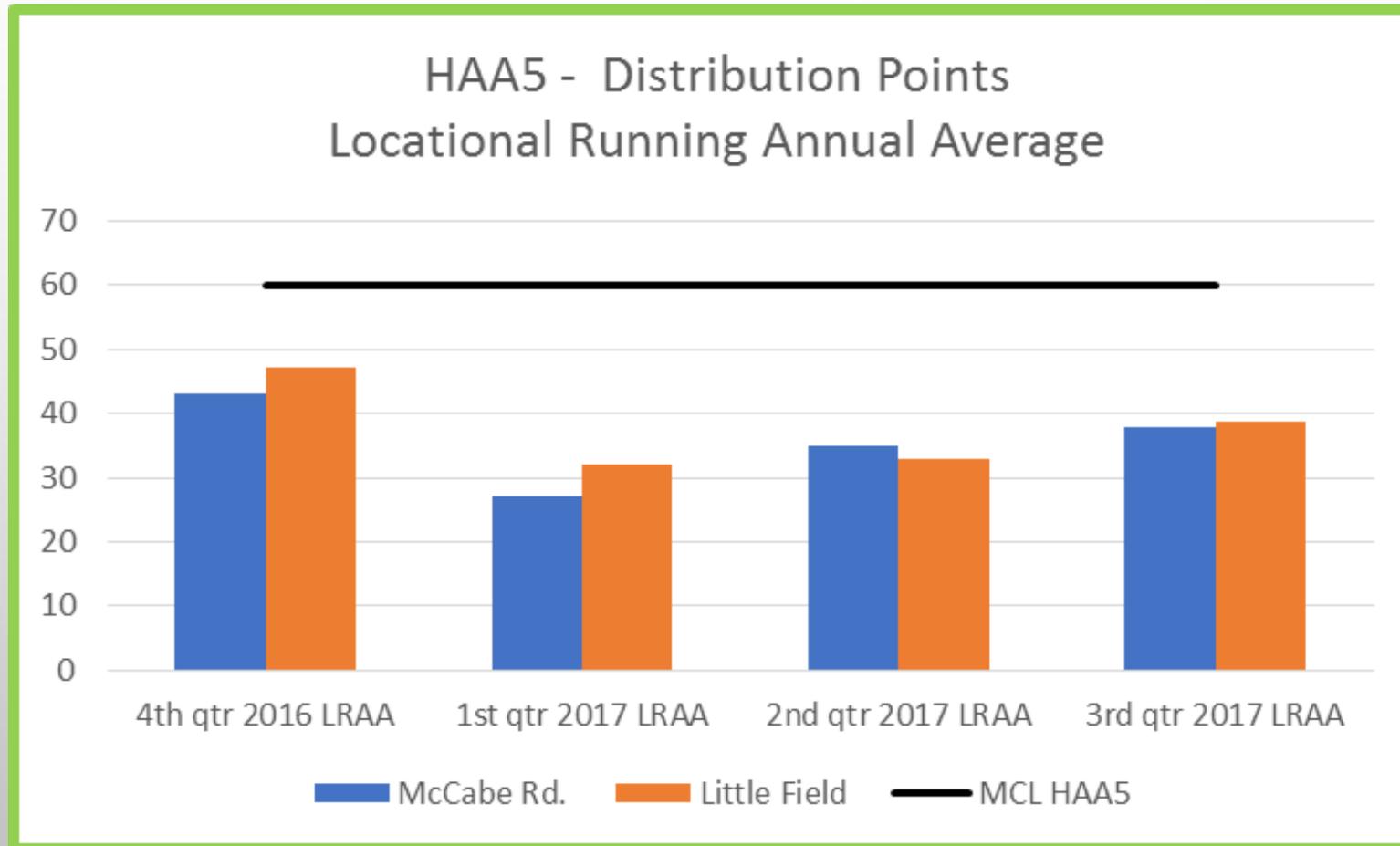
TEST RESULTS FOR TTHM AND HAA5 AT DISTRIBUTION SAMPLING SITES



RUNNING ANNUAL AVERAGE - TTHM



RUNNING ANNUAL AVERAGE – HAA5



SAMPLING PLAN ANALYSIS

- WHEN THE TTHM SYSTEM WAS PLACED ON LINE (ONLY THREE OF FOUR AERATORS)
 - THM's were generated in .75 MG tank with baffling system (as designed)
 - THM's increased on up to 86% in 1.7 MG storage tank (as designed)
 - THM's were reduced in 3 MG tank by 56% before entering distribution system
 - THM's in the distribution system are under the LRRM MCL of 80
 - LRRM is an average of four quarters, and our THM tests in the second quarter of 2017 were high.
 - We need to have a result of 50 or less at the two sampling sites in the 3rd quarter of 2017 to meet LRRM.
- HAA5 have increased slightly at both the plant and distribution sites
 - We are well below the LRRM MCL of 60 for HAA5
 - The Static Mixing Station was not fully operational during these test periods

TTHM REMOVAL SYSTEM

- THE THM REMOVAL SYSTEM WAS PUT INTO SERVICE AND WILL BE MONITORED FOR CONFORMANCE. ADDITIONALLY THE TWO DISTRIBUTION TESTING SITES WILL BE TAKEN INTO CONSIDERATION FOR APPROVAL AND WARRANTY REQUIREMENTS
- THERE ARE FOUR AERATORS IN TANK 3 AND ONLY THREE HAVE BEEN IN OPERATION DUE TO ELECTRICAL ISSUE. THE NEXT TEST RESULTS WILL HAVE RESULTS AFTER ALL FOUR AERATORS ARE ON LINE.
- DRASTIC REDUCTION OF TTHM AT DISTRIBUTION SITES – SUCCESS!

QUESTIONS

The image features a light gray gradient background. The word "QUESTIONS" is centered in a bold, black, sans-serif font. The corners of the image are decorated with several realistic water droplets of various sizes, each with a highlight and a shadow, giving them a three-dimensional appearance.