

STANFORD WATERWORKS

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March 13, 2025

Kentucky Public Service Commission
P.O. Box 615
Frankfort, Kentucky 40602-0615

RECEIVED
MAR 13 2025

PUBLIC SERVICE
COMMISSION

Re: Public Comment
Case No. 2025-00022

Dear Commissioners:

On February 6, 2025, McKinney Water District submitted an application seeking your approval to build and finance, among other things, a water main to provide an interconnection with the City of Danville Municipal Utilities water system. In support of its proposed construction, McKinney Water District cited problems with the quality of water it purchases from the City of Stanford, Kentucky. I am submitting this public comment to explain the efforts the City of Stanford Waterworks has taken in recent years to improve the quality of the water it produces and why the construction proposed by McKinney Water District may replicate actions already taken by Stanford.

I have served as the General Manager of the City of Stanford Waterworks since 2011. Prior to assuming this position, I served as the Director of Marketing for Bell Engineering for four years and worked as a Human Resource Manager at a firm in Danville, Kentucky. I earned a Bachelor of Science in Agriculture, Public Service, Communications, and Leadership from the University of Kentucky, and I served on the Danville City Commission from 2000-2004. I am currently President of the Boyle County Fair Board and the Past-President of the Kentucky Association of Fairs and Horse Shows. I also serve as Chairman of the Board of the Gathering Place Senior Citizen Center of Danville and Boyle County. I am deeply committed to the people of Lincoln and Boyle counties and to the economic success of the region.

There are aspects of McKinney Water District's proposed construction project that certainly need to be accomplished, such as the replacement of old asbestos cement water lines, and the replacement of other lines known to be a source of significant leaks. However, an interconnection to permit McKinney Water District to purchase water from the city of Danville is not needed for the reasons presented in McKinney Water District's application and in its recent Response to Commission Staff's First Request for Information.

In 2017 the City of Stanford Waterworks (Stanford) sought the assistance of Water Solutions Unlimited, Inc.(WSU) and began to explore how Stanford could best address disinfection byproducts in the water it produces. The chemicals Stanford had been using were not consistently effective. During 2017 & 2018 Stanford worked with WSU to lower the level of the disinfection byproducts known as total trihalomethanes (TTHM) and total haloacetic acids (HAA5) in the water it produced and sold to all of its customers, including McKinney Water District. Stanford cleaned its filters and followed the advice and direction of WSU and tested several products to find the best combination of chemicals to consistently produce the cleanest water possible.

Early in the process, McKinney participated with Stanford in discussions with WSU. A summary of an early meeting compiled by Nick Stanley of WSU is attached to this comment as **Attachment 1**. The notes from that meeting contain a discussion of a product called "ORA-CLE." WSU recommended that McKinney Water District begin using this chemical to clean its distribution system. ORA-CLE is a specially designed product to clean water distribution lines and thereby keep disinfection byproducts under control, improve flushing, and improve overall water quality. Stanford began to use this product in 2013 and uses it today. However, it is my understanding that McKinney Water District's Board decided not to use the product. In July 2018, Stanford Waterworks was recognized by the Energy and Environment Cabinet as 1 of 42 water treatment plants in the state that met the goals of Kentucky's Area-Wide Optimization Program. This meant that Stanford went beyond meeting the minimum regulatory requirements and met higher criteria than those found in the Safe Drinking Water Act. A copy of the press release is attached to this Comment as **Attachment 2**.

In early 2019, following jar tests of several coagulants (substances used to aid in the clumping of very fine particles into larger particles so that they can be removed from water more easily), Stanford received authorization from Kentucky's Division of Water (DOW) to use the jar-tested coagulants at its treatment plant on a trial basis. During the jar test in early 2019, a particular coagulant, PremierPac 3050, performed very well. At the end of the in-plant trial, Stanford made the decision to

start using this coagulant because of its effectiveness in reducing Total Organic Carbon (TOC). Reducing TOC removes the particles that lead to water having a cloudy appearance. The results of the jar test and the letter from DOW authorizing the in-plant trial of PremierPac 3050 are attached to this comment as **Attachment 3**. Stanford continues to use PremierPac 3050 today as it significantly reduces the TOC and its cloudy appearance.

In 2019 Stanford also participated in a trial of an Enhanced Carbon Slurry (ECS), KS 9001, to specifically address the disinfection byproducts TTHM and HAA5. The ECS trial results indicated that using ECS reduced TTHM by 31.4 percent to 57.1 percent. ECS reduced HAA5 by 27.3 percent to 54.5 percent. A summary of the Enhanced Carbon Summary Trial is attached to this Comment as **Attachment 4**. ECS is more expensive than some other chemicals, but Stanford made the choice to use it because it helps ensure that the water sold to McKinney Water District meets all DOW clean water requirements at the point of delivery to McKinney.

In addition to seeking the most effective combination of agents to combat disinfection byproducts and total carbon in the water Stanford produces, Stanford has made improvements to its infrastructure that ensure it is equipped to provide an adequate supply of clean water to its customers. In 2020 Stanford completed a \$4.25 million replacement of many of its water mains, including the replacement of the cast iron main from the water treatment plant to the city of Stanford. In total, approximately 75,000 linear feet of existing water line was replaced and approximately 5,000 linear feet of new water line was added. Stanford made this investment in its system to eliminate contaminants stemming from older, deteriorated water lines. Included in this project was the replacement of approximately 1,330 linear feet of water line that feeds **only** the McKinney Water District pump station. The new line delivers water to the McKinney pump station at a pressure of 110-120 psi. Had Stanford known that McKinney Water District was going to substantially reduce its water purchases from Stanford, and thereby reduce or eliminate the demand on this line, Stanford may have chosen to use its resources to replace a different section of water line.

I am attaching a summary of the Notices of Violation due to disinfection byproducts sent to Stanford; McKinney Water District; the city of Eubank, Kentucky; and the city of Danville, Kentucky from 2015-2024 as **Attachment 5**. As you can see McKinney Water District's system tests high in disinfection byproducts even when Stanford's system does not. WSU has suggested that this is caused by a build up biofilm in McKinney Water District's system. Stanford is providing McKinney Water District with clean water that meets all of the regulatory

requirements at the point of delivery. **McKinney Water District does not need a connection with Danville to obtain clean water for its customers.**

Additionally, McKinney Water District suggested in its application and recently filed response to Commission Staff that Stanford does not provide a reliable source of water. To support this assertion, McKinney references the flash-freeze that occurred in December 2022 and Stanford needing to close one of the master meters to McKinney Water District. Like other utilities in Kentucky, the flash-freeze in December of 2022 presented many challenges to Stanford. On Wednesday December 21, 2022, one of Stanford's filters suffered a failure of the filter block, forcing Stanford to take the filter offline. On Friday December 23, 2022, a sludge blowdown valve, which allows regulation of the mud blanket in the cone, became frozen closed. This situation was remedied by slowly warming the valve with torpedo heaters. On Saturday, December 24, 2022, Stanford's high service pump failed. Outside contractors were called in and the pump was repaired in a few hours. On Monday, December 26, 2022, a water line inside of Stanford's high service building ruptured and had to be repaired. Stanford addressed all of these issues and resolved them as quickly as possible.

However, on December 26, 2022, McKinney Water District was using an exceptionally large volume of water. At 9:15 P.M. our million-gallon storage tank had 3.99ft of water left in it and the two tanks in town were completely empty. Stanford serves McKinney Water District via three master meters. A map showing the location of these master meters is attached to this comment as **Attachment 6**. Stanford decided to close the Neals Creek master meter¹ to McKinney's system as it had the highest usage that night. The Neals Creek meter is normally the second highest usage of the three master meters serving McKinney's system.

We determined that night by looking at the usage of the three master meters that serve McKinney's system that the area that is served by the Neals Creek master meter must have had several leaks. The usage on that master meter was much higher than normal and higher than the other two master meters feeding McKinney's system. The two other master meters remained open. Closing the master meter was not a decision we took lightly, but we had to slow the use of water to keep our tanks from running completely dry. Closing the Neals Creek master meter to McKinney's system resulted in a nearly instant gain of 17,587 gallons per hour or 293 gallons per minute.

Stanford and Kentucky Rural Water worked in conjunction with McKinney

¹ Neals Creek is located at Latitude 37° 29' 22" North and Longitude 84° 40' 15" West.

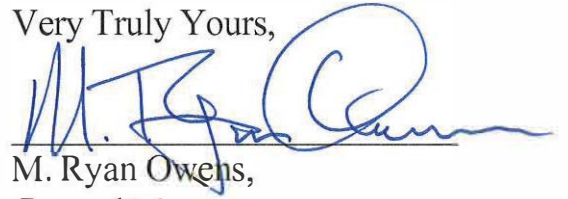
Water District and began to slowly open McKinney's system and checked for leaks. Stanford has no knowledge of exactly how many leaks were located and repaired in conjunction with this incident, but our understanding is that 2 or 3 lines were repaired, plus numerous customer leaks and busted meters.

During times of drought, leadership of the city of Stanford has been forced to declare a state of emergency and to declare a Water Shortage Advisory. These are precautionary procedures taken in the hope and expectation that individuals will voluntarily reduce their water use until the area receives sufficient rainfall to replenish the reservoirs. This is an action taken by many water utilities and municipalities throughout the country during times of drought.

Stanford acknowledges that McKinney Water District has a responsibility to provide its customers with an adequate supply of clean water. However, Stanford questions whether the proposed project will provide McKinney's customers with substantial benefit to justify its cost. Roughly half of McKinney's customers reside outside of the area that will be impacted by this project.

In conclusion, Stanford takes its responsibility as a supplier of water very seriously. We have taken steps to provide the cleanest water possible to all of our customers, including McKinney Water District, and to be good stewards of our source water and our infrastructure so that we may provide adequate water to all who rely upon us. If you have any questions, please feel free to contact me.

Very Truly Yours,



M. Ryan Owens,
General Manager

Attachment 1
February 2018
Meeting Summary

Thanks Nick for coming and being a part of the meeting!

Thanks,
Ryan

M. Ryan Owens
General Manager
City of Stanford Waterworks
P.O. Box 45
842 East Main Street
Stanford, KY 40484

Fax

www.stanfordwater.com

Sent from my iPad

On Feb 10, 2018, at 10:08 AM, Nick Stanley <

> wrote:

Troy & Ryan:

I thought we had a very thorough discussion about our plan to work with McKinney on lowering HAA5's in their water system. It went beyond anything I was hoping for it to be. I thank you for inviting me to the meeting. I'd like to provide a summary of my recollection of the meeting. Please feel free to correct anything that I present.

Summary

* We began by reminding everyone that there are two distinct areas to improve- 1) The Plant Operation up to the Plant Tap sample point, and 2) The distribution system for Stanford and the distribution system for McKinney after their master meter.

* We pointed out that Stanford was being very pro-active in wanting to improve the HAA5's within the plant. Many plants do not admit they have a problem and that they are supplying high DBP numbers to their customers.

* The very first improvement that was discussed was moving the pre-chlorine injection location from inside the Clari-Cone area to the Top of Filter (TOF) location. C.J. Bailey with the state was going to confirm whether this would be possible during late spring, summer, and early fall warmer periods. Stanford would be required to notify the state for approval each time a move was made. We are waiting for that work to be done by CJ Bailey. He was sick the morning of this meeting. **In my opinion this change in feed location will be the most significant improvement that you can make.**

* Stanford is going to clean their four filters the week of March 26.

* Prior to cleaning the filters, Stanford needs to sample for HAA5's at the following locations **prior to cleaning the filters:**

After the Claricone (TOF)
After each Filter
After each Clear Well
Plant Tap

Joe Burns commented that the KRWA/State will cover the costs of these "Profile" tests using the State Lab. Get with Joe Burns to confirm how to do this so there is no cost to Stanford. Perform the

same “Profile “ tests after the cleaning is accomplished as well. When you perform these profile tests, you might as well test for TTHM’s as well.

* WSU will bring in their TTHM meter before the cleaning as well. We will test at these locations as well as the Stanford and McKinney distribution systems.

* It was confirmed that for the past two years the Somerset - McKinney interconnect has been shut off. There was a question about that in the past.

* McKinney has been and will continue to flush twice a year. Joe Burns emphasized that they really need to maximize the flow rates when flushing to “scour” the lines to remove as much as possible.

*** Joe Burns recommended to McKinney that they over-flow their stand-pipe storage units to remove potential stagnant water. This should be done a few weeks ahead of the DBP sampling in the system. It is also recommended that the DBP sample locations be flushed thoroughly (scoured) two weeks before quarterly sampling for DBP’s.**

* Chemical Treatment Options for Stanford:

- 1) Continue Mainstream to control algae especially after moving pre-chlorine
- 2) Continue feeding Sodium Permanganate to control manganese
- 3) Get State approval letter for using Filter Cleaning chemicals- **Nick Stanley to provide**

Treatment Narrative

4) Get Treatment Narrative and State approval for potential use of Ora-Cle- **Nick Stanley to provide Treatment Narrative**

- 5) Continue phosphate corrosion program.

* Joe Burns and Nick Stanley discussed the use of Peroxide and a Ferric/Polymer coagulant to lower TOC’s in plant process even further. It was decided to hold off on this option till we see how the other recommendations come out. **When that time comes, Nick Stanley will assist with Treatment Narrative.**

* Chemical Treatment Option for McKinney: Obtain permit to feed Ora-Cle at master meter location- **Nick Stanley to provide Treatment Narrative.** McKinney needs to first get this approved by their Board.

Overall, it was a very productive meeting. Let me know if there are any corrections or additions.

Best regards,

Nick

Nick Stanley
Founder, CEO
Water Solutions Unlimited

www.getwsu.com

Attachment 2

July 19, 2018

EEC – Optimization Awards

Naturally Connected

A blog of the Kentucky Energy and Environment Cabinet

Energy and Environment Cabinet Recognizes 42 Water Treatment Plants with Optimization Awards

ON JULY 19, 2018 / BY KYDEP / IN UNCATEGORIZED

FRANKFORT, Ky. (July 17, 2018) – Kentucky’s Energy and Environment Cabinet has recognized 42 surface water treatment plants in the Commonwealth for meeting the 2017 goals of Kentucky’s Area-Wide Optimization Program (AWOP).

AWOP is a multi-state initiative administered through the U.S. Environmental Protection Agency which encourages drinking water systems to voluntarily achieve optimization goals that go beyond regulatory requirements. Kentucky is one of 26 participating states. All of Kentucky’s public water systems are encouraged to participate in AWOP in order to provide the highest quality water to residents.

AWOP provides tools and approaches for drinking water systems to meet water quality optimization goals and to provide an increased and sustainable level of public health protection to consumers. The program emphasizes the optimization of turbidity removal through the drinking water treatment process. Turbidity, or cloudiness, is a measurement of particles in water including soil, algae, bacteria, viruses and other substances. AWOP also focuses on improving the operation of existing facilities rather than implementing costly capital improvements.

“Together, these 42 drinking water treatment plants serve more than 1.1 million Kentuckians,” said Joe Uliasz, supervisor of the Division of Water’s Drinking Water Compliance and Technical Assistance Section. “These drinking water treatment plant operators deserve our recognition and appreciation for their daily efforts to exceed the requirements of the Safe Drinking Water Act.”

Two Kentucky water treatment plants received an AWOP Champion Award. This award takes into account the high level of optimization achieved, as well as the system's overall compliance record for the previous three years. Logan Todd Regional Water Commission was awarded the 2017 Champion Award for a large drinking water treatment plant (designed to produce three million or more gallons of water a day). Leitchfield Water Works received the 2017 Champion Award for a small drinking water treatment plant (designed to treat less than three million gallons of water a day).

Thirteen AWOP drinking water systems received special recognition, with a gold seal on their certificates, for achieving the AWOP goals 100 percent of the time in 2017. These include Barbourville Water and Electric, Bullock Pen Water District, Glasgow Water Company – Plant A, Greenup Water System, Jackson County Water Association, Jamestown Municipal Water Works, Kentucky American Water Co. – Plant B, Laurel County Water District No. 2, Lawrenceburg Water and Sewer Department, Liberty Water Works, Logan Todd Regional Water Commission, McCreary County Water District – Plant B, and Rattlesnake Ridge Water District.

The following drinking water systems received certificates for meeting the AWOP criteria:

- Barbourville Water and Electric
- Berea Municipal Utilities
- Bullock Pen Water District
- Burkesville Water Works
- Century Aluminum
- Danville City Water Works
- Franklin Water Works
- Glasgow Water Company – Plants A and B
- Green River Valley Water District
- Greensburg Water Works
- Greenup Water System
- Hardin County Water District No. 2 – Plants A and B
- Hartford Municipal Water Works
- Hodgenville Water Works
- Hopkinsville Water Environment Authority
- Jackson County Water Association
- Jackson Municipal Water Works
- Jamestown Municipal Water Works
- Kentucky American Water Co. – Plants B and C
- Kentucky State Penitentiary
- Laurel County Water District No. 2
- Lawrenceburg Water and Sewer Department
- Leitchfield Water Works
- Liberty Water Works

- Logan Todd Regional Water Commission
- London Utility Commission
- Louisa Water Department
- Madisonville Light and Water
- McCreary County Water District – Plant A and B
- Morehead State University
- Northern Kentucky Water Service – Plant C
- Rattlesnake Ridge Water District
- Richmond Utilities
- Stanford Water Works
- West Liberty Water Company
- Western Flening Water District
- Williamsburg Water Department
- Winchester Municipal Utilities

For additional information about AWOP visit

<https://www.epa.gov/dwstandardsregulations/optimization-program-drinking-water-systems> (<http://links.govdelivery.com:80/track?type=click&enid=ZWFzPTEmbWFpbGluZ2lkPTIwMTgwNzE3LjkxNjMzMMDMxJm1lc3NhZ2VpZD1NREltUFJELUJVTTC0yMDE4MDcxNy45MjYzMzAzMSZkYXRhYmFzZWlkPTEwMDEmc2VyaWFsPTE3MzUzODg2JmVtYWlsaWQ9bGFubnkubm5vY2tAa3kuZ292JnVzZXJpZD1sYW5ueS5icmFubm9ja0BreS5nb3YmZmw9JmV4dHJhPU11bHRpdnFyaWF0ZUIkPSYmJg:==&&100&&https://www.epa.gov/dwstandardsregulations/optimization-program-drinking-water-systems>) or contact Jackie Logsdon at jackie.logsdon@ky.gov (<mailto:jackie.logsdon@ky.gov>) or 270-824-7529

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Attachment 3

Jar Test Results

DOW Letter

Jar Test Summary

**Chemical Coagulants – TOC Removal
Stanford Drinking Water Plant
April 1, 2019**

Overview

The Stanford drinking water treatment facility has been using coagulant EC-309S for turbidity and TOC removal. The EC-309S performance has been inconsistent and it suppresses the pH by at least 0.5 parts. Stanford asked WSU to conduct a jar test to find a PAC product that will increase TOC removal, reduce chemical use and eliminate or reduce the need for pH adjustment. WSU conducted the jar test on April 1, 2019. The results and recommendations from the testing are provided in this summary.

Jar Testing Procedure and Results

Testing was conducted on the raw water. Sodium permanganate and carbon are added to the water before the coagulant in the plant; however, neither of these products were added to the jars. The EC-309S was being dosed at 23 ppm at the time of testing. The WSU PAC products were tested against EC-309S at this dose as well as several others. A summary of the results is presented in TABLE 1 below. The jars were mixed for 70 seconds at 150 rpm, 10 minutes at 70 rpm, 5 minutes at 40 rpm, 10 minutes at 20 rpm and settled for 15 minutes. The raw water had the following characteristics: 13.5 NTU, 0.167 UVA, and 7.20 pH.

TABLE 1 JAR TEST DATA.

Product	Applied Dose (ppm)	Settled Turbidity (NTU)	pH	UVA	%UVA Removal
EC-309S	13	2.59	6.65	0.060	64%
	18	0.723	6.59	0.039	77%
	23	0.531	6.43	0.046	72%
	45	-	-	-	-
PremierPAC 3050	13	2.68	6.69	0.064	62%
	15	0.572	6.67	0.033	80%
	18	0.528	6.66	0.030	82%
	23	0.497	6.66	0.038	77%
	45	-	-	-	-
PremierPAC 3030	30	0.807	6.65	0.037	78%
	45	0.264	6.53	0.021	87%
ACS 2000	23	0.731	6.76	0.034	80%
HI 9114	23	0.721	6.73	0.047	72%
HI 9721	23	-	-	-	-

Analysis

Data was not collected on jars that did not create a significant floc due to over or under dosing of the product. These test doses were still listed in Table 1 as they provide insight into the product performance curve. Of the WSU products tested, the PremierPAC 3050 showed the most significant reduction in TOC and turbidity, as well as reducing the amount of pH suppression. Figures 1-3 compare the results of each data point. The PremierPAC 3030 and ACS 2000 were not included in this comparison.

FIGURE 1 TOC (UVA) REMOVAL.

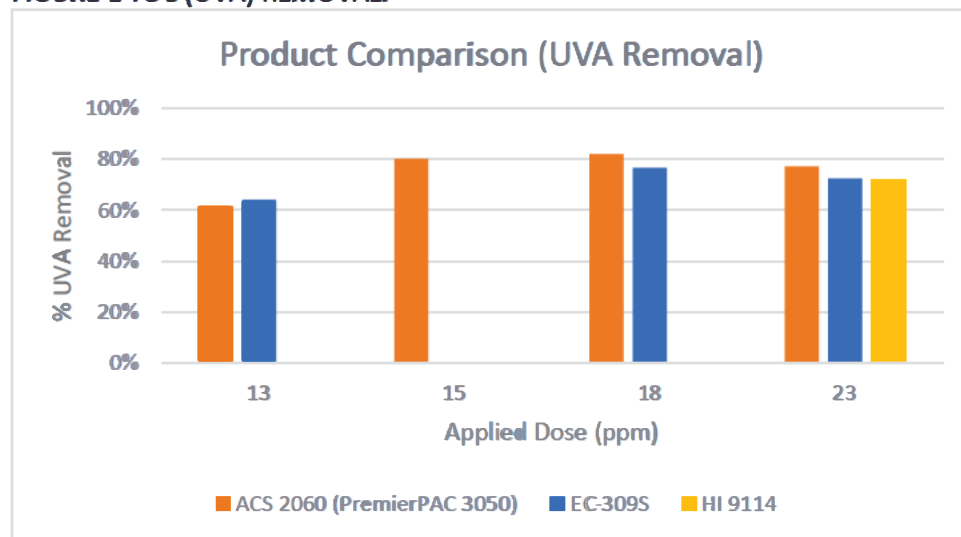


FIGURE 2 SETTLED TURBIDITY.

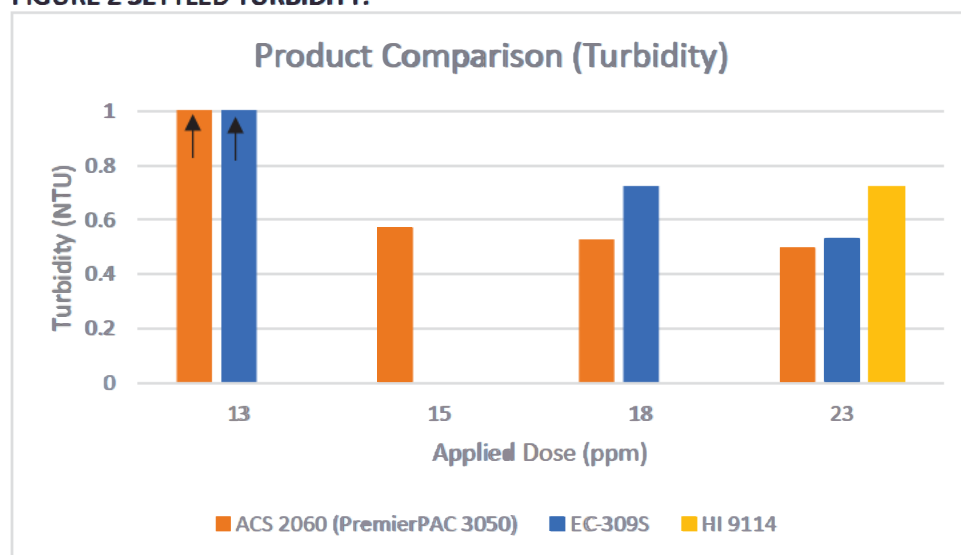
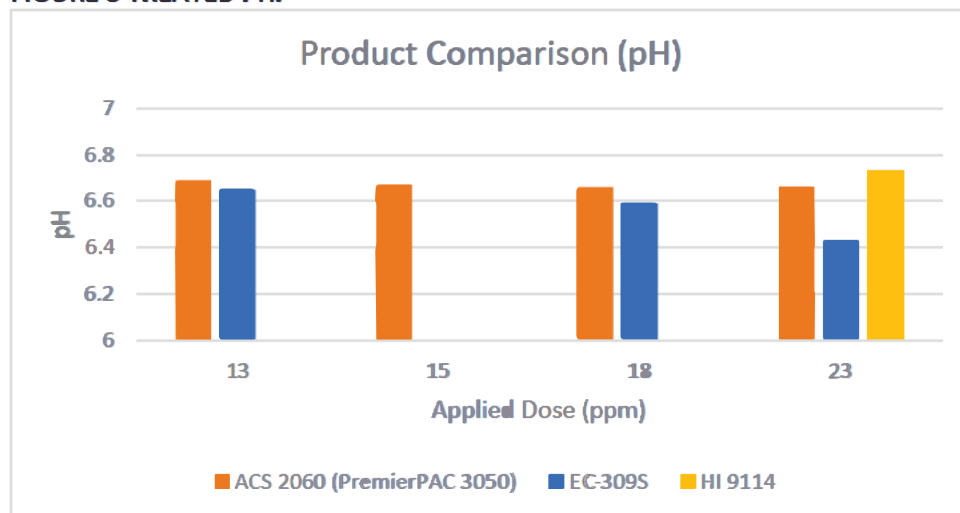


FIGURE 3 TREATED PH.



In addition to the pH, turbidity and UVA, the floc formation was also observed. The PremierPAC 3050 appeared to create a very similar size floc to the EC-309S and the floc was formed at the same rate. The 3050 did appear to create more floc indicating more removal. This was verified in the lower turbidity and UVA results. The 3050 floc did settle slightly slower than to EC-309S but caught up by the end of the 15-minute settle time.

The UVA and turbidity results for the 3050 remained relatively constant even at the lower doses. The EC-309S UVA removal also remained relatively constant but was consistently lower than the removal achieved by the 3050. The turbidity did not remain constant for the EC-309S which saw a considerable increase between 23 and 18 ppm. Neither of the products achieved significant removal at 13 ppm.

The Stanford water source has very low alkalinity, 20-30 ppm, and a relatively low pH. The PremierPAC 3050 has a slightly higher basicity than the EC-309S. This higher basicity reduces the alkalinity consumption and therefore reduces the pH suppression. As the dose was increased on the 3050, the treated pH remained relatively constant and above that of the EC-309S. As the dose was increased on the EC-309S, the pH continued to drop.

Conclusion

The jar testing showed the PremierPAC 3050 to be the most effective at TOC and turbidity removal. Even at a dose of 8 ppm less than is being applied in the plant, the 3050 out performed the current product. Due to the higher aluminum content and basicity of the 3050, WSU is confident Stanford will see improved turbidity and TOC results in the plant setting or be able to reduce chemical usage and achieve the same results as the EC-309S. Additionally, Stanford will be able to reduce caustic usage as the 3050 will not suppress the pH as much as the EC-309S. To confirm the findings of the jar study, WSU is recommending a plant trial with the PremierPAC 3050.

Water Solutions Unlimited would like to thank you for the opportunity to test our coagulant products at your facility. We look forward to a continued partnership and assisting you with your chemical and technical assistant needs.

getwsu.com
1-800-359-3570

P.O. Box 157
8824 Union Mills Drive
Camby, IN 46113

MATTHEW G. BEVIN
GOVERNOR



CHARLES G. SNAVELY
SECRETARY

ENERGY AND ENVIRONMENT CABINET
DEPARTMENT FOR ENVIRONMENTAL PROTECTION

Division of Water
2751 Campbellsville Rd
Columbia, KY 42728
www.kentucky.gov

March 26, 2019

Mr. Troy Carrier
Stanford Water Works
P.O. Box 45
Stanford, Kentucky 40484

RE: PWSID KY0690417
Chemical Approval

Dear Mr. Carrier:

The Division of Water (DOW) has received Stanford Water Work's request for trial use of various coagulants. It was stated jar tests will be performed with the following coagulants prior to in plant trial: Phoenix Solutions PremierPAC 3030, PremierPAC 3050, PremierXtreme 1000, PremierXtreme 1500 and Chemtrade's HyperIon 2063, HyperIon 3938, HyperIon 4064, HyperIon 6550 and HyperIon 9254. The DOW approves the trial use of the listed coagulants with the following stipulation: the maximum feed rate is 250 mg/l for all products listed except for HyperIon 6550, which has a maximum feed rate of 100 mg/L. After the trial period, the facility shall notify DOW if it decides to continue use of any of these products.

As a note, only products bearing the NSF mark on the product, product packaging, and/or documentation shipped with the product are certified. If you have any questions, I can be reached at 270-384-4734 or at cj.bailey@ky.gov.

Sincerely,

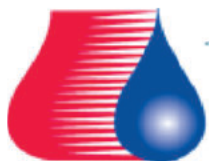
A handwritten signature in cursive script that reads "Charles J. Bailey".

Charles J. Bailey
Technical Assistance
Division of Water

C: Nick Stanley, Water Solutions Unlimited

Attachment 4

Enhanced Carbon Slurry Trial



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2019 Enhanced Carbon Slurry Trial Summary at Stanford, Kentucky

Background

The City of Stanford, Kentucky has been very helpful to Water Solutions Unlimited, inc. in their evaluation of the new Enhanced Carbon Slurry (ECS), KS 9001. During the third quarter sampling period of 2018 they allowed WSU to do some initial testing of the product. Product was made in Louisiana and shipped by common carrier to Stanford, KY. There were quite a few handling and on-site re-mixing issues during the seven week trial period. In spite of all of these issues, DBP test results still showed a 25-40% reduction in TTHM's and 10-16% reduction in HAA5's even at a reduced strength of product that was fed. This gave both parties the confidence to run trials in 2019 during the same heat of the summer 3rd Quarter Sampling Period.

In 2019 WSU committed to purchasing elaborate mixing equipment and was able to blend the product at their Camby, IN plant. Transportation and settling issues were minimized. This helped tremendously in allowing a full 20% solution to be used during the trial.

During the 1st Quarter (2/27/19) and 2nd Quarter DBP tests, Stanford was seeing a serious increase in HAA5 test results. The First Quarter was 0.088 MG/L and Second Quarter was 0.069 MG/L. Both were over the MCL of 0.060 MG/L at the Plant Tap, and much higher out in the Distribution System. Stanford was even more concerned about the future HAA tests in the hot summer 3rd Quarter test period.

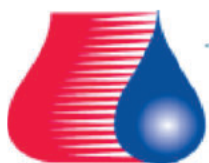
Trial Results

Stanford's and WSU's original DBP testing protocol was to start feeding chemical the following day after Stanford collected their official 3rd Quarter DBP (TTHM & HAA5) sample at the Plant Tap and four distribution sites. A second Plant Tap DBP sample would be taken the following day just hours before turning on the ECS chemical. This would allow for us to have two sets of Plant Tap "Before ECS" test results.

After a week of getting the feed rates under control, the testing protocol was to sample every week for the first 4-6 weeks to get as much data as possible. Tests would then be taken every other week after that. Stanford uses a very good outside laboratory for testing.

getwsu.com
1-800-359-3570

P.O. Box 157
8824 Union Mills Drive
Camby, IN 46113



**WATER
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UNLIMITED**

What we found out later on was that the outside lab received and tested the official 3rd Quarter sample taken on July 24, 2019; our initial "Before ECS" sample. The second "Before ECS" sample plus the first three of the weekly "ECS Being Fed" samples being fed were lost by the Lab. This resulted in only one "Before ECS" and two "ECS Being Fed" data samples for this report. This was not our intent.

3rd Quarter and "Before ECS" DBP Test Result for Plant Tap Location

7/24/19	TTHM MG/L	HAA5 MG/L
Site 01A (Plt. Tap)	0.0468	0.0440

"ECS Being Fed" DBP Test Result at Plant Tap Location

***Note-** Percent Reduction compares results to the "Before ECS" test result

8/28/19	TTHM MG/L	HAA5 MG/L
Site 01A (Plt. Tap)	0.0321	0.0320
	31.4 % Reduction	27.3 % Reduction

9/17/19	TTHM MG/L	HAA5 MG/L
Site 01A (Plt. Tap)	0.0201	0.0200
	57.1 % Reduction	54.5 % Reduction

**** Feed rates were 3 mg/L to 7 mg/L as carbon during the trial period.**

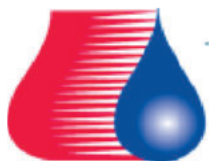
Taste and Odor Control

From right after July 4th till the end of October, Central Kentucky experienced a severe drought. This caused taste and odor issues at surface water plants virtually everywhere. Stanford's Public Works Director brought to my attention that once the ECS trial began, Stanford had no taste and odor issues. This was the reason they fed carbon previously, experiencing mixed results.

Again, we wish we had more data for both the "Before ECS" and "ECS Being Fed" samples. We believe they would have still confirmed the above reductions and the value of using our Enhanced Carbon Slurry, KS 9001. Please see the attached data to confirm these results.

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Attachment 5
Notice of Violation

NOV's 2015-2024

Stanford

Quarter-Year	Violation	Reading
2nd Quarter-2019	MCL,LRAA HAA5	0.066
4th Quarter-2019*	Monitoring, Routine Major (Dichloromethane)	N/A

*= Fouser Environmental sent a letter to Kent Stewart of the Laboratory Certification Program on 1/15/2020 detailing a cross contamination causing false positives on Methylene Chloride that affected Stanford WTP (KY0690417), Lancaster WTP (KY0400233), and Nicholasville WTP (KY0570315). Due to the error being reported in January of 2020, we had passed the sampling period and therefore could not resubmit resulting in a missed sample.

NOV's 2015-2024

Mckinney

Quarter-Year	Violation	Reading
2nd-2015	MCL, LRAA HAA5	0.064
3 rd -2015	MCL, LRAA HAA5	0.067
4 th -2015	PUBLIC NOTICE RULE LINKED TO VIOLATION	N/A
4 th -2015	PUBLIC NOTICE RULE LINKED TO VIOLATION	N/A
3 rd -2016	MCL, LRAA HAA5	0.061
1 st -2017	PUBLIC NOTICE RULE LINKED TO VIOLATION	N/A
1 st -2017	MCL, LRAA HAA5	0.063
3 rd -2017	MCL, LRAA HAA5	0.071
4 th -2017	MONITORING, ROUTINE, MINOR (RTCR)	N/A
4 th -2017	MCL, LRAA HAA5	0.074
1 st -2018	MCL, LRAA HAA5	0.070
2 nd -2018	MCL, LRAA HAA5	0.080
3 rd -2018	MCL, LRAA HAA5	0.075
4 th -2018	MCL, LRAA HAA5	0.071
1 st -2019	MCL, LRAA HAA5	0.070

NOV's 2015-2024

Eubank

Quarter-Year	Violation	Reading
1 st -2015	MCL, LRAA HAA5	0.61
1 st -2015	FAILURE SUBMIT OEL REPORT FOR HAA5	N/A
2 nd -2015	MCL, LRAA HAA5	0.061
3 rd -2015	MCL, LRAA HAA5	0.068
1 st -2017	PUBLIC NOTICE RULE LINKED TO VIOLATION	N/A
3 rd -2017	MCL, LRAA HAA5	0.081
4 th -2017	MCL, LRAA HAA5	0.082
1 st -2018	MCL, LRAA HAA5	0.085
2 nd -2018	MCL, LRAA HAA5	0.086
3 rd -2018	MCL, LRAA HAA5	0.064
4 th -2018	MCL, LRAA HAA5	0.061

NOV's 2015-2024

Danville

Quarter-Year	Violation	Reading
3 rd -2015	MCL, LRAA HAA5	0.072
4 th -2015	MCL, LRAA HAA5	0.084
1 st -2016	MCL, LRAA HAA5	0.095
1 st -2016	FAILURE SUBMIT OEL REPORT FOR HAA5	N/A
2 nd -2016	MCL, LRAA HAA5	0.082
2 nd -2016	FAILURE SUBMIT OEL REPORT FOR HAA5	N/A
3 rd -2016	MCL, LRAA HAA5	0.063
3 rd -2017	PUBLIC NOTICE RULE LINKED TO VIOLATION	N/A
3 rd -2017	CCR ADEQUACY/AVAILABILITY/CONTENT	N/A
4 th -2017	PUBLIC NOTICE RULE LINKED TO VIOLATION	N/A
3 rd -2019	FAILURE TO RESPOND, IESWTR	N/A

Attachment 6
Map
Master Meter Locations

