

CITY OF APALACHICOLA WATER SYSTEM

Disinfection By Product Mitigation Technical Memorandum

JANUARY 31, 2025



ORIGINAL

SUBMITTED BY
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TECHNICAL MEMORANDUM

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1. Introduction

1.1 Overview

The City of Apalachicola operates a community potable water system (PWS #1190150) serving a population of 5,233 with a maximum daily operating capacity of 1.66 million gallons per day (MGD). The City of Apalachicola's potable water system (PWS) has a history of elevated disinfection byproduct (DBP) concentrations, particularly total trihalomethanes (TTHMs). The City is currently implementing flushing measures to mitigate DBPs in the distribution system which results in a significant amount of lost water. Dewberry Engineers, Inc. has been retained to provide potential DBP control options to the City to address the disinfection byproduct issues. Presented herein are the water quality analysis and hydraulic model of the PWS and recommended treatment processes.

1.2 Existing Facilities

The current process flow at the City's WTP consists of three groundwater wells that pump raw water to the plant and enter a packed tower forced draft aerator on top of a ground storage tank. Sodium hypochlorite injection is available both upstream and downstream of the forced draft aerator; historically, the City has been feeding sodium hypochlorite upstream of the aerator. Following disinfection and aeration potable water is discharged to the ground storage tank and is then pumped from the high service pumps into the distribution system. A post ground storage tank sodium hypochlorite injection location is also available downstream of the ground storage tank. Figure 1 displays the current treatment at the WTP. Based on review of the plan operation and maintenance manual, the plant previously utilized pH adjustment via sulfuric acid to lower the pH of the raw water prior to the aerator and sodium hydroxide following aeration. Based on site visits to the plant, this pH adjustment system is no longer in use.

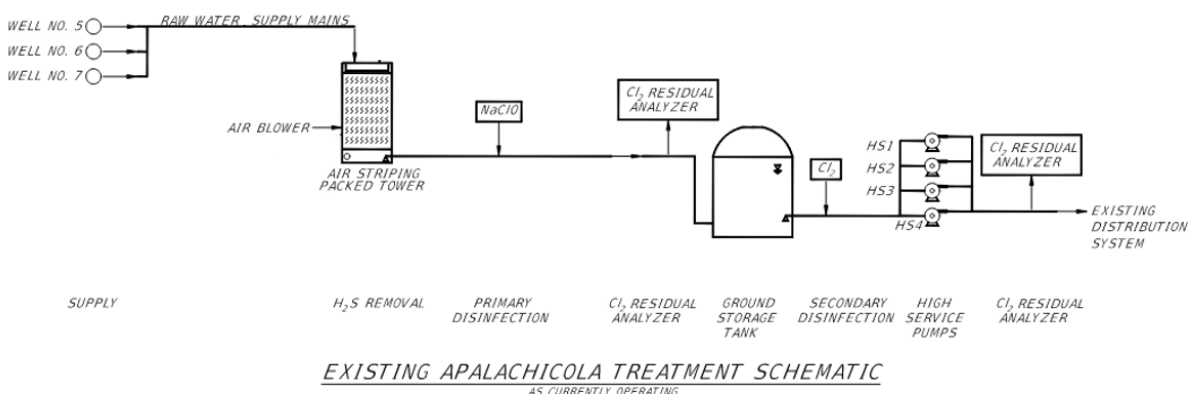


Figure 1: City of Apalachicola Water Treatment Plant Process Flow Diagram

As of October 2024, the plant's treatment train has been temporarily affected by events that are being addressed by the City and do not impact this study. These events include the structural failure of the packed tower aerator resulting from Hurricane Helene and the rehabilitation of Well 6 due to the presence of sulfur-reducing bacteria.

1.3 Historical Data

Historical daily flow and water quality data was acquired from Monthly Operation Reports (MORs) and Disinfection Byproducts Reports (DBPs) from January to December 2023. Figure 2 shows the WTP's point of entry (POE) flow in gallons per day (GPD) and the chlorine concentration in milligrams per liter (mg/L). The City has an annual average daily flow (AADF) from January 2023 to December 2023, with the exclusion of June 2023 as no data was reported, of 0.62 MGD and a chlorine residual of 1.54 mg/L.

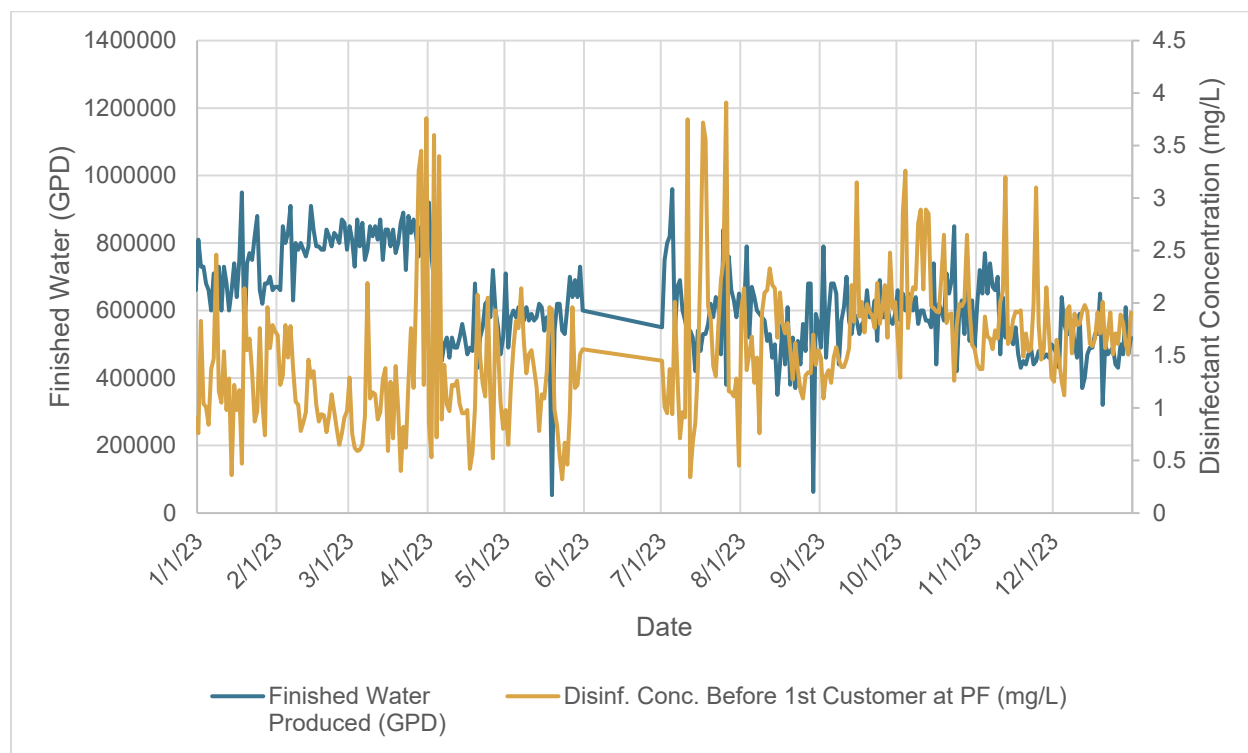


Figure 2: Historical Daily Water Produced and POE Chlorine Residual (note that the month of June is missing data).

Figure 3 shows the Total Trihalomethanes (TTHM) concentration from the same sampling period, sampled once per month at two different locations, Bay City Lodge and Robert's Fish Dock. The Bay City Lodge sampling location had a TTHM concentration above the maximum contaminant level (MCL) of 80 micrograms per liter ($\mu\text{g/L}$) on July 27th, 2023, and both sampling locations exceeded the limit on October 4th, 2023.

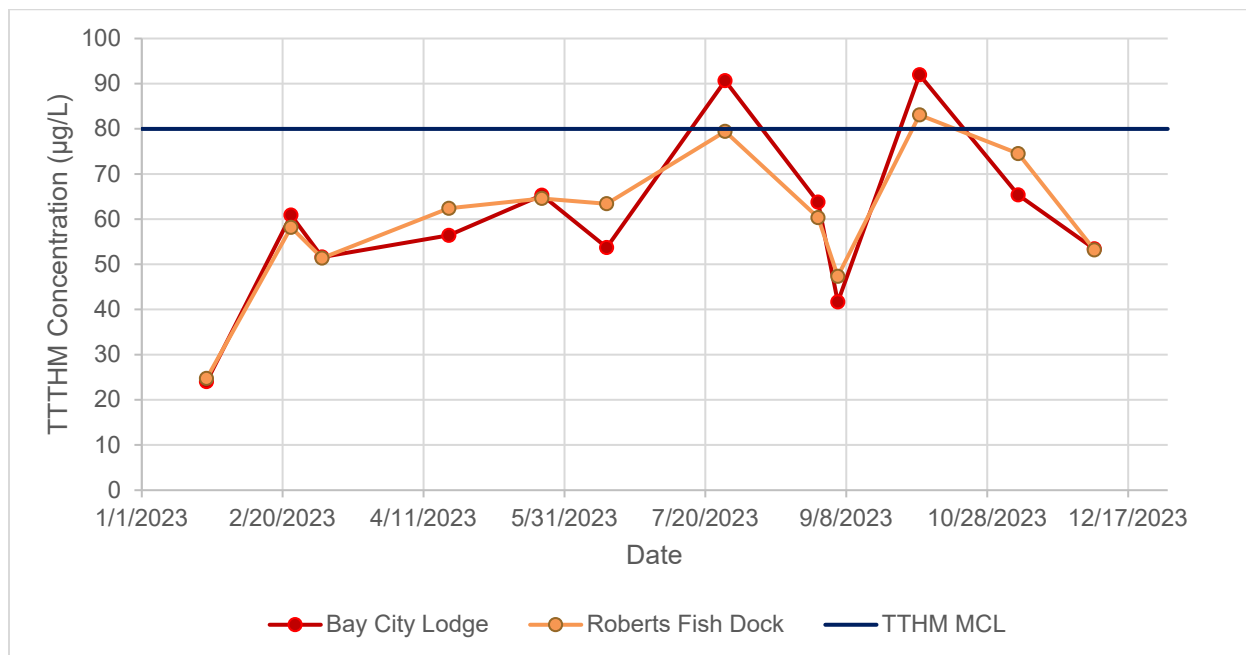


Figure 3: Historical TTHM Concentration at Bay City Lodge and Robert's Fish Dock and TTHM MCL

2. Sampling Plan

As part of this study, Dewberry implemented a limited sampling plan with the City to provide additional background water quality data for evaluating potential DBP formation. Bulk samples were collected on August 8th, 2024, from the following locations:

- The three (3) ground water production wells,
- The point of entry (POE), and
- The elevated storage tank (EST).

The samples were supplied to Eurofins laboratory in Orlando on August 9th, 2024. Full analysis of the water quality is displayed in Appendix A. A summary of the field-testing and water quality analysis is in Table 1. Results from this sampling event were also compared with historical data to assist with providing recommendations. Full sampling results have been included as Appendix A.

Table 1: City of Apalachicola PWS Water Quality Data

PARAMETER	UNITS	WELL 5	WELL 6	WELL 7	POE	EST	MCL STANDARD
pH (Field)	-	7.53	7.35	7.34	7.96	7.95	6.5-8.5 ²
Temperature (Field)	°C	25.6	25.6	27	26.7	29.4	-
Sulfide (Field)	mg/L	5.60	3.90	5.70	0.20	0.00	-
Chlorine Demand (Field)	mg/L	7.17	2.87	10.04	-	-	-
Chlorine Residual (Field)	mg/L	-	-	-	1.42	0.74	4.0 ¹
Total Organic Carbon	mg/L	3.4	3.0	4.1	3.6	3.7	-
Sulfate	mg/L	120	140	4.2	-	-	250 ²
Chloride	mg/L	58	63	23	-	-	250 ²
Turbidity	NTU	3.8	7.8	0.30	2.3	1.6	-
Iron	mg/L	-	0.22	-	-	-	0.3 ²
Total Dissolved Solids	mg/L	440	510	280	-	-	500 ²
Sulfur Reducing Bacteria	CFU/100mL	ABSENT	1-10	ABSENT	-	-	-
Total Trihalomethanes	µg/L	-	-	-	88	110	80 ¹
Total Haloacetic Acids 5	µg/L	-	-	-	-	24	60 ¹
Notes: (1) Primary Drinking Water Standards (2) Secondary Drinking Water Standards							

The results show an elevated TTHM concentration of 88 µg/L as the water leaves the plant at the point of entry, above the primary drinking water standard of 80 µg/L. The TTHM concentration increases throughout the distribution system where the TTHM concentration rises by 22 µg/L from the point of entry to the elevated storage tank. Additionally, the PWS has a high concentration of total organic carbon, a precursor of TTHMs, that react with chlorine during disinfection.

Sulfide recorded in the field in Table 1 show a high sulfide level content in all three (3) wells, all greater than 3.0 mg/L. Sulfide speciation is highly pH dependent as shown in Figure 4 below. The pH observed in the field are between 7.3-7.9, which is neutral leaning slightly basic. This pH indicates the sulfide present in the water is primarily bisulfide, HS⁻, as shown in Figure 4.

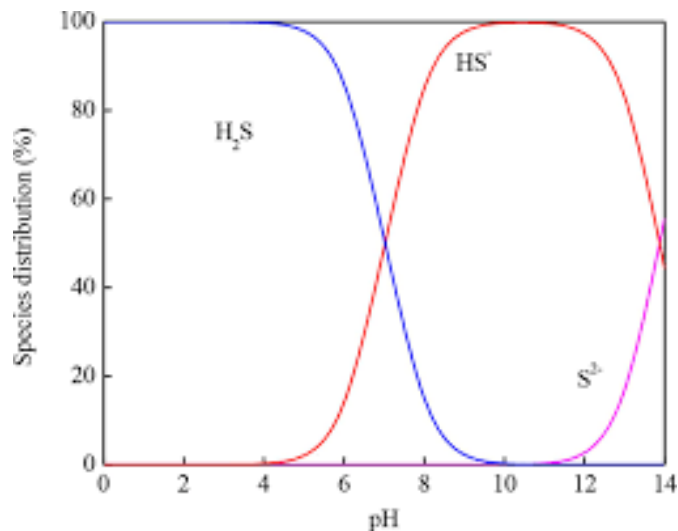


Figure 4: Sulfide Speciation Curve

3. Disinfection Byproduct Formation and Control Options

Disinfection byproducts are predominantly formed by the direct oxidation of organic matter with chlorine. Other factors affecting the formation of DBPs include the disinfection location, chlorine dose, temperature, and water age in the distribution system.

Three (3) main water quality issues were identified for the City of Apalachicola.

1. TOC – Organic compounds are the primary DBP precursor. Direct oxidation of organic compounds with chlorine is a main factor for the formation of TTHMs. The elevated levels of TOC in the City's three wells (3.0 to 4.1 mg/L)
2. Sulfide – Chlorine disinfection before aeration requires increased chlorine usage to directly oxidize the hydrogen sulfide, which then increases the potential for DBP formation. Additionally, chlorine injection prior to the forced draft aerator will directly oxidize the hydrogen sulfide which can create elemental sulfide precipitation which increases TDS.
3. Sulfide – Elevated sulfide (3.9 to 5.7 mg/L) was observed in the three existing wells. Dewberry observed that the City was dosing sodium hypochlorite upstream of the existing forced draft aerator which will lead to direct oxidation of sulfide and an increase in the required chlorine dose.
4. Sulfur reducing bacteria present in well 6 necessitates a higher chlorine dose.

Based on the elevated TOC and sulfide present in the City's wells, Dewberry recommends a sulfide removal and TOC treatment process prior to the dosing of sodium hypochlorite. There are opportunities to improve the City's water quality as detailed in the following subsections.

3.1 Sulfide Treatment

As per F.A.C. 62-555.315(5), sulfide treatment varies depending on the concentration and pH of the raw water supply. Water quality results in Table 1 show a sulfide concentration higher than 3.0 mg/L in all three wells, with a pH between 7.3-7.5. According to Table 2, this would categorize the potential impacts without sulfide removal as very significant and the potential treatment listed is packed tower aeration with pH adjustment. As previously mentioned, the City has historically fed sodium hypochlorite upstream of the packed tower forced draft aerator. This results in direct oxidation of sulfide and greatly reduces the effectiveness of the forced draft aerator to remove sulfides. This in turn requires a higher chlorine dose which can increase DBP formation.

Table 2: Sulfide Water Quality Level and Treatment (F.A.C. 62-555.315(5))

POTENTIAL IMPACTS WITHOUT SULFIDE REMOVAL	SOURCE WATER SULFIDE LEVEL	POTENTIAL WATER TREATMENT TECHNIQUE
Low	Total Sulfide (TS) < 0.3 mg/L; or Dissolved Iron (DI) < 0.1 mg/L ¹	Direct chlorination ²
Moderate	0.3 mg/L < TS < 0.6 mg/L @ pH < 7.2	Conventional aeration ³ (maximum removal efficiency ≈ 40% to 50%)
	0.3 mg/L < TS < 0.6 mg/L @ pH > 7.2	Conventional aeration with pH adjustment ^{4, 5} (maximum removal efficiency ≈ 40% to 50%)
Significant	0.6 mg/L < TS < 3.0 mg/L @ pH < 7.2	Forced draft aeration ³ (maximum removal efficiency ≈ 90%)
	0.6 mg/L < TS < 3.0 mg/L @ pH > 7.2	Forced draft aeration with pH adjustment ^{4, 5} (maximum removal efficiency ≈ 90%)
Very Significant	TS > 3.0 mg/L	Packed tower aeration with pH adjustment ^{4, 5} (maximum removal efficiency ≈ 90%)
Notes: (1) High iron content raises concern if significant dissolved oxygen exists in the water and chlorination is the only disinfection method used. Filtration may be required to remove particulate iron. (2) Direct chlorination of sulfide in the pH range typically found in potable water sources can produce elemental sulfur and turbidity. Finished water turbidity should be no more than 2 NTU greater than raw water turbidity. (3) Corrosivity may be increased with entrained dissolved oxygen during aeration. (4) Corrosion control treatment may be required. Corrosion control treatment includes pH adjustment, alkalinity recovery, and corrosion inhibitor injection. (5) pH adjustment may be more expensive with a higher alkalinity. Other treatment techniques that can maintain the background alkalinity may be preferable.		

The City of Apalachicola's PWS had a packed tower on top of the ground storage tank. As shown in Figure 4, hydrogen sulfide (H₂S) is the primary chemical species of sulfide in lower pHs. Sulfide can off gas when it is present as hydrogen sulfide during aeration, whereas its dissociated ions, bisulfide (HS⁻) and sulfide (S²⁻), are aqueous and will stay present in water when aerated. Proper treatment of sulfide will decrease the chemical demand of the system and reduce the amount of chlorine available to react and form TTHMs.

3.1.1 Packed Tower with pH Adjustment

As mentioned above, packed tower with pH adjustment is the conventional treatment method recommended for the sulfide levels in the Apalachicola wells. To maximize sulfide removal during aeration, raw water pH adjustment can be used to lower the pH such that H₂S is the predominant sulfide species. pH adjustment is typically achieved by injection of an acid, such as sulfuric acid, upstream of aeration. A base chemical, such as sodium hydroxide, is then mixed into the aerated water at the base of the aerator to raise the pH to neutral secondary drinking water standards (6.5 to 8.5). This option is relatively simple to operate if the chemical dosage is controlled based on flow rates from the wells and there are few moving parts in the packed tower. The disadvantage is the handling and cost associated with chemicals.

3.1.2 Ozone

Ozone injection can also be used to oxidize sulfide. Ozone systems are more complex and typically include liquid oxygen tanks, vaporizers, ozone generators, and injection systems. The control of these systems needs to be automated and monitored closely by operations staff. As an additional benefit, the oxidation process will typically break down some of the organics which can make downstream removal easier. Advantages of this method include the total oxidation of sulfide and high-quality finished water. Disadvantages of ozone are the high capital and operating costs of the more complex equipment, dangers of liquid oxygen storage, as well as increased operator training, license, and staffing requirements.

3.2 TOC Treatment Options

There are a variety of treatment technologies that can reduce the concentration of organic carbons. The following treatments were considered:

- Biofiltration
- Granular Activated Carbon (GAC)
- Ion-Exchange (IX)
- Magnetic Ion-Exchange (MIEX)
- Nanofiltration (NF)

The following subsections will briefly describe each treatment technology.

3.2.1 Biofiltration

Biofiltration is a filtration process that uses a granular filter media, such as granular activated carbon (GAC), sand, etc., that promotes microbial growth. The common biofiltration processes are rapid sand filtration (RSF), granular activated carbon filtration (GACF), and slow sand filtration (SSF). Additional factors that can affect biofiltration include pretreatment, contact time, disinfectant residuals, media, and temperature. Biofiltration can treat dissolved organic carbon (DOC) and biodegradable organic matter (BOM) that are precursors to TTHMs. Due to the specific nature of biological growth and specific raw water quality a pilot study is typically performed to size and design the system. Advantages of biofiltration include ease of operation and decreased media replacements. Disadvantages are the reliance on bacteriological growth which will yield lower removal efficiency compared to GAC adsorption, thus requiring larger filtration vessels and a larger capital cost.

3.2.2 Granular Activated Carbon (GAC)

Granular Activated Carbon (GAC) is an established TOC treatment process that has porous, high-surface area carbon granules that adsorb dissolved chemicals in the water as it flows through the media. The carbon granules are made up of coal, wood, peat, shells, and other carbon-rich materials. GAC is sensitive to pH, pore size, and empty bead contact time (EBCT), which is the time the water is contact with the media. GAC systems are typically arranged in pressure vessels with valving to allow parallel or series operation and to allow backwashing. The GAC process requires regeneration after the contaminants have fully saturated the carbon granules, however, water treatment plants typically replace with new carbon beds. Backwashing is typically only needed when new carbon is loaded to remove fines from the carbon bed. TOC is targeted by GAC as the carbon granules adsorb DOC and reduce overall TOC concentration. Advantages of GAC are the high removal efficiency, ease of operations, does not intrinsically rely on bacteria for removal, could be converted to biological activated carbon if desired, and does not require major operations training. Disadvantages of GAC are the capital costs and replacement/regeneration media costs.

3.2.3 Ion-Exchange (IX)

Ion-exchange (IX) is a process where undesirable ions are exchanged with other ions when the water flows through the resin bed. The water contacts the resin, which contains the more desirable ion(s), and the contaminant adheres to the resin while the other ion is released into the water. For the treatment of TOC, an anionic resin would be utilized as DOC is anionic. The anionic resin, usually chloride, would react with anionic contaminants, such as DOC, which will attach to the resin surface. These resins must be regenerated once saturated with contaminants and can be reused for future treatment. Ion exchange systems can be employed in fixed bed configurations similar to GAC systems. Regeneration is typically performed using a brine solution which becomes a waste stream requiring proper disposal. Advantages are the ease of operations, does not intrinsically rely on bacteria for removals, and does not require major operations training. Disadvantages of IX are the capital costs, brine regeneration costs, and the handling of a waste stream.

3.2.4 Magnetic Ion-Exchange (MIEX)

Magnetic Ion-exchange (MIEX) is a type of ion-exchange process that uses magnetic particles in the resin to target contaminants in the water by aiding adsorption and settling. Raw water is pumped into contact with the magnetic resin bed. The magnetic resin particles are attracted to each other, producing large agglomerates that can be easily settled out and recycled. The resin must be regenerated and can be recycled back into the MIEX process once regeneration is complete. MIEX primarily targets DOC that can reduce disinfection byproduct formation. Advantages are the ease of operations, does not intrinsically rely on bacteria for removals, and does not require major operations training. Disadvantages of IX are the capital costs, proprietary nature of MIEX, and the handling of a waste stream.

3.2.5 Nanofiltration (NF)

Nanofiltration (NF) is a membrane treatment process that separates dissolved solutes from a solvent, like water. The water moves through a semipermeable membrane by applying osmotic pressure and large molecules are unable to pass through the membrane. Nanofiltration membranes have a range of pore sizes, from 1 to 10 nanometers, that are chosen based off the treatment design and background water quality. Pre-treatment with filtration and anti-scalant chemicals are typically added before treatment to prevent formation and precipitation of crystallized mineral salts. Nanofiltration can reduce TOC concentration due to the large size of the organic carbon compounds. Advantages of NF membrane treatment include the effectiveness and high-quality water produced. Disadvantages include the capital and operating costs, disposal of a waste stream, and fouling potential from some organics.

3.3 Disinfection Treatment Options

The WTP has three disinfection locations: (1) prior to the packed tower, (2) at the base of the packed tower, (3) ground storage tank outlet to point of entry. To avoid direct oxidation of hydrogen sulfide and TOC, and to decrease sodium hypochlorite usage, the primary disinfection location should be after the selected sulfide and TOC removal processes.

Alternative disinfectants were also a consideration for minimizing DBPs. Common alternative disinfectants include chloramines, chlorine dioxide, UV, and ozone. These alternative disinfectants can be used in conjunction with sulfide and TOC removal or as an alternative to sulfide and TOC removal depending on the concentration and DBP formation potential. Chloramine disinfection is a popular alternative to free chlorine disinfection. Chloramine disinfection is accomplished by addition of ammonia and chlorine at a target ratio, typically between 3:1 and 5:1. Chloramine is a weaker disinfectant and excess ammonia is a food source for certain bacteria which can accumulate in the distribution system. As a result, most utilities that utilize chloramination perform periodic (e.g. yearly) free chlorine "burns" to remove excess ammonia and bacteria from the distribution system.

Based on the measured TTHM concentration at the point of entry (88 µg/L), alternative disinfectants are not estimated to significantly address the City's DBP issues.

4. Hydraulic Modeling

A hydraulic model was developed for the distribution system to aid in determining the water age and assist with recommending alternatives (see full report in Appendix B). Based on average day conditions and no flushing in the system, the maximum water age in the system was approximately 78 hours, with around half of the system seeing 48 hours. When the model simulated the three (3) flushing locations currently in use, the maximum water age across the system was less than 48 hours. Therefore, with the current flushing program, the City is decreasing the water age across the system from 78 to 48 hours. Using the same inputs, an additional model run simulated the results with only one new flushing location. The revised flushing plan indicated the water age could be reduced from from 48 hours to 24 hours.

Based on modeling, the water age in the distribution system is not significant for the formation of DBPs. Until control methods for DBP reduction are implemented at the plant, the City could consider adjusting their flushing plan to reduce water usage and water age.

5. Next Steps and Interim Recommendations

5.1 Interim Recommendations

Based on the hydraulic modeling of the distribution system, a revised flushing plan could be incorporated to reduce flushing quantities and locations. A flushing valve could be relocated to the intersection of 17th and Sawyer as shown in Figure 2 of Appendix B. Based on modeling, this location has the potential to decrease the water age by from 2 days to 1 day on an average day in most of the system. The City could then decrease flushing in other locations.

During site visits, Dewberry inspected the current sodium hypochlorite feed system. It appears the existing feed system requires a manual operator adjustment of chlorine dose. As a result, if multiple wells are operating and one well is turned off the chlorine dose essentially doubles until operator intervention. Dewberry recommends the chlorine dose control be automated to mitigate instances of high chlorine dose which can increase DBP formation. A compound loop-controlled dosing system is recommended. This type of control first feeds sodium hypochlorite at a fixed dose based on which wells are in operation. After a preset amount of time, it then automatically adjusts the chlorine dose to maintain a target chlorine residual as measured by a chlorine analyzer just upstream of the discharge into the ground storage tank. This automated system will mitigate periods of unnecessarily high chlorine dose which can lead to increased DBP formation.

5.2 Treatment Recommendations

Based on the elevated sulfide and TOC concentrations in the existing wells, a sulfide and TOC removal process are recommended prior to sodium hypochlorite injection. Dewberry recommends packed tower forced draft aeration with pH for sulfide removal and either GAC or ion exchange for removal of TOC. Both GAC and ion exchange are anticipated to be installed in fixed bed pressure vessels. The proposed arrangement would include a new or relocated forced draft aerator located at grade. The aerator would be mounted atop a small clear well/pump station. New clear well transfer pumps would pump aerated water through the GAC or ion exchange pressure vessels and into the ground storage tank. For both systems additional pH adjustment chemical storage and feed systems would be necessary and both systems would likely require a backwash storage tank to allow GAC backwash or ion exchange spent brine to be stored and slowly feed into the sanitary sewer.

The equipment and capital costs for the two above alternatives will be largely similar with an estimated construction cost of approximately \$4.2 million. The main operational cost for GAC and ion exchange will be carbon replacement and brine regeneration, respectively. Preliminary estimates from Calgon Carbon

indicate that carbon replacement would cost \$2.25 per pound. For a system with 80,000 pounds of carbon this would cost the City \$180,000.00 for each replacement.

5.3 Next Steps

It is also recommended that the City expand its sampling plan. This plan should include sampling for the typical water quality parameters to gain additional recent data points of the current water quality of the wells and system. This would allow the City and the design team to understand the formation curves of disinfection byproducts and chlorine demands. Due to the limited sampling that has been performed to date, it is difficult to provide design parameters (TOC removal efficiency, bed sizing, break through time periods, regeneration or media replacement durations/costs, etc.). Dewberry recommends that a GAC vs. ion exchange pilot be performed to evaluate these two treatment options and determine the capital and O&M costs associated with each. Simulated distribution system testing (holding and testing samples for 12 hour, 1 day, 3 day intervals to simulate DBP formation in the distribution system) during this pilot study would be beneficial to optimize design parameters and regeneration frequencies.

APPENDIX A

ANALYTICAL REPORT

PREPARED FOR

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JOB DESCRIPTION

City of Apalachicola Well and PWS Sampling

JOB NUMBER

670-45191-1

Eurofins Orlando

Job Notes

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Definitions/Glossary

Client: Dewberry Engineers Inc
Project/Site: City of Apalachicola Well and PWS Sampling

Job ID: 670-45191-1

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
I	The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.
U	Indicates that the compound was analyzed for but not detected.
V	Indicates that the analyte was detected at or above the method detection limit in both the sample and the associated method blank and the value of 10 times the blank value was equal to or greater than the associated sample value.

GC Semi VOA

Qualifier	Qualifier Description
I	The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.
U	Indicates that the compound was analyzed for but not detected.

HPLC/IC

Qualifier	Qualifier Description
U	Indicates that the compound was analyzed for but not detected.

Metals

Qualifier	Qualifier Description
U	Indicates that the compound was analyzed for but not detected.

General Chemistry

Qualifier	Qualifier Description
I	The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.
Q	Sample held beyond the accepted holding time.
U	Indicates that the compound was analyzed for but not detected.

Biology

Qualifier	Qualifier Description
U	Indicates that the compound was analyzed for but not detected.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive

Eurofins Orlando

Definitions/Glossary

Client: Dewberry Engineers Inc

Job ID: 670-45191-1

Project/Site: City of Apalachicola Well and PWS Sampling

Glossary (Continued)

Abbreviation	These commonly used abbreviations may or may not be present in this report.
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Case Narrative

Client: Dewberry Engineers Inc
Project: City of Apalachicola Well and PWS Sampling

Job ID: 670-45191-1

Job ID: 670-45191-1

Eurofins Orlando

Job Narrative 670-45191-1

Analytical test results meet all requirements of the associated regulatory program listed on the Accreditation/Certification Summary Page unless otherwise noted under the individual analysis. Data qualifiers and/or narrative comments are included to explain any exceptions, if applicable.

- Matrix QC may not be reported if insufficient sample is provided or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD may be performed, unless otherwise specified in the method.
- Surrogate and/or isotope dilution analyte recoveries (if applicable) which are outside of the QC window are confirmed unless attributed to a dilution or otherwise noted in the narrative.

Regulated compliance samples (e.g. SDWA, NPDES) must comply with the associated agency requirements/permits.

Receipt

The samples were received on 8/9/2024 9:30 AM. Unless otherwise noted below, the samples arrived in good condition, and, where required, properly preserved and on ice. The temperatures of the 3 coolers at receipt time were 18.2°C, 21.3°C and 21.6°C.

Receipt Exceptions

The following sample(s) was received at the laboratory outside the required temperature criteria: This does not meet regulatory requirements. The client was contacted regarding this issue, and the laboratory was instructed to proceed with analysis.

GC/MS VOA

Method 8260D: The continuing calibration verification (CCV) associated with batch 670-105484 recovered outside acceptance criteria, low biased, for Dichlorodifluoromethane. A reporting limit (RL) standard was analyzed, and the target analytes are detected. Since the associated samples were non-detect for the analyte(s), the data are reported.

Method 524.2_Preserved: The method prep blank for preparation batch 670-105783 and analytical batch 670-106971 contained Chloroform and Trihalomethanes, Total above the method detection limit (MDL). Associated samples were not re-analyzed because the method blank results were less than the reporting limit (RL) OR practical quantitation limit (PQL).

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

GC Semi VOA

Method 552.3_PREC: The low level laboratory control sample (LLCS) for preparation batch 670-106423 and analytical batch 670-106773 recovered outside control limits for the following analytes: Trichloroacetic acid. These analytes were biased high in the LLCS.

Method 552.3_PREC: The %RPD between the primary and confirmation column / detector exceeded 40% for Monochloroacetic acid for the following sample: (LLCS 670-106423/4-A). The lower value has been reported and qualified in accordance with the laboratory's SOP.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

HPLC/IC

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

Metals

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

General Chemistry

Method SM5910B: The following sample was received outside of holding time: Well #2 (670-45191-2).

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

Biology

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

Eurofins Orlando

Detection Summary

Client: Dewberry Engineers Inc
Project/Site: City of Apalachicola Well and PWS Sampling

Job ID: 670-45191-1

Client Sample ID: Well #1

Lab Sample ID: 670-45191-1

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloroform	4.4	V	1.0	0.50	ug/L	1		524.2	Total/NA
Trihalomethanes, Total	4.4	V	1.0	0.50	ug/L	1		524.2	Total/NA
Dichloroacetic acid	0.46	I	5.0	0.23	ug/L	1		552.3	Total/NA
Trichloroacetic acid	0.61	I	5.0	0.20	ug/L	1		552.3	Total/NA
Total Haloacetic Acids 5	1.1	I	5.0	1.0	ug/L	1		552.3	Total/NA
Chloride	58		0.40	0.20	mg/L	1		300.0	Total/NA
Sulfate	120		5.0	2.5	mg/L	5		300.0	Total/NA
Calcium	49		0.50	0.058	mg/L	1		6010D	Total
Magnesium	50		1.0	0.058	mg/L	1		6010D	Total
									Recoverable
Turbidity	3.8		0.40	0.20	NTU	1		180.1	Total/NA
UV254	0.19		0.0090	0.0090	1/cm	1		5910B	Total/NA
Total Dissolved Solids	440		5.0	5.0	mg/L	1		SM 2540C	Total/NA
Total Organic Carbon	3.4		2.0	1.0	mg/L	1		SM 5310C	Total/NA

Client Sample ID: Well #2

Lab Sample ID: 670-45191-2

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
Bromodichloromethane	7.2		1.0	0.50	ug/L	1		524.2	Total/NA
Bromoform	3.5		1.0	0.50	ug/L	1		524.2	Total/NA
Chloroform	9.0		1.0	0.50	ug/L	1		524.2	Total/NA
Dibromochloromethane	7.6		1.0	0.50	ug/L	1		524.2	Total/NA
Trihalomethanes, Total	27		1.0	0.50	ug/L	1		524.2	Total/NA
Dibromoacetic acid	2.2	I	5.0	0.23	ug/L	1		552.3	Total/NA
Dichloroacetic acid	2.3	I	5.0	0.23	ug/L	1		552.3	Total/NA
Trichloroacetic acid	2.6	I	5.0	0.20	ug/L	1		552.3	Total/NA
Total Haloacetic Acids 5	7.1		5.0	1.0	ug/L	1		552.3	Total/NA
Chloride	63		0.40	0.20	mg/L	1		300.0	Total/NA
Sulfate	140		5.0	2.5	mg/L	5		300.0	Total/NA
Calcium	57		0.50	0.058	mg/L	1		6010D	Total
									Recoverable
Iron	0.22		0.20	0.11	mg/L	1		6010D	Total
									Recoverable
Magnesium	57		1.0	0.058	mg/L	1		6010D	Total
									Recoverable
Turbidity	7.8		0.40	0.20	NTU	1		180.1	Total/NA
UV254	0.054	Q	0.0090	0.0090	1/cm	1		5910B	Total/NA
Total Dissolved Solids	510		5.0	5.0	mg/L	1		SM 2540C	Total/NA
Total Organic Carbon	3.0		2.0	1.0	mg/L	1		SM 5310C	Total/NA
Sulfur Reducing Bacteria	1-10		1.0	1.0	CFU/100mL	1		SRB	Total/NA

Client Sample ID: Well #3

Lab Sample ID: 670-45191-3

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloroform	4.7	V	1.0	0.50	ug/L	1		524.2	Total/NA
Trihalomethanes, Total	4.7	V	1.0	0.50	ug/L	1		524.2	Total/NA
Dichloroacetic acid	0.54	I	5.0	0.23	ug/L	1		552.3	Total/NA
Trichloroacetic acid	0.52	I	5.0	0.20	ug/L	1		552.3	Total/NA
Total Haloacetic Acids 5	1.1	I	5.0	1.0	ug/L	1		552.3	Total/NA
Chloride	23		0.40	0.20	mg/L	1		300.0	Total/NA
Sulfate	4.2		1.0	0.50	mg/L	1		300.0	Total/NA

This Detection Summary does not include radiochemical test results.

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Detection Summary

Client: Dewberry Engineers Inc
Project/Site: City of Apalachicola Well and PWS Sampling

Job ID: 670-45191-1

Client Sample ID: Well #3 (Continued)

Lab Sample ID: 670-45191-3

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
Calcium	44		0.50	0.058	mg/L	1		6010D	Total
Magnesium	36		1.0	0.058	mg/L	1		6010D	Recoverable
Turbidity	0.30	I	0.40	0.20	NTU	1		180.1	Total/NA
UV254	0.20		0.0090	0.0090	1/cm	1		5910B	Total/NA
Total Dissolved Solids	280		5.0	5.0	mg/L	1		SM 2540C	Total/NA
Total Organic Carbon	4.1		2.0	1.0	mg/L	1		SM 5310C	Total/NA

Client Sample ID: POE

Lab Sample ID: 670-45191-4

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
Bromodichloromethane	30		1.0	0.50	ug/L	1		524.2	Total/NA
Bromoform	3.8		1.0	0.50	ug/L	1		524.2	Total/NA
Chloroform	31		1.0	0.50	ug/L	1		524.2	Total/NA
Dibromochloromethane	23		1.0	0.50	ug/L	1		524.2	Total/NA
Trihalomethanes, Total	88		1.0	0.50	ug/L	1		524.2	Total/NA
Turbidity	2.3		0.40	0.20	NTU	1		180.1	Total/NA
UV254	0.074		0.0090	0.0090	1/cm	1		5910B	Total/NA
Total Organic Carbon	3.6		2.0	1.0	mg/L	1		SM 5310C	Total/NA

Client Sample ID: EST

Lab Sample ID: 670-45191-5

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
Bromodichloromethane	35		1.0	0.50	ug/L	1		524.2	Total/NA
Bromoform	4.5		1.0	0.50	ug/L	1		524.2	Total/NA
Chloroform	40		1.0	0.50	ug/L	1		524.2	Total/NA
Dibromochloromethane	26		1.0	0.50	ug/L	1		524.2	Total/NA
Trihalomethanes, Total	110		1.0	0.50	ug/L	1		524.2	Total/NA
Dibromoacetic acid	5.5		5.0	0.23	ug/L	1		552.3	Total/NA
Dichloroacetic acid	10		5.0	0.23	ug/L	1		552.3	Total/NA
Trichloroacetic acid	8.0		5.0	0.20	ug/L	1		552.3	Total/NA
Total Haloacetic Acids 5	24		5.0	1.0	ug/L	1		552.3	Total/NA
Turbidity	1.6		0.40	0.20	NTU	1		180.1	Total/NA
UV254	0.065		0.0090	0.0090	1/cm	1		5910B	Total/NA
Total Organic Carbon	3.7		2.0	1.0	mg/L	1		SM 5310C	Total/NA

This Detection Summary does not include radiochemical test results.

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Client Sample Results

Client: Dewberry Engineers Inc
Project/Site: City of Apalachicola Well and PWS Sampling

Job ID: 670-45191-1

Client Sample ID: Well #1

Lab Sample ID: 670-45191-1

Date Collected: 08/08/24 08:00

Matrix: Water

Date Received: 08/09/24 09:30

Method: EPA 524.2 - 524.2 - Trihalomethanes Formation Potential

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bromodichloromethane	0.50	U	1.0	0.50	ug/L			08/22/24 16:59	1
Bromoform	0.50	U	1.0	0.50	ug/L			08/22/24 16:59	1
Chloroform	4.4	V	1.0	0.50	ug/L			08/22/24 16:59	1
Dibromochloromethane	0.50	U	1.0	0.50	ug/L			08/22/24 16:59	1
Trihalomethanes, Total	4.4	V	1.0	0.50	ug/L			08/22/24 16:59	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	102		70 - 130		08/22/24 16:59	1
4-Bromofluorobenzene (Surr)	101		70 - 130		08/22/24 16:59	1
Dibromofluoromethane (Surr)	101		70 - 130		08/22/24 16:59	1

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1,2-Tetrachloroethane	0.61	U	1.0	0.61	ug/L			08/14/24 16:22	1
1,1,1-Trichloroethane	0.80	U	1.0	0.80	ug/L			08/14/24 16:22	1
1,1,2,2-Tetrachloroethane	0.54	U	1.0	0.54	ug/L			08/14/24 16:22	1
1,1,2-Trichloroethane	0.76	U	2.0	0.76	ug/L			08/14/24 16:22	1
1,1-Dichloroethane	0.62	U	1.0	0.62	ug/L			08/14/24 16:22	1
1,1-Dichloroethene	0.94	U	1.0	0.94	ug/L			08/14/24 16:22	1
1,1-Dichloropropene	0.74	U	1.0	0.74	ug/L			08/14/24 16:22	1
1,2,3-Trichlorobenzene	0.86	U	2.0	0.86	ug/L			08/14/24 16:22	1
1,2,3-Trichloropropane	0.64	U	2.0	0.64	ug/L			08/14/24 16:22	1
1,2,4-Trichlorobenzene	0.70	U	2.0	0.70	ug/L			08/14/24 16:22	1
1,2,4-Trimethylbenzene	0.69	U	2.0	0.69	ug/L			08/14/24 16:22	1
1,2-Dibromo-3-Chloropropane	0.96	U	10	0.96	ug/L			08/14/24 16:22	1
1,2-Dichlorobenzene	0.73	U	1.0	0.73	ug/L			08/14/24 16:22	1
1,2-Dichloroethane	0.63	U	1.0	0.63	ug/L			08/14/24 16:22	1
1,2-Dichloropropane	0.80	U	1.0	0.80	ug/L			08/14/24 16:22	1
1,3,5-Trimethylbenzene	0.58	U	2.0	0.58	ug/L			08/14/24 16:22	1
1,3-Dichlorobenzene	0.77	U	1.0	0.77	ug/L			08/14/24 16:22	1
1,3-Dichloropropane	0.60	U	1.0	0.60	ug/L			08/14/24 16:22	1
1,4-Dichlorobenzene	0.76	U	1.0	0.76	ug/L			08/14/24 16:22	1
2,2-Dichloropropane	0.66	U	5.0	0.66	ug/L			08/14/24 16:22	1
2-Butanone (MEK)	4.5	U	10	4.5	ug/L			08/14/24 16:22	1
2-Chlorotoluene	0.68	U	1.0	0.68	ug/L			08/14/24 16:22	1
2-Hexanone	2.5	U	20	2.5	ug/L			08/14/24 16:22	1
4-Chlorotoluene	0.65	U	2.0	0.65	ug/L			08/14/24 16:22	1
4-Isopropyltoluene	0.80	U	2.0	0.80	ug/L			08/14/24 16:22	1
4-Methyl-2-pentanone (MIBK)	5.0	U	20	5.0	ug/L			08/14/24 16:22	1
Acetone	25	U	50	25	ug/L			08/14/24 16:22	1
Benzene	0.71	U	1.0	0.71	ug/L			08/14/24 16:22	1
Bromobenzene	0.77	U	1.0	0.77	ug/L			08/14/24 16:22	1
Bromoform	0.75	U	1.0	0.75	ug/L			08/14/24 16:22	1
Bromomethane	0.95	U	2.0	0.95	ug/L			08/14/24 16:22	1
Carbon disulfide	2.5	U	5.0	2.5	ug/L			08/14/24 16:22	1
Carbon tetrachloride	0.94	U	1.0	0.94	ug/L			08/14/24 16:22	1
Chlorobenzene	0.72	U	1.0	0.72	ug/L			08/14/24 16:22	1
Chlorobromomethane	0.94	U	2.0	0.94	ug/L			08/14/24 16:22	1
Chlorodibromomethane	0.50	U	1.0	0.50	ug/L			08/14/24 16:22	1
Chloroethane	0.98	U	2.0	0.98	ug/L			08/14/24 16:22	1

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Client Sample Results

Client: Dewberry Engineers Inc
Project/Site: City of Apalachicola Well and PWS Sampling

Job ID: 670-45191-1

Client Sample ID: Well #1

Lab Sample ID: 670-45191-1

Date Collected: 08/08/24 08:00

Matrix: Water

Date Received: 08/09/24 09:30

Method: SW846 8260D - Volatile Organic Compounds by GC/MS (Continued)

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloroform	0.80	U	5.0	0.80	ug/L			08/14/24 16:22	1
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			08/14/24 16:22	1
cis-1,3-Dichloropropene	0.59	U	1.0	0.59	ug/L			08/14/24 16:22	1
Dibromomethane	0.84	U	1.0	0.84	ug/L			08/14/24 16:22	1
Dichlorobromomethane	0.52	U	1.0	0.52	ug/L			08/14/24 16:22	1
Dichlorodifluoromethane	0.74	U	1.0	0.74	ug/L			08/14/24 16:22	1
Ethylbenzene	0.69	U	1.0	0.69	ug/L			08/14/24 16:22	1
Ethylene Dibromide	0.78	U	12	0.78	ug/L			08/14/24 16:22	1
Hexachlorobutadiene	0.70	U	1.0	0.70	ug/L			08/14/24 16:22	1
Isopropylbenzene	0.67	U	1.0	0.67	ug/L			08/14/24 16:22	1
Methyl tert-butyl ether	0.60	U	2.0	0.60	ug/L			08/14/24 16:22	1
Methylene Chloride	5.0	U	10	5.0	ug/L			08/14/24 16:22	1
m-Xylene & p-Xylene	1.3	U	2.0	1.3	ug/L			08/14/24 16:22	1
Naphthalene	0.82	U	2.0	0.82	ug/L			08/14/24 16:22	1
n-Butylbenzene	0.70	U	1.0	0.70	ug/L			08/14/24 16:22	1
N-Propylbenzene	0.50	U	1.0	0.50	ug/L			08/14/24 16:22	1
o-Xylene	0.53	U	1.0	0.53	ug/L			08/14/24 16:22	1
sec-Butylbenzene	0.74	U	2.0	0.74	ug/L			08/14/24 16:22	1
Styrene	0.61	U	1.0	0.61	ug/L			08/14/24 16:22	1
tert-Butylbenzene	0.64	U	2.0	0.64	ug/L			08/14/24 16:22	1
Tetrachloroethene	0.76	U	1.0	0.76	ug/L			08/14/24 16:22	1
Toluene	0.72	U	1.0	0.72	ug/L			08/14/24 16:22	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			08/14/24 16:22	1
trans-1,3-Dichloropropene	0.73	U	1.0	0.73	ug/L			08/14/24 16:22	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			08/14/24 16:22	1
Trichlorofluoromethane	0.94	U	1.0	0.94	ug/L			08/14/24 16:22	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			08/14/24 16:22	1
Xylenes, Total	1.3	U	2.0	1.3	ug/L			08/14/24 16:22	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	99		40 - 146		08/14/24 16:22	1
4-Bromofluorobenzene (Surr)	97		41 - 142		08/14/24 16:22	1
Dibromofluoromethane (Surr)	106		53 - 146		08/14/24 16:22	1

Method: EPA 552.3 - Haloacetic Acids (HAAs) Formation Potential

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Monobromoacetic acid	0.38	U	5.0	0.38	ug/L		08/26/24 06:19	08/28/24 12:52	1
Monochloroacetic acid	0.28	U	10	0.28	ug/L		08/26/24 06:19	08/28/24 12:52	1
Dibromoacetic acid	0.23	U	5.0	0.23	ug/L		08/26/24 06:19	08/28/24 12:52	1
Dichloroacetic acid	0.46	I	5.0	0.23	ug/L		08/26/24 06:19	08/28/24 12:52	1
Trichloroacetic acid	0.61	I	5.0	0.20	ug/L		08/26/24 06:19	08/28/24 12:52	1
Total Haloacetic Acids 5	1.1	I	5.0	1.0	ug/L		08/26/24 06:19	08/28/24 12:52	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
2,3-Dibromopropionic acid	81		70 - 130	08/26/24 06:19	08/28/24 12:52	1

Method: EPA 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	58		0.40	0.20	mg/L			08/09/24 20:36	1
Bromide	0.20	U	0.40	0.20	mg/L			08/09/24 20:36	1

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Client Sample Results

Client: Dewberry Engineers Inc
Project/Site: City of Apalachicola Well and PWS Sampling

Job ID: 670-45191-1

Client Sample ID: Well #1

Date Collected: 08/08/24 08:00

Date Received: 08/09/24 09:30

Lab Sample ID: 670-45191-1

Matrix: Water

Method: EPA 300.0 - Anions, Ion Chromatography (Continued)

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	120		5.0	2.5	mg/L			08/12/24 14:07	5

Method: SW846 6010D - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	49		0.50	0.058	mg/L		08/10/24 15:22	08/12/24 14:43	1
Iron	0.11	U	0.20	0.11	mg/L		08/10/24 15:22	08/12/24 14:43	1
Manganese	0.0084	U	0.010	0.0084	mg/L		08/10/24 15:22	08/12/24 14:43	1
Magnesium	50		1.0	0.058	mg/L		08/10/24 15:22	08/12/24 14:43	1

General Chemistry

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Turbidity (EPA 180.1)	3.8		0.40	0.20	NTU			08/09/24 19:45	1
UV254 (SM 5910B)	0.19		0.0090	0.0090	1/cm			08/09/24 13:03	1
Total Dissolved Solids (SM 2540C)	440		5.0	5.0	mg/L			08/14/24 09:17	1
Total Suspended Solids (SM 2540D)	1.0	U	1.0	1.0	mg/L			08/14/24 17:52	1
Total Organic Carbon (SM 5310C)	3.4		2.0	1.0	mg/L			08/12/24 17:44	1

Method: Lab SOP SRB - Sulfate Reducing Bacteria

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfur Reducing Bacteria	ABSENT	U	1.0	1.0	CFU/100mL			08/09/24 19:50	1

Client Sample ID: Well #2

Date Collected: 08/08/24 08:30

Date Received: 08/09/24 09:30

Lab Sample ID: 670-45191-2

Matrix: Water

Method: EPA 524.2 - 524.2 - Trihalomethanes Formation Potential

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bromodichloromethane	7.2		1.0	0.50	ug/L			08/22/24 17:17	1
Bromoform	3.5		1.0	0.50	ug/L			08/22/24 17:17	1
Chloroform	9.0		1.0	0.50	ug/L			08/22/24 17:17	1
Dibromochloromethane	7.6		1.0	0.50	ug/L			08/22/24 17:17	1
Trihalomethanes, Total	27		1.0	0.50	ug/L			08/22/24 17:17	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	100		70 - 130		08/22/24 17:17	1
4-Bromofluorobenzene (Surr)	100		70 - 130		08/22/24 17:17	1
Dibromofluoromethane (Surr)	100		70 - 130		08/22/24 17:17	1

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1,2-Tetrachloroethane	0.61	U	1.0	0.61	ug/L			08/14/24 16:41	1
1,1,1-Trichloroethane	0.80	U	1.0	0.80	ug/L			08/14/24 16:41	1
1,1,2,2-Tetrachloroethane	0.54	U	1.0	0.54	ug/L			08/14/24 16:41	1
1,1,2-Trichloroethane	0.76	U	2.0	0.76	ug/L			08/14/24 16:41	1
1,1-Dichloroethane	0.62	U	1.0	0.62	ug/L			08/14/24 16:41	1
1,1-Dichloroethene	0.94	U	1.0	0.94	ug/L			08/14/24 16:41	1
1,1-Dichloropropene	0.74	U	1.0	0.74	ug/L			08/14/24 16:41	1
1,2,3-Trichlorobenzene	0.86	U	2.0	0.86	ug/L			08/14/24 16:41	1
1,2,3-Trichloropropane	0.64	U	2.0	0.64	ug/L			08/14/24 16:41	1
1,2,4-Trichlorobenzene	0.70	U	2.0	0.70	ug/L			08/14/24 16:41	1
1,2,4-Trimethylbenzene	0.69	U	2.0	0.69	ug/L			08/14/24 16:41	1

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Client Sample Results

Client: Dewberry Engineers Inc
Project/Site: City of Apalachicola Well and PWS Sampling

Job ID: 670-45191-1

Client Sample ID: Well #2

Lab Sample ID: 670-45191-2

Date Collected: 08/08/24 08:30

Matrix: Water

Date Received: 08/09/24 09:30

Method: SW846 8260D - Volatile Organic Compounds by GC/MS (Continued)

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dibromo-3-Chloropropane	0.96	U	10	0.96	ug/L			08/14/24 16:41	1
1,2-Dichlorobenzene	0.73	U	1.0	0.73	ug/L			08/14/24 16:41	1
1,2-Dichloroethane	0.63	U	1.0	0.63	ug/L			08/14/24 16:41	1
1,2-Dichloropropane	0.80	U	1.0	0.80	ug/L			08/14/24 16:41	1
1,3,5-Trimethylbenzene	0.58	U	2.0	0.58	ug/L			08/14/24 16:41	1
1,3-Dichlorobenzene	0.77	U	1.0	0.77	ug/L			08/14/24 16:41	1
1,3-Dichloropropane	0.60	U	1.0	0.60	ug/L			08/14/24 16:41	1
1,4-Dichlorobenzene	0.76	U	1.0	0.76	ug/L			08/14/24 16:41	1
2,2-Dichloropropane	0.66	U	5.0	0.66	ug/L			08/14/24 16:41	1
2-Butanone (MEK)	4.5	U	10	4.5	ug/L			08/14/24 16:41	1
2-Chlorotoluene	0.68	U	1.0	0.68	ug/L			08/14/24 16:41	1
2-Hexanone	2.5	U	20	2.5	ug/L			08/14/24 16:41	1
4-Chlorotoluene	0.65	U	2.0	0.65	ug/L			08/14/24 16:41	1
4-Isopropyltoluene	0.80	U	2.0	0.80	ug/L			08/14/24 16:41	1
4-Methyl-2-pentanone (MIBK)	5.0	U	20	5.0	ug/L			08/14/24 16:41	1
Acetone	25	U	50	25	ug/L			08/14/24 16:41	1
Benzene	0.71	U	1.0	0.71	ug/L			08/14/24 16:41	1
Bromobenzene	0.77	U	1.0	0.77	ug/L			08/14/24 16:41	1
Bromoform	0.75	U	1.0	0.75	ug/L			08/14/24 16:41	1
Bromomethane	0.95	U	2.0	0.95	ug/L			08/14/24 16:41	1
Carbon disulfide	2.5	U	5.0	2.5	ug/L			08/14/24 16:41	1
Carbon tetrachloride	0.94	U	1.0	0.94	ug/L			08/14/24 16:41	1
Chlorobenzene	0.72	U	1.0	0.72	ug/L			08/14/24 16:41	1
Chlorobromomethane	0.94	U	2.0	0.94	ug/L			08/14/24 16:41	1
Chlorodibromomethane	0.50	U	1.0	0.50	ug/L			08/14/24 16:41	1
Chloroethane	0.98	U	2.0	0.98	ug/L			08/14/24 16:41	1
Chloroform	0.80	U	5.0	0.80	ug/L			08/14/24 16:41	1
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			08/14/24 16:41	1
cis-1,3-Dichloropropene	0.59	U	1.0	0.59	ug/L			08/14/24 16:41	1
Dibromomethane	0.84	U	1.0	0.84	ug/L			08/14/24 16:41	1
Dichlorobromomethane	0.52	U	1.0	0.52	ug/L			08/14/24 16:41	1
Dichlorodifluoromethane	0.74	U	1.0	0.74	ug/L			08/14/24 16:41	1
Ethylbenzene	0.69	U	1.0	0.69	ug/L			08/14/24 16:41	1
Ethylene Dibromide	0.78	U	12	0.78	ug/L			08/14/24 16:41	1
Hexachlorobutadiene	0.70	U	1.0	0.70	ug/L			08/14/24 16:41	1
Isopropylbenzene	0.67	U	1.0	0.67	ug/L			08/14/24 16:41	1
Methyl tert-butyl ether	0.60	U	2.0	0.60	ug/L			08/14/24 16:41	1
Methylene Chloride	5.0	U	10	5.0	ug/L			08/14/24 16:41	1
m-Xylene & p-Xylene	1.3	U	2.0	1.3	ug/L			08/14/24 16:41	1
Naphthalene	0.82	U	2.0	0.82	ug/L			08/14/24 16:41	1
n-Butylbenzene	0.70	U	1.0	0.70	ug/L			08/14/24 16:41	1
N-Propylbenzene	0.50	U	1.0	0.50	ug/L			08/14/24 16:41	1
o-Xylene	0.53	U	1.0	0.53	ug/L			08/14/24 16:41	1
sec-Butylbenzene	0.74	U	2.0	0.74	ug/L			08/14/24 16:41	1
Styrene	0.61	U	1.0	0.61	ug/L			08/14/24 16:41	1
tert-Butylbenzene	0.64	U	2.0	0.64	ug/L			08/14/24 16:41	1
Tetrachloroethene	0.76	U	1.0	0.76	ug/L			08/14/24 16:41	1
Toluene	0.72	U	1.0	0.72	ug/L			08/14/24 16:41	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			08/14/24 16:41	1

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Client Sample Results

Client: Dewberry Engineers Inc
Project/Site: City of Apalachicola Well and PWS Sampling

Job ID: 670-45191-1

Client Sample ID: Well #2

Lab Sample ID: 670-45191-2

Date Collected: 08/08/24 08:30

Matrix: Water

Date Received: 08/09/24 09:30

Method: SW846 8260D - Volatile Organic Compounds by GC/MS (Continued)

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
trans-1,3-Dichloropropene	0.73	U	1.0	0.73	ug/L			08/14/24 16:41	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			08/14/24 16:41	1
Trichlorofluoromethane	0.94	U	1.0	0.94	ug/L			08/14/24 16:41	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			08/14/24 16:41	1
Xylenes, Total	1.3	U	2.0	1.3	ug/L			08/14/24 16:41	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	100		40 - 146					08/14/24 16:41	1
4-Bromofluorobenzene (Surr)	96		41 - 142					08/14/24 16:41	1
Dibromofluoromethane (Surr)	105		53 - 146					08/14/24 16:41	1

Method: EPA 552.3 - Haloacetic Acids (HAAs) Formation Potential

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Monobromoacetic acid	0.38	U	5.0	0.38	ug/L		08/26/24 06:19	08/28/24 13:19	1
Monochloroacetic acid	0.28	U	10	0.28	ug/L		08/26/24 06:19	08/28/24 13:19	1
Dibromoacetic acid	2.2	I	5.0	0.23	ug/L		08/26/24 06:19	08/28/24 13:19	1
Dichloroacetic acid	2.3	I	5.0	0.23	ug/L		08/26/24 06:19	08/28/24 13:19	1
Trichloroacetic acid	2.6	I	5.0	0.20	ug/L		08/26/24 06:19	08/28/24 13:19	1
Total Haloacetic Acids 5	7.1		5.0	1.0	ug/L		08/26/24 06:19	08/28/24 13:19	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
2,3-Dibromopropionic acid	82		70 - 130				08/26/24 06:19	08/28/24 13:19	1

Method: EPA 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	63		0.40	0.20	mg/L			08/09/24 20:53	1
Bromide	0.20	U	0.40	0.20	mg/L			08/09/24 20:53	1
Sulfate	140		5.0	2.5	mg/L			08/12/24 14:24	5

Method: SW846 6010D - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	57		0.50	0.058	mg/L		08/10/24 15:22	08/12/24 14:45	1
Iron	0.22		0.20	0.11	mg/L		08/10/24 15:22	08/12/24 14:45	1
Manganese	0.0084	U	0.010	0.0084	mg/L		08/10/24 15:22	08/12/24 14:45	1
Magnesium	57		1.0	0.058	mg/L		08/10/24 15:22	08/12/24 14:45	1

General Chemistry

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Turbidity (EPA 180.1)	7.8		0.40	0.20	NTU			08/09/24 19:45	1
UV254 (SM 5910B)	0.054	Q	0.0090	0.0090	1/cm			08/15/24 13:33	1
Total Dissolved Solids (SM 2540C)	510		5.0	5.0	mg/L			08/14/24 09:17	1
Total Suspended Solids (SM 2540D)	1.0	U	1.0	1.0	mg/L			08/14/24 17:52	1
Total Organic Carbon (SM 5310C)	3.0		2.0	1.0	mg/L			08/12/24 18:33	1

Method: Lab SOP SRB - Sulfate Reducing Bacteria

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfur Reducing Bacteria	1-10		1.0	1.0	CFU/100mL			08/09/24 19:50	1

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Client Sample Results

Client: Dewberry Engineers Inc
Project/Site: City of Apalachicola Well and PWS Sampling

Job ID: 670-45191-1

Client Sample ID: Well #3

Lab Sample ID: 670-45191-3

Date Collected: 08/08/24 09:00

Matrix: Water

Date Received: 08/09/24 09:30

Method: EPA 524.2 - 524.2 - Trihalomethanes Formation Potential

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bromodichloromethane	0.50	U	1.0	0.50	ug/L			08/22/24 17:34	1
Bromoform	0.50	U	1.0	0.50	ug/L			08/22/24 17:34	1
Chloroform	4.7	V	1.0	0.50	ug/L			08/22/24 17:34	1
Dibromochloromethane	0.50	U	1.0	0.50	ug/L			08/22/24 17:34	1
Trihalomethanes, Total	4.7	V	1.0	0.50	ug/L			08/22/24 17:34	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	101		70 - 130		08/22/24 17:34	1
4-Bromofluorobenzene (Surr)	104		70 - 130		08/22/24 17:34	1
Dibromofluoromethane (Surr)	101		70 - 130		08/22/24 17:34	1

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1,2-Tetrachloroethane	0.61	U	1.0	0.61	ug/L			08/14/24 16:59	1
1,1,1-Trichloroethane	0.80	U	1.0	0.80	ug/L			08/14/24 16:59	1
1,1,2,2-Tetrachloroethane	0.54	U	1.0	0.54	ug/L			08/14/24 16:59	1
1,1,2-Trichloroethane	0.76	U	2.0	0.76	ug/L			08/14/24 16:59	1
1,1-Dichloroethane	0.62	U	1.0	0.62	ug/L			08/14/24 16:59	1
1,1-Dichloroethene	0.94	U	1.0	0.94	ug/L			08/14/24 16:59	1
1,1-Dichloropropene	0.74	U	1.0	0.74	ug/L			08/14/24 16:59	1
1,2,3-Trichlorobenzene	0.86	U	2.0	0.86	ug/L			08/14/24 16:59	1
1,2,3-Trichloropropane	0.64	U	2.0	0.64	ug/L			08/14/24 16:59	1
1,2,4-Trichlorobenzene	0.70	U	2.0	0.70	ug/L			08/14/24 16:59	1
1,2,4-Trimethylbenzene	0.69	U	2.0	0.69	ug/L			08/14/24 16:59	1
1,2-Dibromo-3-Chloropropane	0.96	U	10	0.96	ug/L			08/14/24 16:59	1
1,2-Dichlorobenzene	0.73	U	1.0	0.73	ug/L			08/14/24 16:59	1
1,2-Dichloroethane	0.63	U	1.0	0.63	ug/L			08/14/24 16:59	1
1,2-Dichloropropane	0.80	U	1.0	0.80	ug/L			08/14/24 16:59	1
1,3,5-Trimethylbenzene	0.58	U	2.0	0.58	ug/L			08/14/24 16:59	1
1,3-Dichlorobenzene	0.77	U	1.0	0.77	ug/L			08/14/24 16:59	1
1,3-Dichloropropane	0.60	U	1.0	0.60	ug/L			08/14/24 16:59	1
1,4-Dichlorobenzene	0.76	U	1.0	0.76	ug/L			08/14/24 16:59	1
2,2-Dichloropropane	0.66	U	5.0	0.66	ug/L			08/14/24 16:59	1
2-Butanone (MEK)	4.5	U	10	4.5	ug/L			08/14/24 16:59	1
2-Chlorotoluene	0.68	U	1.0	0.68	ug/L			08/14/24 16:59	1
2-Hexanone	2.5	U	20	2.5	ug/L			08/14/24 16:59	1
4-Chlorotoluene	0.65	U	2.0	0.65	ug/L			08/14/24 16:59	1
4-Isopropyltoluene	0.80	U	2.0	0.80	ug/L			08/14/24 16:59	1
4-Methyl-2-pentanone (MIBK)	5.0	U	20	5.0	ug/L			08/14/24 16:59	1
Acetone	25	U	50	25	ug/L			08/14/24 16:59	1
Benzene	0.71	U	1.0	0.71	ug/L			08/14/24 16:59	1
Bromobenzene	0.77	U	1.0	0.77	ug/L			08/14/24 16:59	1
Bromoform	0.75	U	1.0	0.75	ug/L			08/14/24 16:59	1
Bromomethane	0.95	U	2.0	0.95	ug/L			08/14/24 16:59	1
Carbon disulfide	2.5	U	5.0	2.5	ug/L			08/14/24 16:59	1
Carbon tetrachloride	0.94	U	1.0	0.94	ug/L			08/14/24 16:59	1
Chlorobenzene	0.72	U	1.0	0.72	ug/L			08/14/24 16:59	1
Chlorobromomethane	0.94	U	2.0	0.94	ug/L			08/14/24 16:59	1
Chlorodibromomethane	0.50	U	1.0	0.50	ug/L			08/14/24 16:59	1
Chloroethane	0.98	U	2.0	0.98	ug/L			08/14/24 16:59	1

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Client Sample Results

Client: Dewberry Engineers Inc
Project/Site: City of Apalachicola Well and PWS Sampling

Job ID: 670-45191-1

Client Sample ID: Well #3

Lab Sample ID: 670-45191-3

Date Collected: 08/08/24 09:00

Matrix: Water

Date Received: 08/09/24 09:30

Method: SW846 8260D - Volatile Organic Compounds by GC/MS (Continued)

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloroform	0.80	U	5.0	0.80	ug/L			08/14/24 16:59	1
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			08/14/24 16:59	1
cis-1,3-Dichloropropene	0.59	U	1.0	0.59	ug/L			08/14/24 16:59	1
Dibromomethane	0.84	U	1.0	0.84	ug/L			08/14/24 16:59	1
Dichlorobromomethane	0.52	U	1.0	0.52	ug/L			08/14/24 16:59	1
Dichlorodifluoromethane	0.74	U	1.0	0.74	ug/L			08/14/24 16:59	1
Ethylbenzene	0.69	U	1.0	0.69	ug/L			08/14/24 16:59	1
Ethylene Dibromide	0.78	U	12	0.78	ug/L			08/14/24 16:59	1
Hexachlorobutadiene	0.70	U	1.0	0.70	ug/L			08/14/24 16:59	1
Isopropylbenzene	0.67	U	1.0	0.67	ug/L			08/14/24 16:59	1
Methyl tert-butyl ether	0.60	U	2.0	0.60	ug/L			08/14/24 16:59	1
Methylene Chloride	5.0	U	10	5.0	ug/L			08/14/24 16:59	1
m-Xylene & p-Xylene	1.3	U	2.0	1.3	ug/L			08/14/24 16:59	1
Naphthalene	0.82	U	2.0	0.82	ug/L			08/14/24 16:59	1
n-Butylbenzene	0.70	U	1.0	0.70	ug/L			08/14/24 16:59	1
N-Propylbenzene	0.50	U	1.0	0.50	ug/L			08/14/24 16:59	1
o-Xylene	0.53	U	1.0	0.53	ug/L			08/14/24 16:59	1
sec-Butylbenzene	0.74	U	2.0	0.74	ug/L			08/14/24 16:59	1
Styrene	0.61	U	1.0	0.61	ug/L			08/14/24 16:59	1
tert-Butylbenzene	0.64	U	2.0	0.64	ug/L			08/14/24 16:59	1
Tetrachloroethene	0.76	U	1.0	0.76	ug/L			08/14/24 16:59	1
Toluene	0.72	U	1.0	0.72	ug/L			08/14/24 16:59	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			08/14/24 16:59	1
trans-1,3-Dichloropropene	0.73	U	1.0	0.73	ug/L			08/14/24 16:59	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			08/14/24 16:59	1
Trichlorofluoromethane	0.94	U	1.0	0.94	ug/L			08/14/24 16:59	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			08/14/24 16:59	1
Xylenes, Total	1.3	U	2.0	1.3	ug/L			08/14/24 16:59	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	98		40 - 146		08/14/24 16:59	1
4-Bromofluorobenzene (Surr)	96		41 - 142		08/14/24 16:59	1
Dibromofluoromethane (Surr)	105		53 - 146		08/14/24 16:59	1

Method: EPA 552.3 - Haloacetic Acids (HAAs) Formation Potential

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Monobromoacetic acid	0.38	U	5.0	0.38	ug/L		08/26/24 06:19	08/28/24 14:00	1
Monochloroacetic acid	0.28	U	10	0.28	ug/L		08/26/24 06:19	08/28/24 14:00	1
Dibromoacetic acid	0.23	U	5.0	0.23	ug/L		08/26/24 06:19	08/28/24 14:00	1
Dichloroacetic acid	0.54	I	5.0	0.23	ug/L		08/26/24 06:19	08/28/24 14:00	1
Trichloroacetic acid	0.52	I	5.0	0.20	ug/L		08/26/24 06:19	08/28/24 14:00	1
Total Haloacetic Acids 5	1.1	I	5.0	1.0	ug/L		08/26/24 06:19	08/28/24 14:00	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
2,3-Dibromopropionic acid	89		70 - 130	08/26/24 06:19	08/28/24 14:00	1

Method: EPA 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	23		0.40	0.20	mg/L			08/09/24 21:10	1
Bromide	0.20	U	0.40	0.20	mg/L			08/09/24 21:10	1

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Client Sample Results

Client: Dewberry Engineers Inc
Project/Site: City of Apalachicola Well and PWS Sampling

Job ID: 670-45191-1

Client Sample ID: Well #3

Lab Sample ID: 670-45191-3

Date Collected: 08/08/24 09:00

Matrix: Water

Date Received: 08/09/24 09:30

Method: EPA 300.0 - Anions, Ion Chromatography (Continued)

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	4.2		1.0	0.50	mg/L			08/09/24 21:10	1

Method: SW846 6010D - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	44		0.50	0.058	mg/L		08/10/24 15:22	08/12/24 14:47	1
Iron	0.11	U	0.20	0.11	mg/L		08/10/24 15:22	08/12/24 14:47	1
Manganese	0.0084	U	0.010	0.0084	mg/L		08/10/24 15:22	08/12/24 14:47	1
Magnesium	36		1.0	0.058	mg/L		08/10/24 15:22	08/12/24 14:47	1

General Chemistry

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Turbidity (EPA 180.1)	0.30	I	0.40	0.20	NTU			08/09/24 19:45	1
UV254 (SM 5910B)	0.20		0.0090	0.0090	1/cm			08/09/24 13:03	1
Total Dissolved Solids (SM 2540C)	280		5.0	5.0	mg/L			08/14/24 09:17	1
Total Suspended Solids (SM 2540D)	1.0	U	1.0	1.0	mg/L			08/14/24 17:52	1
Total Organic Carbon (SM 5310C)	4.1		2.0	1.0	mg/L			08/12/24 18:54	1

Method: Lab SOP SRB - Sulfate Reducing Bacteria

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfur Reducing Bacteria	ABSENT	U	1.0	1.0	CFU/100mL			08/09/24 19:50	1

Client Sample ID: POE

Lab Sample ID: 670-45191-4

Date Collected: 08/08/24 10:30

Matrix: Water

Date Received: 08/09/24 09:30

Method: EPA-DW 524.2 - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bromodichloromethane	30		1.0	0.50	ug/L			08/21/24 18:08	1
Bromoform	3.8		1.0	0.50	ug/L			08/21/24 18:08	1
Chloroform	31		1.0	0.50	ug/L			08/21/24 18:08	1
Dibromochloromethane	23		1.0	0.50	ug/L			08/21/24 18:08	1
Trihalomethanes, Total	88		1.0	0.50	ug/L			08/21/24 18:08	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	102		70 - 130		08/21/24 18:08	1
4-Bromofluorobenzene (Surr)	104		70 - 130		08/21/24 18:08	1
Dibromofluoromethane (Surr)	101		70 - 130		08/21/24 18:08	1

Method: EPA 552.3 - Haloacetic Acids (HAAs) (GC)

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Monobromoacetic acid	0.38	U	5.0	0.38	ug/L		08/20/24 09:19	08/21/24 22:15	1
Monochloroacetic acid	0.28	U	10	0.28	ug/L		08/20/24 09:19	08/21/24 22:15	1
Dibromoacetic acid	0.23	U	5.0	0.23	ug/L		08/20/24 09:19	08/21/24 22:15	1
Dichloroacetic acid	0.23	U	5.0	0.23	ug/L		08/20/24 09:19	08/21/24 22:15	1
Trichloroacetic acid	0.20	U	5.0	0.20	ug/L		08/20/24 09:19	08/21/24 22:15	1
Total Haloacetic Acids 5	1.0	U	5.0	1.0	ug/L		08/20/24 09:19	08/21/24 22:15	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
2,3-Dibromopropionic acid	108		70 - 130	08/20/24 09:19	08/21/24 22:15	1

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Client Sample Results

Client: Dewberry Engineers Inc
Project/Site: City of Apalachicola Well and PWS Sampling

Job ID: 670-45191-1

Client Sample ID: POE

Date Collected: 08/08/24 10:30

Date Received: 08/09/24 09:30

Lab Sample ID: 670-45191-4

Matrix: Water

General Chemistry

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Turbidity (EPA 180.1)	2.3		0.40	0.20	NTU			08/09/24 19:45	1
UV254 (SM 5910B)	0.074		0.0090	0.0090	1/cm			08/09/24 13:04	1
Total Organic Carbon (SM 5310C)	3.6		2.0	1.0	mg/L			08/12/24 19:08	1

Client Sample ID: EST

Date Collected: 08/08/24 11:30

Date Received: 08/09/24 09:30

Lab Sample ID: 670-45191-5

Matrix: Water

Method: EPA-DW 524.2 - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bromodichloromethane	35		1.0	0.50	ug/L			08/21/24 18:26	1
Bromoform	4.5		1.0	0.50	ug/L			08/21/24 18:26	1
Chloroform	40		1.0	0.50	ug/L			08/21/24 18:26	1
Dibromochloromethane	26		1.0	0.50	ug/L			08/21/24 18:26	1
Trihalomethanes, Total	110		1.0	0.50	ug/L			08/21/24 18:26	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	103		70 - 130					08/21/24 18:26	1
4-Bromofluorobenzene (Surr)	105		70 - 130					08/21/24 18:26	1
Dibromofluoromethane (Surr)	101		70 - 130					08/21/24 18:26	1

Method: EPA 552.3 - Haloacetic Acids (HAAs) (GC)

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Monobromoacetic acid	0.38	U	5.0	0.38	ug/L		08/20/24 09:19	08/21/24 22:28	1
Monochloroacetic acid	0.28	U	10	0.28	ug/L		08/20/24 09:19	08/21/24 22:28	1
Dibromoacetic acid	5.5		5.0	0.23	ug/L		08/20/24 09:19	08/21/24 22:28	1
Dichloroacetic acid	10		5.0	0.23	ug/L		08/20/24 09:19	08/21/24 22:28	1
Trichloroacetic acid	8.0		5.0	0.20	ug/L		08/20/24 09:19	08/21/24 22:28	1
Total Haloacetic Acids 5	24		5.0	1.0	ug/L		08/20/24 09:19	08/21/24 22:28	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
2,3-Dibromopropionic acid	99		70 - 130				08/20/24 09:19	08/21/24 22:28	1

General Chemistry

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Turbidity (EPA 180.1)	1.6		0.40	0.20	NTU			08/09/24 19:45	1
UV254 (SM 5910B)	0.065		0.0090	0.0090	1/cm			08/09/24 15:21	1
Total Organic Carbon (SM 5310C)	3.7		2.0	1.0	mg/L			08/12/24 19:21	1

Surrogate Summary

Client: Dewberry Engineers Inc
Project/Site: City of Apalachicola Well and PWS Sampling

Job ID: 670-45191-1

Method: 524.2 - 524.2 - Trihalomethanes Formation Potential

Matrix: Water

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Surrogate Recovery (Acceptance Limits)		
		TOL (70-130)	BFB (70-130)	DBFM (70-130)
670-45191-1	Well #1	102	101	101
670-45191-2	Well #2	100	100	100
670-45191-3	Well #3	101	104	101
LCS 670-106971/4	Lab Control Sample	102	102	102
MB 670-105783/11-A	Method Blank	101	104	100
MB 670-105783/1-A	Method Blank	101	101	100
MB 670-105783/6-A	Method Blank	100	102	100
MB 670-106971/7	Method Blank	102	103	99

Surrogate Legend

TOL = Toluene-d8 (Surr)

BFB = 4-Bromofluorobenzene (Surr)

DBFM = Dibromofluoromethane (Surr)

Method: 524.2 - Volatile Organic Compounds (GC/MS)

Matrix: Water

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Surrogate Recovery (Acceptance Limits)		
		TOL (70-130)	BFB (70-130)	DBFM (70-130)
670-45191-4	POE	102	104	101
670-45191-5	EST	103	105	101
LCS 670-106681/5	Lab Control Sample	102	104	99
MB 670-106681/8	Method Blank	103	102	100

Surrogate Legend

TOL = Toluene-d8 (Surr)

BFB = 4-Bromofluorobenzene (Surr)

DBFM = Dibromofluoromethane (Surr)

Method: 8260D - Volatile Organic Compounds by GC/MS

Matrix: Water

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Surrogate Recovery (Acceptance Limits)		
		TOL (40-146)	BFB (41-142)	DBFM (53-146)
670-45191-1	Well #1	99	97	106
670-45191-2	Well #2	100	96	105
670-45191-3	Well #3	98	96	105
LB 670-104649/1-A	Method Blank	100	99	105
LCS 670-105484/4	Lab Control Sample	100	95	107
LCSD 670-105484/5	Lab Control Sample Dup	101	98	104
MB 670-105484/8	Method Blank	98	98	106

Surrogate Legend

TOL = Toluene-d8 (Surr)

BFB = 4-Bromofluorobenzene (Surr)

DBFM = Dibromofluoromethane (Surr)

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Surrogate Summary

Client: Dewberry Engineers Inc

Job ID: 670-45191-1

Project/Site: City of Apalachicola Well and PWS Sampling

Method: 552.3 - Haloacetic Acids (HAAs) (GC)

Matrix: Water

Prep Type: Total/NA

Percent Surrogate Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	23DPA1 (70-130)
670-45191-4	POE	108
670-45191-5	EST	99
LCS 670-106423/5-A	Lab Control Sample	109
LCSD 670-106423/6-A	Lab Control Sample Dup	112
LLCS 670-106423/4-A	Lab Control Sample	99
MB 670-106423/7-A	Method Blank	108

Surrogate Legend

23DPA = 2,3-Dibromopropionic acid

Method: 552.3 - Haloacetic Acids (HAAs) Formation Potential

Matrix: Water

Prep Type: Total/NA

Percent Surrogate Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	23DPA1 (70-130)
670-45191-1	Well #1	81
670-45191-2	Well #2	82
670-45191-3	Well #3	89
LCS 670-107451/5-A	Lab Control Sample	102
LCSD 670-107451/6-A	Lab Control Sample Dup	101
LLCS 670-107451/4-A	Lab Control Sample	106
MB 670-105786/1-B	Method Blank	92
MB 670-107451/7-A	Method Blank	95

Surrogate Legend

23DPA = 2,3-Dibromopropionic acid

QC Sample Results

Client: Dewberry Engineers Inc
Project/Site: City of Apalachicola Well and PWS Sampling

Job ID: 670-45191-1

Method: 524.2 - Volatile Organic Compounds (GC/MS)

Lab Sample ID: MB 670-106681/8

Matrix: Water

Analysis Batch: 106681

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bromodichloromethane	0.50	U	1.0	0.50	ug/L			08/21/24 11:46	1
Bromoform	0.50	U	1.0	0.50	ug/L			08/21/24 11:46	1
Chloroform	0.50	U	1.0	0.50	ug/L			08/21/24 11:46	1
Dibromochloromethane	0.50	U	1.0	0.50	ug/L			08/21/24 11:46	1
Trihalomethanes, Total	0.50	U	1.0	0.50	ug/L			08/21/24 11:46	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	103		70 - 130		08/21/24 11:46	1
4-Bromofluorobenzene (Surr)	102		70 - 130		08/21/24 11:46	1
Dibromofluoromethane (Surr)	100		70 - 130		08/21/24 11:46	1

Lab Sample ID: LCS 670-106681/5

Matrix: Water

Analysis Batch: 106681

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Bromodichloromethane	5.00	6.18		ug/L		124	70 - 130
Bromoform	5.00	5.77		ug/L		115	70 - 130
Chloroform	5.00	6.18		ug/L		124	70 - 130
Dibromochloromethane	5.00	5.91		ug/L		118	70 - 130

Surrogate	LCS %Recovery	LCS Qualifier	Limits
Toluene-d8 (Surr)	102		70 - 130
4-Bromofluorobenzene (Surr)	104		70 - 130
Dibromofluoromethane (Surr)	99		70 - 130

Method: 524.2 - 524.2 - Trihalomethanes Formation Potential

Lab Sample ID: MB 670-105783/11-A

Matrix: Water

Analysis Batch: 106971

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bromodichloromethane	0.50	U	1.0	0.50	ug/L			08/22/24 16:42	1
Bromoform	0.50	U	1.0	0.50	ug/L			08/22/24 16:42	1
Chloroform	0.639	I	1.0	0.50	ug/L			08/22/24 16:42	1
Dibromochloromethane	0.50	U	1.0	0.50	ug/L			08/22/24 16:42	1
Trihalomethanes, Total	0.639	I	1.0	0.50	ug/L			08/22/24 16:42	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	101		70 - 130		08/22/24 16:42	1
4-Bromofluorobenzene (Surr)	104		70 - 130		08/22/24 16:42	1
Dibromofluoromethane (Surr)	100		70 - 130		08/22/24 16:42	1

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QC Sample Results

Client: Dewberry Engineers Inc
Project/Site: City of Apalachicola Well and PWS Sampling

Job ID: 670-45191-1

Method: 524.2 - 524.2 - Trihalomethanes Formation Potential (Continued)

Lab Sample ID: MB 670-105783/1-A

Matrix: Water

Analysis Batch: 106971

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bromodichloromethane	0.50	U	1.0	0.50	ug/L			08/22/24 16:07	1
Bromoform	0.50	U	1.0	0.50	ug/L			08/22/24 16:07	1
Chloroform	0.642	I	1.0	0.50	ug/L			08/22/24 16:07	1
Dibromochloromethane	0.50	U	1.0	0.50	ug/L			08/22/24 16:07	1
Trihalomethanes, Total	0.642	I	1.0	0.50	ug/L			08/22/24 16:07	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	101		70 - 130		08/22/24 16:07	1
4-Bromofluorobenzene (Surr)	101		70 - 130		08/22/24 16:07	1
Dibromofluoromethane (Surr)	100		70 - 130		08/22/24 16:07	1

Lab Sample ID: MB 670-105783/6-A

Matrix: Water

Analysis Batch: 106971

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bromodichloromethane	0.50	U	1.0	0.50	ug/L			08/22/24 16:24	1
Bromoform	0.50	U	1.0	0.50	ug/L			08/22/24 16:24	1
Chloroform	0.701	I	1.0	0.50	ug/L			08/22/24 16:24	1
Dibromochloromethane	0.50	U	1.0	0.50	ug/L			08/22/24 16:24	1
Trihalomethanes, Total	0.701	I	1.0	0.50	ug/L			08/22/24 16:24	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	100		70 - 130		08/22/24 16:24	1
4-Bromofluorobenzene (Surr)	102		70 - 130		08/22/24 16:24	1
Dibromofluoromethane (Surr)	100		70 - 130		08/22/24 16:24	1

Lab Sample ID: MB 670-106971/7

Matrix: Water

Analysis Batch: 106971

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bromodichloromethane	0.50	U	1.0	0.50	ug/L			08/22/24 12:54	1
Bromoform	0.50	U	1.0	0.50	ug/L			08/22/24 12:54	1
Chloroform	0.50	U	1.0	0.50	ug/L			08/22/24 12:54	1
Dibromochloromethane	0.50	U	1.0	0.50	ug/L			08/22/24 12:54	1
Trihalomethanes, Total	0.50	U	1.0	0.50	ug/L			08/22/24 12:54	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	102		70 - 130		08/22/24 12:54	1
4-Bromofluorobenzene (Surr)	103		70 - 130		08/22/24 12:54	1
Dibromofluoromethane (Surr)	99		70 - 130		08/22/24 12:54	1

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QC Sample Results

Client: Dewberry Engineers Inc
Project/Site: City of Apalachicola Well and PWS Sampling

Job ID: 670-45191-1

Method: 524.2 - 524.2 - Trihalomethanes Formation Potential (Continued)

Lab Sample ID: LCS 670-106971/4

Matrix: Water

Analysis Batch: 106971

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Bromodichloromethane	5.00	5.17		ug/L		103	70 - 130
Bromoform	5.00	4.40		ug/L		88	70 - 130
Chloroform	5.00	5.45		ug/L		109	70 - 130
Dibromochloromethane	5.00	4.80		ug/L		96	70 - 130

Surrogate	LCS %Recovery	LCS Qualifier	Limits
Toluene-d8 (Surr)	102		70 - 130
4-Bromofluorobenzene (Surr)	102		70 - 130
Dibromofluoromethane (Surr)	102		70 - 130

Method: 8260D - Volatile Organic Compounds by GC/MS

Lab Sample ID: LB 670-104649/1-A

Matrix: Water

Analysis Batch: 105484

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	LB Result	LB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1,2-Tetrachloroethane	61 U		100	61	ug/L			08/14/24 12:44	100
1,1,1-Trichloroethane	80 U		100	80	ug/L			08/14/24 12:44	100
1,1,2,2-Tetrachloroethane	54 U		100	54	ug/L			08/14/24 12:44	100
1,1,2-Trichloroethane	76 U		200	76	ug/L			08/14/24 12:44	100
1,1-Dichloroethane	62 U		100	62	ug/L			08/14/24 12:44	100
1,1-Dichloroethene	94 U		100	94	ug/L			08/14/24 12:44	100
1,1-Dichloropropene	74 U		100	74	ug/L			08/14/24 12:44	100
1,2,3-Trichlorobenzene	86 U		200	86	ug/L			08/14/24 12:44	100
1,2,3-Trichloropropane	64 U		200	64	ug/L			08/14/24 12:44	100
1,2,4-Trichlorobenzene	70 U		200	70	ug/L			08/14/24 12:44	100
1,2,4-Trimethylbenzene	69 U		200	69	ug/L			08/14/24 12:44	100
1,2-Dibromo-3-Chloropropane	96 U		1000	96	ug/L			08/14/24 12:44	100
1,2-Dichlorobenzene	73 U		100	73	ug/L			08/14/24 12:44	100
1,2-Dichloroethane	63 U		100	63	ug/L			08/14/24 12:44	100
1,2-Dichloropropane	80 U		100	80	ug/L			08/14/24 12:44	100
1,3,5-Trimethylbenzene	58 U		200	58	ug/L			08/14/24 12:44	100
1,3-Dichlorobenzene	77 U		100	77	ug/L			08/14/24 12:44	100
1,3-Dichloropropane	60 U		100	60	ug/L			08/14/24 12:44	100
1,4-Dichlorobenzene	76 U		100	76	ug/L			08/14/24 12:44	100
2,2-Dichloropropane	66 U		500	66	ug/L			08/14/24 12:44	100
2-Butanone (MEK)	450 U		1000	450	ug/L			08/14/24 12:44	100
2-Chlorotoluene	68 U		100	68	ug/L			08/14/24 12:44	100
2-Hexanone	250 U		2000	250	ug/L			08/14/24 12:44	100
4-Chlorotoluene	65 U		200	65	ug/L			08/14/24 12:44	100
4-Isopropyltoluene	80 U		200	80	ug/L			08/14/24 12:44	100
4-Methyl-2-pentanone (MIBK)	500 U		2000	500	ug/L			08/14/24 12:44	100
Acetone	2500 U		5000	2500	ug/L			08/14/24 12:44	100
Benzene	71 U		100	71	ug/L			08/14/24 12:44	100
Bromobenzene	77 U		100	77	ug/L			08/14/24 12:44	100
Bromoform	75 U		100	75	ug/L			08/14/24 12:44	100
Bromomethane	95 U		200	95	ug/L			08/14/24 12:44	100

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QC Sample Results

Client: Dewberry Engineers Inc
Project/Site: City of Apalachicola Well and PWS Sampling

Job ID: 670-45191-1

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LB 670-104649/1-A

Matrix: Water

Analysis Batch: 105484

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	LB Result	LB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbon disulfide	250	U	500	250	ug/L			08/14/24 12:44	100
Carbon tetrachloride	94	U	100	94	ug/L			08/14/24 12:44	100
Chlorobenzene	72	U	100	72	ug/L			08/14/24 12:44	100
Chlorobromomethane	94	U	200	94	ug/L			08/14/24 12:44	100
Chlorodibromomethane	50	U	100	50	ug/L			08/14/24 12:44	100
Chloroethane	98	U	200	98	ug/L			08/14/24 12:44	100
Chloroform	80	U	500	80	ug/L			08/14/24 12:44	100
cis-1,2-Dichloroethene	53	U	100	53	ug/L			08/14/24 12:44	100
cis-1,3-Dichloropropene	59	U	100	59	ug/L			08/14/24 12:44	100
Dibromomethane	84	U	100	84	ug/L			08/14/24 12:44	100
Dichlorobromomethane	52	U	100	52	ug/L			08/14/24 12:44	100
Dichlorodifluoromethane	74	U	100	74	ug/L			08/14/24 12:44	100
Ethylbenzene	69	U	100	69	ug/L			08/14/24 12:44	100
Ethylene Dibromide	78	U	1200	78	ug/L			08/14/24 12:44	100
Hexachlorobutadiene	70	U	100	70	ug/L			08/14/24 12:44	100
Isopropylbenzene	67	U	100	67	ug/L			08/14/24 12:44	100
Methyl tert-butyl ether	60	U	200	60	ug/L			08/14/24 12:44	100
Methylene Chloride	500	U	1000	500	ug/L			08/14/24 12:44	100
m-Xylene & p-Xylene	130	U	200	130	ug/L			08/14/24 12:44	100
Naphthalene	82	U	200	82	ug/L			08/14/24 12:44	100
n-Butylbenzene	70	U	100	70	ug/L			08/14/24 12:44	100
N-Propylbenzene	50	U	100	50	ug/L			08/14/24 12:44	100
o-Xylene	53	U	100	53	ug/L			08/14/24 12:44	100
sec-Butylbenzene	74	U	200	74	ug/L			08/14/24 12:44	100
Styrene	61	U	100	61	ug/L			08/14/24 12:44	100
tert-Butylbenzene	64	U	200	64	ug/L			08/14/24 12:44	100
Tetrachloroethene	76	U	100	76	ug/L			08/14/24 12:44	100
Toluene	72	U	100	72	ug/L			08/14/24 12:44	100
trans-1,2-Dichloroethene	73	U	100	73	ug/L			08/14/24 12:44	100
trans-1,3-Dichloropropene	73	U	100	73	ug/L			08/14/24 12:44	100
Trichloroethene	89	U	100	89	ug/L			08/14/24 12:44	100
Trichlorofluoromethane	94	U	100	94	ug/L			08/14/24 12:44	100
Vinyl chloride	71	U	100	71	ug/L			08/14/24 12:44	100
Xylenes, Total	130	U	200	130	ug/L			08/14/24 12:44	100

Surrogate	LB %Recovery	LB Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	100		40 - 146		08/14/24 12:44	100
4-Bromofluorobenzene (Surr)	99		41 - 142		08/14/24 12:44	100
Dibromofluoromethane (Surr)	105		53 - 146		08/14/24 12:44	100

Lab Sample ID: MB 670-105484/8

Matrix: Water

Analysis Batch: 105484

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1,2-Tetrachloroethane	0.61	U	1.0	0.61	ug/L			08/14/24 12:16	1
1,1,1-Trichloroethane	0.80	U	1.0	0.80	ug/L			08/14/24 12:16	1
1,1,2,2-Tetrachloroethane	0.54	U	1.0	0.54	ug/L			08/14/24 12:16	1

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QC Sample Results

Client: Dewberry Engineers Inc
Project/Site: City of Apalachicola Well and PWS Sampling

Job ID: 670-45191-1

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: MB 670-105484/8

Matrix: Water

Analysis Batch: 105484

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,2-Trichloroethane	0.76	U	2.0	0.76	ug/L			08/14/24 12:16	1
1,1-Dichloroethane	0.62	U	1.0	0.62	ug/L			08/14/24 12:16	1
1,1-Dichloroethene	0.94	U	1.0	0.94	ug/L			08/14/24 12:16	1
1,1-Dichloropropene	0.74	U	1.0	0.74	ug/L			08/14/24 12:16	1
1,2,3-Trichlorobenzene	0.86	U	2.0	0.86	ug/L			08/14/24 12:16	1
1,2,3-Trichloropropane	0.64	U	2.0	0.64	ug/L			08/14/24 12:16	1
1,2,4-Trichlorobenzene	0.70	U	2.0	0.70	ug/L			08/14/24 12:16	1
1,2,4-Trimethylbenzene	0.69	U	2.0	0.69	ug/L			08/14/24 12:16	1
1,2-Dibromo-3-Chloropropane	0.96	U	10	0.96	ug/L			08/14/24 12:16	1
1,2-Dichlorobenzene	0.73	U	1.0	0.73	ug/L			08/14/24 12:16	1
1,2-Dichloroethane	0.63	U	1.0	0.63	ug/L			08/14/24 12:16	1
1,2-Dichloropropane	0.80	U	1.0	0.80	ug/L			08/14/24 12:16	1
1,3,5-Trimethylbenzene	0.58	U	2.0	0.58	ug/L			08/14/24 12:16	1
1,3-Dichlorobenzene	0.77	U	1.0	0.77	ug/L			08/14/24 12:16	1
1,3-Dichloropropane	0.60	U	1.0	0.60	ug/L			08/14/24 12:16	1
1,4-Dichlorobenzene	0.76	U	1.0	0.76	ug/L			08/14/24 12:16	1
2,2-Dichloropropane	0.66	U	5.0	0.66	ug/L			08/14/24 12:16	1
2-Butanone (MEK)	4.5	U	10	4.5	ug/L			08/14/24 12:16	1
2-Chlorotoluene	0.68	U	1.0	0.68	ug/L			08/14/24 12:16	1
2-Hexanone	2.5	U	20	2.5	ug/L			08/14/24 12:16	1
4-Chlorotoluene	0.65	U	2.0	0.65	ug/L			08/14/24 12:16	1
4-Isopropyltoluene	0.80	U	2.0	0.80	ug/L			08/14/24 12:16	1
4-Methyl-2-pentanone (MIBK)	5.0	U	20	5.0	ug/L			08/14/24 12:16	1
Acetone	25	U	50	25	ug/L			08/14/24 12:16	1
Benzene	0.71	U	1.0	0.71	ug/L			08/14/24 12:16	1
Bromobenzene	0.77	U	1.0	0.77	ug/L			08/14/24 12:16	1
Bromoform	0.75	U	1.0	0.75	ug/L			08/14/24 12:16	1
Bromomethane	0.95	U	2.0	0.95	ug/L			08/14/24 12:16	1
Carbon disulfide	2.5	U	5.0	2.5	ug/L			08/14/24 12:16	1
Carbon tetrachloride	0.94	U	1.0	0.94	ug/L			08/14/24 12:16	1
Chlorobenzene	0.72	U	1.0	0.72	ug/L			08/14/24 12:16	1
Chlorobromomethane	0.94	U	2.0	0.94	ug/L			08/14/24 12:16	1
Chlorodibromomethane	0.50	U	1.0	0.50	ug/L			08/14/24 12:16	1
Chloroethane	0.98	U	2.0	0.98	ug/L			08/14/24 12:16	1
Chloroform	0.80	U	5.0	0.80	ug/L			08/14/24 12:16	1
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			08/14/24 12:16	1
cis-1,3-Dichloropropene	0.59	U	1.0	0.59	ug/L			08/14/24 12:16	1
Dibromomethane	0.84	U	1.0	0.84	ug/L			08/14/24 12:16	1
Dichlorobromomethane	0.52	U	1.0	0.52	ug/L			08/14/24 12:16	1
Dichlorodifluoromethane	0.74	U	1.0	0.74	ug/L			08/14/24 12:16	1
Ethylbenzene	0.69	U	1.0	0.69	ug/L			08/14/24 12:16	1
Ethylene Dibromide	0.78	U	12	0.78	ug/L			08/14/24 12:16	1
Hexachlorobutadiene	0.70	U	1.0	0.70	ug/L			08/14/24 12:16	1
Isopropylbenzene	0.67	U	1.0	0.67	ug/L			08/14/24 12:16	1
Methyl tert-butyl ether	0.60	U	2.0	0.60	ug/L			08/14/24 12:16	1
Methylene Chloride	5.0	U	10	5.0	ug/L			08/14/24 12:16	1
m-Xylene & p-Xylene	1.3	U	2.0	1.3	ug/L			08/14/24 12:16	1
Naphthalene	0.82	U	2.0	0.82	ug/L			08/14/24 12:16	1
n-Butylbenzene	0.70	U	1.0	0.70	ug/L			08/14/24 12:16	1

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QC Sample Results

Client: Dewberry Engineers Inc
Project/Site: City of Apalachicola Well and PWS Sampling

Job ID: 670-45191-1

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: MB 670-105484/8

Matrix: Water

Analysis Batch: 105484

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
N-Propylbenzene	0.50	U	1.0	0.50	ug/L			08/14/24 12:16	1
o-Xylene	0.53	U	1.0	0.53	ug/L			08/14/24 12:16	1
sec-Butylbenzene	0.74	U	2.0	0.74	ug/L			08/14/24 12:16	1
Styrene	0.61	U	1.0	0.61	ug/L			08/14/24 12:16	1
tert-Butylbenzene	0.64	U	2.0	0.64	ug/L			08/14/24 12:16	1
Tetrachloroethene	0.76	U	1.0	0.76	ug/L			08/14/24 12:16	1
Toluene	0.72	U	1.0	0.72	ug/L			08/14/24 12:16	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			08/14/24 12:16	1
trans-1,3-Dichloropropene	0.73	U	1.0	0.73	ug/L			08/14/24 12:16	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			08/14/24 12:16	1
Trichlorofluoromethane	0.94	U	1.0	0.94	ug/L			08/14/24 12:16	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			08/14/24 12:16	1
Xylenes, Total	1.3	U	2.0	1.3	ug/L			08/14/24 12:16	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	98		40 - 146		08/14/24 12:16	1
4-Bromofluorobenzene (Surr)	98		41 - 142		08/14/24 12:16	1
Dibromofluoromethane (Surr)	106		53 - 146		08/14/24 12:16	1

Lab Sample ID: LCS 670-105484/4

Matrix: Water

Analysis Batch: 105484

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
1,1,1,2-Tetrachloroethane	20.0	22.9		ug/L		115	54 - 141
1,1,1-Trichloroethane	20.0	21.6		ug/L		108	57 - 148
1,1,2,2-Tetrachloroethane	20.0	19.3		ug/L		96	60 - 139
1,1,2-Trichloroethane	20.0	21.1		ug/L		105	57 - 141
1,1-Dichloroethane	20.0	19.3		ug/L		97	57 - 142
1,1-Dichloroethene	20.0	18.3		ug/L		91	47 - 139
1,1-Dichloropropene	20.0	20.0		ug/L		100	56 - 137
1,2,3-Trichlorobenzene	20.0	24.3		ug/L		121	43 - 168
1,2,3-Trichloropropane	20.0	19.1		ug/L		96	57 - 141
1,2,4-Trichlorobenzene	20.0	24.3		ug/L		122	52 - 159
1,2,4-Trimethylbenzene	20.0	22.5		ug/L		112	59 - 142
1,2-Dibromo-3-Chloropropane	20.0	17.2		ug/L		86	48 - 150
1,2-Dichlorobenzene	20.0	22.1		ug/L		111	63 - 131
1,2-Dichloroethane	20.0	19.5		ug/L		98	50 - 156
1,2-Dichloropropane	20.0	20.9		ug/L		104	61 - 133
1,3,5-Trimethylbenzene	20.0	22.6		ug/L		113	61 - 137
1,3-Dichlorobenzene	20.0	22.1		ug/L		110	66 - 129
1,3-Dichloropropane	20.0	19.1		ug/L		96	50 - 148
1,4-Dichlorobenzene	20.0	21.5		ug/L		108	65 - 133
2,2-Dichloropropane	20.0	23.1		ug/L		116	54 - 146
2-Butanone (MEK)	200	146		ug/L		73	10 - 180
2-Chlorotoluene	20.0	21.4		ug/L		107	64 - 133
2-Hexanone	200	177		ug/L		88	12 - 180
4-Chlorotoluene	20.0	21.7		ug/L		109	62 - 138

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QC Sample Results

Client: Dewberry Engineers Inc
Project/Site: City of Apalachicola Well and PWS Sampling

Job ID: 670-45191-1

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCS 670-105484/4

Matrix: Water

Analysis Batch: 105484

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
4-Isopropyltoluene	20.0	22.1		ug/L		110	67 - 153
4-Methyl-2-pentanone (MIBK)	200	167		ug/L		83	19 - 180
Acetone	200	139		ug/L		69	10 - 180
Benzene	20.0	19.5		ug/L		98	56 - 136
Bromobenzene	20.0	21.3		ug/L		107	59 - 147
Bromoform	20.0	19.4		ug/L		97	46 - 148
Bromomethane	20.0	21.4		ug/L		107	10 - 173
Carbon disulfide	20.0	16.9		ug/L		84	43 - 153
Carbon tetrachloride	20.0	22.5		ug/L		112	54 - 156
Chlorobenzene	20.0	21.8		ug/L		109	51 - 139
Chlorobromomethane	20.0	19.9		ug/L		99	54 - 141
Chlorodibromomethane	20.0	21.3		ug/L		106	50 - 140
Chloroethane	20.0	21.0		ug/L		105	27 - 180
Chloroform	20.0	21.3		ug/L		106	58 - 139
cis-1,2-Dichloroethene	20.0	19.6		ug/L		98	56 - 128
cis-1,3-Dichloropropene	20.0	19.8		ug/L		99	64 - 128
Dibromomethane	20.0	20.9		ug/L		104	59 - 143
Dichlorobromomethane	20.0	21.6		ug/L		108	58 - 135
Dichlorodifluoromethane	20.0	6.66		ug/L		33	10 - 180
Ethylbenzene	20.0	21.7		ug/L		109	63 - 133
Ethylene Dibromide	20.0	18.8		ug/L		94	57 - 140
Hexachlorobutadiene	20.0	25.8		ug/L		129	57 - 162
Isopropylbenzene	20.0	22.5		ug/L		112	60 - 132
Methyl tert-butyl ether	20.0	18.0		ug/L		90	51 - 145
Methylene Chloride	20.0	21.2		ug/L		106	43 - 142
m-Xylene & p-Xylene	20.0	21.5		ug/L		108	64 - 133
Naphthalene	20.0	21.3		ug/L		106	40 - 172
n-Butylbenzene	20.0	23.6		ug/L		118	59 - 148
N-Propylbenzene	20.0	22.3		ug/L		112	63 - 135
o-Xylene	20.0	21.6		ug/L		108	61 - 129
sec-Butylbenzene	20.0	22.7		ug/L		113	63 - 137
Styrene	20.0	20.5		ug/L		102	59 - 136
tert-Butylbenzene	20.0	21.9		ug/L		109	61 - 136
Tetrachloroethene	20.0	23.7		ug/L		119	60 - 147
Toluene	20.0	20.0		ug/L		100	64 - 131
trans-1,2-Dichloroethene	20.0	19.2		ug/L		96	54 - 134
trans-1,3-Dichloropropene	20.0	21.1		ug/L		106	65 - 149
Trichloroethene	20.0	21.1		ug/L		106	62 - 135
Trichlorofluoromethane	20.0	22.6		ug/L		113	56 - 155
Vinyl chloride	20.0	17.7		ug/L		88	20 - 167
Xylenes, Total	40.0	43.1		ug/L		108	50 - 150

Surrogate	LCS %Recovery	LCS Qualifier	Limits
Toluene-d8 (Surr)	100		40 - 146
4-Bromofluorobenzene (Surr)	95		41 - 142
Dibromofluoromethane (Surr)	107		53 - 146

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QC Sample Results

Client: Dewberry Engineers Inc
Project/Site: City of Apalachicola Well and PWS Sampling

Job ID: 670-45191-1

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCSD 670-105484/5

Matrix: Water

Analysis Batch: 105484

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
1,1,1,2-Tetrachloroethane	20.0	21.1		ug/L		105	54 - 141	8	21
1,1,1-Trichloroethane	20.0	20.6		ug/L		103	57 - 148	5	25
1,1,2,2-Tetrachloroethane	20.0	20.6		ug/L		103	60 - 139	7	17
1,1,2-Trichloroethane	20.0	19.5		ug/L		97	57 - 141	8	16
1,1-Dichloroethane	20.0	18.1		ug/L		90	57 - 142	7	24
1,1-Dichloroethene	20.0	17.1		ug/L		86	47 - 139	7	16
1,1-Dichloropropene	20.0	18.8		ug/L		94	56 - 137	6	25
1,2,3-Trichlorobenzene	20.0	22.9		ug/L		114	43 - 168	6	26
1,2,3-Trichloropropane	20.0	22.0		ug/L		110	57 - 141	14	19
1,2,4-Trichlorobenzene	20.0	23.2		ug/L		116	52 - 159	5	24
1,2,4-Trimethylbenzene	20.0	22.1		ug/L		111	59 - 142	1	25
1,2-Dibromo-3-Chloropropane	20.0	18.3		ug/L		91	48 - 150	6	21
1,2-Dichlorobenzene	20.0	21.9		ug/L		110	63 - 131	1	25
1,2-Dichloroethane	20.0	20.0		ug/L		100	50 - 156	2	18
1,2-Dichloropropane	20.0	19.9		ug/L		100	61 - 133	5	26
1,3,5-Trimethylbenzene	20.0	22.5		ug/L		113	61 - 137	0	24
1,3-Dichlorobenzene	20.0	21.4		ug/L		107	66 - 129	3	23
1,3-Dichloropropane	20.0	19.6		ug/L		98	50 - 148	2	16
1,4-Dichlorobenzene	20.0	21.6		ug/L		108	65 - 133	0	23
2,2-Dichloropropane	20.0	21.3		ug/L		106	54 - 146	8	19
2-Butanone (MEK)	200	165		ug/L		82	10 - 180	12	29
2-Chlorotoluene	20.0	21.6		ug/L		108	64 - 133	1	22
2-Hexanone	200	199		ug/L		100	12 - 180	12	28
4-Chlorotoluene	20.0	21.7		ug/L		109	62 - 138	0	22
4-Isopropyltoluene	20.0	21.5		ug/L		107	67 - 153	3	25
4-Methyl-2-pentanone (MIBK)	200	186		ug/L		93	19 - 180	11	24
Acetone	200	145		ug/L		72	10 - 180	5	19
Benzene	20.0	18.7		ug/L		93	56 - 136	4	14
Bromobenzene	20.0	21.5		ug/L		108	59 - 147	1	23
Bromoform	20.0	20.3		ug/L		101	46 - 148	5	18
Bromomethane	20.0	18.7		ug/L		93	10 - 173	13	29
Carbon disulfide	20.0	15.5		ug/L		78	43 - 153	8	26
Carbon tetrachloride	20.0	20.4		ug/L		102	54 - 156	10	27
Chlorobenzene	20.0	20.6		ug/L		103	51 - 139	6	13
Chlorobromomethane	20.0	18.6		ug/L		93	54 - 141	7	18
Chlorodibromomethane	20.0	20.6		ug/L		103	50 - 140	3	18
Chloroethane	20.0	19.4		ug/L		97	27 - 180	8	22
Chloroform	20.0	20.4		ug/L		102	58 - 139	4	17
cis-1,2-Dichloroethene	20.0	18.7		ug/L		94	56 - 128	5	17
cis-1,3-Dichloropropene	20.0	19.5		ug/L		98	64 - 128	1	20
Dibromomethane	20.0	20.3		ug/L		101	59 - 143	3	20
Dichlorobromomethane	20.0	20.7		ug/L		104	58 - 135	4	19
Dichlorodifluoromethane	20.0	6.64		ug/L		33	10 - 180	0	26
Ethylbenzene	20.0	20.1		ug/L		101	63 - 133	8	18
Ethylene Dibromide	20.0	20.0		ug/L		100	57 - 140	6	16
Hexachlorobutadiene	20.0	23.8		ug/L		119	57 - 162	8	23
Isopropylbenzene	20.0	22.3		ug/L		111	60 - 132	1	23
Methyl tert-butyl ether	20.0	17.4		ug/L		87	51 - 145	3	22

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QC Sample Results

Client: Dewberry Engineers Inc
Project/Site: City of Apalachicola Well and PWS Sampling

Job ID: 670-45191-1

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCSD 670-105484/5

Matrix: Water

Analysis Batch: 105484

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Methylene Chloride	20.0	21.6		ug/L		108	43 - 142	2	23
m-Xylene & p-Xylene	20.0	20.4		ug/L		102	64 - 133	6	18
Naphthalene	20.0	22.2		ug/L		111	40 - 172	4	35
n-Butylbenzene	20.0	22.6		ug/L		113	59 - 148	4	25
N-Propylbenzene	20.0	21.6		ug/L		108	63 - 135	3	21
o-Xylene	20.0	20.3		ug/L		102	61 - 129	6	16
sec-Butylbenzene	20.0	22.1		ug/L		111	63 - 137	2	23
Styrene	20.0	19.3		ug/L		96	59 - 136	6	32
tert-Butylbenzene	20.0	20.6		ug/L		103	61 - 136	6	25
Tetrachloroethene	20.0	22.2		ug/L		111	60 - 147	7	21
Toluene	20.0	19.7		ug/L		98	64 - 131	2	16
trans-1,2-Dichloroethene	20.0	17.9		ug/L		90	54 - 134	7	20
trans-1,3-Dichloropropene	20.0	20.6		ug/L		103	65 - 149	2	17
Trichloroethene	20.0	19.8		ug/L		99	62 - 135	6	20
Trichlorofluoromethane	20.0	21.3		ug/L		107	56 - 155	6	22
Vinyl chloride	20.0	17.4		ug/L		87	20 - 167	2	24
Xylenes, Total	40.0	40.7		ug/L		102	50 - 150	6	30

Surrogate	LCSD %Recovery	LCSD Qualifier	Limits
Toluene-d8 (Surr)	101		40 - 146
4-Bromofluorobenzene (Surr)	98		41 - 142
Dibromofluoromethane (Surr)	104		53 - 146

Method: 552.3 - Haloacetic Acids (HAAs) (GC)

Lab Sample ID: MB 670-106423/7-A

Matrix: Water

Analysis Batch: 106773

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 106423

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Monobromoacetic acid	0.38	U	5.0	0.38	ug/L		08/20/24 09:19	08/21/24 20:14	1
Monochloroacetic acid	0.28	U	10	0.28	ug/L		08/20/24 09:19	08/21/24 20:14	1
Dibromoacetic acid	0.23	U	5.0	0.23	ug/L		08/20/24 09:19	08/21/24 20:14	1
Dichloroacetic acid	0.23	U	5.0	0.23	ug/L		08/20/24 09:19	08/21/24 20:14	1
Trichloroacetic acid	0.20	U	5.0	0.20	ug/L		08/20/24 09:19	08/21/24 20:14	1
Total Haloacetic Acids 5	1.0	U	5.0	1.0	ug/L		08/20/24 09:19	08/21/24 20:14	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
2,3-Dibromopropionic acid	108		70 - 130	08/20/24 09:19	08/21/24 20:14	1

Lab Sample ID: LCS 670-106423/5-A

Matrix: Water

Analysis Batch: 106773

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 106423

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Monobromoacetic acid	10.0	8.72		ug/L		87	70 - 130
Monochloroacetic acid	10.0	7.40		ug/L		74	70 - 130
Dibromoacetic acid	10.0	10.3		ug/L		103	70 - 130

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QC Sample Results

Client: Dewberry Engineers Inc
Project/Site: City of Apalachicola Well and PWS Sampling

Job ID: 670-45191-1

Method: 552.3 - Haloacetic Acids (HAAs) (GC) (Continued)

Lab Sample ID: LCS 670-106423/5-A

Matrix: Water

Analysis Batch: 106773

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 106423

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Dichloroacetic acid	10.0	9.43		ug/L		94	70 - 130
Trichloroacetic acid	10.0	11.8		ug/L		118	70 - 130

Surrogate	LCS %Recovery	LCS Qualifier	Limits
2,3-Dibromopropionic acid	109		70 - 130

Lab Sample ID: LCSD 670-106423/6-A

Matrix: Water

Analysis Batch: 106773

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 106423

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	Limit
Monobromoacetic acid	10.0	10.1		ug/L		101	70 - 130	15	30
Monochloroacetic acid	10.0	8.91		ug/L		89	70 - 130	19	30
Dibromoacetic acid	10.0	10.4		ug/L		104	70 - 130	1	30
Dichloroacetic acid	10.0	9.85		ug/L		98	70 - 130	4	30
Trichloroacetic acid	10.0	11.7		ug/L		117	70 - 130	0	30

Surrogate	LCSD %Recovery	LCSD Qualifier	Limits
2,3-Dibromopropionic acid	112		70 - 130

Lab Sample ID: LLCS 670-106423/4-A

Matrix: Water

Analysis Batch: 106773

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 106423

Analyte	Spike Added	LLCS Result	LLCS Qualifier	Unit	D	%Rec	%Rec Limits
Monobromoacetic acid	1.25	1.50		ug/L		120	50 - 150
Monochloroacetic acid	1.25	1.36		ug/L		109	50 - 150
Dibromoacetic acid	1.25	1.65		ug/L		132	50 - 150
Dichloroacetic acid	1.25	1.49		ug/L		119	50 - 150
Trichloroacetic acid	1.25	2.12		ug/L		170	50 - 150

Surrogate	LLCS %Recovery	LLCS Qualifier	Limits
2,3-Dibromopropionic acid	99		70 - 130

Method: 552.3 - Haloacetic Acids (HAAs) Formation Potential

Lab Sample ID: MB 670-105786/1-B

Matrix: Water

Analysis Batch: 107777

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 107451

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Monobromoacetic acid	0.38	U	5.0	0.38	ug/L		08/26/24 06:19	08/28/24 12:39	1
Monochloroacetic acid	0.28	U	10	0.28	ug/L		08/26/24 06:19	08/28/24 12:39	1
Dibromoacetic acid	0.23	U	5.0	0.23	ug/L		08/26/24 06:19	08/28/24 12:39	1
Dichloroacetic acid	0.23	U	5.0	0.23	ug/L		08/26/24 06:19	08/28/24 12:39	1
Trichloroacetic acid	0.20	U	5.0	0.20	ug/L		08/26/24 06:19	08/28/24 12:39	1
Total Haloacetic Acids 5	1.0	U	5.0	1.0	ug/L		08/26/24 06:19	08/28/24 12:39	1

Eurofins Orlando

QC Sample Results

Client: Dewberry Engineers Inc
Project/Site: City of Apalachicola Well and PWS Sampling

Job ID: 670-45191-1

Method: 552.3 - Haloacetic Acids (HAAs) Formation Potential (Continued)

Lab Sample ID: MB 670-105786/1-B

Matrix: Water

Analysis Batch: 107777

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 107451

	MB	MB							
Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac			
2,3-Dibromopropionic acid	92		70 - 130	08/26/24 06:19	08/28/24 12:39	1			

Lab Sample ID: MB 670-107451/7-A

Matrix: Water

Analysis Batch: 107777

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 107451

	MB	MB							
Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Monobromoacetic acid	0.38	U	5.0	0.38	ug/L		08/26/24 06:19	08/28/24 11:58	1
Monochloroacetic acid	0.28	U	10	0.28	ug/L		08/26/24 06:19	08/28/24 11:58	1
Dibromoacetic acid	0.23	U	5.0	0.23	ug/L		08/26/24 06:19	08/28/24 11:58	1
Dichloroacetic acid	0.23	U	5.0	0.23	ug/L		08/26/24 06:19	08/28/24 11:58	1
Trichloroacetic acid	0.20	U	5.0	0.20	ug/L		08/26/24 06:19	08/28/24 11:58	1
Total Haloacetic Acids 5	1.0	U	5.0	1.0	ug/L		08/26/24 06:19	08/28/24 11:58	1

	MB	MB							
Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac			
2,3-Dibromopropionic acid	95		70 - 130	08/26/24 06:19	08/28/24 11:58	1			

Lab Sample ID: LCS 670-107451/5-A

Matrix: Water

Analysis Batch: 107777

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 107451

	Spike	LCS	LCS						
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits		
Monobromoacetic acid	10.0	10.0		ug/L		100	70 - 130		
Monochloroacetic acid	10.0	8.91	I	ug/L		89	70 - 130		
Dibromoacetic acid	10.0	11.4		ug/L		114	70 - 130		
Dichloroacetic acid	10.0	9.80		ug/L		98	70 - 130		
Trichloroacetic acid	10.0	12.2		ug/L		122	70 - 130		

	LCS	LCS							
Surrogate	%Recovery	Qualifier	Limits						
2,3-Dibromopropionic acid	102		70 - 130						

Lab Sample ID: LCSD 670-107451/6-A

Matrix: Water

Analysis Batch: 107777

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 107451

	Spike	LCSD	LCSD							
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit	
Monobromoacetic acid	10.0	11.5		ug/L		115	70 - 130	14	30	
Monochloroacetic acid	10.0	9.95	I	ug/L		100	70 - 130	11	30	
Dibromoacetic acid	10.0	11.2		ug/L		112	70 - 130	2	30	
Dichloroacetic acid	10.0	10.2		ug/L		102	70 - 130	4	30	
Trichloroacetic acid	10.0	11.1		ug/L		111	70 - 130	9	30	

	LCSD	LCSD							
Surrogate	%Recovery	Qualifier	Limits						
2,3-Dibromopropionic acid	101		70 - 130						

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QC Sample Results

Client: Dewberry Engineers Inc
Project/Site: City of Apalachicola Well and PWS Sampling

Job ID: 670-45191-1

Method: 552.3 - Haloacetic Acids (HAAs) Formation Potential (Continued)

Lab Sample ID: LLCS 670-107451/4-A

Matrix: Water

Analysis Batch: 107777

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 107451

Analyte	Spike Added	LLCS Result	LLCS Qualifier	Unit	D	%Rec	%Rec Limits
Monobromoacetic acid	1.25	1.70	I	ug/L		136	50 - 150
Monochloroacetic acid	1.25	1.15	I	ug/L		92	50 - 150
Dibromoacetic acid	1.25	1.63	I	ug/L		130	50 - 150
Dichloroacetic acid	1.25	1.40	I	ug/L		112	50 - 150
Trichloroacetic acid	1.25	1.40	I	ug/L		112	50 - 150

Surrogate	LLCS %Recovery	LLCS Qualifier	LLCS Limits
2,3-Dibromopropionic acid	106		70 - 130

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 670-104718/37

Matrix: Water

Analysis Batch: 104718

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	0.20	U	0.40	0.20	mg/L			08/09/24 18:38	1
Bromide	0.20	U	0.40	0.20	mg/L			08/09/24 18:38	1
Sulfate	0.50	U	1.0	0.50	mg/L			08/09/24 18:38	1

Lab Sample ID: MB 670-104718/6

Matrix: Water

Analysis Batch: 104718

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	0.20	U	0.40	0.20	mg/L			08/09/24 09:53	1
Bromide	0.20	U	0.40	0.20	mg/L			08/09/24 09:53	1
Sulfate	0.50	U	1.0	0.50	mg/L			08/09/24 09:53	1

Lab Sample ID: LCS 670-104718/35

Matrix: Water

Analysis Batch: 104718

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Chloride	4.00	3.66		mg/L		92	90 - 110
Bromide	2.00	2.08		mg/L		104	90 - 110
Sulfate	10.0	9.78		mg/L		98	90 - 110

Lab Sample ID: LCSD 670-104718/36

Matrix: Water

Analysis Batch: 104718

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Chloride	4.00	3.69		mg/L		92	90 - 110	1	20
Bromide	2.00	1.96		mg/L		98	90 - 110	6	20
Sulfate	10.0	9.56		mg/L		96	90 - 110	2	20

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QC Sample Results

Client: Dewberry Engineers Inc
Project/Site: City of Apalachicola Well and PWS Sampling

Job ID: 670-45191-1

Method: 300.0 - Anions, Ion Chromatography (Continued)

Lab Sample ID: MB 670-105003/6

Matrix: Water

Analysis Batch: 105003

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	0.20	U	0.40	0.20	mg/L			08/12/24 13:00	1
Sulfate	0.50	U	1.0	0.50	mg/L			08/12/24 13:00	1

Lab Sample ID: LCS 670-105003/4

Matrix: Water

Analysis Batch: 105003

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Chloride	4.00	3.65		mg/L		91	90 - 110
Sulfate	10.0	9.60		mg/L		96	90 - 110

Lab Sample ID: LCSD 670-105003/5

Matrix: Water

Analysis Batch: 105003

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Chloride	4.00	3.65		mg/L		91	90 - 110	0	20
Sulfate	10.0	9.58		mg/L		96	90 - 110	0	20

Method: 6010D - Metals (ICP)

Lab Sample ID: MB 670-104904/3-A

Matrix: Water

Analysis Batch: 105200

Client Sample ID: Method Blank

Prep Type: Total Recoverable

Prep Batch: 104904

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	0.052	U	0.45	0.052	mg/L		08/10/24 15:22	08/12/24 13:59	1
Iron	0.096	U	0.18	0.096	mg/L		08/10/24 15:22	08/12/24 13:59	1
Manganese	0.0076	U	0.0090	0.0076	mg/L		08/10/24 15:22	08/12/24 13:59	1
Magnesium	0.053	U	0.90	0.053	mg/L		08/10/24 15:22	08/12/24 13:59	1

Lab Sample ID: LCS 670-104904/1-A

Matrix: Water

Analysis Batch: 105200

Client Sample ID: Lab Control Sample

Prep Type: Total Recoverable

Prep Batch: 104904

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Calcium	10.1	10.4		mg/L		103	80 - 120
Iron	10.1	10.4		mg/L		103	80 - 120
Manganese	10.1	9.98		mg/L		99	80 - 120
Magnesium	10.1	10.6		mg/L		105	80 - 120

Lab Sample ID: LCSD 670-104904/2-A

Matrix: Water

Analysis Batch: 105200

Client Sample ID: Lab Control Sample Dup

Prep Type: Total Recoverable

Prep Batch: 104904

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Calcium	10.1	10.5		mg/L		104	80 - 120	1	20
Iron	10.1	10.5		mg/L		104	80 - 120	1	20
Manganese	10.1	10.1		mg/L		100	80 - 120	1	20
Magnesium	10.1	10.6		mg/L		105	80 - 120	1	20

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QC Sample Results

Client: Dewberry Engineers Inc
Project/Site: City of Apalachicola Well and PWS Sampling

Job ID: 670-45191-1

Method: 180.1 - Turbidity, Nephelometric

Lab Sample ID: MB 670-104859/1

Matrix: Water

Analysis Batch: 104859

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Turbidity	0.20	U	0.40	0.20	NTU			08/09/24 19:45	1

Lab Sample ID: LCS 670-104859/2

Matrix: Water

Analysis Batch: 104859

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Turbidity	10.0	11		NTU		108	90 - 110

Lab Sample ID: 670-45191-1 DU

Matrix: Water

Analysis Batch: 104859

Client Sample ID: Well #1

Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Turbidity	3.8		3.7		NTU		3	10

Method: 5910B - Organic Constituents, UV Absorbing

Lab Sample ID: MB 680-850726/2

Matrix: Water

Analysis Batch: 850726

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
UV254	0.0090	U	0.0090	0.0090	1/cm			08/09/24 13:03	1

Lab Sample ID: LCS 680-850726/3

Matrix: Water

Analysis Batch: 850726

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
UV254	0.144	0.131		1/cm		91	80 - 120
UV Absorbance 1	0.144	0.131		1/cm		91	
UV Absorbance 2	0.144	0.130		1/cm		91	

Lab Sample ID: MB 680-851635/2

Matrix: Water

Analysis Batch: 851635

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
UV254	0.0090	U	0.0090	0.0090	1/cm			08/15/24 13:33	1

Lab Sample ID: LCS 680-851635/3

Matrix: Water

Analysis Batch: 851635

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
UV254	0.144	0.134		1/cm		93	80 - 120
UV Absorbance 1	0.144	0.133		1/cm		93	
UV Absorbance 2	0.144	0.134		1/cm		93	

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QC Sample Results

Client: Dewberry Engineers Inc
Project/Site: City of Apalachicola Well and PWS Sampling

Job ID: 670-45191-1

Method: SM 2540C - Solids, Total Dissolved (TDS)

Lab Sample ID: MB 670-105487/1
Matrix: Water
Analysis Batch: 105487

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	5.0	U	5.0	5.0	mg/L			08/14/24 09:17	1

Lab Sample ID: LCS 670-105487/2
Matrix: Water
Analysis Batch: 105487

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Total Dissolved Solids	1500	1440		mg/L		96	80 - 120

Method: SM 2540D - Solids, Total Suspended (TSS)

Lab Sample ID: MB 670-105634/1
Matrix: Water
Analysis Batch: 105634

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	1.0	U	1.0	1.0	mg/L			08/14/24 17:52	1

Lab Sample ID: LCS 670-105634/2
Matrix: Water
Analysis Batch: 105634

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Total Suspended Solids	100	94.0		mg/L		94	80 - 120

Method: SM 5310C - TOC

Lab Sample ID: MB 670-105265/7
Matrix: Water
Analysis Batch: 105265

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon	1.0	U	2.0	1.0	mg/L			08/12/24 17:30	1

Lab Sample ID: LCS 670-105265/5
Matrix: Water
Analysis Batch: 105265

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Total Organic Carbon	10.0	9.99		mg/L		100	80 - 120

Lab Sample ID: LCSD 670-105265/6
Matrix: Water
Analysis Batch: 105265

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Total Organic Carbon	10.0	10.1		mg/L		101	80 - 120	1	20

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QC Sample Results

Client: Dewberry Engineers Inc
Project/Site: City of Apalachicola Well and PWS Sampling

Job ID: 670-45191-1

Method: SM 5310C - TOC (Continued)

Lab Sample ID: 670-45191-1 MS
Matrix: Water
Analysis Batch: 105265

Client Sample ID: Well #1
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits		
Total Organic Carbon	3.4		10.0	12.7		mg/L		93	85 - 115		

Lab Sample ID: 670-45191-1 MSD
Matrix: Water
Analysis Batch: 105265

Client Sample ID: Well #1
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Total Organic Carbon	3.4		10.0	12.9		mg/L		95	85 - 115	2	20

QC Association Summary

Client: Dewberry Engineers Inc
Project/Site: City of Apalachicola Well and PWS Sampling

Job ID: 670-45191-1

GC/MS VOA

Leach Batch: 104649

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LB 670-104649/1-A	Method Blank	Total/NA	Water	1311	

Analysis Batch: 105484

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-45191-1	Well #1	Total/NA	Water	8260D	
670-45191-2	Well #2	Total/NA	Water	8260D	
670-45191-3	Well #3	Total/NA	Water	8260D	
LB 670-104649/1-A	Method Blank	Total/NA	Water	8260D	104649
MB 670-105484/8	Method Blank	Total/NA	Water	8260D	
LCS 670-105484/4	Lab Control Sample	Total/NA	Water	8260D	
LCSD 670-105484/5	Lab Control Sample Dup	Total/NA	Water	8260D	

Leach Batch: 105783

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-45191-1	Well #1	Total/NA	Water	5710B Prep	
670-45191-2	Well #2	Total/NA	Water	5710B Prep	
670-45191-3	Well #3	Total/NA	Water	5710B Prep	
MB 670-105783/11-A	Method Blank	Total/NA	Water	5710B Prep	
MB 670-105783/1-A	Method Blank	Total/NA	Water	5710B Prep	
MB 670-105783/6-A	Method Blank	Total/NA	Water	5710B Prep	

Analysis Batch: 106681

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-45191-4	POE	Total/NA	Water	524.2	
670-45191-5	EST	Total/NA	Water	524.2	
MB 670-106681/8	Method Blank	Total/NA	Water	524.2	
LCS 670-106681/5	Lab Control Sample	Total/NA	Water	524.2	

Analysis Batch: 106971

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-45191-1	Well #1	Total/NA	Water	524.2	105783
670-45191-2	Well #2	Total/NA	Water	524.2	105783
670-45191-3	Well #3	Total/NA	Water	524.2	105783
MB 670-105783/11-A	Method Blank	Total/NA	Water	524.2	105783
MB 670-105783/1-A	Method Blank	Total/NA	Water	524.2	105783
MB 670-105783/6-A	Method Blank	Total/NA	Water	524.2	105783
MB 670-106971/7	Method Blank	Total/NA	Water	524.2	
LCS 670-106971/4	Lab Control Sample	Total/NA	Water	524.2	

GC Semi VOA

Leach Batch: 105786

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-45191-1	Well #1	Total/NA	Water	5710D Prep	
670-45191-2	Well #2	Total/NA	Water	5710D Prep	
670-45191-3	Well #3	Total/NA	Water	5710D Prep	
MB 670-105786/1-B	Method Blank	Total/NA	Water	5710D Prep	

Prep Batch: 106423

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-45191-4	POE	Total/NA	Water	552.3	

Eurofins Orlando

QC Association Summary

Client: Dewberry Engineers Inc
Project/Site: City of Apalachicola Well and PWS Sampling

Job ID: 670-45191-1

GC Semi VOA (Continued)

Prep Batch: 106423 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-45191-5	EST	Total/NA	Water	552.3	
MB 670-106423/7-A	Method Blank	Total/NA	Water	552.3	
LCS 670-106423/5-A	Lab Control Sample	Total/NA	Water	552.3	
LCSD 670-106423/6-A	Lab Control Sample Dup	Total/NA	Water	552.3	
LLCS 670-106423/4-A	Lab Control Sample	Total/NA	Water	552.3	

Analysis Batch: 106773

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-45191-4	POE	Total/NA	Water	552.3	106423
670-45191-5	EST	Total/NA	Water	552.3	106423
MB 670-106423/7-A	Method Blank	Total/NA	Water	552.3	106423
LCS 670-106423/5-A	Lab Control Sample	Total/NA	Water	552.3	106423
LCSD 670-106423/6-A	Lab Control Sample Dup	Total/NA	Water	552.3	106423
LLCS 670-106423/4-A	Lab Control Sample	Total/NA	Water	552.3	106423

Prep Batch: 107451

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-45191-1	Well #1	Total/NA	Water	552.3	105786
670-45191-2	Well #2	Total/NA	Water	552.3	105786
670-45191-3	Well #3	Total/NA	Water	552.3	105786
MB 670-105786/1-B	Method Blank	Total/NA	Water	552.3	105786
MB 670-107451/7-A	Method Blank	Total/NA	Water	552.3	
LCS 670-107451/5-A	Lab Control Sample	Total/NA	Water	552.3	
LCSD 670-107451/6-A	Lab Control Sample Dup	Total/NA	Water	552.3	
LLCS 670-107451/4-A	Lab Control Sample	Total/NA	Water	552.3	

Analysis Batch: 107777

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-45191-1	Well #1	Total/NA	Water	552.3	107451
670-45191-2	Well #2	Total/NA	Water	552.3	107451
670-45191-3	Well #3	Total/NA	Water	552.3	107451
MB 670-105786/1-B	Method Blank	Total/NA	Water	552.3	107451
MB 670-107451/7-A	Method Blank	Total/NA	Water	552.3	107451
LCS 670-107451/5-A	Lab Control Sample	Total/NA	Water	552.3	107451
LCSD 670-107451/6-A	Lab Control Sample Dup	Total/NA	Water	552.3	107451
LLCS 670-107451/4-A	Lab Control Sample	Total/NA	Water	552.3	107451

HPLC/IC

Analysis Batch: 104718

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-45191-1	Well #1	Total/NA	Water	300.0	
670-45191-2	Well #2	Total/NA	Water	300.0	
670-45191-3	Well #3	Total/NA	Water	300.0	
MB 670-104718/37	Method Blank	Total/NA	Water	300.0	
MB 670-104718/6	Method Blank	Total/NA	Water	300.0	
LCS 670-104718/35	Lab Control Sample	Total/NA	Water	300.0	
LCSD 670-104718/36	Lab Control Sample Dup	Total/NA	Water	300.0	

QC Association Summary

Client: Dewberry Engineers Inc
Project/Site: City of Apalachicola Well and PWS Sampling

Job ID: 670-45191-1

HPLC/IC

Analysis Batch: 105003

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-45191-1	Well #1	Total/NA	Water	300.0	
670-45191-2	Well #2	Total/NA	Water	300.0	
MB 670-105003/6	Method Blank	Total/NA	Water	300.0	
LCS 670-105003/4	Lab Control Sample	Total/NA	Water	300.0	
LCSD 670-105003/5	Lab Control Sample Dup	Total/NA	Water	300.0	

Metals

Prep Batch: 104904

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-45191-1	Well #1	Total Recoverable	Water	3005A	
670-45191-2	Well #2	Total Recoverable	Water	3005A	
670-45191-3	Well #3	Total Recoverable	Water	3005A	
MB 670-104904/3-A	Method Blank	Total Recoverable	Water	3005A	
LCS 670-104904/1-A	Lab Control Sample	Total Recoverable	Water	3005A	
LCSD 670-104904/2-A	Lab Control Sample Dup	Total Recoverable	Water	3005A	

Analysis Batch: 105200

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-45191-1	Well #1	Total Recoverable	Water	6010D	104904
670-45191-2	Well #2	Total Recoverable	Water	6010D	104904
670-45191-3	Well #3	Total Recoverable	Water	6010D	104904
MB 670-104904/3-A	Method Blank	Total Recoverable	Water	6010D	104904
LCS 670-104904/1-A	Lab Control Sample	Total Recoverable	Water	6010D	104904
LCSD 670-104904/2-A	Lab Control Sample Dup	Total Recoverable	Water	6010D	104904

General Chemistry

Analysis Batch: 104859

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-45191-1	Well #1	Total/NA	Water	180.1	
670-45191-2	Well #2	Total/NA	Water	180.1	
670-45191-3	Well #3	Total/NA	Water	180.1	
670-45191-4	POE	Total/NA	Water	180.1	
670-45191-5	EST	Total/NA	Water	180.1	
MB 670-104859/1	Method Blank	Total/NA	Water	180.1	
LCS 670-104859/2	Lab Control Sample	Total/NA	Water	180.1	
670-45191-1 DU	Well #1	Total/NA	Water	180.1	

Analysis Batch: 105265

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-45191-1	Well #1	Total/NA	Water	SM 5310C	
670-45191-2	Well #2	Total/NA	Water	SM 5310C	
670-45191-3	Well #3	Total/NA	Water	SM 5310C	
670-45191-4	POE	Total/NA	Water	SM 5310C	
670-45191-5	EST	Total/NA	Water	SM 5310C	
MB 670-105265/7	Method Blank	Total/NA	Water	SM 5310C	
LCS 670-105265/5	Lab Control Sample	Total/NA	Water	SM 5310C	
LCSD 670-105265/6	Lab Control Sample Dup	Total/NA	Water	SM 5310C	
670-45191-1 MS	Well #1	Total/NA	Water	SM 5310C	
670-45191-1 MSD	Well #1	Total/NA	Water	SM 5310C	

Eurofins Orlando

QC Association Summary

Client: Dewberry Engineers Inc
Project/Site: City of Apalachicola Well and PWS Sampling

Job ID: 670-45191-1

General Chemistry

Analysis Batch: 105487

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-45191-1	Well #1	Total/NA	Water	SM 2540C	
670-45191-2	Well #2	Total/NA	Water	SM 2540C	
670-45191-3	Well #3	Total/NA	Water	SM 2540C	
MB 670-105487/1	Method Blank	Total/NA	Water	SM 2540C	
LCS 670-105487/2	Lab Control Sample	Total/NA	Water	SM 2540C	

Analysis Batch: 105634

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-45191-1	Well #1	Total/NA	Water	SM 2540D	
670-45191-2	Well #2	Total/NA	Water	SM 2540D	
670-45191-3	Well #3	Total/NA	Water	SM 2540D	
MB 670-105634/1	Method Blank	Total/NA	Water	SM 2540D	
LCS 670-105634/2	Lab Control Sample	Total/NA	Water	SM 2540D	

Analysis Batch: 850726

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-45191-1	Well #1	Total/NA	Water	5910B	
670-45191-3	Well #3	Total/NA	Water	5910B	
670-45191-4	POE	Total/NA	Water	5910B	
670-45191-5	EST	Total/NA	Water	5910B	
MB 680-850726/2	Method Blank	Total/NA	Water	5910B	
LCS 680-850726/3	Lab Control Sample	Total/NA	Water	5910B	

Analysis Batch: 851635

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-45191-2	Well #2	Total/NA	Water	5910B	
MB 680-851635/2	Method Blank	Total/NA	Water	5910B	
LCS 680-851635/3	Lab Control Sample	Total/NA	Water	5910B	

Biology

Analysis Batch: 104857

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-45191-1	Well #1	Total/NA	Water	SRB	
670-45191-2	Well #2	Total/NA	Water	SRB	
670-45191-3	Well #3	Total/NA	Water	SRB	

Lab Chronicle

Client: Dewberry Engineers Inc
Project/Site: City of Apalachicola Well and PWS Sampling

Job ID: 670-45191-1

Client Sample ID: Well #1

Date Collected: 08/08/24 08:00

Date Received: 08/09/24 09:30

Lab Sample ID: 670-45191-1

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Leach	5710B Prep			105783	KF	EET ORL	08/15/24 11:55
Total/NA	Analysis	524.2		1	106971	P1K	EET ORL	08/22/24 16:59
Total/NA	Analysis	8260D		1	105484	AAM	EET ORL	08/14/24 16:22
Total/NA	Leach	5710D Prep			105786	KF	EET ORL	08/15/24 11:58
Total/NA	Prep	552.3			107451	NN	EET ORL	08/26/24 06:19
Total/NA	Analysis	552.3		1	107777	JB	EET ORL	08/28/24 12:52
Total/NA	Analysis	300.0		1	104718	YGS	EET ORL	08/09/24 20:36
Total/NA	Analysis	300.0		5	105003	YGS	EET ORL	08/12/24 14:07
Total Recoverable	Prep	3005A			104904	EB	EET ORL	08/10/24 15:22
Total Recoverable	Analysis	6010D		1	105200	AS	EET ORL	08/12/24 14:43
Total/NA	Analysis	180.1		1	104859	BK	EET ORL	08/09/24 19:45
Total/NA	Analysis	5910B		1	850726	NVF	EET SAV	08/09/24 13:03
Total/NA	Analysis	SM 2540C		1	105487	SM	EET ORL	08/14/24 09:17
Total/NA	Analysis	SM 2540D		1	105634	DGS	EET ORL	08/14/24 17:52
Total/NA	Analysis	SM 5310C		1	105265	IAD	EET ORL	08/12/24 17:44
Total/NA	Analysis	SRB		1	104857	VJW	EET ORL	08/09/24 19:50

Client Sample ID: Well #2

Date Collected: 08/08/24 08:30

Date Received: 08/09/24 09:30

Lab Sample ID: 670-45191-2

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Leach	5710B Prep			105783	KF	EET ORL	08/15/24 11:55
Total/NA	Analysis	524.2		1	106971	P1K	EET ORL	08/22/24 17:17
Total/NA	Analysis	8260D		1	105484	AAM	EET ORL	08/14/24 16:41
Total/NA	Leach	5710D Prep			105786	KF	EET ORL	08/15/24 11:58
Total/NA	Prep	552.3			107451	NN	EET ORL	08/26/24 06:19
Total/NA	Analysis	552.3		1	107777	JB	EET ORL	08/28/24 13:19
Total/NA	Analysis	300.0		1	104718	YGS	EET ORL	08/09/24 20:53
Total/NA	Analysis	300.0		5	105003	YGS	EET ORL	08/12/24 14:24
Total Recoverable	Prep	3005A			104904	EB	EET ORL	08/10/24 15:22
Total Recoverable	Analysis	6010D		1	105200	AS	EET ORL	08/12/24 14:45
Total/NA	Analysis	180.1		1	104859	BK	EET ORL	08/09/24 19:45
Total/NA	Analysis	5910B		1	851635	NVF	EET SAV	08/15/24 13:33
Total/NA	Analysis	SM 2540C		1	105487	SM	EET ORL	08/14/24 09:17
Total/NA	Analysis	SM 2540D		1	105634	DGS	EET ORL	08/14/24 17:52
Total/NA	Analysis	SM 5310C		1	105265	IAD	EET ORL	08/12/24 18:33
Total/NA	Analysis	SRB		1	104857	VJW	EET ORL	08/09/24 19:50

Lab Chronicle

Client: Dewberry Engineers Inc
Project/Site: City of Apalachicola Well and PWS Sampling

Job ID: 670-45191-1

Client Sample ID: Well #3

Date Collected: 08/08/24 09:00

Date Received: 08/09/24 09:30

Lab Sample ID: 670-45191-3

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Leach	5710B Prep			105783	KF	EET ORL	08/15/24 11:55
Total/NA	Analysis	524.2		1	106971	P1K	EET ORL	08/22/24 17:34
Total/NA	Analysis	8260D		1	105484	AAM	EET ORL	08/14/24 16:59
Total/NA	Leach	5710D Prep			105786	KF	EET ORL	08/15/24 11:58
Total/NA	Prep	552.3			107451	NN	EET ORL	08/26/24 06:19
Total/NA	Analysis	552.3		1	107777	JB	EET ORL	08/28/24 14:00
Total/NA	Analysis	300.0		1	104718	YGS	EET ORL	08/09/24 21:10
Total Recoverable	Prep	3005A			104904	EB	EET ORL	08/10/24 15:22
Total Recoverable	Analysis	6010D		1	105200	AS	EET ORL	08/12/24 14:47
Total/NA	Analysis	180.1		1	104859	BK	EET ORL	08/09/24 19:45
Total/NA	Analysis	5910B		1	850726	NVF	EET SAV	08/09/24 13:03
Total/NA	Analysis	SM 2540C		1	105487	SM	EET ORL	08/14/24 09:17
Total/NA	Analysis	SM 2540D		1	105634	DGS	EET ORL	08/14/24 17:52
Total/NA	Analysis	SM 5310C		1	105265	IAD	EET ORL	08/12/24 18:54
Total/NA	Analysis	SRB		1	104857	VJW	EET ORL	08/09/24 19:50

Client Sample ID: POE

Date Collected: 08/08/24 10:30

Date Received: 08/09/24 09:30

Lab Sample ID: 670-45191-4

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	524.2		1	106681	LT	EET ORL	08/21/24 18:08
Total/NA	Prep	552.3			106423	NN	EET ORL	08/20/24 09:19
Total/NA	Analysis	552.3		1	106773	JB	EET ORL	08/21/24 22:15
Total/NA	Analysis	180.1		1	104859	BK	EET ORL	08/09/24 19:45
Total/NA	Analysis	5910B		1	850726	NVF	EET SAV	08/09/24 13:04
Total/NA	Analysis	SM 5310C		1	105265	IAD	EET ORL	08/12/24 19:08

Client Sample ID: EST

Date Collected: 08/08/24 11:30

Date Received: 08/09/24 09:30

Lab Sample ID: 670-45191-5

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	524.2		1	106681	LT	EET ORL	08/21/24 18:26
Total/NA	Prep	552.3			106423	NN	EET ORL	08/20/24 09:19
Total/NA	Analysis	552.3		1	106773	JB	EET ORL	08/21/24 22:28
Total/NA	Analysis	180.1		1	104859	BK	EET ORL	08/09/24 19:45
Total/NA	Analysis	5910B		1	850726	NVF	EET SAV	08/09/24 15:21
Total/NA	Analysis	SM 5310C		1	105265	IAD	EET ORL	08/12/24 19:21

Laboratory References:

EET ORL = Eurofins Orlando, 481 Newburyport Avenue, Altamonte Springs, FL 32701, TEL (407)339-5984

EET SAV = Eurofins Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

Eurofins Orlando

Accreditation/Certification Summary

Client: Dewberry Engineers Inc
Project/Site: City of Apalachicola Well and PWS Sampling

Job ID: 670-45191-1

Laboratory: Eurofins Orlando

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Alabama	State	42800	06-30-25
Arkansas (DW)	State	FL00091	06-30-25
Florida	NELAP	E83018	06-30-25
Georgia (DW)	State	C055	07-01-25
Louisiana (DW)	State	LA039	12-31-24
Mississippi	State	MS00007	06-30-25
New Mexico	State	FL00091	06-30-25
North Carolina (DW)	State	12712	07-31-25
Oklahoma	State	2308	08-31-24
Tennessee	State	TN04930	06-30-25
Texas	NELAP	T104704571	02-28-25
Washington	State	C1089	10-19-24

Laboratory: Eurofins Savannah

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Florida	NELAP	E87052	06-30-25

Method Summary

Client: Dewberry Engineers Inc
Project/Site: City of Apalachicola Well and PWS Sampling

Job ID: 670-45191-1

Method	Method Description	Protocol	Laboratory
524.2	524.2 - Trihalomethanes Formation Potential	EPA	EET ORL
524.2	Volatile Organic Compounds (GC/MS)	EPA-DW	EET ORL
8260D	Volatile Organic Compounds by GC/MS	SW846	EET ORL
552.3	Haloacetic Acids (HAAs) (GC)	EPA	EET ORL
552.3	Haloacetic Acids (HAAs) Formation Potential	EPA	EET ORL
300.0	Anions, Ion Chromatography	EPA	EET ORL
6010D	Metals (ICP)	SW846	EET ORL
180.1	Turbidity, Nephelometric	EPA	EET ORL
5910B	Organic Constituents, UV Absorbing	SM	EET SAV
SM 2540C	Solids, Total Dissolved (TDS)	SM	EET ORL
SM 2540D	Solids, Total Suspended (TSS)	SM	EET ORL
SM 5310C	TOC	SM	EET ORL
SRB	Sulfate Reducing Bacteria	Lab SOP	EET ORL
3005A	Preparation, Total Recoverable or Dissolved Metals	SW846	EET ORL
5030C	Purge and Trap	SW846	EET ORL
552.3	Microextraction	EPA	EET ORL
5710B Prep	Formation Potential of Disinfection By-Products	SM	EET ORL
5710D Prep	Formation Potential of Disinfection By-Products	SM	EET ORL

Protocol References:

EPA = US Environmental Protection Agency

EPA-DW = "Methods For The Determination Of Organic Compounds In Drinking Water", EPA/600/4-88/039, December 1988 And Its Supplements.

Lab SOP = Laboratory Standard Operating Procedure

SM = "Standard Methods For The Examination Of Water And Wastewater"

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

EET ORL = Eurofins Orlando, 481 Newburyport Avenue, Altamonte Springs, FL 32701, TEL (407)339-5984

EET SAV = Eurofins Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

Eurofins Orlando

Sample Summary

Client: Dewberry Engineers Inc
Project/Site: City of Apalachicola Well and PWS Sampling

Job ID: 670-45191-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
670-45191-1	Well #1	Water	08/08/24 08:00	08/09/24 09:30
670-45191-2	Well #2	Water	08/08/24 08:30	08/09/24 09:30
670-45191-3	Well #3	Water	08/08/24 09:00	08/09/24 09:30
670-45191-4	POE	Water	08/08/24 10:30	08/09/24 09:30
670-45191-5	EST	Water	08/08/24 11:30	08/09/24 09:30



[illegible]

[illegible]

Login Sample Receipt Checklist

Client: Dewberry Engineers Inc

Job Number: 670-45191-1

Login Number: 45191

List Source: Eurofins Orlando

List Number: 1

Creator: Lavardera, Angelina

Question	Answer	Comment
Radioactivity wasn't checked or is $\leq$ background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	False	Water present in cooler; indicates evidence of melted ice.
Cooler Temperature is acceptable.	True	Cooler temperature outside required temperature criteria.
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	False	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: Dewberry Engineers Inc

Job Number: 670-45191-1

Login Number: 45191

List Number: 2

Creator: Johnson, Corey M

List Source: Eurofins Savannah

List Creation: 08/09/24 03:11 PM

Question	Answer	Comment
Radioactivity wasn't checked or is $\leq$ background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: Dewberry Engineers Inc

Job Number: 670-45191-1

Login Number: 45191

List Number: 3

Creator: Lincoln, Alyssa

List Source: Eurofins Savannah

List Creation: 08/10/24 01:31 PM

Question	Answer	Comment
Radioactivity wasn't checked or is $\leq$ background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

APPENDIX B

REFERENCE NO.

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CITY OF APALACHICOLA WATER SYSTEM

Water System Hydraulic Model Report

NOVEMBER 13, 2024



ORIGINAL

SUBMITTED BY
Dewberry Engineers Inc.
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Orlando, Florida 32803

SUBMITTED TO
City of Apalachicola
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City/County, State ZIP
123.456.7890

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1. Introduction

The City of Apalachicola operates potable water system (PWS #1190150) that serves a population of 5,233 with an average day demand of 180,000 gallons per day. A hydraulic model of the City of Apalachicola PWS was built to be able to assist with recommending treatment processes.

2. Water System Hydraulic Model

2.1 Model Setup

The hydraulic model was created by digitizing the georeferenced as-built drawing (Baskerville-Donavan Inc. June 2001) provided by the Apalachicola stakeholders while making sure the potable water network aligned with the road centerlines. A follow up meeting was held in August 2023 to verify and validate the pipe network; supplemental information provided based on stakeholder input was subsequently incorporated into the hydraulic model.

A comprehensive demands analysis was conducted based on the September 2023 customer billing data provided. The demands were then scaled and projected for the year 2023 and were spatially allocated to the hydraulic model.

2.2 Water Quality Evaluation

A water age scenario was evaluated in the hydraulic model to validate how long the water takes to navigate the system under average day demand conditions without flushing. This evaluation provides a snapshot of the water age in the system. The model results show the maximum water age is less than 72 hours which is below the threshold for the DBP (THM/ HAA) formation as shown in Figure 1.0.

2.3 Alternative Evaluation

Multiple alternatives were evaluated to understand the variations in the water system performance and the potential for DBP formation. When the hydraulic model was simulated without flushing, the maximum water age observed is in the range of 55-67 hours at Location 1.0 (shown in Figure 1.0) along the 12- and 10-inch water main that runs along Avenue L from 13th St to 5th St. It is observed that one of the flushing locations, 205 9th street, corresponds to this area.

At Location 2.0 (shown in Figure 1.0), that is toward the end of Market St by the Apalachicola Farmers Market and appears to be a dead-end loop, the maximum water age observed exceeded 72 hours. This may not be significant considering the commercial land use type with a dead-end loop and minimal water demand. It is observed that one of the flushing locations, 301 Market St, corresponds to this area.

At another Location 3.0 (Shown in Figure 1.0) along the 6-inch water main on Water St, between Cherry St and Palmetto St, the maximum water age observed was 55-67 hours. A corresponding flushing location was noted at 202 Market St.

We understand that there may be potential gaps in the water distribution system related to where the pipes are connected and where they are not connected. Mitigating these data gaps can play a significant role in optimizing the system performance related to meeting the appropriate level of service. It is recommended that these data gaps be objectively evaluated with the field services team to extract any operational intelligence that will aid in optimizing the hydraulic model.

When the hydraulic model was simulated with flushing (at the flushing location(s) provided by the City) it was noticed that the maximum water age observed across the system was less than 48 hours. However, there is a need to optimize the flushing locations. We recommend flushing be conducted on main trunk lines so that the flushing demand draws water from low flow stagnant areas and ultimately improves the water quality, thus mitigating the potential for DBP formation as shown in Figure 2.0.

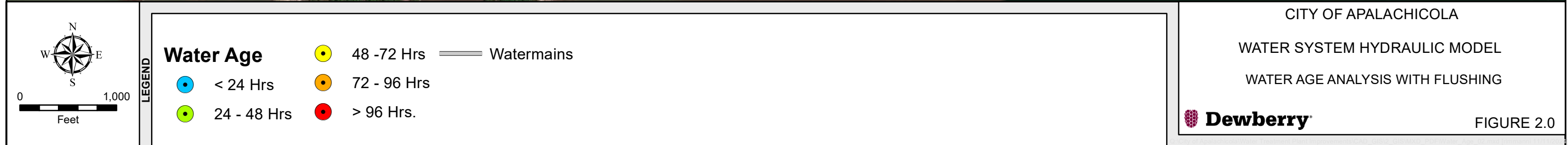


Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

	LEGEND Water Age ● < 24 Hrs ● 24 - 48 Hrs ● 48 - 72 Hrs ● 72 - 96 Hrs ● > 96 Hrs. — Watermains	CITY OF APALACHICOLA WATER SYSTEM HYDRAULIC MODEL INITIAL WATER AGE ANALYSIS Dewberry FIGURE 1.0
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Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community



3. Conclusion

Water age in the current system is not significant for the potential to form DBP's. However, there is a need to optimize flushing location(s) to avoid any potential for DBP formation as recommended in Figure 2.0.

It is also recommended that the City should consider evaluating the water system in a comprehensive hydraulic model setting with Average Daily flow (ADF), Max Day Flow (MDF) and Peak Hour Flow (PHF) scenarios.

This should be done in conjunction with appropriate validation on pipe network connectivity based on operational intelligence from the field services team, so that any potential data gaps are mitigated resulting in an accurate field verified hydraulic model, which can accurately simulate existing conditions. This model can then serve as a foundational system of record and provide avenues for alternative analysis such as fire flow analysis and water quality analysis as the City's water system continues to deliver appropriate level of service to your customers.