

City of Venice

WATER QUALITY ASSESSMENT

November 21, 2017



WATER QUALITY ASSESSMENT



Christopher P. Hill, PE, BCEE
Vice President



Timothy N. Ware, PE
Client Manager



Sean K. Chaparro, PE
Principal Engineer

WATER QUALITY ASSESSMENT

Prepared for:
City of Venice
Water Production, Utilities Department
200 N. Warfield Avenue
Venice
Florida 34285-4637

Prepared by:
Arcadis U.S., Inc.
3109 West Dr. Martin Luther King Jr.
Boulevard
Suite 350
Tampa
Florida 33607
Tel 813 903 3100
Fax 813 903 9115

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ACRONYMS AND ABBREVIATIONS

AL	action level
ANSI	American National Standards Institute
AWWA	American Water Works Association
BAT	best available technology
DBP	disinfection byproduct
DBPR	Disinfectants and Disinfection Byproducts Rule
EWG	Environmental Working Group
FDEP	Florida Department of Environmental Protection
FDOH	Florida Department of Health
GWR	Groundwater Rule
HRL	health reference level
MCL	maximum contaminant level
mg/L	milligrams per liter
MRDL	maximum residual disinfectant level
MGD	million gallons per day
MOR	monthly operating report
ug/L	micrograms per liter
NSF	National Sanitation Foundation
pCi/L	picocuries per liter
ppb	parts per billion
ppm	parts per million
PWS	public water system
RFP	Request for Proposals
RO	reverse osmosis
SDWA	Safe Drinking Water Act
SCHD	Sarasota County Health Department
SWFWMD	Southwest Florida Water Management District
TCR	Total Coliform Rule 0.20
TTHM	total trihalomethanes
USEPA	United States Environmental Protection Agency
WTP	City of Venice Water Treatment Plant

EXECUTIVE SUMMARY

The City of Venice (City) recently found itself in the press as a result of a report by the Environmental Working Group (EWG) that first stated the City exceeded EWG's drinking water standards, then backtracked to say the City was not in violation of any health-based standards, but had failed to conduct its monitoring or report its results properly. Arcadis U.S., Inc. was selected by the City to conduct a comprehensive water quality assessment, including an evaluation of the current treatment process, monitoring and reporting practices. The assessment included the following activities:

- Evaluated the claims of EWG and the basis for those claims
- Discussed monitoring and reporting requirements and the City's compliance with those requirements with both the Florida Department of Environmental Protection (FDEP) and United States Environmental Protection Agency (USEPA)
- Reviewed historic monthly operating reports
- Reviewed historic water quality data and conducted independent water quality sampling and analysis
- Discussed WTP operations, monitoring, reporting and sampling procedures with City staff throughout completion of the evaluation.

EWG misrepresents data and distorts facts to encourage consumers to buy water filters. The EWG Tap Water Database claims that the City's water exceeds "health guidelines" for chlorate, radium-226, and total trihalomethanes (TTHM). EWG selectively chose non-enforceable guidelines based on outdated, rescinded, and/or disputed guidelines as the basis for their claims and to serve their purposes. Regarding the claim that the City was in violation of monitoring requirements, this issue was resolved in 2013. A reporting issue between FDEP and USEPA has resulted in an erroneous determination that the City is in violation of monitoring and reporting requirements. The City is in 100% compliance with all state and federal drinking water regulations and the City's water is safe.

In addition, interviews were conducted with Water Department staff to verify background and training to ensure an adequate knowledge of standard operating procedures. Each of the operators was interviewed to understand their roles and level of understanding. Each was found to display the highest level of competence in their understanding of and ability to complete their required tasks. Their knowledge of the treatment and distribution system was very apparent, as was their care and diligence in doing their job.

Chlorate, radium-226 and TTHM samples were collected in October 2017 and analyzed by a certified, third party laboratory. The results of those analyses are provided in Table 1.

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Table 1. Sampling Results Summary

Parameter (units)	Sampling Location	Results
Chlorate (ug/L)	Entry point to distribution system	600
Radium (pCi/L)	Entry point to distribution system	0.201
Total trihalomethanes (ug/L)	Stage 2 DBPR Site #1 (booster station “on”)	8.6
	Stage 2 DBPR Site #1 (booster station “off”)	7.3
	Stage 2 DBPR Site #2 (booster station “on”)	13
	Stage 2 DBPR Site #2 (booster station “off”)	14

The results in Table 1 are consistent with historical results reported by the City. Radium and TTHM levels are well below regulatory levels, which is not surprising given the quality of the City’s groundwater and its treatment process. Reverse osmosis is best available technology for the control of both radium and TTHM.

Chlorate is not currently regulated and there is no universally accepted “guideline” for drinking water. It is believed that the USEPA health reference level (HRL) of 210 micrograms per liter (ug/L) could be at least 4 times higher (840 ug/L). The City’s supply meets that suggested guideline. The chlorate present is primarily a byproduct of sodium hypochlorite degradation.

The City provided a copy of their sodium hypochlorite specification. It generally follows standards for bulk sodium hypochlorite from both the American Water Works Association (AWWA) and American National Standards Institute/National Sanitation Foundation (ANSI/NSF) intended to reduce chlorate concentrations in bulk hypochlorite solutions, including the following the requirements:

- “Submicron” filtered to remove impurities which increase degradation
- A minimum of 0.20 percent by weight sodium hydroxide and a maximum of 0.40 weight percent sodium hydroxide. This helps to control the pH of the solution between 11 and 13. Below pH 11, chlorate formation increases. Above pH 13, perchlorate formation increases.

To further control chlorate concentrations, the following are recommended:

- Liquid sodium hypochlorite should have a concentration limit of less than 2,000,000 ug/L.

The level in the current bulk storage tank should be lowered to the lowest possible level to remove the current product and the tank should be filled with new product that meets the above criteria. Future operation should include steps to minimize the amount of hypochlorite remaining in the tank upon receipt of a new shipment.

Based upon the review of EWG’s claims, discussions with FDEP and USEPA, historic operations and water quality data, and water quality sampling and analysis by a certified, third party laboratory it is our conclusion that the City’s water is safe, its operations staff follow approved best practices, and the City is in 100% compliance with all requirements of the Safe Drinking Water Act (SDWA).

1 INTRODUCTION

1.1 Background

The City of Venice (City) operates a 4.48 million gallon per day (MGD) water treatment plant (WTP) that utilizes reverse osmosis (RO) to treat brackish groundwater from the Intermediate Aquifer. The capacity of the RO skids is 4.32 MGD. Raw water is currently produced by 14 wells with a permitted average day capacity of 6.86 million gallons. The distribution system includes one booster pumping station, two elevated storage tanks and about 185 miles of distribution piping.

The City recently found itself in the press as a result of a report by the Environmental Working Group (EWG) that first stated the City exceeded EWG's drinking water standards, then backtracked to say the City was not in violation of any health-based standards, but had failed to conduct its monitoring or report its results properly. As a result, the City issued a Request for Proposals (RFP) to conduct a "comprehensive assessment" of the water produced by its Reverse Osmosis Water Treatment Plant (RO WTP). Arcadis U.S., Inc. was selected by the City to conduct the water quality assessment, including an assessment of the current treatment process, monitoring and reporting practices.

1.2 Approach

The intent of this effort was to conduct an objective evaluation of the City's water system. The evaluation included the following activities:

- Evaluated the claims of EWG and the basis for those claims (section 2)
- Discussed monitoring and reporting requirements and the City's compliance with those requirements with both the Florida Department of Environmental Protection (FDEP) and United States Environmental Protection Agency (USEPA) (section 3)
- Reviewed historic monthly operating reports (section 3)
- Reviewed historic water quality data and conducted independent water quality sampling and analysis (section 4)
- Discussed WTP operations, monitoring, reporting and sampling procedures with City staff throughout completion of the evaluation.

This report summarizes the results of the water quality evaluation.

2 REVIEW OF EWG CLAIMS

The Environmental Working Group (EWG) touts itself as a non-profit, non-partisan organization dedicated to protecting human health and the environment. Their stated mission is “...to empower people to live healthier lives in a healthier environment. With breakthrough research and education, we drive consumer choice and civic action.”

EWG maintains the online Tap Water Database (<https://www.ewg.org/tapwater/#.WgORCWCWyT8>). Users of the database are able to enter their zip code and see a summary of water quality data for their drinking water provider. The data are based on results reported by the utility (in this case, the City of Venice) to their state regulatory agency (Florida Department of Environmental Protection).

EWG claims the City exceeds their “health guidelines” for three contaminants – chlorate, radium-226, and total trihalomethanes (TTHM). That is not the case. The City is in full compliance with all of the requirements of the Safe Drinking Water Act (SDWA). EWG has arbitrarily chosen health guidelines based on outdated or questionable information to serve their purposes.

The chlorate determination is based on a 2004 health reference level (HRL) published by the United States Environmental Protection Agency (USEPA). USEPA has, on at least two occasions over the last 20 years, considered regulation of chlorate in drinking water, but declined to do so due to lack of adequate information regarding the effects of chlorate. The HRL is non-enforceable guideline and was based on toxicity in rats. The method by which the HRL has also been re-evaluated and it has been determined that the HRL could likely be at least 4 times higher than previously published.

It is unclear exactly what the radium-226 determination is based on as it only states that it was detected and cites no health guideline upon which this claim is based.

The TTHM determination is based on a draft California Public Health Goal that was proposed in 2010, but was never implemented. In this case, not only is the health guideline cited a non-enforceable guideline, but it was never even formally accepted as a guideline by the agency that initially considered it.

It is worth noting that EWG also states three other contaminants – chromium, strontium, and haloacetic acids – were “detected” but at levels lower than any regulatory or health guideline limit. Again, it is intentionally misleading and suggests that any “contaminant” is harmful.

EWG misrepresents data and distorts facts to encourage consumers to buy water filters. Go to the City's entry in the Tap Water Database and there is a link right there at the top of the page “want to filter these contaminants out?” Coincidentally there is also a “what about lead” link. Despite the fact that the City's 90th percentile lead concentration is 0.1 ug/L, compared to the USEPA action level (AL) of 15 ug/L, and there is no indication of any lead in the City's water supply, EWG still states that “doesn't mean the water is safe” and again cite misleading water quality guidelines. *For the purposes of comparison, during the Flint, Michigan water crisis, the 90th percentile lead concentration was 20 ug/L (200 times the levels in Venice) with a maximum value of 3,343 ug/L.*

Regarding EWG's claim that the City was in violation of monitoring requirements, this issue was resolved in 2013. A reporting issue between FDEP and USEPA has resulted in an erroneous determination that the City is in violation of monitoring and reporting requirements. This is discussed in greater detail in section 3. Thus, again EWG has misrepresented the facts regarding the City's water quality and compliance status to the public and media.

3 REPORTING AND RECORDKEEPING REVIEW

3.1 Objective

The objective of this section is to review, evaluate and report on the documentation maintained by the City for the source and final water for their drinking water system.

Throughout this section a number of scientific units are used to discuss chemical concentrations and the concentrations of various water quality parameters. The following definitions are provided to assist in understanding the levels being discussed:

- milligrams per liter (mg/L) or parts per million (ppm): 1 liter (1 quart) of water in a swimming pool, one minute in 2 years, or a single penny in \$10,000
- micrograms per liter (ug/L) or parts per billion (ppb): 1 milliliter (about the size of a sugar cube) of water in a swimming pool, one minute in 2,000 years or a single penny in \$10 million
- picocuries per liter (pCi/L): a curie measures the radioactivity of one gram of radium. A picocurie (pCi) is one trillionth of a curie
- millirem (mrem): a millirem measures a dose of radiation. For example, a chest x-ray typically gives a dose of about 10 mrem and a full-body CT gives a dose of 1,000 mrem.

3.2 Regulatory Authorities

The City of Venice is a public municipality and as such is regulated by a number of regulatory agencies.

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Table 2 summarizes the agencies that enact and enforce the regulations for the City's water system which is inclusive of the raw water supply, water treatment, and water distribution.

Table 2: Regulatory Agencies

Level	Name / Area of Regulatory Impact	Agency Responsibilities
Federal	United States Environmental Protection Agency - Regulates entire water system	<ul style="list-style-type: none"> • Administers Clean Water Act nationally • Oversees Safe Drinking Water Act nationally
State	Florida Department of Environmental Protection - Regulates entire water system	<ul style="list-style-type: none"> • Administers drinking water quality regulation • Regulates public water supplies and systems • Manages all six FDEP regions • Supervises all five Water Management Districts • Manages surface/groundwater monitoring/protection • Conducts water resource planning • Directs drinking water quality regulation • Manages Source Water Assessment Program
Regional	Southwest Florida Water Management District - Regulates water supply	<ul style="list-style-type: none"> • Oversees local Environmental Resource/Water Use/Well Construction Permitting • Locally administers Surface Water/Groundwater Monitoring/Protection • Conducts Regional Water Supply Planning and Resource Regulations
Regional	Sarasota County Health Department - Regulates water quality - Regulates water treatment plant and distribution system operations	<ul style="list-style-type: none"> • SCHD is one of six health departments recognized as an FDEP Approved County Health Department and assumes the responsibilities of FDEP for permitting and compliance and surveillance within Sarasota County • Locally enforces Safe Drinking Water Act • Reviews applications and issue permits for construction of potable water systems and clearance certification

The City's public water system is governed nationally by the USEPA and locally by FDEP, which has given regulatory rights within Sarasota County to the Sarasota County Health Department (SCHD) and Southwest Florida Water Management District (SWFWMD). SCHD governs and regulates well construction and monitoring, in addition to water treatment and distribution system water quality. SWFWMD governs the City's water supply.

3.3 Regulatory Requirements

FDEP primary drinking water regulations are based on the National Primary Drinking Water Regulations (40 CFR 141) and are codified in Section 65-550 of the Florida Administrative Code (FAC). The Sarasota County Health Department was delegated to enforce the SDWA and FAC water quality regulations within Sarasota County. The primary standards protect public health by limiting the levels of contaminants in drinking water. For regulatory purposes, the City is considered a large groundwater system, serving more than 10,000 people. The City's current resident population is estimated to be 20,752 people and the 2030 projected resident population is 25,431 people. This determination affects the City's regulatory requirements, including compliance dates, monitoring and reporting requirements.

3.3.1 Disinfectant Residuals and Disinfection Byproducts

The Stage 1 Disinfectants and Disinfection Byproducts Rule (DBPR) establishes maximum contaminant levels (MCLs), maximum contaminant level goals (MCLGs), maximum residual disinfectant levels (MRDLs) and maximum residual disinfectant level goals (MRDLGs) for chemical disinfectants and the concentrations of disinfection byproducts (DBPs) in finished water and in drinking water distribution systems. Compliance with the MRDL is based on the 95th percentile of all distribution system chlorine residual measurements.

Although the Stage 1 DBPR includes MCLs for both bromate and chlorite, these contaminants are generally only a concern in those systems that utilize ozone or chlorine dioxide, respectively, for primary disinfection. The Stage 1 DBPR also established MCLs for two groups of disinfection byproducts: total trihalomethanes (TTHMs) and the sum of five haloacetic acid species (HAA5). However, the manner in which compliance with the TTHM and HAA5 MCLs is determined was modified by the Stage 2 DBPR. Compliance is now based on a locational running annual average (LRAA) rather than a system-wide running annual average as it was previously. Table 3 summarizes the City's disinfectant and DBP requirements.

Table 3: Disinfectants and Disinfection Byproducts Requirements

	MRDL	MRDLG	MCL	MCLG
Disinfectants				
Chlorine (mg/L ¹ as Cl ₂)	4.0	4.0		
Chloramines (mg/L ¹ as Cl ₂)	4.0	4.0		
Chlorine Dioxide (mg/L ¹ as ClO ₂)	0.8	0.8		
Disinfection Byproducts				
TTHM (µg/L) ²			80	
HAA5 (µg/L) ²			60	
Bromate (µg/L) ²			10	0
Chlorite (mg/L) ²			1.0	0.8

1. A milligram per liter (mg/L) is equivalent to 1 liter of water (1 quart) in a swimming pool, one minute in 2 years, or a single penny in \$10,000
2. A microgram per liter (ug/L) is equivalent to 1 milliliter of water (about the size of a sugar cube) in a swimming pool, one minute in 2000 years or a single penny in \$10 million

Figure 1 shows historic chlorine residual levels leaving the WTP and in the distribution system. In addition to the maximum residual disinfectant level (MRDL), FDEP requires a minimum free chlorine residual of 0.2 mg/L in the distribution system. As the data shows, the City consistently provides a chlorine residual above the minimum and below the maximum chlorine residual requirements.

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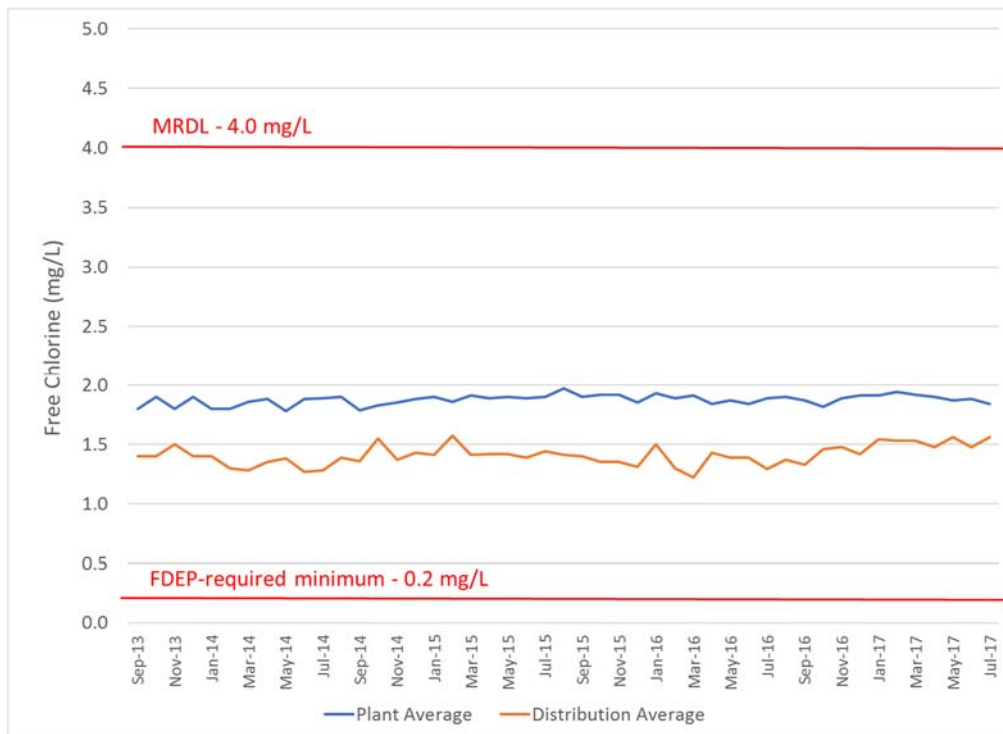


Figure 1. Historic Chlorine Residual Levels

Due to historically low levels of both TTHM and HAA5, the City is on reduced monitoring for these contaminants and is only required to collect two samples during historically high water temperature months. Figures 2 and 3 show historic TTHM and HAA5 concentrations, respectively. As can be seen, both TTHM and HAA5 are well below their respective MCLs.

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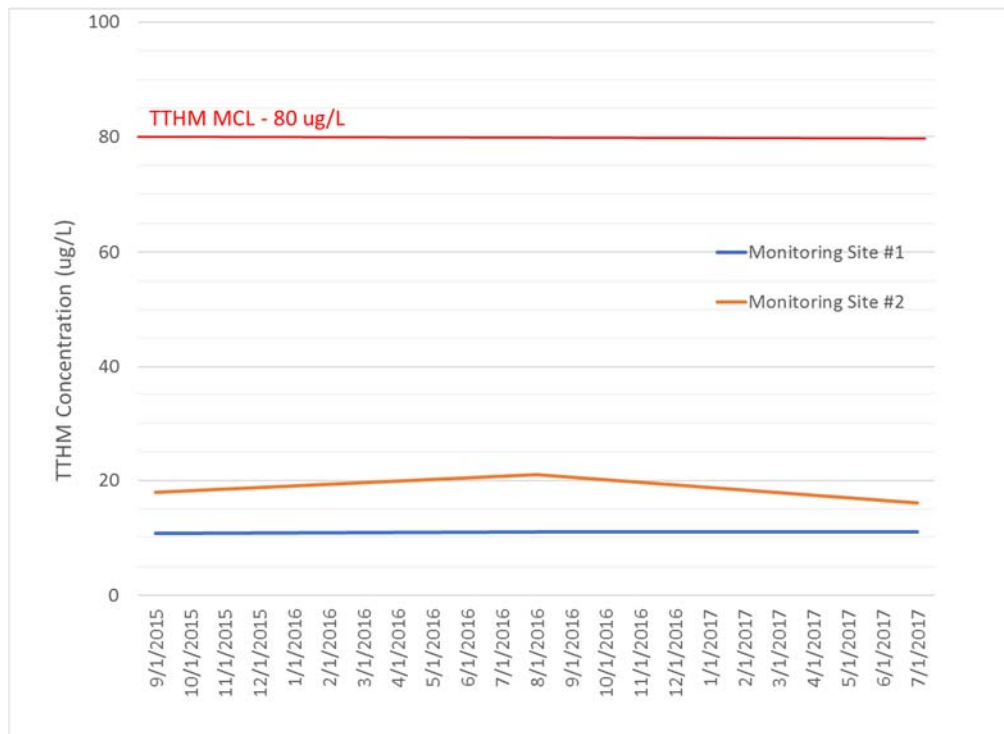


Figure 2. Historic TTHM Concentrations

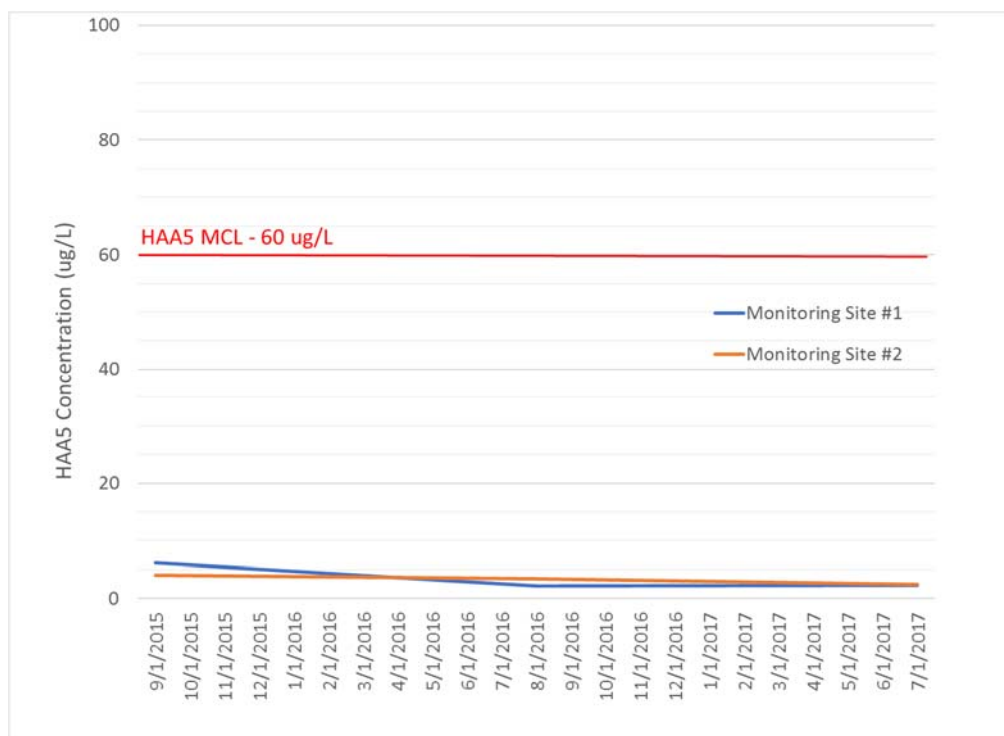


Figure 3. Historic HAA5 Concentrations

3.3.2 Microbial Contaminants

In accordance with State regulations, FAC 62-550.310, the maximum contaminant level for microbial contaminants is based on the presence or absence of total coliforms in a sample, rather than coliform density. For systems which collect fewer than 40 samples per month, which includes the City, if no more than one sample collected during a month is total coliform-positive, the system is in compliance with the MCL for total coliforms. The state regulations are based on the USEPA Total Coliform Rule (TCR). Arcadis reviewed the City's monthly operating reports dating back to September 2013. The City is in compliance with all the requirements of the TCR.

The Ground Water Rule (GWR) became effective in 2010 and intends to provide increased protection against microbial pathogens, specifically viral and bacterial pathogens, in public water systems (PWSs) that use groundwater sources. The rule applies to all PWSs that use groundwater sources in whole or in part (including consecutive systems that receive finished groundwater from another PWS), except for PWSs that combine all of their groundwater with surface water or groundwater under the direct influence of surface water prior to treatment under the Surface Water Treatment Rule. The City utilizes 100% groundwater, as such the requirements of the GWR apply. Based on a review of monthly operating reports dating to July 2013, the City complies with all of the requirements of the GWR.

3.3.3 Radionuclides

There are two sources of radioactive contamination in drinking water. The first is soil where naturally-occurring radionuclides are present. Some areas in Florida are susceptible to contamination from phosphate-rich soils and rock. The second source is man-made sources. There are no known sources of man-made radioactive contamination of drinking water in Florida, and this is not a concern for the City. Due to extremely low concentrations, the City is on reduced monitoring for radionuclides and collects samples every three years. The MCLs and most recent monitoring results are presented in Table 4. As can be seen, results are well below the MCL for all radionuclides.

Table 4: Radionuclides MCLs and Monitoring Results

Constituent	MCLG	MCL	May 2017 Results
Beta/Photon emitters	0 mrem/yr ¹	4 mrem/yr ¹	Not detected
Gross Alpha (excluding Radon & Uranium)	0 pCi/L ²	15 pCi/L ²	Not detected
Combined Radium-226/228	0 pCi/L ²	5 pCi/L ²	0.34 pCi/L ³
Uranium	0 µg/L	30 µg/L	Not detected

1. A millirem (mrem) measures a dose of radiation. For example, a chest x-ray typically gives a dose of about 10 mrem and a full-body CT gives a dose of 1,000 mrem. None was detected in the City's water.
2. A curie measures the radioactivity of one gram of radium. A picocurie (pCi) is one trillionth of a curie.
3. Radium 228 was not detected, thus this is equivalent to the radium-226 concentration

3.3.4 Secondary Drinking Water Standards

The Secondary Drinking Water Standard contaminants are required to be monitored at the entry point to the distribution system. Monitoring of the secondary chemicals is required the first year of each compliance period for groundwater sources. Table 5 summarizes the secondary contaminants, respective MCLs, and levels as last sampled in May of 2017. As seen, the City meets all secondary maximum contaminant levels.

Table 5: Secondary Drinking Water Standards

Contaminant	SMCL (mg/L)	Detected Levels (mg/L)	SMCL Violation (Yes/No)
Aluminum	0.2	0	No
Chloride	250	43	No
Copper	1	0	No
Fluoride	2.0	0.1	No
Iron	0.3	0	No
Manganese	0.05	0	No
Silver	0.1	0	No
Sulfate	250	61	No
Zinc	5	0.3200	No
Color	15 color units	0	No
Odor	3 (threshold odor number)	0	No
pH	6.5 – 8.5	7.64	No
Total Dissolved Solids	500	140	No
Foaming Agents	0.5	0	No

3.3.5 Consumer Confidence Reports Rule

The Consumer Confidence Reports (CCR) Rule requires water systems to prepare and provide to their consumers annual CCRs concerning the quality of the water delivered by the systems every July. The City's annual CCR is synonymous with the water quality report. The annual CCR informs consumers what is in their water, where it comes from, and where they can obtain additional information. The CCR encourages consumer awareness and confidence in water supply. The CCR Rule became effective September 18, 1998. The City submits their CCR to the public with their utility bills annually.

3.4 USEPA ECHO Database

3.4.1 Database Background

The USEPA Enforcement and Compliance History Online (ECHO) database compiles data reported to the agency on more than 800,000 facilities nationwide. The database receives information from state regulatory agencies quarterly and updates their information providing a usable dashboard for anyone to utilize. Based on the parameters defined in the various regulations listed above, this database is designed to highlight violations or errors in the different water systems.

3.4.2 City of Venice Issue

On November 5, 2013 there was a failure of a 2" water service line at the intersection of Lucaya Avenue and Montego Avenue in the City. At the time of the break coliform samples were not immediately taken as required by the Total Coliform Rule. The City remedied this oversight taking the required samples over the following days and ensuring that the system was repaired, and the public adequately protected. The City also self-reported the issue to the Florida Department of Health (FDOH) and FDEP, and self-disclosed the issue on their Consumer Confidence Report, as required.

The City received a violation from FDEP for failure to follow the proper procedures. The City worked with FDEP and satisfactorily corrected the issue shortly after the occurrence. When FDEP updated their quarterly information to the ECHO database the violation was also submitted as is required.

The violation from 2013 is still shown as "unaddressed" in the ECHO database. In communicating with FDEP and FDOH both have acknowledged that the violation had been immediately remedied by the City and were at first unable to explain the continued appearance of a violation. Upon further investigation it was learned that the computer code used to close the issue in the FDEP system was slightly different than that in the ECHO database which caused ECHO to show the issue as unaddressed, as though it was never addressed. Speaking with FDEP it was learned that the timeline to correct these issues in the database is typically 3 years and since this occurred almost 4 years ago there has been some difficulty in trying to update the system.

At the present time both agencies are attempting to work through the USEPA to make the update to the ECHO system. Until such time as they are able to successfully update the computer database, the City will continue to show as having a violation despite being fully compliant with all SDWA requirements.

3.5 Florida Department of Environmental Protection and Florida Department of Health

Monthly operating reports (MORs) record information on a water treatment plant's monthly, weekly and daily operations and present are submitted to the State of Florida every month for evaluation. The MORs include data such as raw water flow, water produced, chlorine residual leaving the plant, chlorine residual in the distribution system, regulatory monitoring results, chemical usage, pH, and total coliform monitoring results. The reports also document any issues that may have caused a boil water notice such as a line break or other problem. Arcadis reviewed four years of MORs from the City of Venice. Having reviewed all available data it was determined that the facility consistently meets the requirements of SDWA. As a

part of this effort, several discussions were had with both FDEP and FDOH. Both agencies concur that the City is in 100 percent compliance.

3.6 Southwest Florida Water Management District

The Southwest Florida Water Management District is responsible for the oversight of the City's production wells used as the source water for the City's drinking water system. SWFWMD ensures that the wells do not produce more than is allowed under the City's Water Use Permit and that the water is of sufficient quality for treatment. Their monitoring information also ensures that any changes to the water quality, such as an increase in total dissolved solids, is recorded and the health of the wells and the overall system is maintained.

Arcadis reviewed all of the City's reports submitted to SWFWMD over the last four years looking for any anomalies. None were found. Records of well production, water quality, and maintenance issues were all well documented. The City maintains all records on-site at the water facility.

3.7 Operator Training and Licensure

Plant and distribution system sampling is completed by the operations staff. The three primary operators responsible for sampling were interviewed to verify background and training to ensure an adequate knowledge of standard operating procedures. All three operators, William (Jim) Anderson (7081), Paul Dagley (20301), and Brian Treat (12446) are Certified A Licensed Water Operators in Florida. Each has more than 20 years of experience in the water industry and complete regular training classes, seminars and schooling to fulfill the continuing education hours required by the State of Florida for licensure. When completing water quality sampling, standard operating procedures are followed to maintain the required quality of samples for compliance. Each of the operators was interviewed to understand their roles and level of understanding. Each was found to display the highest level of competence in their understanding of and ability to complete their required tasks. Their knowledge of the treatment and distribution system was very apparent, as was their care and diligence in doing their job.

4 WATER QUALITY EVALUATION

4.1 Objective

The objective of this water quality evaluation is to conduct sampling to independently verify previously reported water quality monitoring results for the City of Venice.

Throughout this section a number of scientific units are used to discuss chemical concentrations and the concentrations of various water quality parameters. The following definitions are provided to assist in understanding the levels being discussed:

- milligrams per liter (mg/L) or parts per million (ppm): 1 liter (1 quart) of water in a swimming pool, one minute in 2 years, or a single penny in \$10,000
- micrograms per liter (ug/L) or parts per billion (ppb): 1 milliliter (about the size of a sugar cube) of water in a swimming pool, one minute in 2000 years or a single penny in \$10 million
- picocuries per liter (pCi/L): a curie measures the radioactivity of one gram of radium. A picocurie (pCi) is one trillionth of a curie

4.2 Parameters of Interest

Table 6 provides a summary of water quality parameters of interest for this evaluation. It includes the current regulatory limit or maximum contaminant level (MCL), historic levels measured by the City, compliance status and mention of best available technology (BAT) for control of that parameter in drinking water. As can be seen, the City has historically been well below the MCL for each of these parameters and the reverse osmosis (RO) treatment process utilized at the City's water treatment plant is typically best available technology for each of the parameters of interest.

Table 6. Parameter of Interest Summary

Parameter	MCL	City Levels	Violation? (Y/N)	Best Available Technology
Chlorate ¹	NA	370 – 413 ug/L	N	NaOCl source control and inventory management
Radium-226 ²	5 pCi/L	0.34 pCi/L	N	Reverse Osmosis
TTHM ³	80 ug/L	11 – 16 ug/L	N	Reverse Osmosis

1. There is no MCL for chlorate and routine monitoring is not required by the Safe Drinking Water Act. Reported levels are based on results of Unregulated Contaminant Monitoring Rule (UCMR) monitoring conducted in October 2013.
2. Sample collected in May 2017.
3. Samples collected in August 2017.

4.2.1 Chlorate

Chlorate occurs in drinking water as a result of chlorine products used in treatment and may not be present in the City's RO permeate, but may be added during disinfection with sodium hypochlorite. One of the most common sources of chlorate is the degradation of hypochlorite solutions.

Chlorate has periodically been considered for regulation since the early 1990s, when it was part of the negotiated rulemaking for the proposed Stage 1 Disinfectants and Disinfection Byproducts Rule (DBPR). Chlorate was not included in the final Stage 1 DBPR because the health effects data at that time were inadequate to establish a MCL. The United States Environmental Protection Agency (USEPA) again opted not to establish an MCL for chlorate during development of the Stage 2 DBPR in the early 2000s. However, chlorate is currently being discussed again for potential regulation. Because it is not currently regulated, routine monitoring for chlorate is not required. The City was required to conduct chlorate monitoring under the Unregulated Contaminants Monitoring Rule (UCMR) in October 2013 and did so. Reported levels at that time ranged from 370 – 413 micrograms per liter (ug/L).

USEPA established health reference level (HRL) for chlorate of 210 ug/L in 2004. However, it must again be stated that this is not a regulatory requirement and there currently is no MCL for chlorate in drinking water. As previously stated, this is due to inadequate health effects data. Further, in USEPA's calculations of the HRL for chlorate, a reference dose of 0.03 mg/kg/d was used based on a chronic toxicity study in rats (USEPA, 2006; NTP, 2005), and a default relative source contribution (RSC) of 20%, resulting in the HRL of 210 ug/L. However, the major exposure to chlorate comes from drinking water, suggesting that an RSC of 80% is more appropriate. Simply adjusting the RSC to 80% increases the HRL to 840 ug/L (Cotruvo, 2014).

4.2.2 Radium 226

Radium is a naturally-occurring radioactive element present in varying amounts in rocks and soil within the earth's crust. Under natural conditions, radium leaches into groundwater from radium bearing rocks. All rocks contain some radium in small amounts.

The MCL for radium-226 is 5 picocuries per liter (pCi/L). The City is on reduced monitoring for radionuclides and is only required to conduct monitoring once every three years. The last detected radium-226 level was 0.34 pCi/L in May 2017.

There are several treatment technologies available to control radium in drinking water, however, reverse osmosis is identified by USEPA as one of the best available technologies (BATs) for removal of radionuclides.

4.2.3 Total Trihalomethanes

There are a number of disinfection byproducts (DBPs) that are regulated in drinking water, including total trihalomethanes (TTHM). TTHM is the sum of the concentrations of chloroform, bromodichloromethane, dibromochloromethane, and bromoform. TTHM are formed by the reaction of chlorine and natural organic matter (NOM) which is found in groundwater and surface water.

TTHM is currently regulated under the Stage 2 DBPR. The maximum contaminant level (MCL) for TTHM is 80 micrograms per liter (ug/L). The MCL is based on a 1 in 1 million cancer risk for an individual

WATER QUALITY ASSESSMENT

consuming 2 liters of water per day for 70 years. Compliance is based on a locational running annual average (LRAA) of results at locations determined to be representative of high TTHM locations in the distribution system. That is, monitoring is conducted at sites deliberately selected to have high TTHM concentrations.

Due to the City's extremely low levels of TTHM it qualifies for reduced monitoring and is required to conduct monitoring at two locations in the distribution system annually. The most recent results collected in August 2017 ranged from 11 – 16 ug/L.

There are a number of treatment options available to control TTHM, however, reverse osmosis is identified by USEPA as one of the best available technologies (BATs) for removal of NOM and control of DBPs.

4.3 Sampling Plan

Sampling was conducted to confirm chlorate, radium and TTHM concentrations in the City's water system. Figure 1 provides a schematic of the water system and locations where samples were collected.

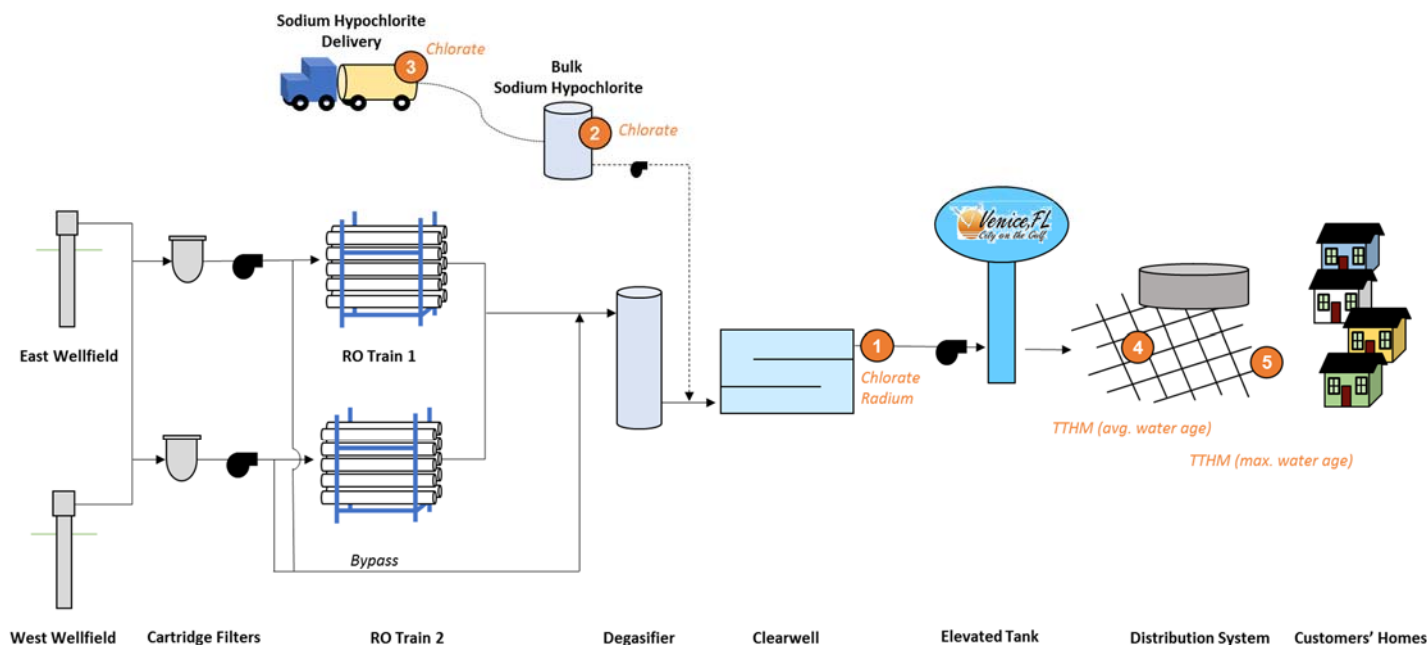


Figure 4. Sampling Locations

4.3.1 Chlorate

The presence of chlorate in the City's finished water is likely due to its presence in the bulk sodium hypochlorite shipment and hypochlorite degradation and is most likely not a source water issue. As a result, sampling was conducted at the following locations:

1. Entry point to the distribution system (i.e., after disinfection)
2. Bulk sodium hypochlorite (i.e., in the bulk storage tank)

WATER QUALITY ASSESSMENT

3. Sodium hypochlorite product upon delivery (i.e., from the tanker).

Arcadis also reviewed the supplier/manufacture's quality control procedures and the City's sodium hypochlorite purchasing contract for purity requirements to see if revisions to the contract might help to limit chlorate concentrations.

4.3.2 Radium 226

The presence of any radium in the City's finished water is likely the result of naturally occurring radium in the aquifer(s) from which the City draws its supply. As RO is considered BAT for radium removal, very little, if any radium should be present in the RO permeate. To confirm this, sampling was conducted at the following location:

1. Entry point to distribution system

4.3.3 Total Trihalomethanes

Unlike the other contaminants for which sampling was conducted, TTHM concentrations can increase throughout the distribution system. While the City's TTHM results have historically been well below the MCL, TTHM monitoring was conducted at the following locations:

1. Stage 2 DBPR compliance monitoring site #1 (Inlet Circle)
2. Stage 2 DBPR compliance monitoring site #2 (Veneto Boulevard)

Because system operation can impact water age and conversely TTHM concentrations, Sites 4 and 5 were sampled twice – once with the Pinebrook Booster Pump Station in operation, and once with the pump station "off."

4.4 Results

Water quality samples were collected on October 24 and 25, 2017 and sent to TestAmerica Laboratories, Inc. for analysis. TestAmerica is certified by the State of Florida Department of Health, Bureau of Public Health Laboratories for drinking water analysis. TestAmerica utilizes USEPA-approved methods for drinking water analyses and follows all quality control requirements for certification. Further, TestAmerica did not conduct the previous analyses reported by the City and therefore can be considered a third-party verification of previously reported results. Table 7 summarizes the analytical results. A copy of the laboratory reports is provided in Appendix A.

WATER QUALITY ASSESSMENT

Table 7. Sampling Results Summary

Parameter (units)	Sampling Location	Results
Chlorate (ug/L)	Entry point to distribution system	600
Radium (pCi/L)	Entry point to distribution system	0.201
Total trihalomethanes (ug/L)	Stage 2 DBPR Site #1 (booster station "on")	8.6
	Stage 2 DBPR Site #1 (booster station "off")	7.3
	Stage 2 DBPR Site #2 (booster station "on")	13
	Stage 2 DBPR Site #2 (booster station "off")	14

4.4.1 Chlorate

Chlorate was detected in the City's treated water at a concentration of 600 ug/L. This is similar to previous results reported in October 2013 during UCMR monitoring. It is believed all of chlorate present in the treated water is added as a byproduct of sodium hypochlorite addition.

Sampling of chlorate in the bulk storage tank and from the tanker were 14,000,000 ug/L and 2,200,000 ug/L, respectively. These concentrations equate to 1.4% and 0.22%. Based on the flow plant flow (2.147 MGD) and chlorine dose (4.11 mg/L) on October 24, the entire chlorite concentration can be attributed to the sodium hypochlorite product.

The City provided a copy of their sodium hypochlorite specification. It generally follows standards for bulk sodium hypochlorite from both the American Water Works Association (AWWA) and American National Standards Institute/National Sanitation Foundation (ANSI/NSF) intended to reduce chlorate concentrations in bulk hypochlorite solutions, including the following the requirements:

- "Submicron" filtered to remove impurities which increase degradation
- A minimum of 0.20 percent by weight sodium hydroxide and a maximum of 0.40 weight percent sodium hydroxide. This helps to control the pH of the solution between 11 and 13. Below pH 11, chlorate formation increases. Above pH 13, perchlorate formation increases.

To further control chlorate concentrations, the following are recommended:

- Liquid sodium hypochlorite should have a concentration limit of less than 2,000,000 ug/L.
- The level in the current bulk storage tank should be lowered to the lowest possible level to remove the current product and the tank should be filled with new product that meets the above criteria. Future operation should include steps to minimize the amount of hypochlorite remaining in the tank upon receipt of a new shipment.

A copy of an example sodium hypochlorite specification use for purchasing is provided in Appendix B.

4.4.2 Radium-226

Radium-226 was detected in the City's water supply at a concentration of 0.201 pCi/L which is well below the MCL of 5 pCi/L. This is consistent with previously reported results which found radium-226

concentrations of 0.34 pCi/L. This is expected given the quality of the City's groundwater supply and its use of reverse osmosis which is best available technology for the control of radium-226.

4.4.3 Total Trihalomethanes

TTHM concentrations in the City's distribution system ranged from 7.3 – 14 ug/L. These concentrations are consistent with the City's results from August 2017 as well as historic TTHM concentrations (Figure 2), and are well below the MCL of 80 ug/L. This is not surprising given the quality of the City's groundwater supply and its use of reverse osmosis which is a best available technology for the control of TTHM.



Figure 5. Historic TTHM Concentrations

4.5 Summary

Sampling was conducted in October 2017 to independently confirm prior reported concentrations of chlorate, radium-226 and total trihalomethanes in the City's water system. The analyses were conducted by a certified, third party laboratory using USEPA required analytical methods. Results from October 2017 were consistent with previously reported results and the City is in 100% compliance with all drinking water regulations for chlorate, radium 226, and total trihalomethanes.

5 CONCLUSIONS

Based upon the review of EWG's claims, discussions with FDEP and USEPA, historic operations and water quality data, and water quality sampling and analysis by a certified, third party laboratory it is our conclusion that the City's water is safe, its operations staff follow approved best practices, and the City is in 100% compliance with all requirements of the Safe Drinking Water Act SDWA.

EWG intentionally misrepresents data and distorts facts to encourage consumers to buy water filters. The EWG Tap Water Database claims that the City's water exceeds "health guidelines" for chlorate, radium-226, and total trihalomethanes TTHM. EWG selectively chose non-enforceable guidelines based on outdated, rescinded, and/or disputed guidelines as the basis for their claims and to serve their purposes. Regarding the claim that the City was in violation of monitoring requirements, this issue was resolved in 2013. A reporting issue between FDEP and USEPA has resulted in an erroneous determination that the City is in violation of monitoring and reporting requirements. The City is in 100% compliance with all state and federal drinking water regulations and the City's water is safe.

Interviews were conducted with Water Department staff to verify background and training to ensure an adequate knowledge of standard operating procedures. Each of the operators was interviewed to understand their roles and level of understanding. Each was found to display the highest level of competence in their understanding of and ability to complete their required tasks. Their knowledge of the treatment and distribution system was very apparent, as was their care and diligence in doing their job.

Water quality samples were collected on October 24 and 25, 2017 and sent to TestAmerica Laboratories, Inc. for analysis. TestAmerica is certified by the State of Florida Department of Health, Bureau of Public Health Laboratories for drinking water analysis. The results of those analyses were consistent with historical results reported by the City. Radium and TTHM levels are well below regulatory levels, which is not surprising given the quality of the City's groundwater and its treatment process. Reverse osmosis is best available technology for the control of both radium and TTHM.

Chlorate is not currently regulated and there is no universally accepted "guideline" for drinking water. It is believed that the USEPA HRL of 210 ug/L could be at least 4 times higher (840 ug/L). The City's supply meets that suggested guideline. However, the chlorate present is primarily a byproduct of sodium hypochlorite degradation.

The City provided a copy of their sodium hypochlorite specification. It generally follows standards for bulk sodium hypochlorite from both the American Water Works Association (AWWA) and American National Standards Institute/National Sanitation Foundation (ANSI/NSF) intended to reduce chlorate concentrations in bulk hypochlorite solutions, including the following the requirements:

- "Submicron" filtered to remove impurities which increase degradation
- A minimum of 0.20 percent by weight sodium hydroxide and a maximum of 0.40 weight percent sodium hydroxide. This helps to control the pH of the solution between 11 and 13. Below pH 11, chlorate formation increases. Above pH 13, perchlorate formation increases.

To further control chlorate concentrations, the following are recommended:

- Liquid sodium hypochlorite should have a concentration limit of less than 2,000,000 ug/L.

WATER QUALITY ASSESSMENT

- The level in the current bulk storage tank should be lowered to the lowest possible level to remove the current product and the tank should be filled with new product that meets the above criteria. Future operation should include steps to minimize the amount of hypochlorite remaining in the tank upon receipt of a new shipment.

APPENDIX A

Analytical Reports



ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Savannah

5102 LaRoche Avenue

Savannah, GA 31404

Tel: (912)354-7858

TestAmerica Job ID: 680-144728-1

Client Project/Site: Clty of Venice WTP/Distribution system

For:

ARCADIS U.S. Inc

3109 W. Dr. Martin Luther King Jr. Blvd.

Suite 350

Tampa, Florida 33607

Attn: Chris Hill



Authorized for release by:

11/24/2017 12:56:25 PM

Haukur Gudnason, Project Manager II

(813)280-8342

haukur.gudnason@testamericainc.com

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The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

Definitions/Glossary

Client: ARCADIS U.S. Inc
Project/Site: City of Venice WTP/Distribution system

TestAmerica Job ID: 680-144728-1

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
I	The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.

HPLC/IC

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

Rad

Qualifier	Qualifier Description
U	Result is less than the sample detection limit.

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
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)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
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)

Sample Summary

Client: ARCADIS U.S. Inc
Project/Site: City of Venice WTP/Distribution system

TestAmerica Job ID: 680-144728-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
680-144728-1	Chlorate 1 Entry Dist.	Water	10/24/17 11:00	10/25/17 09:40
680-144728-2	Chlorate 2 Bulk Tank (day).	Water	10/24/17 01:29	10/25/17 09:40
680-144728-3	Chlorate 3 Bulk Tank (day).	Water	10/24/17 01:53	10/25/17 09:40
680-144728-4	Radium-1	Water	10/24/17 01:10	10/25/17 09:40
680-144728-5	Distribution 1	Water	10/24/17 11:31	10/25/17 09:40
680-144728-6	Distribution 2	Water	10/24/17 12:04	10/25/17 09:40

Case Narrative

Client: ARCADIS U.S. Inc
Project/Site: City of Venice WTP/Distribution system

TestAmerica Job ID: 680-144728-1

Job ID: 680-144728-1

Laboratory: TestAmerica Savannah

Narrative

**Job Narrative
680-144728-1**

Comments

No additional comments.

Receipt

The samples were received on 10/25/2017 9:40 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 2.0° C.

GC/MS VOA

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

HPLC/IC

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

RAD

Method(s) PrecSep-21: Radium 226 Prep Batch 160-334835
The following sample was reduced due to limited volume.
Radium-1

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

Client Sample Results

Client: ARCADIS U.S. Inc
Project/Site: City of Venice WTP/Distribution system

TestAmerica Job ID: 680-144728-1

Client Sample ID: Chlorate 1 Entry Dist.

Lab Sample ID: 680-144728-1

Date Collected: 10/24/17 11:00

Matrix: Water

Date Received: 10/25/17 09:40

Method: 300.1B-1997 R1. - Disinfection By-Products, (IC)

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlorate	600		250	53	ug/L	-		10/31/17 14:28	25
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Dichloroacetic acid(Surr)	99		90 - 115					10/31/17 14:28	25

Client Sample Results

Client: ARCADIS U.S. Inc
Project/Site: City of Venice WTP/Distribution system

TestAmerica Job ID: 680-144728-1

Client Sample ID: Chlorate 2 Bulk Tank (day).

Lab Sample ID: 680-144728-2

Date Collected: 10/24/17 01:29

Matrix: Water

Date Received: 10/25/17 09:40

Method: 300.1B-1997 R1. - Disinfection By-Products, (IC)

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlorate	14000000		5000000	1100000	ug/L	-		10/31/17 15:01	500000
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Dichloroacetic acid(Surr)	104		90 - 115					10/31/17 15:01	500000

Client Sample Results

Client: ARCADIS U.S. Inc
Project/Site: City of Venice WTP/Distribution system

TestAmerica Job ID: 680-144728-1

Client Sample ID: Chlorate 3 Bulk Tank (day).

Lab Sample ID: 680-144728-3

Date Collected: 10/24/17 01:53

Matrix: Water

Date Received: 10/25/17 09:40

Method: 300.1B-1997 R1. - Disinfection By-Products, (IC)

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlorate	2200000		500000	110000	ug/L	-		10/31/17 15:33	50000
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Dichloroacetic acid(Surr)	105		90 - 115					10/31/17 15:33	50000

Client Sample Results

Client: ARCADIS U.S. Inc
Project/Site: City of Venice WTP/Distribution system

TestAmerica Job ID: 680-144728-1

Client Sample ID: Radium-1

Date Collected: 10/24/17 01:10

Date Received: 10/25/17 09:40

Lab Sample ID: 680-144728-4

Matrix: Water

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Ra-226	0.201		0.106	0.108	1.00	0.125	pCi/L	10/30/17 10:29	11/21/17 08:40	1
Carrier	%Yield	Qualifier	Limits				Prepared		Analyzed	Dil Fac
Barium	97.3		40 - 110				10/30/17 10:29		11/21/17 08:40	1

Client Sample Results

Client: ARCADIS U.S. Inc
Project/Site: City of Venice WTP/Distribution system

TestAmerica Job ID: 680-144728-1

Client Sample ID: Distribution 1

Lab Sample ID: 680-144728-5

Date Collected: 10/24/17 11:31

Matrix: Water

Date Received: 10/25/17 09:40

Method: 524.2 - Total Trihalomethane Calculation

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bromoform	0.0034		0.00050	0.00017	mg/L			10/26/17 21:47	1
Chlorodibromomethane	0.0033		0.00050	0.00013	mg/L			10/26/17 21:47	1
Chloroform	0.00047	I	0.00050	0.00020	mg/L			10/26/17 21:47	1
Dichlorobromomethane	0.0014		0.00050	0.000079	mg/L			10/26/17 21:47	1
Trihalomethanes, Total	0.0086		0.00050	0.000079	mg/L			10/26/17 21:47	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene	101		70 - 130		10/26/17 21:47	1
1,2-Dichlorobenzene-d4	99		70 - 130		10/26/17 21:47	1

Client Sample Results

Client: ARCADIS U.S. Inc
Project/Site: City of Venice WTP/Distribution system

TestAmerica Job ID: 680-144728-1

Client Sample ID: Distribution 2

Lab Sample ID: 680-144728-6

Date Collected: 10/24/17 12:04

Matrix: Water

Date Received: 10/25/17 09:40

Method: 524.2 - Total Trihalomethane Calculation

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bromoform	0.0040		0.00050	0.00017	mg/L			10/26/17 22:12	1
Chlorodibromomethane	0.0054		0.00050	0.00013	mg/L			10/26/17 22:12	1
Chloroform	0.00096		0.00050	0.00020	mg/L			10/26/17 22:12	1
Dichlorobromomethane	0.0030		0.00050	0.000079	mg/L			10/26/17 22:12	1
Trihalomethanes, Total	0.013		0.00050	0.000079	mg/L			10/26/17 22:12	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene	102		70 - 130		10/26/17 22:12	1
1,2-Dichlorobenzene-d4	99		70 - 130		10/26/17 22:12	1

Tracer/Carrier Summary

Client: ARCADIS U.S. Inc
Project/Site: City of Venice WTP/Distribution system

TestAmerica Job ID: 680-144728-1

Method: 903.0 - Radium-226 (GFPC)

Matrix: Water

Prep Type: Total/NA

Percent Yield (Acceptance Limits)

Lab Sample ID	Client Sample ID	Ba (40-110)
680-144728-4	Radium-1	97.3
LCS 160-334835/2-A	Lab Control Sample	106
MB 160-334835/1-A	Method Blank	106

Tracer/Carrier Legend

Ba = Barium

QC Sample Results

Client: ARCADIS U.S. Inc
Project/Site: City of Venice WTP/Distribution system

TestAmerica Job ID: 680-144728-1

Method: 300.1B-1997 R1. - Disinfection By-Products, (IC)

Lab Sample ID: MB 680-500732/7

Matrix: Water

Analysis Batch: 500732

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlorate	2.1	U	10	2.1	ug/L			10/30/17 21:01	1
Surrogate	MB %Recovery	MB Qualifier	Limits				Prepared	Analyzed	Dil Fac
Dichloroacetic acid(Surr)	96		90 - 115					10/30/17 21:01	1

Lab Sample ID: LCS 680-500732/8

Matrix: Water

Analysis Batch: 500732

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Chlorate	50.0	50.8		ug/L		102	85 - 115		
Surrogate	LCS %Recovery	LCS Qualifier	Limits						
Dichloroacetic acid(Surr)	98		90 - 115						

Lab Sample ID: LCSD 680-500732/9

Matrix: Water

Analysis Batch: 500732

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
Chlorate	50.0	50.6		ug/L		101	85 - 115	0	10
Surrogate	LCSD %Recovery	LCSD Qualifier	Limits						
Dichloroacetic acid(Surr)	102		90 - 115						

Method: 903.0 - Radium-226 (GFPC)

Lab Sample ID: MB 160-334835/1-A

Matrix: Water

Analysis Batch: 338344

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 334835

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Ra-226	-0.01135	U	0.0421	0.0421	1.00	0.100	pCi/L	10/30/17 10:29	11/21/17 08:34	1
Carrier	MB %Yield	MB Qualifier	Limits					Prepared	Analyzed	Dil Fac
Barium	106		40 - 110					10/30/17 10:29	11/21/17 08:34	1

Lab Sample ID: LCS 160-334835/2-A

Matrix: Water

Analysis Batch: 338344

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 334835

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Ra-226	15.7	12.75		1.31	1.00	0.0934	pCi/L	81	68 - 137		

TestAmerica Savannah

QC Sample Results

Client: ARCADIS U.S. Inc
Project/Site: City of Venice WTP/Distribution system

TestAmerica Job ID: 680-144728-1

Method: 903.0 - Radium-226 (GFPC) (Continued)

Lab Sample ID: LCS 160-334835/2-A

Matrix: Water

Analysis Batch: 338344

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 334835

Carrier	LCS	LCS	Limits
	%Yield	Qualifier	
Barium	106		40 - 110

QC Association Summary

Client: ARCADIS U.S. Inc
Project/Site: City of Venice WTP/Distribution system

TestAmerica Job ID: 680-144728-1

GC/MS VOA

Analysis Batch: 500066

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-144728-5	Distribution 1	Total/NA	Water	524.2	
680-144728-6	Distribution 2	Total/NA	Water	524.2	

HPLC/IC

Analysis Batch: 500732

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-144728-1	Chlorate 1 Entry Dist.	Total/NA	Water	300.1B-1997 R1.	
680-144728-2	Chlorate 2 Bulk Tank (day).	Total/NA	Water	300.1B-1997 R1.	
680-144728-3	Chlorate 3 Bulk Tank (day).	Total/NA	Water	300.1B-1997 R1.	
MB 680-500732/7	Method Blank	Total/NA	Water	300.1B-1997 R1.	
LCS 680-500732/8	Lab Control Sample	Total/NA	Water	300.1B-1997 R1.	
LCSD 680-500732/9	Lab Control Sample Dup	Total/NA	Water	300.1B-1997 R1.	

Rad

Prep Batch: 334835

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-144728-4	Radium-1	Total/NA	Water	PrecSep-21	
MB 160-334835/1-A	Method Blank	Total/NA	Water	PrecSep-21	
LCS 160-334835/2-A	Lab Control Sample	Total/NA	Water	PrecSep-21	

Lab Chronicle

Client: ARCADIS U.S. Inc
Project/Site: City of Venice WTP/Distribution system

TestAmerica Job ID: 680-144728-1

Client Sample ID: Chlorate 1 Entry Dist.

Date Collected: 10/24/17 11:00

Date Received: 10/25/17 09:40

Lab Sample ID: 680-144728-1

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.1B-1997 R1.		25	5 mL	5 mL	500732	10/31/17 14:28	KMB	TAL SAV

Client Sample ID: Chlorate 2 Bulk Tank (day).

Date Collected: 10/24/17 01:29

Date Received: 10/25/17 09:40

Lab Sample ID: 680-144728-2

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.1B-1997 R1.		500000	5 mL	5 mL	500732	10/31/17 15:01	KMB	TAL SAV

Client Sample ID: Chlorate 3 Bulk Tank (day).

Date Collected: 10/24/17 01:53

Date Received: 10/25/17 09:40

Lab Sample ID: 680-144728-3

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.1B-1997 R1.		50000	5 mL	5 mL	500732	10/31/17 15:33	KMB	TAL SAV

Client Sample ID: Radium-1

Date Collected: 10/24/17 01:10

Date Received: 10/25/17 09:40

Lab Sample ID: 680-144728-4

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep-21			749.84 mL	1.0 g	334835	10/30/17 10:29	LDE	TAL SL
Total/NA	Analysis	903.0		1	1.0 mL	1.0 mL	338342	11/21/17 08:40	ALD	TAL SL

Client Sample ID: Distribution 1

Date Collected: 10/24/17 11:31

Date Received: 10/25/17 09:40

Lab Sample ID: 680-144728-5

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	524.2		1	5 mL	5 mL	500066	10/26/17 21:47	DAS	TAL SAV

Client Sample ID: Distribution 2

Date Collected: 10/24/17 12:04

Date Received: 10/25/17 09:40

Lab Sample ID: 680-144728-6

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	524.2		1	5 mL	5 mL	500066	10/26/17 22:12	DAS	TAL SAV

Laboratory References:

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

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

TestAmerica Savannah

Accreditation/Certification Summary

Client: ARCADIS U.S. Inc
Project/Site: City of Venice WTP/Distribution system

TestAmerica Job ID: 680-144728-1

Laboratory: TestAmerica Savannah

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

Authority	Program	EPA Region	Identification Number	Expiration Date
L-A-B	DoD ELAP		L2463	09-22-19

Laboratory: TestAmerica St. Louis

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

Authority	Program	EPA Region	Identification Number	Expiration Date
Florida	NELAP	4	E87689	06-30-18

Laboratory: TestAmerica Tampa

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

Authority	Program	EPA Region	Identification Number	Expiration Date
Florida	NELAP	4	E84282	06-30-18
Georgia	State Program	4	905	06-30-18
USDA	Federal		P525-170731-001	09-25-20

Method Summary

Client: ARCADIS U.S. Inc
Project/Site: City of Venice WTP/Distribution system

TestAmerica Job ID: 680-144728-1

Method	Method Description	Protocol	Laboratory
524.2	Total Trihalomethane Calculation	EPA-DW	TAL SAV
300.1B-1997 R1.	Disinfection By-Products, (IC)	EPA	TAL SAV
903.0	Radium-226 (GFPC)	EPA	TAL SL

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.

Laboratory References:

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

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Chain of Custody Record

Client Information		Lab PM: Gudnason, Haukur M		Camer Tracking No(s):		COC No: 660-77519-25006.1	
Client Contact: Chris Hill		E-Mail: haukur.gudnason@testamericainc.com		Page 1 of 1			
Company: ARCADIS U.S. Inc		Address: 3109 W. Dr. Martin Luther King Jr. Blvd. Suite 350		City: Tampa		State, Zip: FL, 33607	
Phone: 813-353-5717(Tel)		PO #: Purchase Order Requested		WO #:			
Email: chris.hill@arcadis.com		Project #:		Project Name: City of Venice WTP / Distribution System		City of Venice	
Site:		SSOW#:					

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/effluent, BT=tissue, A=air)	Field Filtered Sample (Yes or No)			Perform MS/MSD (Yes or No)			300.1B.28D - (MOD) Custom Sublist			903.0 - (MOD) Local Method			TTHM Calc - Trihalomethanes			Total Number of Containers	Special Instructions/Note:		
					L	D	R	L	D	R	L	D	R	L	D	R	L	D	R				
Chlorate 1-Entry Dist.	10/24/17	1:10pm	G	Water																			
Chlorate 2-Bulk Tank (Day)	" "	1:29pm	G	Water																			
Chlorate 3-Shipment	" "	1:53pm	G	Water																			
Radium - 1	" "	1:10pm	G	Water																			
Distribution 1-1	" "	11:31AM	G	Water																			
Distribution 1-2	" "	" "	G	Water																			
Distribution 1-3	" "	" "	G	Water																			
Distribution 2-1	" "	12:04pm	G	Water																			
Distribution 2-2	" "	" "	G	Water																			
Distribution 2-3	" "	" "	G	Water																			

Possible Hazard Identification <input type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input type="checkbox"/> Unknown <input type="checkbox"/> Radiological			
Deliverable Requested: I, II, III, IV, Other (specify) _____			
Empty Kit Relinquished by: _____			
Relinquished by	Date/Time	Company	Received by
Relinquished by	Date/Time	Company	Received by
Relinquished by	Date/Time	Company	Received by
Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks: 1.8°C (OP) 2.6°C	

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month) <input type="checkbox"/> Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months	
Special Instructions/QC Requirements: _____	
Method of Shipment: _____	

America Savannah
LaRoche Avenue

Chain of Custody Record

235508

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING
TestAmerica Laboratories, Inc.
TAL-8210 (07/13)

Company Name: Arcadis

Address: 3109 W. Dr. MLK Jr Blvd, Suite 350

City/State/Zip: Tampa, FL 33607

Phone: (813) 353-5717

Fax:

Project Name: City of Venice

Site: Venice WTP

PO # 05710031.0000

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

Project Manager: Chris Hill

Tel/Fax: (813) 353-5717

Analysis Turnaround Time

☐ CALENDAR DAYS ☒ WORKING DAYS

TAT if different from Below

☐ 2 weeks

☒ 1 week

☐ 2 days

☐ 1 day

Site Contact:

Lab Contact:

Date:

Carrier:

Filtered Sample (Y/N)

Perform MS / MSD (Y/N)

300-18-28 D

403.0

THM-Calc

Sample Specific Notes:

COC No: 000-77519-25006

1 of 1 COCs

Sampler:

For Lab Use Only:

Walk-In Client:

Lab Sampling:

Job / SDG No.:

Sample Identification

Sample Date

Sample Time

Sample Type (C=Comp, G=Grab)

Matrix

of Cont.

Chlorate 1-Entry Dist.

Chlorate 2-Bulk Tank (Day)

Chlorate 3-Shipments

Radium - 1

Distribution 1-1

Distribution 1-2

Distribution 1-3

Distribution 2-1

Distribution 2-2

Distribution 2-3

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4= HNO3; 5= NaOH; 6= Other

Possible Hazard Identification:

Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the

Comments Section if the lab is to dispose of the sample.

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Special Instructions/QC Requirements & Comments:

Custody Seal No.:

Company:

Relinquished by:

Company:

Relinquished by:

Company:

Relinquished by:

Company:

Relinquished by:

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Relinquished by:

Return to Client

Disposal by Lab

Archive for

Months

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Return to Client

Disposal by Lab

Archive for

Months

Therm ID No.:

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Return to Client

Disposal by Lab

Archive for

Months

Therm ID No.:

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Login Sample Receipt Checklist

Client: ARCADIS U.S. Inc

Job Number: 680-144728-1

Login Number: 144728

List Number: 1

Creator: Tyler, Matthew M

List Source: TestAmerica Savannah

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	Containers received broken. No volume could be salvaged for analysis.
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
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").	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: ARCADIS U.S. Inc

Job Number: 680-144728-1

Login Number: 144728

List Number: 2

Creator: Clarke, Jill C

List Source: TestAmerica St. Louis

List Creation: 10/27/17 03:31 PM

Question	Answer	Comment
Radioactivity wasn't checked or is <=/ background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	
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	3.3
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?	False	
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.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Tampa
6712 Benjamin Road
Suite 100
Tampa, FL 33634
Tel: (813)885-7427

TestAmerica Job ID: 660-83599-1

Client Project/Site: Clty of Venice/Distribution system

For:

ARCADIS U.S. Inc
3109 W. Dr. Martin Luther King Jr. Blvd.
Suite 350
Tampa, Florida 33607

Attn: Chris Hill



Authorized for release by:
11/2/2017 11:30:01 AM

Haukur Gudnason, Project Manager II
(813)280-8342
haukur.gudnason@testamericainc.com

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www.testamericainc.com

The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Sample Summary

Client: ARCADIS U.S. Inc
Project/Site: City of Venice/Distribution system

TestAmerica Job ID: 660-83599-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
660-83599-1	Dist. 3-1	Water	10/25/17 07:57	10/25/17 13:42
660-83599-4	Dist. 4-1	Water	10/25/17 08:31	10/25/17 13:42

Case Narrative

Client: ARCADIS U.S. Inc
Project/Site: Clty of Venice/Distribution system

TestAmerica Job ID: 660-83599-1

Job ID: 660-83599-1

Laboratory: TestAmerica Tampa

Narrative

Receipt

The samples were received on 10/25/2017 1:42 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 2.1° C.

GC/MS VOA

Method(s) 524.2: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with analytical batch 680-500502.

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

Definitions/Glossary

Client: ARCADIS U.S. Inc
Project/Site: City of Venice/Distribution system

TestAmerica Job ID: 660-83599-1

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.

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
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)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
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)

Detection Summary

Client: ARCADIS U.S. Inc
Project/Site: City of Venice/Distribution system

TestAmerica Job ID: 660-83599-1

Client Sample ID: Dist. 3-1

Lab Sample ID: 660-83599-1

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
Bromoform	0.0030		0.00050	0.00017	mg/L	1		524.2	Total/NA
Chlorodibromomethane	0.0029		0.00050	0.00013	mg/L	1		524.2	Total/NA
Chloroform	0.00029	I	0.00050	0.00020	mg/L	1		524.2	Total/NA
Dichlorobromomethane	0.0011		0.00050	0.000079	mg/L	1		524.2	Total/NA
Trihalomethanes, Total	0.0073		0.00050	0.000079	mg/L	1		524.2	Total/NA

Client Sample ID: Dist. 4-1

Lab Sample ID: 660-83599-4

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
Bromoform	0.0039		0.00050	0.00017	mg/L	1		524.2	Total/NA
Chlorodibromomethane	0.0057		0.00050	0.00013	mg/L	1		524.2	Total/NA
Chloroform	0.00093		0.00050	0.00020	mg/L	1		524.2	Total/NA
Dichlorobromomethane	0.0030		0.00050	0.000079	mg/L	1		524.2	Total/NA
Trihalomethanes, Total	0.014		0.00050	0.000079	mg/L	1		524.2	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Tampa

Client Sample Results

Client: ARCADIS U.S. Inc
Project/Site: City of Venice/Distribution system

TestAmerica Job ID: 660-83599-1

Client Sample ID: Dist. 3-1

Date Collected: 10/25/17 07:57

Date Received: 10/25/17 13:42

Lab Sample ID: 660-83599-1

Matrix: Water

Method: 524.2 - Total Trihalomethane Calculation

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bromoform	0.0030		0.00050	0.00017	mg/L			10/30/17 18:30	1
Chlorodibromomethane	0.0029		0.00050	0.00013	mg/L			10/30/17 18:30	1
Chloroform	0.00029	I	0.00050	0.00020	mg/L			10/30/17 18:30	1
Dichlorobromomethane	0.0011		0.00050	0.000079	mg/L			10/30/17 18:30	1
Trihalomethanes, Total	0.0073		0.00050	0.000079	mg/L			10/30/17 18:30	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene	102		70 - 130		10/30/17 18:30	1
1,2-Dichlorobenzene-d4	100		70 - 130		10/30/17 18:30	1

Client Sample ID: Dist. 4-1

Date Collected: 10/25/17 08:31

Date Received: 10/25/17 13:42

Lab Sample ID: 660-83599-4

Matrix: Water

Method: 524.2 - Total Trihalomethane Calculation

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bromoform	0.0039		0.00050	0.00017	mg/L			10/30/17 18:55	1
Chlorodibromomethane	0.0057		0.00050	0.00013	mg/L			10/30/17 18:55	1
Chloroform	0.00093		0.00050	0.00020	mg/L			10/30/17 18:55	1
Dichlorobromomethane	0.0030		0.00050	0.000079	mg/L			10/30/17 18:55	1
Trihalomethanes, Total	0.014		0.00050	0.000079	mg/L			10/30/17 18:55	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene	101		70 - 130		10/30/17 18:55	1
1,2-Dichlorobenzene-d4	100		70 - 130		10/30/17 18:55	1

TestAmerica Tampa

QC Sample Results

Client: ARCADIS U.S. Inc
Project/Site: City of Venice/Distribution system

TestAmerica Job ID: 660-83599-1

Method: 524.2 - Total Trihalomethane Calculation

Lab Sample ID: MB 680-500502/10

Matrix: Water

Analysis Batch: 500502

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bromoform	0.00017	U	0.00050	0.00017	mg/L			10/30/17 13:05	1
Chlorodibromomethane	0.00013	U	0.00050	0.00013	mg/L			10/30/17 13:05	1
Chloroform	0.00020	U	0.00050	0.00020	mg/L			10/30/17 13:05	1
Dichlorobromomethane	0.000079	U	0.00050	0.000079	mg/L			10/30/17 13:05	1
Trihalomethanes, Total	0.000079	U	0.00050	0.000079	mg/L			10/30/17 13:05	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene	101		70 - 130		10/30/17 13:05	1
1,2-Dichlorobenzene-d4	95		70 - 130		10/30/17 13:05	1

Lab Sample ID: LCS 680-500502/4

Matrix: Water

Analysis Batch: 500502

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Bromoform	0.0200	0.0215		mg/L		108	70 - 130
Chlorodibromomethane	0.0200	0.0192		mg/L		96	70 - 130
Chloroform	0.0200	0.0180		mg/L		90	70 - 130
Dichlorobromomethane	0.0200	0.0186		mg/L		93	70 - 130

Surrogate	LCS %Recovery	LCS Qualifier	Limits
4-Bromofluorobenzene	107		70 - 130
1,2-Dichlorobenzene-d4	98		70 - 130

Lab Sample ID: LCSD 680-500502/5

Matrix: Water

Analysis Batch: 500502

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
Bromoform	0.0200	0.0214		mg/L		107	70 - 130	1	30
Chlorodibromomethane	0.0200	0.0190		mg/L		95	70 - 130	1	30
Chloroform	0.0200	0.0178		mg/L		89	70 - 130	1	30
Dichlorobromomethane	0.0200	0.0186		mg/L		93	70 - 130	0	30

Surrogate	LCSD %Recovery	LCSD Qualifier	Limits
4-Bromofluorobenzene	108		70 - 130
1,2-Dichlorobenzene-d4	97		70 - 130

TestAmerica Tampa

QC Association Summary

Client: ARCADIS U.S. Inc
Project/Site: City of Venice/Distribution system

TestAmerica Job ID: 660-83599-1

GC/MS VOA

Analysis Batch: 500502

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-83599-1	Dist. 3-1	Total/NA	Water	524.2	
660-83599-4	Dist. 4-1	Total/NA	Water	524.2	
MB 680-500502/10	Method Blank	Total/NA	Water	524.2	
LCS 680-500502/4	Lab Control Sample	Total/NA	Water	524.2	
LCSD 680-500502/5	Lab Control Sample Dup	Total/NA	Water	524.2	

Lab Chronicle

Client: ARCADIS U.S. Inc
Project/Site: City of Venice/Distribution system

TestAmerica Job ID: 660-83599-1

Client Sample ID: Dist. 3-1

Date Collected: 10/25/17 07:57

Date Received: 10/25/17 13:42

Lab Sample ID: 660-83599-1

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	524.2		1	500502	10/30/17 18:30	DAS	TAL SAV

Client Sample ID: Dist. 4-1

Date Collected: 10/25/17 08:31

Date Received: 10/25/17 13:42

Lab Sample ID: 660-83599-4

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	524.2		1	500502	10/30/17 18:55	DAS	TAL SAV

Laboratory References:

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

Method Summary

Client: ARCADIS U.S. Inc
Project/Site: City of Venice/Distribution system

TestAmerica Job ID: 660-83599-1

Method	Method Description	Protocol	Laboratory
524.2	Total Trihalomethane Calculation	EPA-DW	TAL SAV

Protocol References:

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

Laboratory References:

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

Accreditation/Certification Summary

Client: ARCADIS U.S. Inc
Project/Site: City of Venice/Distribution system

TestAmerica Job ID: 660-83599-1

Laboratory: TestAmerica Tampa

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

Authority	Program	EPA Region	Identification Number	Expiration Date
Florida	NELAP	4	E84282	06-30-18
Georgia	State Program	4	905	06-30-18
USDA	Federal		P525-170731-001	09-25-20

Laboratory: TestAmerica Savannah

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	EPA Region	Identification Number	Expiration Date
L-A-B	DoD ELAP		L2463	09-22-19

The following analytes are included in this report, but accreditation/certification is not offered by the governing authority:

Analysis Method	Prep Method	Matrix	Analyte
524.2		Water	Bromoform
524.2		Water	Chlorodibromomethane
524.2		Water	Chloroform
524.2		Water	Dichlorobromomethane
524.2		Water	Trihalomethanes, Total



Client Information (Sub Contract Lab)				Carrier Tracking No(s) 660-100471.1	
Client Contact Shipping/Receiving Company TestAmerica Laboratories, Inc.				Page: Page 1 of 1	
Address: 5102 LaRoche Avenue, City Savannah State Zip: GA, 31404 Phone: 912-354-7858(Tel) 912-352-0165(Fax) Email:				Job #: 660-83599-1	
Project Name: City of Venice Site:				Preservation Codes: A - HCL B - NaOH C - Zn Acetate D - Nitric Acid E - NaHSO4 F - MeOH G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA Other:	
Analysis Requested				Special Instructions/Note:	
Due Date Requested: 10/31/2017 TAT Requested (days):				Total Number of containers	
PO #: WO #: Project #: 66012122 SSOW#:				TTHM_Calc/ Trihalomethanes	
Sample Date 10/25/17 Sample Time 07:57 Eastern 08:31 Eastern				Field Filtered Sample (Yes or No) Perform MS/MSD (Yes or No)	
Sample Type (C=comp, G=grab) Preservation Code:				Matrix (W=water, S=solid, O=waste/oil, BT=tissue, A=air)	
Dist 3-1 (660-83599-1) Dist 4-1 (660-83599-4)				Water Water	
Sample Identification - Client ID (Lab ID)				Special Instructions/Note:	

Note: Since laboratory accreditations are subject to change, TestAmerica Laboratories, Inc. places the ownership of method, analyte & accreditation compliance upon out subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/matrix being analyzed, the samples must be shipped back to the TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to TestAmerica Laboratories, Inc. attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to TestAmerica Laboratories, Inc.

Possible Hazard Identification		Sample Disposal (A fee may be assessed if samples are retained longer than 1 month) <input type="checkbox"/> Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For Months	
Deliverable Requested: I, II, III, IV, Other (specify)		Special Instructions/OC Requirements:	
Empty Kit Relinquished by:		Method of Shipment:	
Relinquished by: <i>Gunnar Egan</i> Date/Time: 10/26/17 1700 Company: <i>MTA</i>		Received by: <i>M. Tye</i> Date/Time: 10/27/17 720 Company: <i>MTA</i>	
Relinquished by:		Received by:	
Relinquished by:		Received by:	
Custody Seals Intact: Yes No		Cooler Temperature(s) °C and Other Remarks 0.9°C (RF) 1.1°C 1.2°C (AF) 1.4°C 2.4°C (AF) 2.6°C 1.9°C (AF) 1.9°C	

Login Sample Receipt Checklist

Client: ARCADIS U.S. Inc

Job Number: 660-83599-1

Login Number: 83599

List Number: 1

Creator: Edwards, Erricka

List Source: TestAmerica Tampa

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.	True	
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").	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: ARCADIS U.S. Inc

Job Number: 660-83599-1

Login Number: 83599

List Number: 2

Creator: Tyler, Matthew M

List Source: TestAmerica Savannah

List Creation: 10/27/17 09:03 AM

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?	N/A	
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").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

APPENDIX B

Example Sodium Hypochlorite Specification



TECHNICAL SPECIFICATIONS FOR LIQUID SODIUM HYPOCHLORITE

1. GENERAL

The intent and purpose of this specification document is for delivery of liquid sodium hypochlorite (12.5 Trade Percent Available Chlorine) FOB destination in accordance with the American Water Works Association's (AWWA's) Standard B-300-99, latest revision for hypochlorite, except as modified or supplemented herein, to Tampa Bay Water, A Regional Water Supply Authority's Brandon Urban Dispersed Well No. 7 located at 1702 Miller Road Valrico, FL 33594-4736.

2. VENDOR QUALIFICATION / SUBMITTALS

- 2.1 Bid Sample: Each prospective vendor shall submit a 1500 ml "chilled" sample of their product representative of their manufacturing process from prospective vendor's manufacturing facility which would serve the customer to one of the approved testing laboratories listed in this Specification for analysis within the past ninety (90) days. The laboratory shall ascertain whether the prospective vendor's product is in compliance with this Specification for available chlorine, % sodium hypochlorite, excess caustic, iron, copper, nickel, chlorate, bromate and suspended solids (based on Filter Test time). The cost of the analysis shall be borne by prospective vendor. The results of the analysis shall be submitted with the prospective vendor's proposal. Failure to submit a sample or meet the requirements of the Specification shall result in prospective vendor being disqualified.
- 2.2 Other Samples: Further, Tampa Bay Water reserves the right to take samples from prospective vendor's other customers to ensure that the prospective vendor's sample and delivery equipment is in compliance with all the requirements of this Specification and such a sample shall be judged representative of the prospective vendor's quality. The prospective vendor shall provide a customer contact and phone number in either Pasco or Hillsborough County whereby Tampa Bay Water may obtain sample of prospective vendor's product to check it for compliance with the Specification. Tampa Bay Water may choose to obtain a sample from this customer or from any of prospective vendor's customers to ensure compliance with the Specification. In such event, Tampa Bay Water shall bear the cost of any analysis. Based on this compliance check, failure to meet the requirements of this Specification shall result in prospective vendor being disqualified.
- 2.3 Safety and Reliability: As part of assessing the prospective vendor's responsibility, reliability and safety record, the prospective vendor shall include all regulatory actions including but not limited to, copies of any fines, correspondence and consent orders relating to the operation of ALL of its manufacturing and distribution facilities. Additionally, the prospective vendor shall submit a copy of its OSHA Form 300A/300 logs for the past three years (if the prospective vendor utilizes a third party driving company or affiliated company, then they shall submit the OSHA 300 logs for that company as well). Tampa Bay Water may require a site visit to the prospective vendor's manufacturing and distribution facilities to assess their safety and reliability as

part of the bid evaluation process. Each prospective vendor shall provide the names of any customers where its vendor or purchase order was terminated early (e.g., debarred) for safety, quality, or service issues for any product it supplies over the past five years. The prospective vendor shall also provide a detailed listing of all accidents, incidents, releases, spills, vehicle accidents involving death or injury and National Response Center Notifications (“safety incidents”) for all chemicals it delivers or manufacturers for the past five (5) years. Failure to disclose references, terminations, or safety incidents may result in prospective vendor being disqualified from being awarded a purchase order for this product.

3. DELIVERY REQUIREMENTS

- 3.1 Vendor shall make “normal” deliveries within 48 hours after receipt of order and must make “emergency” deliveries within 24 hours. An emergency delivery is defined as a delivery which is necessary in order to prevent Tampa Bay Water from running out of sodium hypochlorite in less than 24 hours. Tampa Bay Water shall endeavor to minimize the number of “emergency” deliveries.
- 3.2 All deliveries of liquid sodium hypochlorite shall be freight prepaid, F.O.B. to 1702 Miller Road Valrico, FL 33594-4736. The site has limited access. Smaller than normal transportation equipment may be required (see attached Site Plan).
- 3.3 The storage tank volume is 4,000 gallons; there are two 2,000 gallon tanks.
- 3.4 Estimated usage is 83 gallons per day.
- 3.5 Delivery time of day shall be arranged upon placement of order and shall be between the hours of 8:00 A.M. and 4:30 P.M. Requests to deviate from this schedule must be confirmed with Tampa Bay Water 48 hours prior to the scheduled delivery and must conform to the delivery conditions set forth in these specifications. Deliveries made to unmanned facilities must be coordinated with Tampa Bay Water so delivery personnel can gain access to the facility.
- 3.6 Packaging and shipment of liquid sodium hypochlorite shall conform to all current regulations of the State of Florida, the United States Department of Transportation and all other applicable regulatory agencies.
- 3.7 All delivery personnel must have company cell phones to facilitate deliveries to unmanned and manned facilities.
- 3.8 Tampa Bay Water reserves the right to change quantities and delivery dates at its discretion with a 24-hour notice.
- 3.9 The vendor shall be responsible for pumping liquid sodium hypochlorite into the storage tanks at the delivery site and shall provide all necessary hoses, fittings, air-padding, pumps, etc. required to safely and efficiently “offload” the liquid sodium hypochlorite into designated storage tanks. Vendor shall furnish a Tampa Bay Water approved, leak-free connection device between the vehicle and Tampa Bay Water’s

intake receptacle. Vendor shall be responsible for ascertaining the correct storage tanks and fill point locations to prevent accidental discharge of the product into the wrong storage tank(s).

- 3.10 The vendor shall be responsible for any spills resulting from the failure of its or its subcontractor's delivery equipment or from failure of attendant delivery personnel in the proper performance of their duties. Proper performance shall require delivery personnel's constant inspection and observation of unloading operations and knowledgeable response to problems or emergencies, which would most commonly be expected to occur. Tampa Bay Water reserves the right to refuse any and all deliveries made with equipment that is poorly maintained and/or leaking sodium hypochlorite. The vendor shall observe the entire filling operation at each delivery site and shall immediately report any spills caused during the filling operations. The vendor shall take immediate and appropriate actions to clean up any spilled liquid sodium hypochlorite. If the spill is not cleaned up, Tampa Bay Water will hire a certified hazardous material handling company to clean up the spill, and the cost of such service will be charged to the vendor and deducted from the amount due to the vendor. If the Tampa Bay Water's unloading equipment such as pipe, valves or level indication and alarms should fail and the spillage is not the fault of the vendor or its subcontractor, the vendor shall be relieved of cleanup of the spill.
- 3.11 The transporting equipment shall be clean and free of residue that may contaminate the vendor's product or impede the unloading process. It is the vendor's responsibility to verify the cleanliness of the transporting equipment before loading. All appurtenant valves, pumps, and discharge hoses used for the delivery of sodium hypochlorite shall be supplied by the vendor and shall be clean and free from contaminating material. Tampa Bay Water may reject a load if the equipment is not properly cleaned.
- 3.12 All delivery vehicle drivers shall have a proper commercial driver's license issued through the State of Florida with a Hazardous Material endorsement.
- 3.13 Delivery Shipments shall be rejected which fail to meet any of the requirements of the Specification. In the event a delivery shipment is rejected, upon notification to the vendor that the shipment is rejected, vendor shall be required to ship a replacement delivery to the affected location within four (4) hours from time of notification. Failure to provide replacement product that meets the Specification within the specified time period will constitute failure to comply with the delivery requirements set forth in this document.

4. PRODUCT MATERIAL REQUIREMENTS

- 4.1 Hypochlorite supplied under this purchase order shall be tested and certified as meeting the Specification, the AWWA Standard B300-99, latest revision and those of the American National Standards Institute/National Sanitation Foundation Standard 60 (ANSI/NSF Standard 60), Drinking Water Treatment Chemicals Health Effects.
- 4.2 It is the responsibility of the vendor to inform Tampa Bay Water that NSF or UL certification has been revoked or lapsed within 24 hours of the time the supplier

receives verbal or written notification. Loss of certification shall constitute sufficient grounds for immediate termination of the purchase order from Tampa Bay Water.

- 4.3 Liquid sodium hypochlorite delivered under this Specification shall have a minimum of 125 Grams per Liter (GPL) available chlorine equivalent (a.k.a., 12.5 Trade Percent Available Chlorine) and shall be consistent as determined by chemical analysis.
- 4.4 Product shall be a clear straw colored liquid with no visible cloudiness, impurities, or sediment. It shall contain no soluble materials or organic substances in quantities capable of producing deleterious or injurious effects on the health of those consuming water treated with the liquid sodium hypochlorite.
- 4.5 Liquid sodium hypochlorite delivered under this Specification shall have a minimum of 0.15 percent by weight sodium hydroxide and a maximum of 0.40 weight percent sodium hydroxide.
- 4.6 Liquid sodium hypochlorite delivered under this Specification shall have not more than 0.15% insoluble matter by weight.
- 4.7 Liquid sodium hypochlorite delivered under this purchase order shall meet the following containment concentration limits:

Iron	< 0.3 mg/L
Copper	< 0.03 mg/L
Nickel	< 0.03 mg/L
Chlorate	< 2,000 mg/L
Bromate	< 20 mg/L
- 4.8 The delivery time of the shipment shall not exceed 72 hours from the time of manufacture of the liquid sodium hypochlorite.
- 4.9 The suspended solids in the sodium hypochlorite delivered under this purchase order shall be minimized and the shipments delivered shall achieve a filtration time of less than 3 minutes for 1000 ml when applying the "Suspended Solids Quality Test for Bleach Using the Vacuum Filtration" Method co-developed by Dr. Bernard Bubnis of NovaChem and previously referenced in this Specification.

5. QUALITY ASSURANCE, SAFETY AND TRAINING

5.1 Sampling and Testing

- 5.1.1 All Sampling and Testing shall be in accordance with EPA and AWWA B300-99 standards, latest revision and in accordance with the documents titled: "The Weight Percent Determination of Sodium Hypochlorite, Sodium Hydroxide, And Sodium Chlorate in Liquid Bleach" and "Suspended Solids Quality Test for Bleach Using Vacuum Filtration", distributed by Powell Fabrication and Manufacturing, Inc. and available at <http://www.powellfab.com>.

- 5.1.2 The approved laboratories are listed below for all sampling and. No other Laboratory shall be used unless authorized by Tampa Bay Water.

NovaChem Laboratories (formerly Novatek)
5172 College Corner Pike
PO Box 608
Oxford, Ohio 45056
Ph: 513-523-3605
Fax: 513-523-4025

Thornton Laboratories
1145 East Cass Street
Tampa, Florida 33602
Ph: 813-223-9702
Fax: 813-223-9332
Attn: Steve Thickett

- 5.1.3 Sampling and Testing Prior to Unloading: The vendor's transportation equipment shall have a sample port to provide a sample for analysis prior to hooking up and transferring the load to a Tampa Bay Water storage tank. At the sole discretion of Tampa Bay Water, the vendor's delivery personnel (driver) may be asked to provide a sample of liquid sodium hypochlorite before transferring the load to a Tampa Bay Water storage tank. Tampa Bay Water will supply the sample container and the driver shall collect the sample from the transportation equipment and turn it over to a Tampa Bay Water representative. The sample shall be considered representative of the load. Tampa Bay Water reserves the right to subject samples of the liquid sodium hypochlorite to quick analyses to ensure that it meets basic conditions of the specification with respect to specific gravity, weight percent of sodium hypochlorite, sodium hydroxide, and suspended solids. Any load tested by Tampa Bay Water that fails to comply with the Specification shall constitute grounds for rejection of that load. No payment shall be made for sodium hypochlorite that is rejected. The vendor or its subcontractors shall allow 60 minutes for this testing to be completed. If testing cannot be completed within the 60 minute period, Tampa Bay Water shall allow the vendor to transfer the load. In the event that the load is rejected, the vendor shall have four (4) hours to supply another shipment. In the event that the vendor is unable or unwilling to supply another shipment within this time period, Tampa Bay Water has the right to procure a shipment from another source. Three rejections of a load or shipment during any period of this purchase order shall constitute automatic termination of the vendor's purchase order from Tampa Bay Water.
- 5.1.4 Sampling and Test of Shipment after Unloading. Tampa Bay Water reserves the right to subject samples of the liquid sodium hypochlorite to complete analyses to ensure that it meets EPA specifications, AWWA B300-99 specifications, latest revision, and the Specification. Three failures during any period of this purchase order shall constitute automatic termination of the vendor's purchase order from Tampa Bay Water.
- 5.1.5 Certified Analysis. Vendor shall supply an affidavit, signed by a corporate designated official, certifying that the liquid sodium hypochlorite furnished by the vendor, complies with all applicable requirements of this Specification and AWWA Standard B300-99, latest revision. The affidavit shall also indicate compliance with Water Chemicals Codex directives, latest revision, for impurity limits.

5.2 Manufacturer's Laboratory Delivery Reports

5.2.1 A certified report from the manufacturer shall be submitted for each liquid sodium hypochlorite delivery to Tampa Bay Water.

5.2.2 The report shall contain the following data:

- Date and Time of Manufacture
- Percent by Weight Sodium Hypochlorite
- Percent by Weight Excess Sodium Hydroxide
- Specific Gravity (Referenced to a temperature)
- Suspended Solids Test Time

5.2.3 No deliveries will be accepted by the Tampa Bay Water unless accompanied by said certified laboratory report for the specific batch of liquid sodium hypochlorite delivered showing the above data and that it conforms to the Specification. Failure to comply with this provision three (3) times during the purchase order period shall constitute sufficient grounds for termination of the purchase order from Tampa Bay Water.

5.3 Quarterly Reports

5.3.1 At the start of the purchase order and every 90 days, the vendor shall utilize one of the approved testing agencies listed in this Specification to analyze a sample of the liquid sodium hypochlorite delivered to Tampa Bay Water. The vendor shall supply the sample container and the driver shall collect the sample from the transportation equipment. This sample will be given to Tampa Bay Water at the time of the sample and Tampa Bay Water shall forward the sample to the approved authorized testing agency. Any failure to comply with the Specification shall constitute grounds for cancellation of the purchase order from Tampa Bay Water.

5.3.2 Charges for the manufacturer's certified report and all quarterly reports by outside testing agencies should be included in the quoted price.

6. OCCUPATIONAL HEALTH AND SAFETY

6.1 Vendor must ensure delivery personnel's compliance with all OSHA requirements, including personal protective equipment for vendor delivery personnel, including without limitation chemical goggles, transparent face shield and hard hat, rubber gloves, rubber boots, and rubber or plastic-coated fabric apron or slicker suit. Vendor delivery personnel must wear at minimum, chemical goggles and rubber gloves when handling hoses and valves.

6.2 Material Safety Data Sheets. In compliance with Chapter 442 Florida Statutes, any chemical delivered from the vendor must be accompanied by a Material Safety Data

Sheet (MSDS). The MSDS must be maintained by the user agency and must include the following information:

- The Chemical Name and the common name of the toxic substance
- The hazards and other risks in the use of the toxic substance, including:
 - The potential for fire, explosion, corrosivity and reactivity;
 - The known acute and chronic health effects of risks from exposure, including the medical conditions which are generally recognized as being aggravated by exposure to the toxic substance; and
 - The primary routes of entry and symptoms of overexposure.
- The proper precautions, handling practices, necessary personal protective equipment, and other safety precautions in the use of, or exposure to, the toxic substances, including appropriate emergency treatment in the case of overexposure.
- The emergency procedure for spills, fire, disposal and first aid.
- A description, in lay terms, of the known specific potential health risks posed by the toxic substance intended to alert any person reading this information.
- The year and month, if available, that the information was compiled and the name, address, and emergency telephone number of the manufacturer responsible for preparing the information.
- Any questions regarding this requirement shall be directed to:
Department of Labor and Employment Security
Bureau of Industrial Safety and Health
Toxic Waste Information Center
2551 Executive Center, Circle West
Tallahassee, Florida 32301-5014
Phone: 800/367-4378

6.3 Emergency Plan of Action and Safety Training

- 6.3.1 Within 30 days of award and acceptance of the purchase order for the supply of liquid sodium hypochlorite, the vendor shall provide in writing, an emergency contingency plan, with appropriate telephone contacts, for Tampa Bay Water to follow in case an emergency supply of liquid sodium hypochlorite is needed. The vendor shall supply in writing, an emergency spill response plan with appropriate emergency response personnel names (to include at least two degreed engineers who live within sixty miles of Tampa) and telephone contact numbers (24-hour contact numbers) within 30 days of award and acceptance of the purchase order to supply liquid sodium hypochlorite. In addition, the proper spill response notification procedure, along with any forms required by all local, state or federal regulatory agencies, shall be supplied by the vendor. This section in no way relieves the vendor of his responsibility to notify the proper regulatory agencies in the event of a spill incident. In the event of a spill or leak, the vendor shall supply the necessary personnel (including one degreed engineer) to immediately respond to such an event, to work with the local Hazardous Materials Response Team and to manage and oversee "After Event" cleanup efforts. Should a spill or leak occur, caused by vendor's personnel, equipment or method of delivery, vendor shall immediately comply with all applicable terms and conditions of the current version of Title III,

Superfund Amendments and Reauthorization Act of 1986, 42 U.S.C.S. 11001, et seq. (SARA) and the Florida Hazardous Materials Emergency Response and Community Right to Know Act of 1988, Chapter 252, Part II, Florida Statutes. The responsibility for compliance with Federal and State rules and regulations regarding vendor caused spills or releases shall be the sole responsibility of the vendor. The vendor shall indemnify and hold Tampa Bay Water harmless for any failure to properly report and /or comply with this provision. In addition, vendor shall bear all expenses of spills, unless caused by the sole negligence of Tampa Bay Water.

- 6.3.2 Safe Handling Training. The vendor shall provide an appropriate safe handling training course for liquid sodium hypochlorite within the first month of the purchase order, to current Tampa Bay Water operations personnel and shall be available to conduct “refresher” courses or new employee training at six (6) month intervals during the purchase order period. The vendor shall provide this assistance at no charge to Tampa Bay Water.
- 6.3.3 Technical Assistance. The vendor shall provide technical assistance, as needed, regarding the application of its product and disposal and handling of residues and sludge’s produced by the application of liquid sodium hypochlorite in the water treatment process. The vendor shall provide this assistance at no charge to Tampa Bay Water.

7. TERMINATION

In addition to the various statements in this Specification stating the grounds for automatic termination of the vendor’s purchase order to supply liquid sodium hypochlorite to Tampa Bay Water, and in addition to any other remedies, including the right to obtain cover and charge vendor for the costs of cover vendor’s failure to comply with this Specification three (3) times over the duration of this purchase order shall constitute sufficient grounds for termination of the purchase order by Tampa Bay Water. These failures any three of which can result in termination of the purchase order, include, but are not limited to, failure to deliver in a timely manner, failure to deliver with proper equipment, failure of the liquid sodium hypochlorite to meet the Specification at anytime, failure to provide a certificate of analysis, failure to comply with the safety and OSHA requirements of the Specification, failure to provide drivers with company cell phones, failure to provide requested technical assistance and/or training and failure to respond in a timely manner to any Tampa Bay Water emergency.

8. SECURITY PROVISIONS

- 8.1 All Shippers and vendors shall provide Tampa Bay Water with a summary of the actions taken to reduce the possibility of criminal activity during packaging and shipment of products and materials to our facilities.
- 8.2 All vendors (and their transportation companies) shall send a list of names of representatives that are authorized to enter our facilities on their behalf. This list will be kept current with any personnel changes being reflected on the list.

- 8.3 All delivery personnel must have a photo ID and appropriate company identification.
- 8.4 All vendors and delivery personnel must sign in and out of Tampa Bay Water facilities. The purpose of their visit will be verified and validated by Tampa Bay Water personnel.
- 8.5 Chemical deliveries will strictly follow Tampa Bay Water bulk off-loading policy and procedure where applicable.
- 8.6 No unscheduled or after-hours deliveries will be accepted without written permission from Tampa Bay Water.
- 8.7 All deliveries must be made through the main entrance.

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Arcadis U.S., Inc.

3109 West Dr. Martin Luther King Jr. Boulevard

Suite 350

Tampa, Florida 33607

Tel 813 903 3100

Fax 813 903 9115

www.arcadis.com

A decorative graphic consisting of three thin orange lines. One line is horizontal, extending from the left edge of the page towards the right. Two other lines are diagonal, starting from the bottom left and extending towards the top right, intersecting the horizontal line.