2019 Water Quality Report

U.S. Army Corps of Engineers Saint Louis District

Mark Twain Lake Water Quality Conditions: 2014-2019



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Prepared for

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EXECUTIVE SUMMARY

The United States Army Corps of Engineers (USACE) commitment to environmental compliance and protection of estuaries, rivers, lakes, and navigable waters arises from the national policy and directives expressed in Federal Statutes, Executive Orders, and internal regulations. These regulations were designed to minimize pollution, maximize recreation, protect aesthetics, preserve natural resources, and promote the comprehensive planning and use of water bodies to enhance the public interest rather than private gain; therefore, USACE, in the design, construction, management, operation, and maintenance of its facilities, will exert leadership within existing authorities and appropriations in the nationwide effort to protect, enhance, and sustain the quality of the nation's resources. It is USACEs policy to comply with requirements of the Clean Water Act and not to degrade existing water quality conditions to the maximum extent that is practicable, consistent with project authorities, Federal legal and regulatory requirements, the public interest, and water control manuals.

The United States Army Corps of Engineers, Saint Louis District (CEMVS), implemented a water quality monitoring program during the 1970s to evaluate how its civil projects may be affecting water resources. Data collected from this effort serves as an invaluable tool for evaluating the significance of annual water quality measurements and tracking long-term trends. Water quality data is provided to the Missouri Department of Natural Resources and the Illinois Environmental Protection Agency to be used as a screening mechanism for the Missouri and Illinois Water Quality Report which is required every two years by the Clean Water Act Sections 303(d) and 305(b).

The National Water Quality Inventory Report to Congress (305(b) report) is the primary vehicle for informing law makers and the public about general water quality conditions in the United States. This document characterizes our water quality, identifies widespread water quality problems of national significance and describes various programs implemented to restore and protect our waters. The 2018 water quality report compiled by the Missouri Department of Natural Resources (MDNR) has listed the following impairments: Middle Fork Salt River impaired for total suspended solids and dissolved oxygen, South Fork Salt River as impaired for dissolved oxygen, Black Creek Tributary to the North Fork Salt River as impaired for E. coli, North Fork Salt River and Mark Twain Lake as impaired for mercury, and the Salt River below the dam as impaired for mercury and dissolved oxygen.

Water quality sampling in 2019 revealed the following concerns at Mark Twain Lake: dissolved oxygen, Atrazine, total suspended solids, iron, manganese, and total phosphorus.

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INTRODUCTION

The Mark Twain Lake watershed is comprised of 2,318 square miles with an additional 29 square miles draining into the re-regulation pool. The North Fork of the Salt River is the major drainage channel, draining 626 square miles (27% of the drainage area). The North Fork is 88.0 miles in length, has an average gradient of 4.5 feet per mile and has a maximum elevation of approximately 1,000 feet. The Middle Fork, Elk Fork and South Fork of the Salt River are the other major tributaries to Mark Twain Lake. The Middle Fork drains 356 square miles (15%), is 65.4 miles in length, has an average gradient of 5.1 feet per mile and has a maximum elevation of approximately 940 feet. The Elk Fork drains 262 square miles (11%), is 34.8 miles in length, has an average gradient of 7.9 feet per mile and has a maximum elevation of approximately 880 feet. The South Fork drains 298 square miles (13%), is 38.0 miles in length, has an average gradient of 7.2 feet per mile and has a maximum elevation of 880 feet. Combined, the North Fork, Middle Fork, Elk Fork and South Fork drain a total of 1,542 square miles, which is 66% of the Mark Twain Lake watershed.

The Mark Twain Lake watershed is a gently undulating plain in the upstream portion and it becomes more rolling and hilly in the downstream reaches. High rock bluffs border the streams at various locations. The river valleys are characterized by fairly narrow, tortuous courses interspersed by areas of widened bottomlands. Hickory and oak groves are scattered among crop and grazing lands. Strip mining in the South Fork watershed may produce acid runoff. Several clay pits in the southwestern portion of the Mark Twain Lake watershed account for some colloidal suspension, which increases the turbidity of the lake.

Clarence Cannon Dam and Mark Twain Lake are located on the Salt River in northeastern Missouri, generally in Monroe and Ralls Counties. The main dam site is located in Ralls County at mile 63.0 on the Salt River, approximately 12 miles southeast of Monroe City, Missouri. A re-regulation dam is located approximately 9.5 miles downstream from the main dam site. The project area is served on the north by U.S. Highway 24, and on the south by State Highway 154. State Highway 107 bisects the project area from north to south, and provides a major reservoir crossing near Florida, Missouri. State Highway J crosses the main dam, and is the primary north-south transportation corridor on the eastern side of the lake.

Several areas have been developed at Mark Twain Lake for the visiting public to enjoy a variety of outdoor recreational experiences. The most common activities engaged in are fishing, boating, water-skiing, sailing, camping, picnicking, swimming and hunting. Developed facilities available at the lake include a visitor center, four campgrounds, three group camping areas, five picnic areas, 21 boat launching areas, five nature trails, two marinas, and three beaches. Hunting and fishing opportunities are available on all Corps of Engineers lands and waters except where restricted and posted due to recreational development or safety.

Mark Twain Lake is managed and operated by the CEMVS for the authorized purposes of flood risk management in the Salt River Basin, hydroelectric power generation, water supply, fish and wildlife conservation, recreation, and incidental navigation. The lake serves as a heavy recreational usage lake. The land surrounding the lake is used predominately for agriculture. Agricultural runoff and municipal wastewater treatment facilities are the primary potential source of pollution into the Mark Twain Lake watershed. Additional sources are marinas, recreational watercraft discharges and wildlife fecal material runoff.

Water quality is of paramount importance for sustaining ecological integrity and services provided by Mark Twain Lake. Water quality is influenced by a range of both point and nonpoint pollution sources, which may include natural processes, industrial and municipal effluents, and surface runoff from agricultural arenas.

The Saint Louis District (CEMVS) of United States Army Corps of Engineers (USACE) has implemented a Water Quality Management Plan (WQMP) as part of the operation and maintenance activities associated with managing USACEs' civil works projects throughout the District which includes, among other reservoirs and rivers, the Mark Twain Lake and watershed. The WQMP addresses surface water quality management issues and adheres to the guidance and requirements specified by Clean Water Act (CWA), as well as the self-imposed Engineering Regulation (ER) 1110-2-8154, "Water Quality and Environmental Management for USACE Civil Works Projects" (USACE, 2018). Water quality monitoring is implemented to fulfill five primary objectives that drive the CEMVS WQMP:

- 1) Establish baseline conditions, identify significant water quality trends, and document problems and accomplishments.
- Ensure that surface water quality, as affected by CEMVS projects, is suitable for project purposes, existing water uses, public health and safety, and in compliance with applicable state and federal water quality standards.
- 3) Provide support to water control, project operations, and navigation for regulations and modifications.
- 4) Investigate special problems, design and implement modifications, and improve water management procedures
- 5) Establish and maintain strong working partnerships and collaborations with appropriate entities within and outside USACE regarding water quality.

This report is intended to document and assess water quality conditions occurring at Mark Twain Lake. The report describes conditions observed in 2019, as well as baseline data collected from 2014-2018. Additional historical data are available upon request.

MARK TWAIN LAKE WQMP COVERAGE

The WQMP for Mark Twain Lake includes water samples taken at the following locations: major tributaries (MTL-5, MTL-9, MTL-11, MTL-13), main body of the lake (MTL-22, MTL-33, MTL-66, MTL-77, Indian Creek Marina and Blackjack Marina), and just downstream of the dam (MTL-1 and MTL-12). See figures 1 and 2, and Table 1 for a site map and site coordinates.

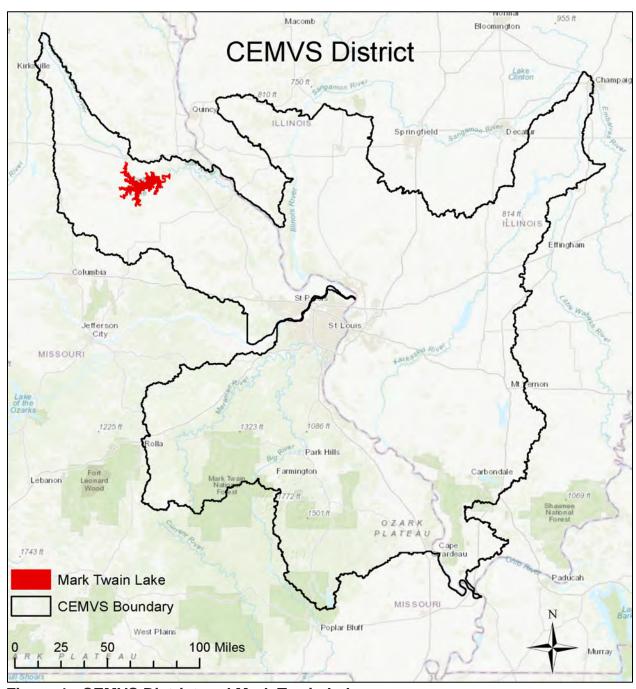


Figure 1. CEMVS District and Mark Twain Lake

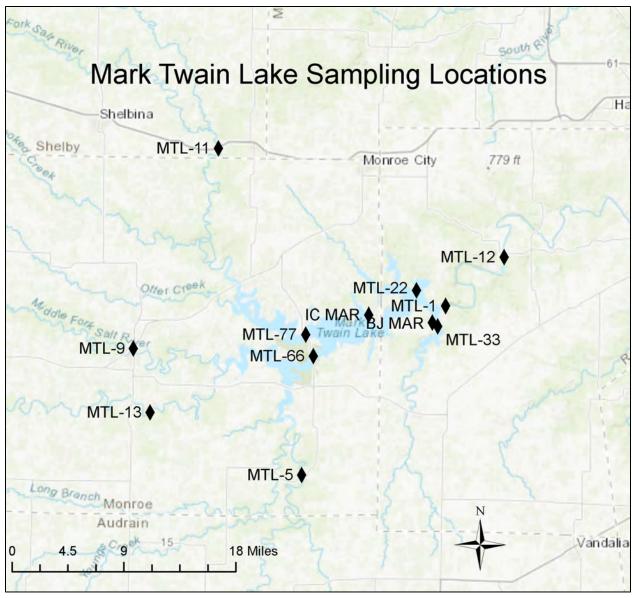


Figure 2. Water Quality (WQ) Sampling Locations in 2019 at Mark Twain Lake

Sample Location Summary Table

Table 1: Sample Location Summary and Geographic Location (NAD 1983)

Sample Location Type	Abbreviation	Site Name	Latitude	Longitude
Major Tributary	TRIB	MTL-5	39.374579	-91.805621
	TRIB	MTL-9	39.488315	-92.001401
	TRIB	MTL-11	39.667697	-91.9024
	TRIB	MTL-13	39.431077	-91.981933
Main Reservoir Surface	RS	MTL-22	39.540296	-91.672235
	RS	MTL-33	39.50815	-91.647435
	RS	MTL-66	39.481451	-91.792267
	RS	MTL-77	39.500849	-91.801118
	RS	MTL-IC MAR	39.518418	-91.727866
	RS	MTL-BJ MAR	39.511730	-91.653858
Reservoir Benthic	RB	MTL-22-15	39.540296	-91.672235
Tail Race (below main dam)	TR	MTL-1	39.526495	-91.638336
Tail Race (below re- regulation dam)	TR	MTL-12	39.570112	-91.570442

Samples at Marinas are not always taken in the exact same location. All MTL-22 and MTL-22-15 samples from 2019 on were taken from the profiler location in front of the dam (39.525714°, -91.647466°).

METHODS AND ANALYSIS: WATER QUALITY

Data Collection and Historical Reference Data

During 2019, water quality samples were collected and analyzed for 13 locations during four separate sampling events (n=52; Table 1). One duplicate sample was also collected during each sampling event for quality control purposes. Samples were collected from the upper one meter of the water column, preserved, and transported to the Applied Research and Development Laboratory (ARDL) in Mount Vernon, Illinois for analysis.

For the purpose of this report, historical reference data refers to water quality data collected during the previous five years (2014-2018). Historical reference data are intended to represent the current condition of Mark Twain Lake.

Statistical Summary and Comparison to Applicable Water Quality Standards

Statistical analyses were performed on water quality monitoring data collected for 13 locations, and classified as TRIB (n= 4), RS (n=6), RB (n=1), and TR (n=2). Descriptive statistics were calculated to describe central tendencies and corresponding 95% confidence levels for the geometric mean. Monitoring results were compared to applicable water quality standard criteria established by the appropriate state agencies pursuant to the Federal Clean Water Act. If a state water quality standard criteria was not available, recommended criteria from the literature were considered.

Seasonal data are classified as: Winter (December 01 - March 14), Spring (March 15 – May 31), Summer (June 1 – September 15), Fall (September 16 – November 30).

Quality Assurance

The United States Army Corps of Engineers, Saint Louis District quality assurance procedures considers two primary focus areas: (1) those that involve laboratory analysis of samples, and (2) those concerning the collection and processing of the water samples in the field.

Since 2012, ARDL has analyzed water quality samples for CEMVS. Their quality assurance program includes the use of quality control charts, check standards, field and in-house matrix spikes, laboratory blanks and performance evaluation samples. In addition, one blind duplicate sample is submitted for at least every 20 samples, or, in this case, every sampling event (one event/day at Mark Twain Lake has 13 samples and one duplicate).

Internal checks are also used for field sampling. This includes adherence to operating procedures for data collection and periodic evaluation of sampling personnel. Field sampling equipment and multimeters are calibrated/serviced in accordance with factory recommendations.

Water Quality Parameters and Criteria

Parameters used to characterize water quality have been generally accepted criteria for assessing aquatic life and human health include:

Temperature (Temp) is important because it controls several aspects of water quality. Colder water holds more dissolved oxygen which is required by aquatic organisms. Plants grow more rapidly and use more oxygen in warmer water. Decomposition of organic matter which uses oxygen is accelerated in warmer water. Temperature can also determine the availability of toxic compounds such as ammonia. Since aquatic organisms are cold blooded, water temperature regulates their metabolism and ability to survive. The number and kinds of organisms that are found in streams or lakes is directly related to temperature. Certain organisms require a specific temperature range, such as Salmonids, which require water temperatures below 20°C. Water temperature criteria for warm water bodies in Illinois is within 2.8°C of the seasonal norm.

<u>Dissolved Oxygen (DO)</u> refers to the measurement of free oxygen molecules (O_2) that are not bonded to any other elements; thus, oxygen bonded in water (H_2O) would not be considered in a measurement of dissolved oxygen. Oxygen is dissolved in surface waters through interactions with the atmosphere and as a waste product of photosynthesis ($CO_2 + H_2O$ (CH_2O) + O_2) from phytoplankton and aquatic vegetation. Additional factors influencing DO include temperature, pressure, and salinity.

Dissolved oxygen is required for most aquatic life including fish, invertebrates, bacteria, and plants. Fish and invertebrates utilize DO for respiration through gills and cutaneous breathing, and plants

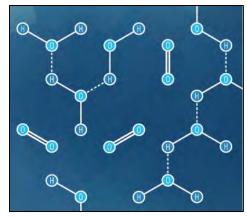


Figure 1: Dissolved oxygen (O_2) vs oxygen bonded in water (H_2O) .

require dissolved oxygen for respiration when photosynthesis is not possible. Smaller microbes and bacteria utilize DO for decomposition of organic materials, a process essential for nutrient cycling. Bottom feeders such as worms and mussels can persist when DO is $\geq 1 \text{mg/L}$, while most inland fish species require a minimum DO of 4 mg/L. The DO water quality criteria for Illinois is > 5 mg/L.

Potential of Hydrogen (pH) is a measure of how acidic or basic water is. Potential of Hydrogen is reported on a logarithmic scale ranging from 0 – 14, with 7.0 being neutral. As pH increases from 7.0, water increases in alkalinity, whereas a decrease from 7.0 indicates an increase in acidity. Since pH is measured on a logarithmic scale, every one-unit change in pH indicates a 10-fold change in acidity; thus, a pH of 6.0 is ten times more acidic than a pH of 7.0 and a pH of 4.0 would be one-thousand times more than a pH of 7.0.

The pH of water varies considerably beyond the local level. Natural variation in bedrock and soil composition through which water moves has been reported as one of the most influential factors. Additional factors include decomposition of organic materials, acidity of local precipitation, discharge of effluents and chemicals, and mining operations.

Most freshwater streams and rivers have a natural pH ranging from 6 to 8. As pH approaches 5 (acidic), less tolerant fish and aquatic invertebrate assemblages may be extirpated, and a pH below 4.5 would be without most desired aquatic life. Conversely, when pH exceeds 9.5 (alkaline), aquatic fish and invertebrates begin to rapidly decrease and beyond 10, fish become extirpated. The pH water quality criteria for Illinois ranges from 6.5 - 9.0.

<u>Conductivity</u> is a measure of water's ability to conduct electrical current. In its purist form, water has a *near* neutral charge, indicating that it is an inefficient conductor of electrical current. Thus the ability to carry electrical current is driven by water soluble ions (atoms and molecules with a charge) such as salts and other inorganic materials. Conductivity is also influenced by water temperature; as temperature increases, conductivity increases. For this reason, conductivity is commonly reported as Specific Conductivity (SpCond), which is the measurement of conductivity at 25 degrees Celsius.

Conductivity in streams and rivers is affected by the geology of the area. Streams running through granite tend to have lower conductivity due to granite being composed of inert material; materials that do not ionize or dissolve into ionic compounds in water. Conversely, streams that run through areas of limestone or clay soils tend to have higher conductivity readings because of the presence of materials that ionize. Conductivity is useful as a general measure of water quality. A stream tends to have a relatively constant range of conductivity that, once established, can be used as a baseline. Significant changes, either increases or decreases, might indicate a source of pollution has been introduced into the water. The pollution source could be a treatment plant, which raises the conductivity, or an oil spill, which would lower the conductivity. In general, there are no water quality criteria for SpCond. The District threshold of 500 μ S/cm is a rule of thumb value that is often associated with some form of biological impairment.

Oxidation Reduction Potential (ORP) is a measurement of the net status of all the oxidation and reduction reactions in a given water sample. Oxidation involves an exchange of electrons between 2 atoms. The atom that loses an electron is oxidized and the one that gains an electron is reduced. Oxidation reduction potential sensors measure the electrochemical potential between the solution and a reference electrode. Readings are expressed in millivolts. Positive readings indicate increased oxidizing potential and negative readings increased reduction. Oxidation reduction potential values are used much like pH values to determine water quality. While pH readings characterize the state of a system relative to the receiving or donating hydrogen ions (base or acid), ORP readings characterize the relative state of losing or gaining electrons. Generally ORP readings above 400mV are harmful to aquatic life; however,

ORP is a non-specific measurement, which is a reflection of a combination of effects of all the dissolved materials in the water. Therefore, the measurement of ORP in relatively clean water has only limited utility unless a predominant redox-active material is known to be present.

Total Suspended Solids (TSS) concentrations, which cause the photosynthetic activity to be reduced by more than 10% from the seasonably established norm, can have a detrimental effect on aquatic life. Soil particles, organic material, and other debris comprise suspended solids in the water column. Turbidity (FNU) measurements are inverse to suspended solid measurements. As TSS increases, the FNU or water transparency decreases. Total suspended solids can be an important indicator of the type and degree of FNU. Total Suspended Solids measurements represent a combination of Volatile Suspended Solids (VSS), which consist of organic material, and Nonvolatile Suspended Solids (NVSS), which is comprised of inorganic mineral particles in the water. In order to more accurately determine the types and amounts of suspended solids, VSS are analyzed. Volatile suspended solid concentration represents the organic portion of the total suspended solids. Organic material often includes plankton, and additional plant and animal debris present in water. Total VSS indicates the presence of organics in suspension; and, therefore, show additional demand levels of oxygen. Illinois Environmental Protection Agency (EPA) recommends that TSS not exceed 116 mg/L for streams and 12 mg/L for lakes. Illinois does not currently have a standard criteria for NVSS or VSS.

Total Organic Carbon (TOC) is a measure of the amount of organic carbon in a water body. In addition to natural organic substances, TOC includes insecticides and herbicides, as well as domestic and industrial waste. Industrial waste effluent may include carbon-containing compounds with various toxicity levels. Further, a high organic content means an increase in the growth of microorganisms which contribute to the depletion of oxygen supplies.

Currently, there are no state or federal water quality standard criteria set for TOC. Because carbon occurs naturally, its concentration varies based on physical and chemical attributes in a watershed; thus, this study relies on historical reference conditions to identify unfavorable conditions.

Metals Iron (TFe) and Manganese (TMn) (T=total) are nutrients for both plants and animals. Living organisms require trace amounts of metals. However, excessive amounts can be harmful to the organism. Heavy metals exist in surface waters in three forms, colloidal, particulate, and dissolved. Water chemistry determines the rate of adsorption and desorption of metals to and from sediment. Metals are desorbed from the sediment if the water experiences increases in salinity, decreases in redox potential, or decreases in pH. Metals in surface waters can be from natural or human sources. Metal levels in surface water may pose a health risk to humans and the environment.

<u>Pesticides</u> are commonly used throughout much of the agricultural landscape that the Big Muddy River flows. This study considers one insecticide and seven herbicides.

Atrazine and Alachlor herbicides are commonly used agricultural chemicals which can be readily transported by rainfall runoff. Both compounds are suspected of causing cancer; and therefore, were monitored for the protection of human and aquatic health. Herbicides which are pesticides used to kill vegetation are the most widely used and sampled. Two of the most widely used herbicides are Atrazine and Alachlor. Atrazine is a preemergence or postemergence herbicide use to control broadleaf weeds and annual grasses. Atrazine is most commonly detected in ground and surface water due to its wide use, and its ability to persist in soil and move in water. Alachlor is a Restricted Use Pesticide (RUP) due to the potential to contaminate groundwater. The water quality standards for the pesticides sampled are located in Table 2.

<u>Nitrogen</u> occurs naturally in water through several forms including nitrogen (N2), nitrite (NO2-N), nitrate (NO3-N), ammonia (NH3), and ammonium (NH4). Nitrates are the most commonly reported form of nitrogen, and may have a meaningful influence on a water body's trophic status. Algae and other plants use NO3-N as a food source, thus excess levels of NO3-N can promote increases in algae production and hypereutrophic conditions.

In general, NO3-N does not have a *direct* effect on fish or aquatic insects. Illinois has set criteria standards for NO3-N to 10 mg/L to accommodate safe drinking waters for human and livestock; however, this threshold likely exceeds the concentration that is appropriate for assessing ecosystem health.

<u>Total Ammonia Nitrogen (TAN)</u> includes NH3 and NH4. Total ammonia nitrogen is a colorless gas with a strong pungent odor. Ammonia occurs naturally and is a biological requirement for aquatic life, however elevated concentrations can be toxic to freshwater organisms. Unnatural sources of ammonia include, accidental releases of ammonia rich fertilizer, effluent from sewage treatment plants, improper disposal of ammonia products, and livestock waste.

Toxic concentrations for freshwater organisms range from 0.53 – 22.8 mg/L, and are strongly dependent on both pH and temperature. In general, an increase in pH and/or temperature corresponds with an increase in toxicity. Additional information in regards to the relationship between pH, temperature, and ammonia, as it relates to toxicity, can be reviewed in Aquatic Life Ambient Water Quality Criteria for Ammonia – Freshwater (USEPA 2013).

Total Phosphorus (TP) is analyzed as phosphorus, and has been monitored due to the potential for uptake by nuisance algae. Levels of phosphate can indicate the potential for rapid growth of algae (algae bloom) which can cause serious oxygen depletion during the algae decay process. Phosphorous is typically the limiting nutrient in a water body; therefore, any addition of phosphorous to the ecosystem stimulates the growth of plants and algae. Phosphorous is delivered to lakes and streams by way of runoff from agricultural fields and urban environments. Other sources of phosphorous are anaerobic decomposition of organic matter, leaking sewer systems, and point source pollution. The general standard for phosphorous in lake water is 0.05 mg/L. Dissolved

phosphorous, also called **Orthophosphate (PO₄-P)** is generally found in much smaller concentrations than total phosphorous, and is readily available for algal uptake. Orthophosphate concentrations in a water body vary widely over short periods of time as plants take it up and release it.

<u>Chlorophyll a (CHL_a)</u> is a measure of the amount of algae growing in a waterbody, and therefore can be used to classify trophic status. Although algae are a natural part of freshwater ecosystems, too much algae can cause aesthetic problems such as green scums and bad odors, and can result in decreased levels of DO.

<u>Pheophytin a (PHEO a)</u> is a natural degradation product or digestion of CHL_a. The ratio of PHEO_a to CHL_a can provide an indication of the decline or growth in eukaryotic algae and cyanobacteria populations.

<u>Trophic Status</u> is determined using a modified **Trophic State Index (TSI)**, as described by Carlson (1977). Trophic State Index is calculated from secchi-depth transparency, total phosphorus, and chlorophyll-a measurements. Values for these three parameters are converted to an index number ranging from 0-100 according to the following equations:

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TSI (Seechi Depth) = 10(6 - (\ln SD/\ln 2))
TSI (Chlorophyll-a) = TSI(Chl) = 10(6 - ((2.04 - 0.68 \ln Chl)/\ln 2))
TSI (Total Phosphorus) = TSI(TP) = 10(6 - (\ln (48/TP)/\ln 2))
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where In indicates the Natural Logarithm

A TSI average value, calculated as the average of the three individually determined TSI metrics, is used as an overall indicator of a water body's trophic state. The relationship between TSI and trophic condition is defined as follows:

TSI	Trophic Condition
0-40	Oligotrophic
40-60	Mesotrophic
60-70	Eutrophic
70-100	Hypereutrophic

Laboratory Methods and Water Quality Criteria Summary Table

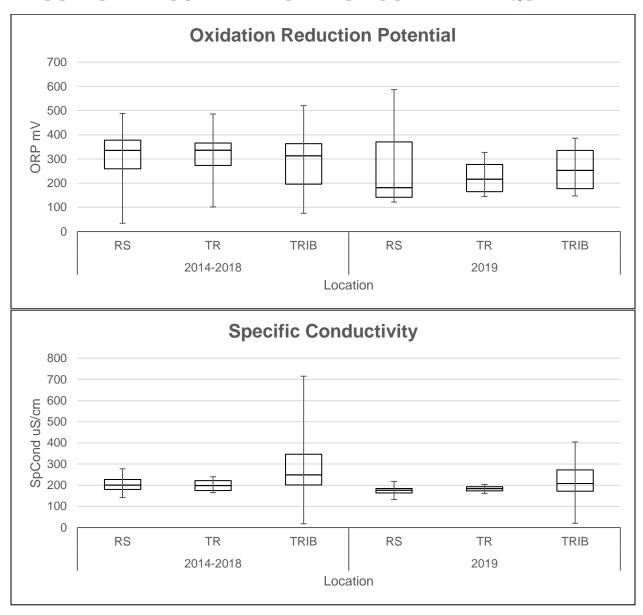
Table 2: Metrics, Methods, and Water Quality Criteria Used for Evaluating Water Quality

<u>Metric</u>	Abbreviation	Analysis Method	Water Quality Criteria	<u>Source</u>
Alachlor		EPA Method 8270C	< 2ug/L DWS	Missouri DNR
Ammonia Nitrogen	NH ₃	EPA Method 350.1	pH & temp dependent	Missouri DNR
Atrazine	Atrazine	EPA Method 8270C	3 ug/L DWS	Missouri DNR
Bacteria: E. Coliform	E Col	EPA Method 1604	1 10	
Chlorophyll a (1)	Chl_a	SM Method 10200H	Criteria: <30 ug/L, or screening value: <18 ug/L with any other eutrophication impacts	Missouri DNR
Chlorophyll a (2)	Chl_a	SM Method 10200H	< 25mg/cm³ (Eutrophic Upper Limit)	Carlson 1977
Chlorpyrifos			<.041 ug/L: chronic or 0.083: acute aquatic life, 20 ug/L DWS	Missouri DNR
Depth	Depth	Multiparameter Meter	Measurements reported at ~1 meter	
Dissolved Oxygen	DO	Multiparameter Meter	Greater than 5.0mg/L	Missouri DNR
Metolachlor		EPA Method 8270C	70 ug/L DWS	Missouri DNR
Metribuzin		EPA Method 8270C	100 ug/L DWS	Missouri DNR
Nitrate as Nitrogen	NO ₃	Green Method	< 10 mg/L	Missouri DNR
Non-Volatile Suspended Solids	NVSS	TSS - VSS		
Orthophosphate	Ortho	EPA Method 365.2		
Pheophytin a	Phpy_a	SM Method 10200H		
Potential of Hydrogen	pН	Multiparameter Meter	Range: 6.5 – 9.0pH 4 day average	Missouri DNR
Secchi Disk	SD		1.093 meters	USEPA*
Specific Conductivity	SpCond	Multiparameter Meter	500 uS/cm	
Temperature	Temp	Multiparameter Meter	Less than rise of 2.77°C above normal seasonal temp. or above 32.22°C	Missouri DNR
Total Dissolved Solids	TDS	Multiparameter Meter	<250 mg/L	USEPA*
Total Manganese	TMn	EPA Method 6010C	< 0.05 mg/L	Missouri DNR

<u>Metric</u>	Abbreviation	Analysis Method	Water Quality Criteria	Source
Total Organic Carbon	TOC	EPA Method 415.1		
Total Iron	TFe	EPA Method 6010C	< 1 mg/L	Missouri DNR
Total Phosphorus	al Phosphorus TP EPA Meth		Screening value: <0.049 mg/L, with any other eutrophication impacts	Missouri DNR
Total Suspended Solids	TSS	EPA Method 160.2 < 116 mg/L: streams or <12 mg/L: lakes		
Trifluralin		EPA Method 8270C	< 5 ug/L: DWS	Missouri DNR
Turbidity	Turb	Multiparameter Meter		
Volatile Suspended Solids	VSS	EPA Method 160.4		

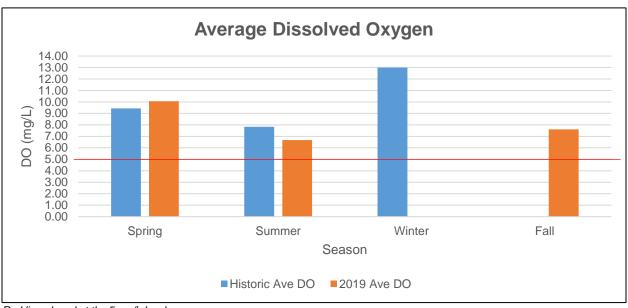
^{*1} mg/L is equivalent to 1 drop in two bathtubs and 1 ug/L is equivalent to 1 drop in an Olympic size swimming pool. PWS is public water supply. DWS is drinking water standard. WBC is whole body contact recreation. SCR is secondary contact recreation. USEPA* refers to the Federal EPA reference nutrient conditions for level III ecoregion 72 lakes and rivers.

RESULTS AND SUMMARY STATISTICS: WATER QUALITY



		<u>Histor</u>	ical Refere	ence 201	<u>4-2018</u>		<u>201</u>	<u>19</u>	
	1		NA - P	0	CL	N.4	N.A 11	0 - 1	CL
-	Location	Mean	Median	Count	(95.0%)	Mean	Median	Count	(95.0%)
SpCond	RS	204.17	200.55	70	7.26	177.16	176.50	22	8.98
	TR	198.96	198.40	16	13.01	182.88	183.55	4	28.66
	TRIB	290.50	249.00	80	30.61	222.74	208.30	20	41.76
ORP	RS	315.36	335.50	70	27.65	256.30	181.40	22	71.81
	TR	312.71	336.50	16	55.33	226.13	216.45	4	133.06
	TRIB	285.28	313.00	80	24.61	250.59	253.05	20	38.39

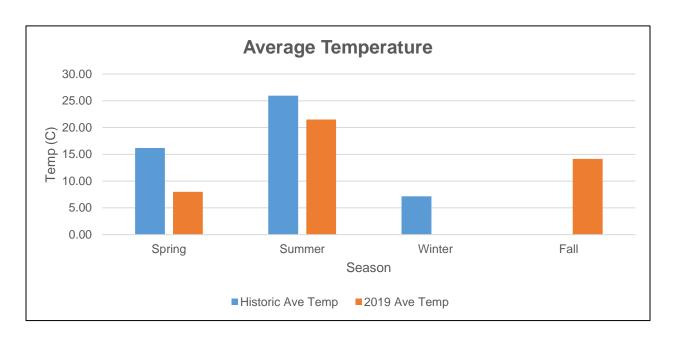
^{*}This report does not acknowledge a water quality criteria for SpCond or ORP.



Red line placed at the 5 mg/L level.

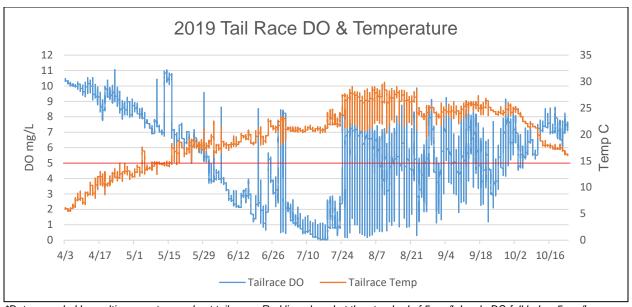
	<u>H</u>	istorical	Reference	2014-201	<u>8</u>		2	<u> 2019</u>	
					CL				CL
Season	Location	Mean	Median	Count	(95.0%)	Mean	Median	Count	(95.0%)
Spring	RS	9.81	9.81	20	0.55	9.63	9.52	4	1.18
	TR	10.76	10.20	4	2.11	10.18	10.18	1	
	TRIB	8.75	8.47	19	0.74	10.40	10.32	5	0.34
Summer	RS	7.34	7.22	42	0.31	6.99	6.80	12	0.91
	TR	7.82	7.91	10	0.81	7.25	7.25	2	20.90
	TRIB	8.25	7.62	50	0.59	7.18	7.28	10	0.51
Fall	RS					6.96	6.92	6	0.32
	TR					8.44	8.44	1	
	TRIB					9.66	9.61	5	1.50
Winter	RS	12.55	12.67	8	0.40				
	TR	13.32	13.32	2	2.73				
	TRIB	13.27	13.14	10	1.07				

^{*} During the four sampling events only one DO reading was recorded below the standard. On August 28, 2019 DO was recorded at 4.91 mg/L at MTL-66.

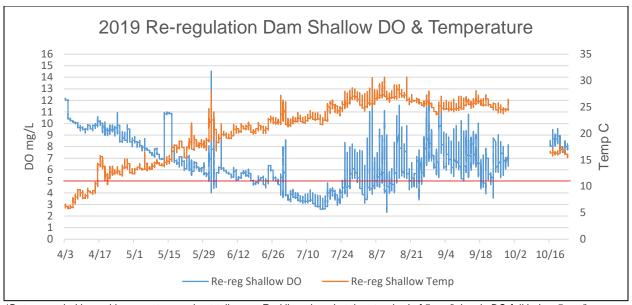


	<u>H</u>	istorical	Reference	2014-201	8		20	<u>19</u>	
					CL				CL
Season	Location	Mean	Median	Count	(95.0%)	Mean	Median	Count	(95.0%)
Spring	RS	15.64	16.75	20	1.67	7.88	7.90	4	1.99
	TR	13.46	13.73	4	3.09	6.10	6.10	1	
	TRIB	17.29	18.26	20	1.93	8.48	8.50	5	1.84
Summ									
er	RS	26.42	26.40	42	0.68	23.01	23.30	12	1.42
	TR	24.61	25.71	10	2.34	20.59	20.59	2	48.42
	TRIB	25.83	25.76	50	1.06	21.83	22.02	10	1.68
Fall	RS					15.46	15.56	6	0.49
	TR					16.00	16.00	1	
	TRIB					12.40	11.56	5	2.09
Winter	RS	6.07	6.08	8	1.55				
	TR	5.83	5.83	2	16.17				
	TRIB	8.32	8.51	10	2.35				

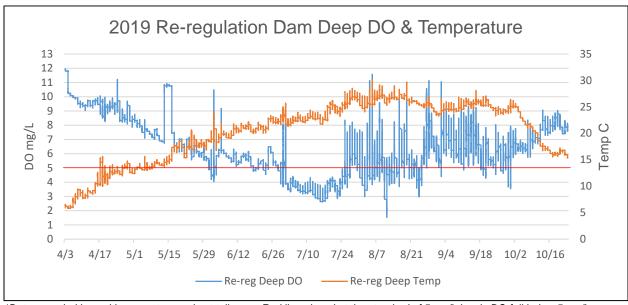
^{*} All recorded surface temperatures in 2019 were within the acceptable range when compared to the historical data.



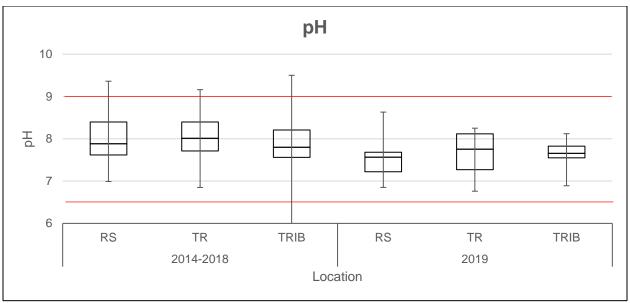
*Data recorded by multi-parameter sonde at tail race. Red line placed at the standard of 5 mg/L level. DO fell below 5 mg/L multiple times during 2019.



*Data recorded by multi-parameter sonde at tail race. Red line placed at the standard of 5 mg/L level. DO fell below 5 mg/L multiple times during 2019.



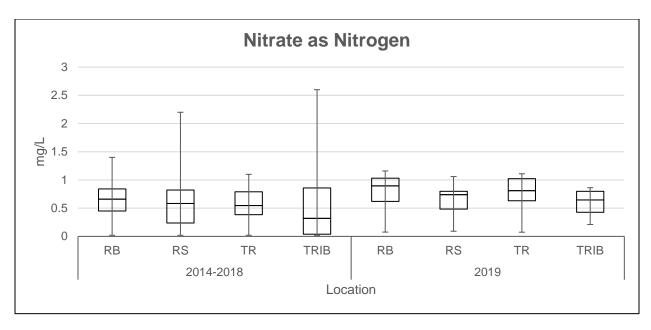
*Data recorded by multi-parameter sonde at tail race. Red line placed at the standard of 5 mg/L level. DO fell below 5 mg/L multiple times during 2019.

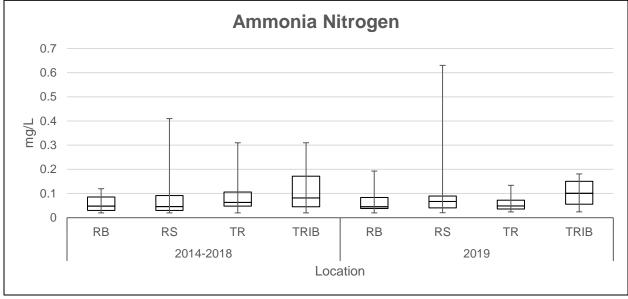


*Red lines indicate the upper and lower water quality criteria standards (between 6.5 and 9).

		<u>H</u>	listorical R	eference 2	2014-2018			2019		
				CL						
	Location	Mean	Median	Count	(95.0%)	Mean	Median	Count	(95.0%)	
рН	RS	7.99	7.88	64	0.14	7.56	7.57	22	0.20	
	TR	8.01	8.01	16	0.34	7.63	7.76	4	1.08	
	TRIB	7.82	7.80	80	0.16	7.66	7.66	20	0.14	

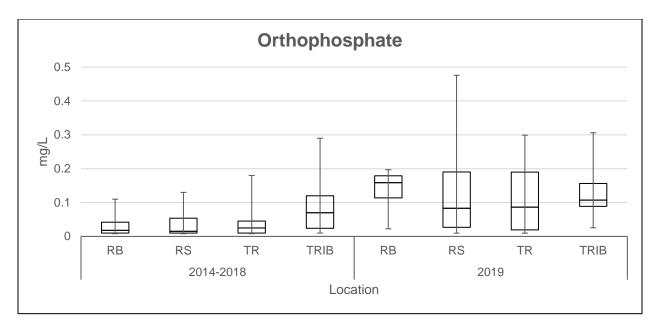
^{*}All pH readings were within the water quality standard during 2019.

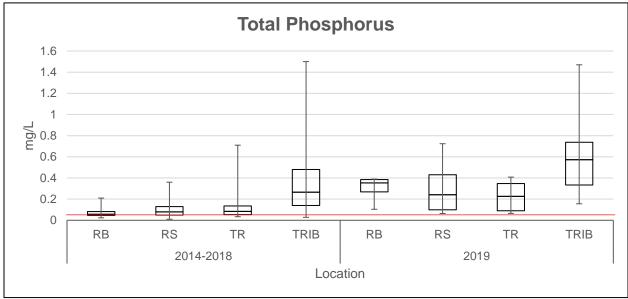




		Histo	rical Refe	rence 201	14-201 <u>8</u>			2 <u>019</u>	
					CL				
	Location	Mean	Median	Count	(95.0%)	Mean	Median	Count	CL (95.0%)
NO3N	RB	0.62	0.66	17	0.20	0.76	0.89	4	0.76
	RS	0.61	0.58	68	0.11	0.64	0.74	16	0.15
	TR	0.54	0.55	34	0.10	0.72	0.81	8	0.34
	TRIB	0.59	0.32	65	0.17	0.61	0.65	16	0.11
NH3N	RB	0.06	0.05	17	0.02	0.08	0.05	4	0.13
	RS	0.07	0.05	68	0.02	0.13	0.07	16	0.09
	TR	0.09	0.06	34	0.02	0.06	0.05	8	0.03
	TRIB	0.11	0.08	65	0.02	0.10	0.10	16	0.03

^{*}All observations of nitrate and ammonia nitrogen were within the water quality standard.

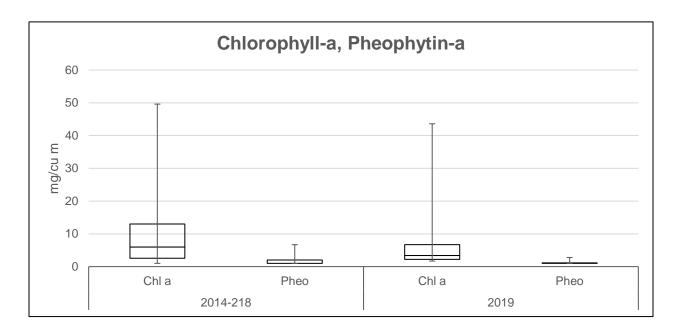




*Red line indicates the water quality standard of 0.049 mg/L.

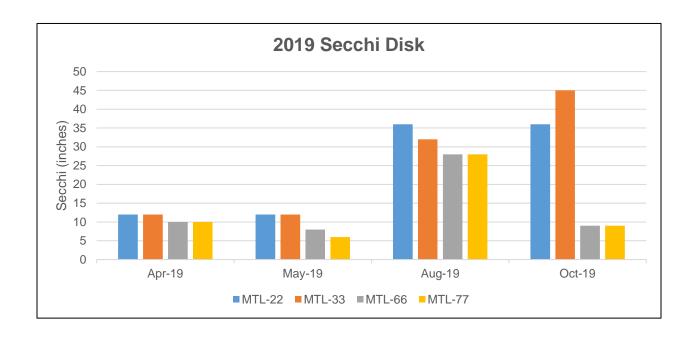
		Histo	rical Refe	rence 201	4-2018	<u>2019</u>			
					CL				CL
	Location	Mean	Median	Count	(95.0%)	Mean	Median	Count	(95.0%)
Ortho	RB	0.03	0.02	17	0.01	0.13	0.16	4	0.12
	RS	0.03	0.02	68	0.01	0.14	0.08	16	0.07
	TR	0.04	0.03	34	0.01	0.12	0.09	8	0.10
	TRIB	0.08	0.07	65	0.02	0.13	0.11	16	0.04
TP	RB	0.08	0.06	17	0.03	0.30	0.35	4	0.21
	RS	0.10	0.08	68	0.02	0.29	0.24	16	0.11
	TR	0.12	0.08	34	0.04	0.23	0.23	8	0.12
	TRIB	0.36	0.27	65	0.08	0.64	0.57	16	0.20

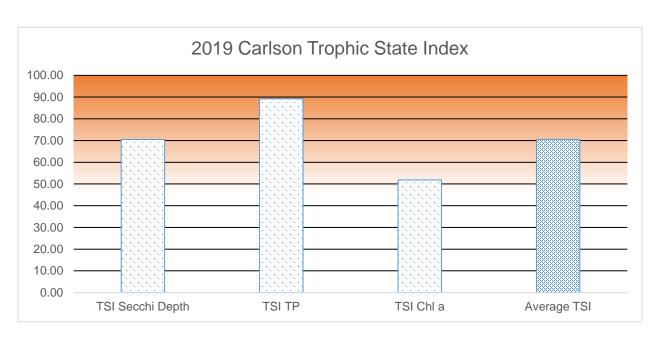
^{*}Total phosphorus exceeded the geometric mean screening value of 0.049 mg/L as well as at all locations. This study does not acknowledge a water quality criteria for orthophosphate.



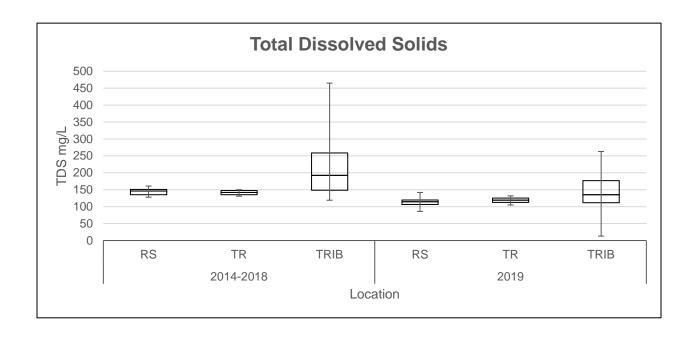
	Historical Reference 2014-2018 2019									
		CL(95.0							CL(95.0	
	Location	Mean	Median	Count	%)	Mean	Median	Count	%)	
Chl a	RS	9.08	6.00	67	2.25	8.74	3.40	16	6.46	
Pheo a	RS	1.95	2.00	67	0.25	1.21	1.00	16	0.25	

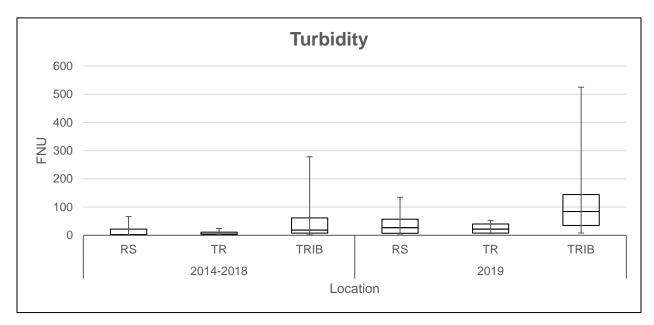
^{*}Based on the geometric mean, neither the criterion (30 mg/cu m) nor the screening value (18 mg/cu m) were exceeded in 2019.





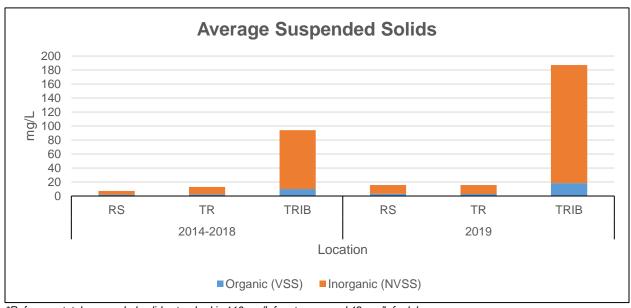
<40 = Oligotrophic ___ 40-60 = Mesotrophic ___ 60-70 = Eutrophic ___ >70 Hypereutrophic





		Histo	rical Refe	<u>2019</u>						
			CL							
	Location	Mean	Median	Count	(95.0%)	Mean	Median	Count	(95.0%)	
FNU	RS	14.35	2.82	18	10.13	37.54	27.03	22	16.08	
	TR	8.30	4.07	4	17.45	25.57	22.15	4	35.43	
	TRIB	54.16	18.68	20	35.95	116.89	84.30	20	58.67	
TDS	RS	144.11	146.00	18	4.82	115.14	114.50	22	5.81	
	TR	141.25	142.00	4	14.02	118.75	119.00	4	18.30	
	TRIB	222.85	192.50	20	45.78	144.75	135.50	20	27.13	

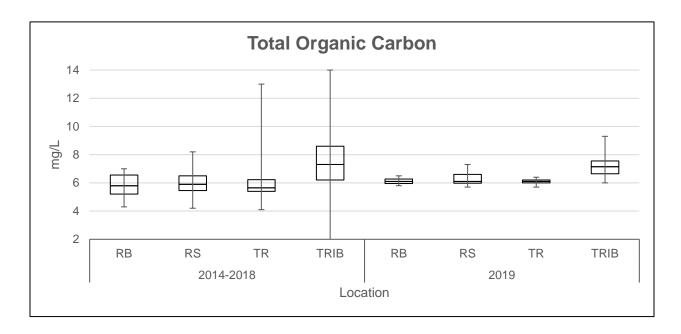
^{*} The TDS criterion (250 mg/L) was exceeded once on October 23, 2019 at MTL-5. All other observations were within the referenced water quality standard during 2019.



*Reference total suspended solids standard is 116 mg/L for streams and 12 mg/L for lakes.

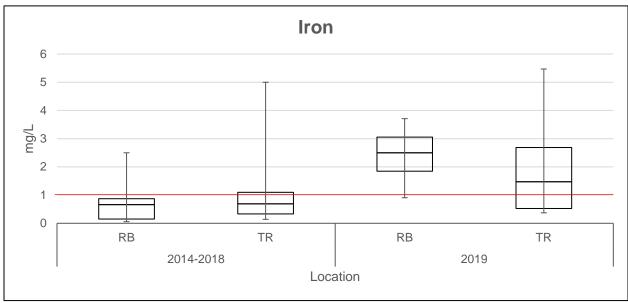
		Hist	orical Ref	<u>2019</u>					
	Location	Mean	Median	Count	CL(95.0%)	Mean	Median	Count	CL(95.0%)
TSS	RS	7.14	5.73	67	1.66	15.77	8.60	16	9.53
	TR	12.91	8.65	34	6.42	15.60	8.07	8	18.61
	TRIB	94.19	24.90	65	41.90	187.21	77.65	16	145.08
VSS	RS	2.00	2.00	67	0.17	3.07	2.75	16	0.95
	TR	2.55	2.12	34	0.54	2.97	1.64	8	1.91
	TRIB	9.98	5.00	65	3.18	18.54	10.35	16	12.77
NVSS	RS	5.14	3.60	67	1.57	12.70	5.54	16	8.76
	TR	10.36	6.19	34	5.92	12.62	6.60	8	17.09
	TRIB	84.20	21.25	65	38.79	168.67	67.30	16	132.35

^{*}In 2019 the TSS stream standard (116 mg/L) was exceeded in the tributaries in April, May, and August, while the TSS lake standard (12 mg/L) was exceeded multiple times in the lake in April, May, and October.

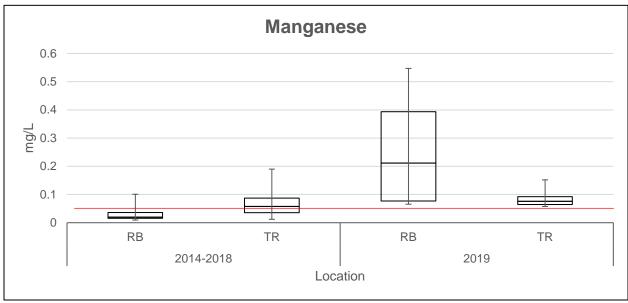


	<u>H</u>	istorical Re	eference 20	<u>2019</u>				
Location	Mean	Median	Count	CL(95.0%)	Mean	Median	Count	CL(95.0%)
RB	5.78	5.80	18	0.43	6.13	6.10	4	0.48
RS	5.93	5.90	67	0.20	6.27	6.10	16	0.23
TR	5.87	5.65	34	0.53	6.09	6.10	8	0.17
TRIB	7.47	7.30	65	0.49	7.18	7.15	16	0.46

^{*}This study does not recognize a water quality criteria for TOC.



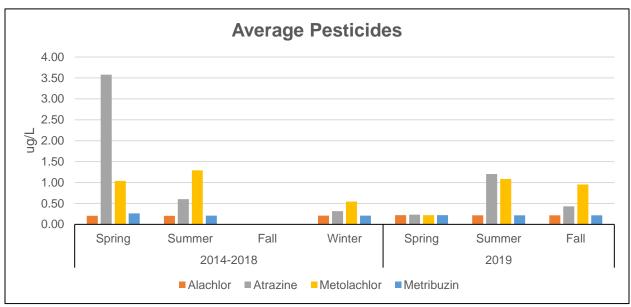
*Red line indicates the water quality standard of 1 mg/L.



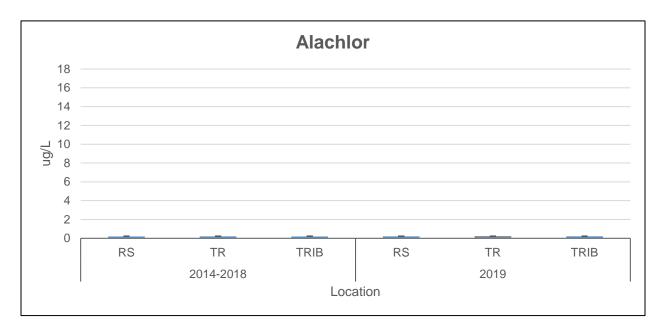
*Red line indicates the standard for manganese of 0.05 mg/L.

		Hist	orical Refe	erence 20	2019				
					CL(95.0%				CL(95.0%
	Location	Mean	Median	Count)	Mean	Median	Count)
Iron	RB	0.81	0.66	17	0.40	2.40	2.50	4	1.88
	TR	0.95	0.69	34	0.33	1.97	1.47	8	1.55
Mang	RB	0.03	0.02	17	0.01	0.26	0.21	4	0.37
	TR	0.07	0.06	34	0.02	0.09	0.08	8	0.03

^{*}In 2019 iron exceeded the standard of 1 mg/L near the lake bottom in front of the dam as well as in the discharges of both the main dam and re-regulation dam. Manganese exceeded the criterion of 0.05 mg/L at every sampling event in front of the dam and in the discharges of both the main dam and re-regulation dam.

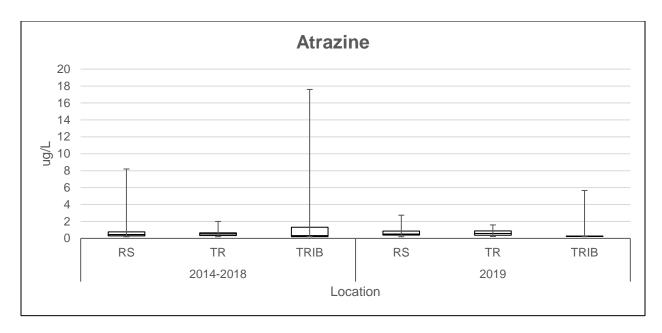


*Of the eight pesticides tested, only the above four were reported above detection levels for the period 2014-2019.



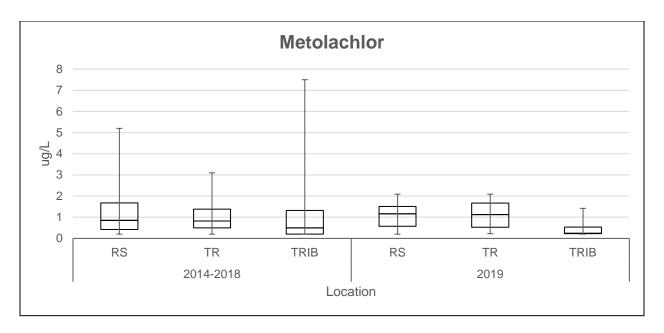
		Histo	rical Refe	rence 20	<u>2019</u>				
	CL(95.0								
	Location	Mean	Median	Count	%)	Mean	Median	Count	%)
Alachlor	RS	0.20	0.20	65	0.00	0.21	0.20	16	0.01
	TR	0.21	0.20	34	0.00	0.22	0.22	8	0.01
	TRIB	0.21	0.20	65	0.00	0.22	0.22	16	0.01

^{*}The criterion of 2 ug/L for Alachlor was not exceeded in 2019 as all observations were under the detection limit..



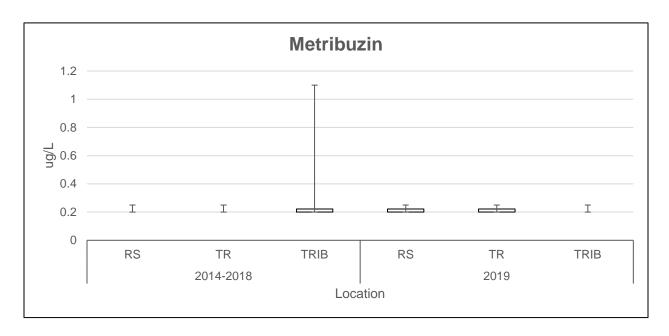
		Histo	rical Refe	rence 20	<u>2019</u>				
			CL(95.0						
	Location	Mean	Median	Count	%)	Mean	Median	Count	%)
Atrazine	RS	0.70	0.45	65	0.28	0.82	0.51	16	0.41
	TR	0.57	0.52	34	0.13	0.72	0.58	8	0.43
	TRIB	2.60	0.32	63	1.20	0.73	0.22	16	0.74

^{*}The criterion of 3 ug/L for Atrazine was exceeded once at MTL-5 in 2019.



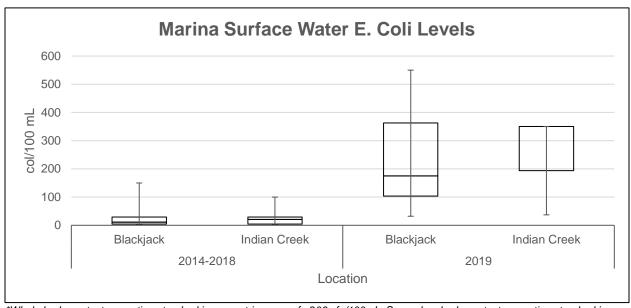
		Histo	orical Refe	erence 20	<u>2019</u>				
					CL(95.0				CL(95.0
	Location	Mean	Median	Count	%)	Mean	Median	Count	%)
Metolachlor	RS	1.11	0.85	65	0.23	1.09	1.17	16	0.36
	TR	1.00	0.83	34	0.25	1.10	1.13	8	0.61
	TRIB	1.23	0.50	65	0.40	0.45	0.24	16	0.19

^{*}The criterion of 70 ug/L for Metolachlor was not exceeded in 2019.



		<u>Histo</u>	rical Refer	<u>2019</u>					
	Location	Mean	Median	Mean	Median	Count	CL(95.0%)		
Metribuzin	RS	0.20	0.20	65	0.00	0.21	0.20	16	0.01
	TR	0.20	0.20	34	0.00	0.22	0.22	8	0.01
	TRIB	0.25	0.20	65	0.22	0.22	16	0.01	

^{*}The criterion of 100 ug/L for Metribuzin was not exceeded in 2019.



*Whole body contact recreation standard is geometric mean of <206 cfu/100mL. Secondary body contact recreation standard is geometric mean of <1,134 cfu/100mL.

	Histo	rical Refer	ence 2014	<u>1-2018</u>		<u>20</u>	19	
				CL				CL
Marina Location	Mean	Median	Count	(95.0%)	Mean	Median	Count	(95.0%)
Blackjack	29.42	11.00	12	27.99	252.33	175.00	3	664.55
Indian Creek	29.08	20.50	12	22.50	245.67	350.00	3	448.91

^{*}Marina bacteria levels did not exceed the water quality standard in 2019.

2019 Swimming Beach Bacteria Levels (E. Coli MPN / 100mL)

Mark Twain State Park Public Beach Sample Location

		campic Ecoc	111011	
	Right	Duplicate	Left	Geometric Mean
5/20/2019	10.9	14.6	10.8	11.98
6/10/2019	52	16.1	14.6	23.04
6/17/2019	35.5		9.7	18.56
6/24/2019	461.1		>2419.6	>1056.26
7/1/2019	24.6		172.2	65.09
7/8/2019	27.9	47.3	37.3	36.65
7/15/2019	20.9		3	7.92
7/22/2019	5.2		15.3	8.92
7/29/2019	77.1		118.7	95.66
8/5/2019	<1	<1	<1	<1
8/12/2019	298.7		133.4	199.62
8/19/2019	2		1	1.41
8/26/2019	33.6		48	40.16

^{*}Beach bacteria levels exceeded the reference water quality criterion once on June 24, 2019.

DISCUSSION: WATER QUALITY

Water quality metrics assessed by CEMVS can be sporadic and highly variable from year to year, thus long-term data collection using consistent and comparable methodology is critical to identify trends or patterns. In general, conditions observed during 2019 did not deviate far from conditions observed during the reference period (2014-2018); nevertheless, concerns regarding DO, Atrazine, TSS, Fe, Mn, and TP were evident. In addition, estimated TSI levels were indicative of a hyper eutrophic system.

During the four sampling events in 2019, DO was recorded below 5 mg/L one time in August at site MTL-66 (4.91 mg/L) in the upper lake. DO readings are taken daily at the Cannon Dam tailrace and at the Re-regulation Dam to monitor conditions in the re-regulation pool and the discharge into the lower Salt River. As with previous years, there were many instances of DO falling under 5 mg/L once the lake stratified and during times of power generation. When the lake stratifies and conditions allow, surface water is spilled through the tainter gates to mix with the anoxic water coming through the turbines to improve the downstream conditions. DO and temperature readings are monitored daily and there is a weekly coordination meeting that occurs between the USACE, state of Missouri, and Southwestern Power Administration to address this issue.

Pesticides are commonly used throughout much of the agricultural landscape that the Salt River flows. Of the eight pesticides tested, only Alachlor, Atrazine, Metolachlor, and Metribuzin were detected between 2014 and 2019. Of those four, only Atrazine was found to exceed the criteria. In 2019 the Atrazine drinking water standard (3 ug/L) was exceeded once with a level of 5.66 ug/L at MTL-5 on May 29. Atrazine levels were recorded over the standard multiple times in the tributaries historically. The 2019 Atrazine average (0.62 ug/L) is lower than the historic Atrazine average (1.50 ug/L). Atrazine and Alachlor herbicides are commonly used agricultural chemicals which can be readily transported by rainfall runoff. Both compounds are suspected of causing cancer; and therefore, were monitored for the protection of human and aquatic health. Atrazine is most commonly detected in ground and surface water due to its wide use, and its ability to persist in soil and move in water. Low levels of pesticides have historically been observed in the tailrace.

Total solids can affect water quality by increasing temperature through the absorption of sunlight by suspended particles in the water column, and consequently reduce DO. Total solids are also strongly correlated with water clarity and the presence of Macrophytes. Missouri has no numeric water quality criteria for total suspended solids. USACE uses a reference standard (IL EPA) as well as historical comparison. In 2019 the TSS reference stream standard (116 mg/L) was exceeded in the tributaries in April, May, and August, while the TSS lake standard (12 mg/L) was exceeded multiple times in April, May, and October. Historical TSS levels are similar to the 2019 results with the following exception. Average TSS 2019 levels in the tributaries(187.21 mg/L) are much higher than the historical tributary average (94.19 mg/L). This is likely due to the sampling events in 2019 occurring after rain events.

Living organisms require trace amounts of metals, but excessive levels can be harmful. TFe exceeded the criterion of 1 mg/L near the lake bottom in front of and downstream of Cannon dam as well as below the Re-regulation dam. The average TFe levels in 2019 were significantly higher than historical (2014-2018) levels. Iron cycling is a function of oxidation-reduction processes. Elevated levels of iron near the bottom of a lake is not immediately detrimental to the overall lake system. Iron oxidizes relatively rapidly (minutes to hours); therefore, any iron released through the discharge should be oxidized in a short period of time. However, the high TFe levels observed downstream of both dams may indicate an upward trend. Similarly, TMn in 2019 exceeded the criterion above and below Cannon dam as well as below the Re-regulation dam. 2019 TMn levels are significantly higher then historical levels. Historically, TMn has also exceeded the criterion multiple times in the above and below Cannon dam and below the Re-regulation dam. Future monitoring is imperative to document potential trends.

TP levels have surpassed the criterion for several years. In 2019 the TP criterion was exceeded at all locations with a geometric mean across all sites of 0.29 mg/L, which is an increase when compared to the historical geometric mean of 0.12 mg/L. Phosphorus is a limiting nutrient for primary producers (algae and plants) due to its relatively low amount in the environment. Higher inputs of TP and NO3-N into the lake contribute to a highly productive environment which stimulates algal growth that can lead to blooms that deplete the oxygen levels during die off. In addition, blooms can sometimes contain toxins which may be harmful to humans and wildlife.

Although there were individual instances of the CHL_a screening value and criterion being exceeded, the geometric mean was not exceeded. The 2019 average CHL_a level (8.74 mg/cm³) was not significantly different compared to the historical average (9.08 mg/cm³). CHL_a is an indicator of the abundance of phytoplankton. Any water environment with a level recorded above 25 mg/cm³ is considered to be eutrophic (nutrient enrichment increases algal and plant growth and negative effects). The 2019 TSI level, an average of the individual trophic state indexes for secchi depth, CHL_a, and TP, for Mark Twain Lake was 70.5. Mark Twain Lake is considered hyper-eutrophic based on this TSI level. This does not necessarily mean the water quality is poor, but that its trophic level indicates nutrient levels are abundant, which can support an abundance of plants and algae. Long term monitoring and analyses are important to assess changes over time.

Swimming beach bacteria levels exceeded the criterion one time in 2019 on June 24 at Mark Twain State Park Public Beach, but the sample immediately following was low. All remaining parameters evaluated during the 2019 water quality monitoring effort were within designated criteria or within historical reference norms.

MONITORING PROGRAM RECOMMENDATIONS

The 2018 water quality report compiled by the Missouri Department of Natural Resources (MDNR) has listed the following impairments: Middle Fork Salt River impaired for total suspended solids and dissolved oxygen, South Fork Salt River as impaired for dissolved oxygen, Black Creek Tributary to the North Fork Salt River as impaired for E. coli, North Fork Salt River and Mark Twain Lake as impaired for mercury, and the Salt River below the dam as impaired for mercury and dissolved oxygen. In order to better understand and monitor these impairments the following additional monitoring is recommended: bacteria and mercury at site MTL-11 and mercury at sites MTL-22, MTL-33, MTL-66, MTL-77, MTL-1, and MTL-12.

In accordance with EM-1110-2-1201, benthic sediment samples should be taken to monitor and assess potential impacts to aquatic and human health. Sediment sampling and analyses occurred at Mark Twain Lake in 2018, and prior to that in 2007. During these last analyses multiple exceedances over the recommended criteria were observed. Identifying trends over time is much more achievable with more consistent data. Contaminated sediments may have negative impacts on ecological processes. It is recommended, if possible, to sample and analyze for sediment metals and nutrients, as well as grain size analyses yearly or every two years.

Given the hypereutrophic status of Mark Twain Lake it is recommended that Nitrite (NO₂) and Total Kjeldahl Nitrogen (TKN) be added to the monitoring program. Doing so would allow CEMVS to evaluate Total Nitrogen (TN), which is a strong indicator of trophic status and is used by the state of Missouri to capture all lakes trophic status included in the 305(b) report. Similarly, it would strengthen the monitoring program to add CHL_a to every sample site. Currently CHL_a is only sampled at the lake sites and not the tributaries or lake discharge. This would allow for a trophic status comparison between the tributaries, lake, and discharge.

According to the Missouri State Code of Regulations 10CSR20-7.031, the parameters TP, TN, and CHL_a must be sampled a minimum of four times per year in order to calculate a geometric mean to be compared to the state's ecoregion criteria thresholds. Thus, given the hypereutrophic status of Mark Twain Lake, it is imperative that sampling remain at a minimum of four events per year.

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							Sp		
		Depth	DO		ORP	Temp	Cond	TDS	Turbidity
Date	Site	(m)	(mg/L)	рН	(mV)	(°C)	(µS/cm)	(mg/L)	(FNU)
4/2/2019	1	0.6	10.18	7.44	171.9	6.1	203.3	132	36.1
4/2/2019	11	0.5	10.12	7.65	196.6	10.1	210.1	137	238.7
4/2/2019	12	0.9	10.66	7.32	293.4	6.1	206.5	134	36.3
4/2/2019	22	0.5	10.58	7.56	213.9	6.4	196.7	128	32.9
4/2/2019	22	1.0	10.58	7.52	214.9	6.4	196.7	128	31.6
4/2/2019	22	2.0	10.57	7.52	215.0	6.4	196.7	128	33.2
4/2/2019	22	3.1	10.52	7.44	219.0	6.2	196.9	128	31.9
4/2/2019	22	4.3	10.49	7.43	220.3	6.1	196.8	128	32.7
4/2/2019	22	5.0	10.47	7.41	221.2	6.0	196.9	128	32.7
4/2/2019	22	6.1	10.43	7.37	223.5	5.7	196.5	128	33.3
4/2/2019	22	7.1	10.38	7.35	224.9	5.6	196.9	128	32.9
4/2/2019	22	8.1	10.35	7.37	224.1	5.5	197.3	128	34.7
4/2/2019	22	9.4	10.34	7.32	226.9	5.4	197.6	128	33.6
4/2/2019	22	10.8	10.32	7.34	226.3	5.3	197.8	129	36.2
4/2/2019	22	11.3	10.31	7.38	224.4	5.3	197.8	129	33.5
4/2/2019	22	12.4	10.30	7.32	225.0	5.3	197.8	129	34.1
4/2/2019	22	13.4	10.29	7.30	228.8	5.3	197.8	129	34.7
4/2/2019	22	14.3	10.27	7.46	220.6	5.3	197.8	129	35.2
4/2/2019	22	16.7	10.24	7.34	227.6	5.2	198.0	129	36.2
4/2/2019	33	0.4	9.53	7.48	199.0	7.4	214.3	139	47.8
4/2/2019	33	1.0	9.55	7.50	198.7	7.3	214.4	139	48.6
4/2/2019	33	1.0	9.83	7.47	199.8	7.4	214.2	139	50.2
4/2/2019	66	1.1	8.90	7.56	208.3	9.3	217.8	142	65.7
4/2/2019	66	2.1	8.87	7.52	208.6	9.2	217.9	142	69.0
4/2/2019	66	3.2	8.81	7.49	210.1	8.9	217.5	141	82.6
4/2/2019	66	4.0	8.79	7.44	212.5	8.9	217.2	141	72.8
4/2/2019	66	5.0	8.77	7.43	213.0	8.8	216.9	141	79.8
4/2/2019	66	6.2	8.77	7.42	213.4	8.8	215.7	140	69.3
4/2/2019	66	7.0	8.77	7.41	213.8	8.7	214.1	139	70.8
4/2/2019	66	8.1	8.84	7.39	214.4	7.9	203.4	132	66.1
4/2/2019	66	9.3	9.03	7.34	215.6	7.1	196.5	128	63.0
4/2/2019	66	10.1	9.06	7.33	215.8	7.1	196.5	128	64.9
4/2/2019	66	11.1	8.98	7.31	216.8	7.1	195.8	127	62.7
4/2/2019	66	12.2	8.90	7.29	218.0	7.0	195.4	127	62.0
4/2/2019	66	13.1	8.73	7.28	208.8	7.0	196.1	127	305.3
4/2/2019	77	1.1	9.21	7.57	198.0	8.4	209.6	136	68.5
4/2/2019	77	2.1	9.16	7.51	198.3	8.4	210.0	137	66.7
4/2/2019	77	3.0	9.13	7.49	198.7	8.3	210.1	137	74.8
4/2/2019	77	4.0	9.09	7.46	198.9	8.2	210.2	137	68.1
4/2/2019	77	5.2	9.14	7.44	200.0	7.7	206.3	134	81.2
4/2/2019	77	6.1	9.18	7.42	200.6	7.3	202.3	132	60.0
4/2/2019	77	7.1	9.24	7.41	201.3	7.0	200.4	130	61.9

							Sp		
		Depth	DO		ORP	Temp	Cond	TDS	Turbidity
Date	Site	(m)	(mg/L)	рН	(mV)	(°C)	(µS/cm)	(mg/L)	(FNU)
4/2/2019	77	8.1	9.45	7.40	202.7	6.1	195.0	127	52.6
4/2/2019	77	9.0	9.44	7.38	203.8	6.0	194.4	126	48.8
4/2/2019	77	9.5	9.40	7.38	203.7	6.1	195.1	127	56.6
4/2/2019	77	10.1	9.43	7.37	204.2	6.0	194.3	126	54.0
4/2/2019	77	11.1	9.42	7.38	203.8	6.0	194.2	126	44.9
4/2/2019	77	12.1	9.39	7.38	204.5	5.9	194.0	126	50.1
4/2/2019	77	13.0	9.36	7.37	204.9	5.9	194.0	126	50.1
4/2/2019	77	14.0	8.53	7.36	149.3	5.9	194.1	126	63.9
4/3/2019	5	1.2	10.32	7.81	149.4	9.2	264.3	172	66.1
4/3/2019	9	0.8	10.18	7.69	191.1	8.5	252.7	164	147.2
4/3/2019	13	1.1	10.71	7.87	147.3	8.5	295.4	192	57.1
5/29/2019	1	0.3	5.60	6.76	327.0	16.8	189.9	123	52.0
5/29/2019	5	0.7	7.17	7.57	335.0	22.4	249.7	162	143.8
5/29/2019	9	0.5	6.36	7.35	336.8	20.7	122.7	80	279.9
5/29/2019	11	0.0	6.24	7.34	338.6	21.1	20.1	13	237.8
5/29/2019	12	0.6	7.65	6.89	386.1	17.6	172.5	112	84.4
5/29/2019	13	0.0	7.39	7.61	351.1	19.9	149.4	97	524.9
5/29/2019	22	1.0	6.95	7.09	422.6	21.7	180.5	117	55.3
5/29/2019	22	2.3	6.92	7.04	425.8	21.7	180.6	117	58.5
5/29/2019	22	3.0	6.87	7.00	427.4	21.6	181.1	118	54.9
5/29/2019	22	4.1	6.32	6.87	433.4	20.0	182.2	118	54.9
5/29/2019	22	5.0	6.04	6.79	437.1	19.3	182.8	119	57.9
5/29/2019	22	5.6	6.10	7.22	408.4	18.8	184.1	120	58.2
5/29/2019	22	6.1	5.83	6.75	438.5	18.7	183.6	119	56.5
5/29/2019	22	7.0	5.51	6.74	439.2	17.5	185.2	120	47.1
5/29/2019	22	7.9	5.20	6.71	440.8	16.5	186.3	121	50.2
5/29/2019	22	9.1	5.03	6.61	445.5	16.2	186.3	121	51.5
5/29/2019	22	10.1	4.87	6.55	448.4	15.9	185.9	121	53.7
5/29/2019	22	11.1	4.64	6.51	450.0	15.6	186.3	121	54.7
5/29/2019	22	12.1	3.88	6.50	450.7	14.2	191.6	125	48.9
5/29/2019	22	12.8	3.67	6.49	450.9	13.7	192.3	125	51.0
5/29/2019	22	15.0	3.40	6.53	449.4	12.2	195.7	127	46.7
5/29/2019	22	16.0	3.42	6.60	445.6	12.0	196.5	128	42.6
5/29/2019	22	17.0	3.30	6.66	442.0	11.5	196.9	128	41.4
5/29/2019	22	18.1	3.13	6.71	439.9	10.6	199.3	130	39.5
5/29/2019	22	19.5	3.04	6.83	434.4	10.1	201.6	131	38.1
5/29/2019	33	0.0	6.76	7.14	450.6	22.1	179.4	117	57.1
5/29/2019	33	1.0	6.65	7.12	451.1	21.2	177.7	115	56.8
5/29/2019	33	2.0	6.54	7.09	452.9	20.4	181.4	118	55.8
5/29/2019	33	3.1	6.30	7.02	456.8	19.7	182.7	119	55.5
5/29/2019	33	4.1	6.18	6.93	461.0	19.3	182.9	119	55.6
5/29/2019	33	5.1	6.12	6.89	463.5	19.1	182.8	119	54.6

							Sp		
		Depth	DO		ORP	Temp	Cond	TDS	Turbidity
Date	Site	(m)	(mg/L)	рН	(mV)	(°C)	(µS/cm)	(mg/L)	(FNU)
5/29/2019	33	6.1	5.83	6.80	467.4	18.6	182.4	119	56.4
5/29/2019	33	7.1	5.55	6.67	474.0	17.4	184.5	120	57.7
5/29/2019	33	8.1	5.46	6.62	476.6	17.2	184.9	120	55.3
5/29/2019	33	9.1	5.09	6.53	480.1	16.7	185.7	121	57.3
5/29/2019	33	10.0	4.69	6.49	481.5	16.2	184.0	120	55.0
5/29/2019	33	11.3	4.24	6.42	483.5	15.8	183.6	119	52.9
5/29/2019	33	12.1	4.22	6.39	484.8	15.2	187.6	122	53.4
5/29/2019	33	12.9	3.30	6.33	487.1	14.2	187.1	122	58.3
5/29/2019	33	14.3	2.83	6.27	488.0	13.3	178.7	116	62.1
5/29/2019	33	15.2	2.77	6.24	489.1	12.4	189.5	123	59.2
5/29/2019	66	0.0	5.88	7.02	559.6	20.9	166.3	108	99.7
5/29/2019	66	1.1	5.58	6.90	562.1	20.4	156.3	102	112.1
5/29/2019	66	2.1	5.50	6.81	564.4	20.3	157.3	102	102.3
5/29/2019	66	3.0	5.46	6.78	563.6	20.2	158.7	103	94.8
5/29/2019	66	3.1	5.43	6.76	563.9	20.2	158.5	103	104.7
5/29/2019	66	4.1	5.47	6.74	562.6	20.2	159.5	104	107.3
5/29/2019	66	5.1	5.44	6.73	561.6	20.2	162.0	105	104.5
5/29/2019	66	6.1	5.37	6.71	560.6	20.1	164.3	107	103.3
5/29/2019	66	7.0	5.39	6.68	561.9	20.0	169.6	110	83.0
5/29/2019	66	8.0	3.95	6.58	565.7	16.9	181.9	118	70.5
5/29/2019	66	9.1	3.56	6.47	569.4	16.3	182.7	119	71.2
5/29/2019	66	10.2	3.11	6.41	572.1	15.9	182.4	119	70.3
5/29/2019	66	11.0	2.82	6.34	573.6	15.4	180.3	117	88.6
5/29/2019	66	12.1	2.44	6.28	570.8	15.1	181.7	118	84.5
5/29/2019	66	13.2	2.20	6.24	564.0	14.9	183.8	119	82.0
5/29/2019	66	14.2	1.82	6.22	554.7	14.5	185.8	121	87.2
5/29/2019	66	15.2	1.11	6.19	541.0	14.1	188.8	123	78.3
5/29/2019	66	16.0	0.38	6.16	530.7	12.8	197.0	128	62.8
5/29/2019	77	0.1	5.27	6.98	586.4	21.2	130.9	85	125.8
5/29/2019	77	1.1	5.24	6.85	587.0	21.0	132.1	86	134.6
5/29/2019	77	2.1	5.22	6.80	585.4	21.0	132.7	86	133.3
5/29/2019	77	3.0	5.19	6.74	589.0	20.9	135.7	88	144.8
5/29/2019	77	4.1	5.18	6.71	588.6	20.9	136.5	89	119.5
5/29/2019	77	5.0	5.16	6.68	588.9	20.8	137.5	89	129.9
5/29/2019	77	6.1	5.12	6.68	588.5	20.8	137.6	89	149.4
5/29/2019	77	7.2	4.51	6.62	588.2	19.7	143.9	94	122.6
5/29/2019	77	8.1	4.32	6.56	588.7	19.3	144.9	94	133.3
5/29/2019	77	9.1	3.91	6.49	591.3	18.2	148.5	97	133.1
5/29/2019	77	10.3	3.44	6.41	592.1	16.6	152.7	99	132.4
5/29/2019	77	11.1	3.25	6.35	591.7	15.9	156.4	102	133.9
5/29/2019	77	12.0	3.23	6.32	592.4	15.8	157.3	102	129.0
5/29/2019	77	13.2	2.91	6.29	587.9	15.3	160.6	104	109.2

							Sp		
		Depth	DO		ORP	Temp	Cond	TDS	Turbidity
Date	Site	(m)	(mg/L)	рН	(mV)	(°C)	(µS/cm)	(mg/L)	(FNU)
5/29/2019	77	14.1	2.79	6.27	584.4	15.1	161.9	105	120.7
5/29/2019	77	15.3	1.77	6.23	571.1	14.0	175.1	114	122.5
5/29/2019	BJ MAR	0.0	6.98	7.41	503.6	22.7	176.0	114	56.8
5/29/2019	BJ MAR	1.2	6.70	7.16	510.2	20.5	177.6	115	56.9
5/29/2019	BJ MAR	7.3	5.73	6.49	487.5	17.8	184.0	120	53.0
5/29/2019	BJ MAR	13.9	3.27	6.66	487.6	12.4	194.4	126	50.3
5/29/2019	IC MAR	0.0	6.72	7.33	504.1	21.0	181.7	118	62.0
5/29/2019	IC MAR	1.1	6.65	7.14	506.4	20.6	181.3	118	61.1
5/29/2019	IC MAR	9.0	5.06	6.85	518.9	16.6	182.2	118	65.5
5/29/2019	IC MAR	13.6	3.09	6.49	379.4	13.7	191.0	124	136.8
8/28/2019	1	1.0	8.89	8.25	261.0	24.4	161.1	105	8.2
8/28/2019	5	0.5	7.46	7.56	358.4	22.8	144.3	94	84.2
8/28/2019	9	0.3	6.76	7.65	266.9	22.5	200.3	130	102.9
8/28/2019	11	0.5	6.60	7.52	268.5	23.1	223.4	145	134.0
8/28/2019	12	0.5	8.57	8.11	239.2	26.6	170.6	111	10.0
8/28/2019	13	0.4	7.62	7.66	301.5	21.6	195.5	127	85.8
8/28/2019	22	0.0	8.77	8.47	192.7	25.1	158.2	103	4.9
8/28/2019	22	0.4	8.69	8.46	192.8	25.1	158.3	103	4.9
8/28/2019	22	1.0	8.57	8.46	191.6	25.1	158.4	103	4.9
8/28/2019	22	2.1	8.50	8.43	191.8	25.1	158.3	103	4.9
8/28/2019	22	3.1	8.46	8.42	191.8	25.1	158.3	103	4.7
8/28/2019	22	4.1	8.40	8.41	190.9	25.0	158.3	103	4.9
8/28/2019	22	5.1	8.32	8.39	190.9	25.0	158.3	103	4.9
8/28/2019	22	6.1	8.26	8.35	190.3	25.0	158.3	103	4.9
8/28/2019	22	7.1	8.08	8.31	190.3	24.9	158.4	103	5.1
8/28/2019	22	8.1	8.09	8.29	190.0	24.9	158.3	103	5.9
8/28/2019	22	9.0	0.80	7.99	189.4	21.5	166.2	108	38.2
8/28/2019	22	10.0	0.44	7.90	187.7	17.2	185.9	121	57.8
8/28/2019	22	11.1	0.28	7.75	183.5	15.9	188.9	123	52.2
8/28/2019	22	12.1	0.23	7.66	183.0	14.0	193.8	126	46.2
8/28/2019	33	0.3	10.14	8.75	129.4	25.8	158.0	103	5.1
8/28/2019	33	1.0	9.44	8.63	135.4	25.4	158.2	103	4.9
8/28/2019	33	2.0	8.76	8.50	139.7	25.2	158.4	103	4.8
8/28/2019	33	3.1	8.34	8.36	142.6	25.1	158.6	103	4.8
8/28/2019	33	4.0	8.10	8.28	145.2	25.1	158.6	103	4.9
8/28/2019	33	5.2	7.96	8.23	145.9	25.1	158.8	103	4.8
8/28/2019	33	6.3	6.58	8.03	148.2	25.0	159.1	103	5.3
8/28/2019	33	7.2	4.95	7.89	146.4	24.7	159.8	104	6.4
8/28/2019	33	8.2	1.76	7.69	143.3	24.2	161.0	105	12.7
8/28/2019	33	9.0	0.37	7.56	138.8	21.9	167.0	109	37.1
8/28/2019	33	10.1	0.20	7.47	135.4	17.0	194.3	126	72.0
8/28/2019	33	11.2	0.16	7.45	134.0	14.5	193.8	126	49.3

							Sp		
		Depth	DO		ORP	Temp	Cond	TDS	Turbidity
Date	Site	(m)	(mg/L)	рН	(mV)	(°C)	(µS/cm)	(mg/L)	(FNU)
8/28/2019	33	12.1	0.13	7.28	139.0	13.4	197.7	129	46.5
8/28/2019	66	0.1	5.11	7.52	123.5	25.2	165.7	108	13.2
8/28/2019	66	1.1	4.91	7.55	121.8	25.1	165.5	108	13.7
8/28/2019	66	2.1	4.48	7.52	123.2	24.9	165.4	108	15.1
8/28/2019	66	3.1	4.47	7.50	125.0	24.9	165.4	108	14.9
8/28/2019	66	4.1	4.25	7.48	126.8	24.8	165.5	108	15.7
8/28/2019	66	5.1	4.19	7.49	126.9	24.8	165.4	107	15.5
8/28/2019	66	6.1	4.22	7.46	129.6	24.7	165.5	108	14.6
8/28/2019	66	7.2	1.00	7.37	116.8	23.4	176.6	115	29.3
8/28/2019	66	8.0	0.44	7.28	-23.5	18.4	212.4	138	86.6
8/28/2019	66	9.1	0.24	7.26	-46.7	15.2	216.2	141	89.3
8/28/2019	66	9.9	0.17	7.23	-62.5	14.6	225.0	146	84.8
8/28/2019	66	10.7	0.14	7.19	-73.0	13.4	237.6	154	128.5
8/28/2019	77	0.1	5.15	7.49	126.1	25.2	165.7	108	13.3
8/28/2019	77	0.6	7.27	7.84	131.7	25.0	169.6	110	11.1
8/28/2019	77	1.2	7.24	7.84	136.0	25.0	169.6	110	11.4
8/28/2019	77	2.0	6.86	7.81	142.6	24.8	169.4	110	10.6
8/28/2019	77	3.1	6.42	7.73	148.7	24.7	169.4	110	10.3
8/28/2019	77	4.1	6.15	7.55	161.0	24.6	169.1	110	10.4
8/28/2019	77	5.2	5.99	7.44	168.4	24.5	168.9	110	10.5
8/28/2019	77	6.1	5.38	7.35	173.1	24.2	168.0	109	11.5
8/28/2019	77	7.0	0.64	7.13	117.6	22.8	171.8	112	22.9
8/28/2019	77	8.2	0.29	6.95	28.7	18.9	185.1	120	61.9
8/28/2019	77	9.5	0.12	6.75	-0.2	17.2	193.8	126	70.4
8/28/2019	BJ MAR	0.0	9.61	8.00	126.5	25.5	157.9	103	4.7
8/28/2019	BJ MAR	0.4	9.08	8.23	133.5	25.2	158.1	103	5.3
8/28/2019	BJ MAR	6.1	7.09	7.90	148.4	24.8	158.8	103	5.7
8/28/2019	BJ MAR	10.3	1.09	7.76	138.1	17.6	186.1	121	162.3
8/28/2019	IC MAR	0.5	6.90	7.68	171.2	24.9	163.1	106	6.5
8/28/2019	IC MAR	4.6	6.48	7.63	174.8	24.6	162.6	106	8.4
8/28/2019	IC MAR	9.4	1.39	7.48	126.6	19.3	181.1	118	62.5
10/23/2019	1	1.0	8.44	8.07	144.6	16.0	177.2	115	6.0
10/23/2019	5	0.3	11.37	8.12	158.9	12.3	404.5	263	8.1
10/23/2019	5	0.3	11.37	8.12	158.9	12.3	404.5	263	8.1
10/23/2019	9	0.2	8.73	7.79	173.1	11.6	297.8	194	36.6
10/23/2019	9	0.2	8.73	7.79	173.1	11.6	297.8	194	36.6
10/23/2019	11	0.5	9.60	7.93	153.7	11.5	352.7	229	35.1
10/23/2019	11	0.5	9.60	7.93	153.7	11.5	352.7	229	35.1
10/23/2019	11	0.5	9.61	7.93	154.0	11.5	352.7	229	31.9
10/23/2019	11	0.5	9.61	7.93	154.0	11.5	352.7	229	31.9
10/23/2019	12	0.5	8.36	7.81	178.7	15.3	175.6	114	8.2
10/23/2019	13	0.2	10.25	7.90	187.2	11.3	346.7	225	20.0

							Sp		
		Depth	DO		ORP	Temp	Cond	TDS	Turbidity
Date	Site	(m)	(mg/L)	рН	(mV)	(°C)	(µS/cm)	(mg/L)	(FNU)
10/23/2019	13	0.2	10.25	7.90	187.2	11.3	346.7	225	20.0
10/24/2019	22	0.2	7.39	7.66	130.7	15.9	175.1	114	6.5
10/24/2019	22	0.2	7.39	7.66	130.7	15.9	175.1	114	6.5
10/24/2019	22	1.1	7.20	7.61	152.3	15.9	175.4	114	6.5
10/24/2019	22	1.1	7.20	7.61	152.3	15.9	175.4	114	6.5
10/24/2019	22	2.0	7.17	7.59	161.0	15.9	175.4	114	6.7
10/24/2019	22	2.0	7.17	7.59	161.0	15.9	175.4	114	6.7
10/24/2019	22	3.1	7.15	7.57	166.7	15.9	175.5	114	6.8
10/24/2019	22	3.1	7.15	7.57	166.7	15.9	175.5	114	6.8
10/24/2019	22	4.1	7.13	7.51	172.5	15.9	175.4	114	6.6
10/24/2019	22	4.1	7.13	7.51	172.5	15.9	175.4	114	6.6
10/24/2019	22	5.1	7.12	7.52	174.5	15.9	175.5	114	6.4
10/24/2019	22	5.1	7.12	7.52	174.5	15.9	175.5	114	6.4
10/24/2019	22	6.1	7.11	7.51	176.8	15.9	175.4	114	6.4
10/24/2019	22	6.1	7.11	7.51	176.8	15.9	175.4	114	6.4
10/24/2019	22	7.0	7.09	7.50	178.2	15.9	175.4	114	6.4
10/24/2019	22	7.0	7.09	7.50	178.2	15.9	175.4	114	6.4
10/24/2019	22	8.1	7.06	7.47	181.4	15.9	175.5	114	6.5
10/24/2019	22	8.1	7.06	7.47	181.4	15.9	175.5	114	6.5
10/24/2019	22	9.0	7.05	7.46	182.6	15.9	175.3	114	6.9
10/24/2019	22	9.0	7.05	7.46	182.6	15.9	175.3	114	6.9
10/24/2019	22	10.2	6.95	7.45	184.3	15.9	175.9	114	6.8
10/24/2019	22	10.2	6.95	7.45	184.3	15.9	175.9	114	6.8
10/24/2019	22	11.2	6.42	7.42	186.3	15.7	177.3	115	10.6
10/24/2019	22	11.2	6.42	7.42	186.3	15.7	177.3	115	10.6
10/24/2019	22	12.1	5.94	7.37	188.1	15.6	178.2	116	11.4
10/24/2019	22	12.1	5.94	7.37	188.1	15.6	178.2	116	11.4
10/24/2019	22	13.1	5.06	7.32	190.1	15.3	181.3	118	14.4
10/24/2019	22	13.1	5.06	7.32	190.1	15.3	181.3	118	14.4
10/24/2019	22	14.0	1.01	7.21	192.0	14.2	196.1	127	30.2
10/24/2019	22	14.0	1.01	7.21	192.0	14.2	196.1	127	30.2
10/24/2019	22	14.6	0.51	7.15	191.0	13.6	202.8	132	34.9
10/24/2019	22	14.6	0.51	7.15	191.0	13.6	202.8	132	34.9
10/24/2019	22	15.4	0.39	7.10	181.0	13.1	206.6	134	39.2
10/24/2019	22	15.4	0.39	7.10	181.0	13.1	206.6	134	39.2
10/24/2019	33	0.2	6.88	7.69	131.4	15.9	175.2	114	7.4
10/24/2019	33	0.2	6.88	7.69	131.4	15.9	175.2	114	7.4
10/24/2019	33	1.0	6.68	7.60	140.8	15.9	175.4	114	7.4
10/24/2019	33	1.0	6.68	7.60	140.8	15.9	175.4	114	7.4
10/24/2019	33	1.7	6.59	7.77	119.7	15.9	175.5	114	7.2
10/24/2019	33	1.7	6.59	7.77	119.7	15.9	175.5	114	7.2
10/24/2019	33	2.1	6.58	7.75	130.6	15.9	175.4	114	7.1

							Sp		
		Depth	DO		ORP	Temp	Cond	TDS	Turbidity
Date	Site	(m)	(mg/L)	рН	(mV)	(°C)	(µS/cm)	(mg/L)	(FNU)
10/24/2019	33	2.1	6.58	7.75	130.6	15.9	175.4	114	7.1
10/24/2019	33	3.1	6.58	7.73	135.4	15.9	175.6	114	7.7
10/24/2019	33	3.1	6.58	7.73	135.4	15.9	175.6	114	7.7
10/24/2019	33	3.1	6.56	7.72	138.2	15.9	175.4	114	7.6
10/24/2019	33	3.1	6.56	7.72	138.2	15.9	175.4	114	7.6
10/24/2019	33	4.1	6.53	7.72	141.1	15.9	175.4	114	7.4
10/24/2019	33	4.1	6.53	7.72	141.1	15.9	175.4	114	7.4
10/24/2019	33	5.0	6.53	7.71	142.5	15.9	175.5	114	7.3
10/24/2019	33	5.0	6.53	7.71	142.5	15.9	175.5	114	7.3
10/24/2019	33	6.0	6.53	7.69	145.8	15.9	175.6	114	7.7
10/24/2019	33	6.0	6.53	7.69	145.8	15.9	175.6	114	7.7
10/24/2019	33	7.0	6.61	7.62	153.5	15.9	175.4	114	7.4
10/24/2019	33	7.0	6.61	7.62	153.5	15.9	175.4	114	7.4
10/24/2019	33	8.1	6.62	7.67	151.4	15.9	175.4	114	7.1
10/24/2019	33	8.1	6.62	7.67	151.4	15.9	175.4	114	7.1
10/24/2019	33	9.1	6.63	7.65	154.3	15.9	175.3	114	7.0
10/24/2019	33	9.1	6.63	7.65	154.3	15.9	175.3	114	7.0
10/24/2019	33	10.3	6.65	7.65	155.1	15.8	175.3	114	7.0
10/24/2019	33	10.3	6.65	7.65	155.1	15.8	175.3	114	7.0
10/24/2019	33	11.1	6.65	7.65	156.4	15.8	175.3	114	7.0
10/24/2019	33	11.1	6.65	7.65	156.4	15.8	175.3	114	7.0
10/24/2019	33	12.0	6.66	7.64	158.6	15.8	175.3	114	7.1
10/24/2019	33	12.0	6.66	7.64	158.6	15.8	175.3	114	7.1
10/24/2019	33	13.3	6.63	7.59	162.7	15.8	175.3	114	7.6
10/24/2019	33	13.3	6.63	7.59	162.7	15.8	175.3	114	7.6
10/24/2019	33	14.1	6.33	7.59	162.7	15.8	175.9	114	9.0
10/24/2019	33	14.1	6.33	7.59	162.7	15.8	175.9	114	9.0
10/24/2019	33	15.0	5.35	7.55	164.0	15.8	176.9	115	9.8
10/24/2019	33	15.0	5.35	7.55	164.0	15.8	176.9	115	9.8
10/24/2019	33	15.8	1.12	7.34	43.1	12.7	210.1	137	57.3
10/24/2019	33	15.8	1.12	7.34	43.1	12.7	210.1	137	57.3
10/24/2019	33	16.0	0.52	7.23	23.2	12.2	217.3	141	63.6
10/24/2019	33	16.0	0.52	7.23	23.2	12.2	217.3	141	63.6
10/24/2019	66	0.2	7.05	7.74	122.7	14.9	186.6	121	24.5
10/24/2019	66	0.2	7.05	7.74	122.7	14.9	186.6	121	24.5
10/24/2019	66	1.0	6.98	7.72	128.3	15.0	186.7	121	24.6
10/24/2019	66	1.0	6.98	7.72	128.3	15.0	186.7	121	24.6
10/24/2019	66	2.0	6.96	7.69	132.3	15.0	186.7	121	24.8
10/24/2019	66	2.0	6.96	7.69	132.3	15.0	186.7	121	24.8
10/24/2019	66	3.1	6.95	7.65	137.4	15.0	186.6	121	24.8
10/24/2019	66	3.1	6.95	7.65	137.4	15.0	186.6	121	24.8
10/24/2019	66	4.0	6.93	7.64	141.4	15.0	186.6	121	23.4

							Sp		
		Depth	DO		ORP	Temp	Cond	TDS	Turbidity
Date	Site	(m)	(mg/L)	рН	(mV)	(°C)	(µS/cm)	(mg/L)	(FNU)
10/24/2019	66	4.0	6.93	7.64	141.4	15.0	186.6	121	23.4
10/24/2019	66	5.2	6.93	7.60	145.0	15.0	186.7	121	23.9
10/24/2019	66	5.2	6.93	7.60	145.0	15.0	186.7	121	23.9
10/24/2019	66	6.0	6.91	7.59	146.8	15.0	186.7	121	23.7
10/24/2019	66	6.0	6.91	7.59	146.8	15.0	186.7	121	23.7
10/24/2019	66	7.1	6.89	7.58	148.1	15.0	186.8	121	24.0
10/24/2019	66	7.1	6.89	7.58	148.1	15.0	186.8	121	24.0
10/24/2019	66	8.2	6.88	7.56	150.6	15.0	186.7	121	23.0
10/24/2019	66	8.2	6.88	7.56	150.6	15.0	186.7	121	23.0
10/24/2019	66	9.0	6.88	7.57	151.2	15.0	186.7	121	24.3
10/24/2019	66	9.0	6.88	7.57	151.2	15.0	186.7	121	24.3
10/24/2019	66	10.0	6.87	7.57	152.6	15.0	186.7	121	24.5
10/24/2019	66	10.0	6.87	7.57	152.6	15.0	186.7	121	24.5
10/24/2019	66	10.9	6.86	7.56	153.2	15.0	186.7	121	24.2
10/24/2019	66	10.9	6.86	7.56	153.2	15.0	186.7	121	24.2
10/24/2019	77	0.2	6.90	7.73	165.9	14.9	184.7	120	28.4
10/24/2019	77	0.2	6.90	7.73	165.9	14.9	184.7	120	28.4
10/24/2019	77	1.1	6.86	7.68	167.2	14.9	184.9	120	29.5
10/24/2019	77	1.1	6.86	7.68	167.2	14.9	184.9	120	29.5
10/24/2019	77	2.1	6.84	7.68	165.4	14.9	185.0	120	29.7
10/24/2019	77	2.1	6.84	7.68	165.4	14.9	185.0	120	29.7
10/24/2019	77	3.1	6.84	7.69	164.7	14.9	184.9	120	28.5
10/24/2019	77	3.1	6.84	7.69	164.7	14.9	184.9	120	28.5
10/24/2019	77	4.0	6.84	7.73	161.7	14.9	185.0	120	28.5
10/24/2019	77	4.0	6.84	7.73	161.7	14.9	185.0	120	28.5
10/24/2019	77	5.1	6.83	7.72	162.3	14.9	184.9	120	27.6
10/24/2019	77	5.1	6.83	7.72	162.3	14.9	184.9	120	27.6
10/24/2019	77	6.1	6.82	7.68	165.3	14.9	184.9	120	28.0
10/24/2019	77	6.1	6.82	7.68	165.3	14.9	184.9	120	28.0
10/24/2019	77	7.1	6.82	7.63	168.0	14.9	184.9	120	30.0
10/24/2019	77	7.1	6.82	7.63	168.0	14.9	184.9	120	30.0
10/24/2019	77	7.9	6.81	7.63	169.1	14.9	185.0	120	32.5
10/24/2019	77	7.9	6.81	7.63	169.1	14.9	185.0	120	32.5
10/24/2019	77	9.1	6.81	7.65	168.9	14.9	185.0	120	29.5
10/24/2019	77	9.1	6.81	7.65	168.9	14.9	185.0	120	29.5
10/24/2019	77	10.1	6.81	7.62	171.1	14.9	185.0	120	30.5
10/24/2019	77	10.1	6.81	7.62	171.1	14.9	185.0	120	30.5
10/24/2019	77	11.0	6.79	7.60	173.4	14.9	185.2	120	29.0
10/24/2019	77	11.0	6.79	7.60	173.4	14.9	185.2	120	29.0
10/24/2019	BJ MAR	1.0	6.63	7.57	154.9	15.8	175.2	114	7.4
10/24/2019	BJ MAR	1.0	6.63	7.57	154.9	15.8	175.2	114	7.4
10/24/2019	BJ MAR	2.4	6.58	7.56	155.5	15.8	175.3	114	7.7

							Sp		
		Depth	DO		ORP	Temp	Cond	TDS	Turbidity
Date	Site	(m)	(mg/L)	рН	(mV)	(°C)	(µS/cm)	(mg/L)	(FNU)
10/24/2019	BJ MAR	2.4	6.58	7.56	155.5	15.8	175.3	114	7.7
10/24/2019	BJ MAR	5.0	6.53	7.56	152.3	15.8	175.3	114	8.5
10/24/2019	BJ MAR	5.0	6.53	7.56	152.3	15.8	175.3	114	8.5
10/24/2019	IC MAR	1.1	7.43	7.40	145.2	15.3	183.3	119	11.3
10/24/2019	IC MAR	1.1	7.43	7.40	145.2	15.3	183.3	119	11.3
10/24/2019	IC MAR	3.5	7.38	7.29	144.0	15.3	183.3	119	11.2
10/24/2019	IC MAR	3.5	7.38	7.29	144.0	15.3	183.3	119	11.2
10/24/2019	IC MAR	7.5	7.56	7.33	133.4	15.2	182.8	119	11.8
10/24/2019	IC MAR	7.5	7.56	7.33	133.4	15.2	182.8	119	11.8





PO Box 1566 400 Aviation Drive Mt. Vernon, IL 62864 618-244-3235

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Customer Name: SLCOE

Project Name: Mark Twain Lake

Samples Received at ARDL: 4/4/19

Date: 5/3/19

Lab Name: ARDL, Inc.

ARDL Report No.: 8469

CASE NARRATIVE

Customer Sample No.	<u>Date</u> <u>Collected</u>	<u>Lab ID</u> <u>Number</u>	Analyses Requested
MTL-1	4/02/19	8469-01	NP Pesticides, Metals(1), Inorganics(2)
MTL-5	4/03/19	8469-02	NP Pesticides, Metals(1), Inorganics(2)
MTL-13	4/03/19	8469-03	NP Pesticides, Metals(1), Inorganics(2)
MTL-9	4/03/19	8469-04	NP Pesticides, Metals(1), Inorganics(2)
MTL-11	4/02/19	8469-05	NP Pesticides, Metals(1), Inorganics(2)
MTL-12	4/02/19	8469-06	NP Pesticides, Metals(1), Inorganics(2)
MTL-15-0	4/02/19	8469-07	NP Pesticides, Metals(1), Inorganics(2)(3)
MTL-22-0	4/02/19	8469-08	NP Pesticides, Metals(1), Inorganics(2)(3)
MTL-22-15	4/02/19	8469-09	Metals(1), Inorganics(2)
MTL-33-0	4/02/19	8469-10	NP Pesticides, Metals(1), Inorganics(2)(3)
MTL-66-0	4/02/19	8469-11	NP Pesticides, Metals(1), Inorganics(2)(3)
MTL-77-0	4/02/19	8469-12	NP Pesticides, Metals(1), Inorganics(2)(3)

- (1) Including iron and manganese.
- (2) Including ammonia, nitrate, orthophosphate, total phosphorus, TOC, TSS, and TVSS.
- (3) Including chlorophyll-a and pheophytin-a.

Mislabeling noted on the chain of custody between samples MTL-33 and MTL-77 was corrected at sample log-in.

The quality control data are summarized as follows:

NP PESTICIDE FRACTION - METHOD 8270-SIM

HOLDING TIME

Samples were prepared and analyzed within method specified holding times.

INITIAL CALIBRATION

The initial calibration passed criteria.

CONTINUING CALIBRATION

The continuing calibration verification (CCV) passed criteria for all analytes. The closing CCV passed criteria for all analytes.

PREPARATION BLANK

The blank met acceptance criteria.

Project Name: Mark Twain Lake ARDL Report No.: 8469

CASE NARRATIVE (Continued)

LABORATORY CONTROL SAMPLE

The LCS analyses met recovery criteria.

MATRIX SPIKE

The matrix spike and matrix spike duplicate met recovery criteria.

DUPLICATE

Duplicate analyses are reported as MS/MSD. RPD of the duplicate analyses met criteria.

INTERNAL STANDARD

All internal standard criteria were met.

SURROGATE

All surrogate recovery criteria were met.

INORGANIC FRACTION

TOC were analyzed by an accredited outside laboratory due to instrument status.

PREPARATION BLANK

Results of the preparation blanks were within acceptable limits.

LABORATORY CONTROL SAMPLE

Percent recoveries of all LCS analyses were within control limits.

MATRIX SPIKE

Percent recovery of all matrix spikes and matrix spike duplicates were within control limits, except 1 of 2 for iron and total phosphorus.

DUPLICATE

All duplicate analyses are reported as MS/MSD except chlorophyll-a, pheophytin-a, TSS, and TVSS. RPD on all duplicate analyses were within control limits, with the exception of chlorophyll-a and pheophytin-a, which was within ± the reporting limit and therefore acceptable.

DATA REPORTING QUALIFIERS

The following data reporting qualifiers are used as required:

- ND Indicates parameter was analyzed for but not detected.
- J Indicates an estimated value. This flag is used either when estimating a concentration or this flag indicates analyte(s) associated with a DOD-QSM specified non-compliance pertaining to matrix QC criteria.

Page 2 of 3

Project Name: Mark Twain Lake ARDL Report No.: 8469

CASE NARRATIVE (Continued)

REPORT ORGANIZATION

The data in this report appear by sample type (Field sample, preparation blank, laboratory control sample / spike blank, matrix spike /spike duplicate and sample duplicate). Within each sample type the data appear in the order that the analytical methods were discussed in this case narrative. Sample receipt information follows the analytical data.

Release of the data contained in this package has been authorized by the Technical Services Manager or his designee as verified by the following signature.

Dean S. Dickerson

Technical Services Manager



Sample & QC Results

Including as appropriate:
Field Sample Results
Batch QC
Prep Blank
LCS/Spike Blank
Matrix QC
MS/MSD
Sample Duplicate

ARDL Data Package

8469

Lab Report No: 008469 Report Date: 04/11/2019

Project Name:	MARK TWAIN L	AKE	Ana	lysis: N	P PESTICII	DES (82	70SIM-MO	D)
Project No.:		7	Analytical M	ethod: 82	270C			
NELAC Certi	fied - IL1003	8 0	Prep M	ethod: 35	510C			
Field ID:	MTL-1			ARDL 1	Lab No.:	00846	59-01	
Desc/Location:	MARK TWAIN L	AKE		Lab F	ilename:	E0410	905	
Sample Date:	04/02/2019			Receiv	ved Date:	04/04	1/2019	
Sample Time:	1252			Prep.	Date:	04/08	3/2019	
Matrix:	WATER			Analys	sis Date:	04/10)/2019	
Amount Used:	900 mL			Instr	ument ID:	AG5	,	
Final Volume:	1 mL			QC Bat	ch:	B1103	37	
% Moisture:	NA			Level	:	LOW		
						Data		Dilution
Parameter			LOD	LOQ	Result	Flag	Units	Factor
Trifluralin			0.222	0.222	ND		UG/L	1
Atrazine			0.222	0.222	ND		UG/L	1
Metribuzin			0.222	0.222	ND		UG/L	1
Alachlor			0.222	0.222	ND		UG/L	1
Metolachlor			0.222	0.222	ND		UG/L	1
Chlorpyrifos			0.222	0.222	ND		UG/L	1
Cyanazine			0.222	0.222	ND		UG/L	1
Pendimethalin			0.222	0.222	ND		UG/L	1

SURROGATE RECOVERIES:	Limits	Results	
Triphenylphosphate	30-130	69%	ĺ
			I

Surrogate recoveries marked with '*' indicates they are outside standard limits.

ARDL, INC. 400 Aviation Drive; P.O. Box 1566 Mt. Vernon, Illinois 62864

Lab Report No: 008	008469						ĸ	Report Date:	: 05/01/2019	119
Project Name: MARK TWAIN LAKE Project No:	AIN LAKE						Z	Analysis: Inorganics NELAC Certified - IL100308	: Inorganics fied - IL1003	lcs 00308
ARDL No: 008469-01 Field ID: MTL-1 Received: 04/04/2019	01	Sampl Samp Samp	Sampling Loc'n: Sampling Date: Sampling Time:		MARK TWAIN LAKE 04/02/2019 1252			Matrix: Moisture:	: WATER : NA	
Analyte	гор	007	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
(a) Iron	0.0400	0.0500	p	2.38	MG/L	3010A	6010C	04/10/19	04/10/19	P7190
(a) Manganese	0.00400	0.00500		0.0609	MG/L	3010A	6010C	04/10/19	04/10/19	P7190
Ammonia Nitrogen	0.0200	0.0300		0.0538	MG/L	NONE	350.1	NA	04/08/19 (04114463
Nitrate as Nitrogen	0.0190	0.0200		0.82	MG/L	NONE	GREEN	NA	04/12/19 (04154479
Phosphorus	0.00800	0.0100	p	0.328	MG/L	365.2	365.2	04/08/19	04/09/19 (04114464
Phosphorus, -ortho	0.00800	0.0100		0.299	MG/L	NONE	365.2	NA	04/04/19 (04084456
Solids, Total Suspended	1.33	1.33		7.73	MG/L	NONE	160.2	NA	04/04/19 (04124470
Solids, Volatile Suspen	1.33	1.33		ND	MG/L	NONE	160.4	AN	04/04/19 (04124471
Total Organic Carbon	0.50	1.0		6.2	MG/L	NONE	415.1	NA	04/19/19 (04304502

(a) DOD and/or NELAC Accredited Analyte.

Sample 008469-01, Inorganic Analyses

Lab Report No: 008469 Report Date: 04/11/2019

Project Name:	MARK TWAIN LAKE	Ai	nalysis: N	P PESTICII	DES (82	70SIM-MO	DD)
Project No.:		Analytical	Method: 8	270C			
NELAC Certi:	fied - IL100308	Prep	Method: 3	510C			
Field ID:	MTL-5		ARDL	Lab No.:	00846	59-02	
Desc/Location:	MARK TWAIN LAKE		Lab F	ilename:	E041	0908	
Sample Date:	04/03/2019		Recei	ved Date:	04/04	1/2019	
Sample Time:	0852		Prep.	Date:	04/08	3/2019	
Matrix:	WATER		Analy	sis Date:	04/10	0/2019	
Amount Used:	900 mL		Instr	ument ID:	AG5		
Final Volume:	1 mL		QC Ba	tch:	B1103	37	
% Moisture:	NA		Level	:	LOW		
					Data		Dilution
Parameter		LOD	LOQ	Result	Flag	Units	Factor
Trifluralin		0.222	0.222	ND		UG/L	1
Atrazine	•	0.222	0.222	ND		UG/L	1
Metribuzin		0.222	0.222	ND		UG/L	1
Alachlor		0.222	0.222	ND		UG/L	1
Metolachlor		0.222	0.222	ND		UG/L	1
Chlorpyrifos		0.222	0.222	ND		UG/L	1
Cyanazine		0.222	0.222	ND		UG/L	1
Pendimethalin		0.222	0.222	ND		UG/L	1
						/	

SURROGATE RECOVERIES:	Limits	Results	
Triphenylphosphate	30-130	61%	j
			1

Surrogate recoveries marked with '*' indicates they are outside standard limits.

ARDL, INC. 400 Aviation Drive; P.O. Box 1566 Mt. Vernon, Illinois 62864

	38	ı	Run Number	14463	04154479	04114464	04084456	04124470	04124471	04304502
05/01/2019	Inorganics d - IL10030			9 0411	9 0415					9 043(
	Inorg ied - I	WATER	Analysis Date	04/08/19 04114463	04/12/19	04/09/19	04/04/19	04/04/19	04/04/19	04/19/19
Report Date:	Analysis: Inorganics NELAC Certified - IL100308	Matrix: Moisture:	Prep Date	NA	NA	04/08/19	NA	NA	NA	NA
M M	Z		Analysis Method	350.1	GREEN	365.2	365.2	160.2	160.4	415.1
			Prep Method	NONE	NONE	365.2	NONE	NONE	NONE	NONE
		MARK TWAIN LAKE 04/03/2019 0852	Units	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L
			Result	0.062	0.736	0.477	0.131	39.2	4.59	7.4
		Sampling Loc'n: Sampling Date: Sampling Time:	Flag							
		Samp. Samy Samy	TOO	0.0300	0.0200	0.0100	0.0100	2.70	2.70	1.0
69	N LAKE	თ	LOD	0.0200	0.0190	0.00800	0.00800	2.70	2.70	0.50
Lab Report No: 008469	Project Name: MARK TWAIN LAKE Project No:	ARDL No: 008469-02 Field ID: MTL-5 Received: 04/04/2019	Analyte	Ammonia Nitrogen	Nitrate as Nitrogen	Phosphorus	Phosphorus, -ortho	Solids, Total Suspended	Solids, Volatile Suspen	Total Organic Carbon

(a) DOD and/or NELAC Accredited Analyte.

Sample 008469-02, Inorganic Analyses

Lab Report No: 008469 Report Date: 04/11/2019

-	MARK TWAIN LAKE		alysis: NI		DES (82	70SIM-MO	D)
Project No.:		Analytical I					
NELAC Certi:	fied - IL100308	Prep I	Method: 35	510C			
Field ID:	MTL-13		ARDL 1	Lab No.:	00846	59-03	
Desc/Location:	MARK TWAIN LAKE		Lab F:	llename:	E0410	0909	
Sample Date:	04/03/2019		Recei	ved Date:	04/04	1/2019	
Sample Time:	0820		Prep.	Date:	04/08	3/2019	
Matrix:	WATER		Analys	sis Date:	04/10	0/2019	
Amount Used:	900 mL		Instr	ument ID:	AG5		
Final Volume:	1 mL		QC Bat	ch:	B1103	37	
% Moisture:	NA		Level	:	LOW		
					Data		Dilution
Parameter		LOD	LOQ	Result	Flag	Units	Factor
Trifluralin		0.222	0.222	ND		UG/L	1
Atrazine		0.222	0.222	ND		UG/L	1
Metribuzin		0.222	0.222	ND		UG/L	1
Alachlor		0.222	0.222	ND		UG/L	1
Metolachlor		0.222	0.222	ND		UG/L	1
Chlorpyrifos		0.222	0.222	ND		UG/L	1
Cyanazine		0.222	0.222	ND		UG/L	1
Pendimethalin		0.222	0.222	ND		UG/L	1

SURROGATE RECOVERIES:	Limits	Results	
Triphenylphosphate	30-130	73%	Ì
			1

Surrogate recoveries marked with '*' indicates they are outside standard limits.

ARDL, INC. 400 Aviation Drive; P.O. Box 1566 Mt. Vernon, Illinois 62864

19	cs 0308		Run Number	4114463	04154479	4114464	4084456	4124470	04124471	4304502
05/01/2019	Inorganics ied - IL1003	WATER NA	Analysis Date	04/08/19 04114463	04/12/19 0	04/09/19 04114464	04/04/19 04084456	04/04/19 04124470	04/04/19 0	04/19/19 04304502
Report Date:	Analysis: Inorganics NELAC Certified - IL100308	Matrix: Moisture:	Prep Date	NA	NA	04/08/19	NA	NA	NA	NA
ሏ	Й		Analysis Method	350.1	GREEN	365.2	365.2	160.2	160.4	415.1
			Prep Method	NONE	NONE	365.2	NONE	NONE	NONE	NONE
		MARK TWAIN LAKE 04/03/2019 0820	Units	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L
			Result	0.0796	0.588	0.342	0.0921	37.8	4.4	6.9
		Sampling Loc'n: Sampling Date: Sampling Time:	Flag							
		Samp. Samı Samı	TOO	0.0300	0.0200	0.0100	0.0100	2.00	2.00	1.00
6,9	N LAKE	on on	LOD	0.0200	0.0190	0.0000.0	0.800.0	2.0	2.0	0.500
Lab Report No: 008469	Project Name: MARK TWAIN LAKE Project No:	ARDL No: 008469-03 Field ID: MTL-13 Received: 04/04/2019	Analyte	Ammonia Nitrogen	Nitrate as Nitrogen	Phosphorus	Phosphorus, -ortho	Solids, Total Suspended	Solids, Volatile Suspen	Total Organic Carbon

(a) DOD and/or NELAC Accredited Analyte.

Lab Report No: 008469 Report Date: 04/11/2019

	MARK TWAIN LAK		nalysis: N		DES (82	70SIM-MO	D)
Project No.:		Analytical	Method: 8	270C			
NELAC Certi	fied - IL100308	Prep	Method: 3	510C			
Field ID:	MTL-9		ARDL :	Lab No.:	00846	59-04	
Desc/Location:	MARK TWAIN LAK	E	Lab F	ilename:	E041	0910	
Sample Date:	04/03/2019		Recei	ved Date:	04/04	1/2019	
Sample Time:	0756		Prep.	Date:	04/08	3/2019	
Matrix:	WATER		Analy	sis Date:	04/10	0/2019	
Amount Used:	800 mL		Instr	ument ID:	AG5		
Final Volume:	1 mL		QC Ba	tch:	B1103	3 7	
% Moisture:	NA		Level	:	LOW		
***************************************					Data		Dilution
Parameter		LOD	LOQ	Result	Flag	Units	Factor
Trifluralin	•	0.250	0.250	ND		UG/L	1
Atrazine		0.250	0.250	ND		UG/L	1
Metribuzin		0.250	0.250	ND		UG/L	1
Alachlor		0.250	0.250	ND		UG/L	1
Metolachlor		0.250	0.250	ND		UG/L	1
Chlorpyrifos		0.250	0.250	ND		UG/L	1
Cyanazine		0.250	0.250	ND		UG/L	1
Pendimethalin		0.250	0.250	ND		UG/L	1

SURROGATE RECOVERIES:	Limits	Results	
Triphenylphosphate	30-130	59%	
			1

Surrogate recoveries marked with '*' indicates they are outside standard limits.

ARDL, INC. 400 Aviation Drive; P.O. Box 1566 Mt. Vernon, Illinois 62864

/2019	anics :100308		s Run Number			9 04114464 9 04084456		9 04124471	04/19/19 04304502
: 05/01/2019	: Inorganics fied - IL1003	NATER NA	Analysis Date	04/08/19	04/12/19	04/09/19	04/04/19	04/04/19	04/19/19
Report Date:	Analysis: Inorganics NELAC Certified - IL100308	Matrix: Moisture:	Prep Date	NA	AN 60,00	04/08/19 NA	NA	NA	NA
ĸ	Z		Analysis Method	350.1	GREEN	365.2	160.2	160.4	415.1
			Prep Method	NONE	NONE	365.Z	NONE	NONE	NONE
		MARK TWAIN LAKE 04/03/2019 0756	Units	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L
			Result	0.17	0.646	0.626	117	11.9	7.8
		Sampling Loc'n: Sampling Date: Sampling Time:	Flag						
		Samp. Samp Samp	TOOT	0.0300	0.0200	0.0100	7.94	7.94	1.00
69	N LAKE	n	LOD	0.0200	0.0190	0.0800.0	7.94	7.94	0.500
Lab Report No: 008469	Project Name: MARK TWAIN LAKE Project No:	ARDL No: 008469-04 Field ID: MTL-9 Received: 04/04/2019	Analyte	Ammonia Nitrogen	Nitrogen	Phosphorus Phosphorus -ortho	ended	Solids, Volatile Suspen	Total Organic Carbon

(a) DOD and/or NELAC Accredited Analyte.

Sample 008469-04, Inorganic Analyses

Lab Report No: 008469 Report Date: 04/11/2019

Project Name:	MARK TWAIN LAKE	Ana	alysis: N	P PESTICII	DES (82	70SIM-MO	D)
Project No.:		Analytical N	Method: 8:	270C			
NELAC Certi	fied - IL100308	Prep M	Method: 3	510C			
Field ID:	MTL-11		ARDL :	Lab No.:	00846	59-05	
Desc/Location:	MARK TWAIN LAKE		Lab F	ilename:	E0410	0911	
Sample Date:	04/02/2019		Recei	ved Date:	04/04	1/2019	
Sample Time:	1640		Prep.	Date:	04/08	3/2019	
Matrix:	WATER		Analy	sis Date:	04/10	0/2019	
Amount Used:	900 mL		Instr	ument ID:	AG5		
Final Volume:	1 mL		QC Ba	tch:	B1103	37	
% Moisture:	NA		Level	:	LOW		
					Data		Dilution
Parameter		LOD	LOQ	Result	Flag	Units	Factor
Trifluralin		0.222	0.222	ND		UG/L	1
Atrazine		0.222	0.222	ND		UG/L	1
Metribuzin		0.222 +	0.222	ND		UG/L	1
Alachlor		0.222	0.222	ND		UG/L	1
Metolachlor		0.222	0.222	ND		UG/L	1
Chlorpyrifos		0.222	0.222	ND		UG/L	1
Cyanazine		0.222	0.222	ND		UG/L	1
Pendimethalin		0.222	0.222	ND		UG/L	1

SURROGATE RECOVERIES:	Limits	Results	
Triphenylphosphate	30-130	60%	ĺ
			ĺ

Surrogate recoveries marked with '*' indicates they are outside standard limits.

ARDL, INC. 400 Aviation Drive; P.O. Box 1566 Mt. Vernon, Illinois 62864

19	0308		Run Number	04114463 04154479 04114464 04084456 04124470 04124471
05/01/2019	Inorganics ied - IL1003	WATER NA	Analysis Date	04/08/19 04114463 04/12/19 04154479 04/09/19 04114464 04/04/19 04024456 04/04/19 04124470 04/04/19 04124471
Report Date:	Analysis: Inorganics NELAC Certified - IL100308	Matrix: Moisture:	Prep Date	NA NA 04/08/19 NA NA NA NA
Re	N		Analysis Method	350.1 GREEN 365.2 365.2 160.2 160.4
			Prep Method	NONE NONE 365.2 NONE NONE NONE
		MARK TWAIN LAKE 04/02/2019 1640	Units	MG/L MG/L MG/L MG/L MG/L MG/L
			Result	0.108 0.644 1.47 0.116 409 32.8
		Sampling Loc'n: Sampling Date: Sampling Time:	Flag	
		Samp Sam Sam	OOT	0.0300 0.0200 0.0100 0.0100 17.2 17.2
69	N LAKE	on on	гор	0.0200 0.0190 0.00800 0.00800 17.2 17.2 0.500
Lab Report No: 008469	Project Name: MARK TWAIN LAKE Project No:	ARDL No: 008469-05 Field ID: MTL-11 Received: 04/04/2019	Analyte	Ammonia Nitrogen Nitrate as Nitrogen Phosphorus Phosphorus, -ortho Solids, Total Suspended Solids, Volatile Suspen Total Organic Carbon

(a) DOD and/or NELAC Accredited Analyte.

Lab Report No: 008469 Report Date: 04/11/2019

Project Name:	MARK TWAIN LAKE	A	nalysis: N	P PESTICII	DES (82'	70SIM-MC	D)
Project No.:		Analytical	Method: 8	270C			
NELAC Certi	fied - IL100308	Prep	Method: 3	510C			
Field ID:	MTL-12		ARDL	Lab No.:	0084	69-06	
Desc/Location:	MARK TWAIN LAKE		Lab F	ilename:	E041	0912	
Sample Date:	04/02/2019		Recei	ved Date:	04/04	4/2019	
Sample Time:	1200		Prep.	Date:	04/0	8/2019	
Matrix:	WATER		Analy	sis Date:	04/1	0/2019	
Amount Used:	900 mL		Instr	ument ID:	AG5		
Final Volume:	1 mL		QC Ba	tch:	B110	3 7	
% Moisture:	NA		Level	:	LOW		
					Data		Dilution
Parameter		LOD	LOQ	Result	Flag	Units	Factor
Trifluralin		0.222	0.222	ND		UG/L	1
Atrazine		0.222	0.222	ND		UG/L	1
Metribuzin		0.222	0.222	ND		UG/L	1
Alachlor	•	0.222	0.222	ND		UG/L	1
Metolachlor		0.222	0.222	ND		UG/L	1
Chlorpyrifos		0.222	0.222	ND		UG/L	1
Cyanazine		0.222	0.222	ND		UG/L	1
Pendimethalin		0.222	0.222	ND		UG/L	1

SURROGATE RECOVERIES:	Limits	Results	
Triphenylphosphate	30-130	63%	

Surrogate recoveries marked with '*' indicates they are outside standard limits.

400 Aviation Drive; P.O. Box 1566 Mt. Vernon, Illinois 62864

2019	nics 100308		Run Number	P7190 P7190 04114463 04154479 04114464 04084456 04124470 04124471
: 05/01/2019	: Inorganics fied - IL1003	: WATER : NA	Analysis Date	04/10/19 04/10/19 04/08/19 04/09/19 04/04/19 04/04/19 04/04/19
Report Date:	Analysis: Inorganics NELAC Certified - IL100308	Matrix: Moisture:	Prep Date	04/10/19 04/10/19 NA NA 04/08/19 NA NA NA
Ř	Z Z		Analysis Method	6010C 6010C 350.1 GREEN 365.2 365.2 160.2 160.4
			Prep Method	3010A 3010A NONE NONE 365.2 NONE NONE NONE
		MARK TWAIN LAKE 04/02/2019 1200	Units	MG/L MG/L MG/L MG/L MG/L MG/L MG/L MG/L
			Result	2.35 0.0654 0.116 1.03 0.408 0.262 10.5 ND
		Sampling Loc'n: Sampling Date: Sampling Time:	Flag	
		Samp Samp Samj	TOO	0.0500 0.00500 0.0300 0.0200 0.0100 1.67 1.67
691	N LAKE	, o	ГОБ	0.0400 0.00400 0.0200 0.0190 0.00800 1.67 1.67
: No: 008469	MARK TWAIN LAKE	008469-06 MTL-12 04/04/2019	t e	ren rogen rtho Suspended le Suspen
Lab Report No:	Project Name: Project No:	ARDL No: Field ID: Received:	Analyte	(a) Iron (a) Manganese Ammonia Nitrogen Nitrate as Nitrogen Phosphorus, -ortho Solids, Total Suspended Solids, Volatile Suspen

(a) DOD and/or NELAC Accredited Analyte.

Sample 008469-06, Inorganic Analyses

Lab Report No: 008469 Report Date: 04/11/2019

Project No.: NELAC Certifie	ed - IL10030		Analytical	Mothod.				
NELAC Certifie	ed - IL10030	0		Method:	8270C			
		, 6	Prep	Method:	3510C			
Field ID: MT	L-15-0			ARDL	Lab No.:	0084	69-07	
Desc/Location: MA	ARK TWAIN LA	KE		Lab	Filename:	E041	0913	
Sample Date: 04	/02/2019			Rece	ived Date:	04/04	4/2019	
Sample Time: 15	540			Prep	. Date:	04/08	8/2019	
Matrix: WA	ATER			Anal	ysis Date:	04/10	0/2019	
Amount Used: 90	00 mL			Inst	rument ID:	AG5		
Final Volume: 1	mL			QC B	atch:	B1103	37	
% Moisture: NA	Ā			Leve	1:	LOW		
		······································				Data		Dilution
Parameter			LOD	LOQ	Result	Flag	Units	Factor
Trifluralin			0.222	0.222	ND		UG/L	1
Atrazine			0.222	0.222	ND		UG/L	1
Metribuzin			0.222	0.222	ND		UG/L	1
Alachlor			0.222	0.222	ND		UG/L	1
Metolachlor			0.222	0.222	ND		UG/L	1
Chlorpyrifos			0.222	0.222	ND		UG/L	1
Cyanazine			0.222	0.222	ND		UG/L	1
Pendimethalin			0.222	0.222	ND		UG/L	1

SURROGATE RECOVERIES:	Limits	Results	
Triphenylphosphate	30-130	81%	Ì
			1

Surrogate recoveries marked with '*' indicates they are outside standard limits.

ARDL, INC. 400 Aviation Drive; P.O. Box 1566 Mt. Vernon, Illinois 62864

							2	Analysis:	Analysis: Inorganics	cs 0308
ARDL No: 008469-07 Field ID: MTL-15-0 Received: 04/04/2019	<u>م</u>	Samplin Sampli Sampli	Sampling Loc'n: Sampling Date: Sampling Time:		MARK TWAIN LAKE 04/02/2019 1540			Matrix: Moisture:	: WATER : NA	
Analyte	LOD	TOO	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Ammonia Nitrogen	0.0200	0.0300		0.481	MG/L	NONE	350.1	NA	04/08/19 0	04114463
Chlorophyll-a, Correcte	1.0	1.00		5.4	MG/CU.M.	10200H	10200H	04/04/19	04/05/19 0	04114468
Nitrate as Nitrogen	0.0190	0.0200		0.642	MG/L	NONE	GREEN	NA	04/12/19 0	04154479
Pheophytin-a	1.0	1.00		QN	MG/CU.M.	10200H	10200H	04/04/19	04/05/19 0	04114468
Phosphorus	0.00800	0.0100		1.4	MG/L	365.2	365.2	04/08/19	04/09/19 0	04114464
Phosphorus, -ortho	0.00800	0.0100		0.327	MG/L	NONE	365.2	NA	04/04/19 0	04084456
Solids, Total Suspended	4.0	4.00		28.0	MG/L	NONE	160.2	NA	04/04/19 0	04124470
Solids, Volatile Suspen	4.0	4.00		NO	MG/L	NONE	160.4	NA	04/04/19 0	04124471
Total Organic Carbon	0.500	1.00		7.5	MG/L	NONE	415.1	NA	04/19/19	04304502

(a) DOD and/or NELAC Accredited Analyte.

Lab Report No: 008469 Report Date: 04/11/2019

Project Name:	MARK TWAIN LAKE	Ana	lysis: N	P PESTICII	DES (82	70SIM-MO	D)
Project No.:		Analytical M	Method: 82	270C			
NELAC Certi:	fied - IL100308	Prep M	Method: 35	510C			
Field ID:	MTL-22-0		ARDL 1	Lab No.:	00846	59-08	
Desc/Location:	MARK TWAIN LAKE		Lab F	ilename:	E0410	0914	
Sample Date:	04/02/2019		Recei	ved Date:	04/04	1/2019	
Sample Time:	1330		Prep.	Date:	04/08	3/2019	
Matrix:	WATER		Analys	sis Date:	04/10	0/2019	
Amount Used:	900 mL		Instr	ument ID:	AG5		
Final Volume:	1 mL		QC Bat	ch:	B1103	37	
% Moisture:	NA		Level	:	LOW		
					Data		Dilution
Parameter		LOD	LOQ	Result	Flag	Units	Factor
Trifluralin		0.222	0.222	ND		UG/L	1
Atrazine		0.222	0.222	ND		UG/L	1
Metribuzin		0.222	0.222	ND		UG/L	1
Alachlor		0.222	0.222	ND		UG/L	1
Metolachlor		0.222	0.222	ND		UG/L	1
Chlorpyrifos		0.222	0.222	ND		UG/L	1
Cyanazine		0.222	0.222	ND		UG/L	1
Pendimethalin		0.222	0.222	ND		UG/L	1

SURROGATE RECOVERIES:	Limits	Results	
Triphenylphosphate	30-130	64%	ĺ
			1

Surrogate recoveries marked with '*' indicates they are outside standard limits.

ARDL, INC. 400 Aviation Drive; P.O. Box 1566 Mt. Vernon, Illinois 62864

Lab Report No: 008469	691						PK.	Report Date:	: 05/01/2019	119
Project Name: MARK TWAIN LAKE Project No:	IN LAKE						Z	Analysis: IELAC Certif	Analysis: Inorganics NELAC Certified - IL100308	.cs 00308
ARDL No: 008469-08 Field ID: MTL-22-0 Received: 04/04/2019	5	Sampling L Sampling Sampling	Sampling Loc'n: Sampling Date: Sampling Time:		MARK TWAIN LAKE 04/02/2019 1330			Matrix: Moisture:	: WATER : NA	
Analyte	LOD	OOT	Flag F	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Ammonia Nitrogen	0.0200	0.0300	0	0.0414	MG/L	NONE	350.1	NA	04/08/19 04114463	4114463
Chlorophyll-a, Correcte	1.0	1.00		3.4	MG/CU.M.	10200H	10200H	04/04/19	04/05/19 (04114468
Nitrate as Nitrogen	0.0190	0.0200		0.718	MG/L	NONE	GREEN	NA	04/12/19 (04154479
Pheophytin-a	1.0	1.00		ND	MG/CU.M.	10200H	10200H	04/04/19	04/05/19 (04114468
Phosphorus	0.00800	0.0100		0.31	MG/L	365.2	365.2	04/08/19	04/09/19 (04114464
Phosphorus, -ortho	0.00800	0.0100		0.171	MG/L	NONE	365.2	NA	04/04/19 (04084456
Solids, Total Suspended	1.33	1.33		5.47	MG/L	NONE	160.2	NA	04/04/19 (04124470
Solids, Volatile Suspen	1.33	1.33		NO	MG/L	NONE	160.4	NA	04/04/19 (04124471
Total Organic Carbon	0.500	1.00		5.7	MG/L	NONE	415.1	NA	04/19/19 (04304502

(a) DOD and/or NELAC Accredited Analyte.

Sample 008469-08, Inorganic Analyses

ARDL, INC. 400 Aviation Drive; P.O. Box 1566 Mt. Vernon, Illinois 62864

Report Date: 05/01/2019	Analysis: Inorganics NELAC Certified - IL100308	n: MARK TWAIN LAKE . Matrix: WATER ce: 04/02/2019 . Moisture: NA ne: 1335	Prep Analysis Prep Analysis Run Result Units Method Method Date Date Number	2.16 MG/L 3010A 6010C 04/10/19 04/10/19 P7190	0.0656 MG/L 3010A 6010C 04/10/19 04/10/19 P7190	ND MG/L NONE 350.1 NA 04/08/19 04114463	0.988 MG/L NONE GREEN NA 04/12/19 04154479	0.324 MG/L 365.2 365.2 04/08/19 04/09/19 04114464	0.173 MG/L NONE 365.2 NA 04/04/19 04084456	6.4 MG/L NONE 160.2 NA 04/04/19 04124470	ND MG/L NONE 160.4 NA 04/04/19 04124471	
		Sampling Loc'n: Sampling Date: Sampling Time:	LOQ Flag	0.0500	0.00500	0.0300	0.0200	0.0100	0.0100	1.33	1.33	
69	N LAKE		LOD	0.0400	0.00400 0	0.0200	0.0190	0.0000.0	0.0000.0	1.33	1.33	
Lab Report No: 008469	Project Name: MARK TWAIN LAKE Project No:	ARDL No: 008469-09 Field ID: MTL-22-15 Received: 04/04/2019	Analyte	(a) Iron	(a) Manganese	Ammonia Nitrogen	Nitrate as Nitrogen	Phosphorus	Phosphorus, -ortho	Solids, Total Suspended	Solids, Volatile Suspen	

(a) DOD and/or NELAC Accredited Analyte.

Lab Report No: 008469 Report Date: 04/11/2019

Project Name:	MARK TWAIN LAKE	Ana	alysis: NI	PESTICII	DES (827	70SIM-MO	D)
Project No.:		Analytical D	Method: 82	270C			
NELAC Certi:	fied - IL100308	Prep 1	Method: 35	510C			
Field ID:	MTL-33-0		ARDL I	Lab No.:	00846	59-10	
Desc/Location:	MARK TWAIN LAKE		Lab F:	ilename:	E0410	0915	
Sample Date:	04/02/2019		Receiv	ved Date:	04/04	1/2019	
Sample Time:	1405		Prep.	Date:	04/08	3/2019	
Matrix:	WATER		Analys	sis Date:	04/10	0/2019	
Amount Used:	1000 mL		Instr	ument ID:	AG5		
Final Volume:	1 mL		QC Bat	ch:	B1103	37	
% Moisture:	NA		Level	:	LOW		
		A STATE OF THE STA			Data		Dilution
Parameter		LOD	LOQ	Result	Flag	Units	Factor
Trifluralin		0.200	0.200	ND		UG/L	1
Atrazine		0.200	0.200	0.350		UG/L	1
Metribuzin		0.200	0.200	ND		UG/L	1
Alachlor		0.200	0.200	ND		UG/L	1
Metolachlor		0.200	0.200	ND		UG/L	1
Chlorpyrifos		0.200	0.200	ND		UG/L	1
Cyanazine		0.200	0.200	ND		UG/L	1
Pendimethalin		0.200	0.200	ND		UG/L	1

SURROGATE RECOVERIES:	Limits	Results	
Triphenylphosphate	30-130	69%	

Surrogate recoveries marked with '*' indicates they are outside standard limits.

ARDL, INC. 400 Aviation Drive; P.O. Box 1566 Mt. Vernon, Illinois 62864

Report Date: 05/01/2019	Analysis: Inorganics NELAC Certified - IL100308	Matrix: WATER Moisture: NA	Prep Analysis Run Date Date Number	NA 04/08/19 04114468 04/04/19 04/05/19 04114468 NA 04/12/19 04154479 04/04/19 04/05/19 04114468 04/08/19 04/09/19 04114464 NA 04/04/19 04084456 NA 04/04/19 04124471 NA 04/04/19 04124471 NA 04/19/19 04124471
Repo	NEL		Analysis Method	350.1 10200H 04 GREEN 10200H 04 365.2 160.2 160.4
			Prep Method	NONE 10200H NONE 10200H 365.2 NONE NONE NONE
		MARK TWAIN LAKE 04/02/2019 1405	Units	MG/CU.M. MG/CU.M. MG/L MG/L MG/L MG/L MG/L MG/L
		Loc'n: MARK Date: 04/02	Result	0.0923 2.7 0.759 ND 0.496 0.309 17.2 2.2 6.9
		ממו	Flag	
		Sampling Sampling Sampling	TOO	0.0300 1.00 1.00 0.0100 0.0100 2.00 2.00
б	N LAKE	9	LOD	0.0200 1.0 0.0190 1.0 0.00800 0.00800 2.0 2.0
Lab Report No: 008469	Project Name: MARK TWAIN LAKE Project No:	ARDL No: 008469-10 Field ID: MTL-33-0 Received: 04/04/2019	Analyte	Ammonia Nitrogen Chlorophyll-a, Correcte Nitrate as Nitrogen Phosphorus Phosphorus, -ortho Solids, Total Suspended Solids, Volatile Suspen Total Organic Carbon

(a) DOD and/or NELAC Accredited Analyte.

Lab Report No: 008469 Report Date: 04/11/2019

Project Name:	MARK TWAIN L	AKE	Ar	alysis:	NP PESTICI	DES (82	70SIM-MO	DD)
Project No.:		A	malytical	Method:	8270C			
NELAC Certi	fied - IL1003	80	Prep	Method:	3510C			
Field ID:	MTL-66-0			ARDL	Lab No.:	0084	59-11	
Desc/Location:	MARK TWAIN L	AKE		Lab	Filename:	E041	0916	
Sample Date:	04/02/2019			Rece	ived Date:	04/0	4/2019	
Sample Time:	1515			Prep	. Date:	04/0	3/2019	
Matrix:	WATER			Anal	ysis Date:	04/1	0/2019	
Amount Used:	1000 mL			Inst	rument ID:	AG5		
Final Volume:	1 mL			QC B	atch:	B110	37	
% Moisture:	NA			Leve	1:	LOW		
						Data		Dilution
Parameter			LOD	LOQ	Result	Flag	Units	Factor
Trifluralin			0.200	0.200	ND		UG/L	1
Atrazine			0.200	0.200	ND		UG/L	1
Metribuzin			0.200	0.200	ND		UG/L	1
Alachlor			0.200	0.200	ND		UG/L	1
Metolachlor			0.200	0.200	ND		UG/L	1
Chlorpyrifos			0.200	0.200	ND		UG/L	1
Cyanazine			0.200	0.200	ND		UG/L	1
Pendimethalin			0.200	0.200	ND		UG/L	1

SURROGATE RECOVERIES:	Limits	Results	
Triphenylphosphate	30-130	55%	
			1

Surrogate recoveries marked with '*' indicates they are outside standard limits.

ARDL, INC. 400 Aviation Drive; P.O. Box 1566 Mt. Vernon, Illinois 62864

Lab Report No: 008469	69:						A	Report Date:	: 05/01/2019	119
Project Name: MARK TWAIN LAKE Project No:	N LAKE				ė.		N	Analysis: ELAC Certif	Analysis: Inorganics NELAC Certified - IL100308	cs 00308
ARDL No: 008469-11 Field ID: MTL-66-0 Received: 04/04/2019	م م	Sampl Samp Samp	Sampling Loc'n: Sampling Date: Sampling Time:		MARK TWAIN LAKE 04/02/2019 1515			Matrix: Moisture:	: WATER : NA	
Analyte	LOD	ЙОЛ	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Ammonia Nitrogen	0.0200	0.0300		0.494	MG/L	NONE	350.1	NA	04/08/19 (04114463
Chlorophyll-a, Correcte	1.0	1.00		5.6	MG/CU.M.	10200H	10200H	04/04/19	04/05/19 (04114468
Nitrate as Nitrogen	0.0190	0.0200		0.62	MG/L	NONE	GREEN	NA	04/12/19 (04154479
Pheophytin-a	1.0	1.00		1.1	MG/CU.M.	10200H	10200H	04/04/19	04/05/19 (04114468
Phosphorus	0.00800	0.0100		0.598	MG/L	365.2	365.2	04/08/19	04/09/19 0	04114464
Phosphorus, -ortho	0.00800	0.0100		0.34	MG/L	NONE	365.2	NA	04/04/19 (04084456
Solids, Total Suspended	2.0	2.00		26.6	MG/L	NONE	160.2	NA	04/04/19 (04124470
Solids, Volatile Suspen	2.0	2.00		3.2	MG/L	NONE	160.4	NA	04/04/19 0	04124471
Total Organic Carbon	0.500	1.00		7.3	MG/L	NONE	415.1	NA	04/19/19 (04304502

(a) DOD and/or NELAC Accredited Analyte.

Sample 008469-11, Inorganic Analyses

Lab Report No: 008469 Report Date: 04/11/2019

Project Name:	MARK TWAIN LA	KE Z	Analysis:	NP PESTICI	DES (82	70SIM-MC	D)
Project No.:		Analytical	L Method:	8270C			
NELAC Certi	fied - IL100308	8 Prep	Method:	3510C			
Field ID:	MTL-77-0		ARDI	Lab No.:	0084	59-12	
Desc/Location:	MARK TWAIN LA	KE	Lab	Filename:	E041	0917	
Sample Date:	04/02/2019		Rece	eived Date:	04/04	1/2019	
Sample Time:	1545		Pre	p. Date:	04/08	3/2019	
Matrix:	WATER		Ana:	lysis Date:	04/1	0/2019	
Amount Used:	1000 mL		Inst	rument ID:	AG5		
Final Volume:	1 mL		QC 1	Batch:	B110	37	
% Moisture:	NA		Leve	el:	LOW		
					Data		Dilution
Parameter		LOD	LOQ	Result	Flag	Units	Factor
Trifluralin		0.200	0.200) ND		UG/L	1
Atrazine		0.20	0.20) ND		UG/L	1
Metribuzin		0.20	0.20) ND		UG/L	1
Alachlor		0.20	0.20) ND		UG/L	1
Metolachlor		0.20	0.20) ND		UG/L	1
Chlorpyrifos		0.20	0.20) ND		UG/L	1
Cyanazine		0.20	0.20) ND		UG/L	1
Pendimethalin		0.20	0.200) ND		UG/L	1

SURROGATE RECOVERIES:	Limits	Results	
Triphenylphosphate	30-130	62%	j

Surrogate recoveries marked with '*' indicates they are outside standard limits.

ARDL, INC. 400 Aviation Drive; P.O. Box 1566 Mt. Vernon, Illinois 62864

(a) DOD and/or NELAC Accredited Analyte.

Sample 008469-12, Inorganic Analyses

METHOD BLANK REPORT ARDL, Inc. 400 Aviation Drive; P.O. Box 1566 Mt. Vernon, Illinois 62864

Lab Report No: 008469 Report Date: 04/11/2019

Project Name:	MARK TWAIN LAKE	Analys	sis: NP PEST	CICIDES (8	270SIM-M	OD)
Project No.:		Analytical Meth	nod: 8270C		•	
NELAC Certi	fied - IL100308	Prep Meth	nod: 3510C			
Field ID:	NA		ARDL Lab No	008	469-01B1	
Desc/Location:	NA		Lab Filenam	ne: E04	10903	
Sample Date:	NA		Received Da	te: NA		
Sample Time:	NA		Prep. Date:	04/	08/2019	
Matrix:	QC Material		Analysis Da	te: 04/	10/2019	
Amount Used:	1000 mL		Instrument	ID: AG5		
Final Volume:	1 mL		QC Batch:	B11	037	
% Moisture:	NA		Level:	LOW		
					Data	
Parameter		LOD	LOQ	Result	Flag	Units
Trifluralin		0.200	0.200	ND		UG/L
Atrazine		0.200	0.200	ND		UG/L
Metribuzin		0.200	0.200	ND		UG/L
Alachlor		0.200	0.200	ND		UG/L
Metolachlor		0.200	0.200	ND		UG/L
Chlorpyrifos		0.200	0.200	ND		UG/L
Cyanazine		0.200	0.200	ND		UG/L
Pendimethalin		0.200	0.200	ND		UG/L

SURROGATE RECOVERIES:	Limits	Results	
Triphenylphosphate	30-130	95%	İ
			1

Surrogate recoveries marked with '*' indicates they are outside standard limits.

Mt. Vernon, IL 400 Aviation Drive; P.O. Box 1566 BLANK SUMMARY REPORT ARDL, INC.

05/01/2019
Report Date:
008469
Lab Report No:

Project Name:	MARK T	MARK TWAIN LAKE	E					NELAC C	ertifie	NELAC Certified - IL100308
Analyte	LOD	TOO	Blank Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date R	Run	QC Lab Number
(a) Iron	0.040	0.050	S S	MG/L	3010A	6010C	04/10/19	04/10/19 E	P7190	008468-01B1
(a) Manganese	0.004	0.005	ON	MG/L	3010A	6010C	04/10/19	04/10/19 F	P7190	008468-01B1
Ammonia Nitrogen	0.020	0.030	NO	MG/L	NONE	350.1	AN	04/08/19 041	04114463	008469-01B1
Chlorophyll-a, Corre	1.0	1.0	NO	MG/CU.M.	10200H	10200H	04/04/19	04/05/19 041	04114468	008469-11B1
Nitrate as Nitrogen	0.019	0.020	NO	MG/L	NONE	GREEN	AN	04/12/19 041	04154479	008469-02B1
Pheophytin-a	1.0	٥٠٦	ON	MG/CU.M.	10200H	10200H	04/04/19	04/05/19 041	04114468	008469-11B1
Phosphorus	0.008	0.010	NO	MG/L	365.2	365.2	04/08/19	04/09/19 041	04114464	008469-01B1
Phosphorus, -ortho	0.008	0.010	ON	MG/L	NONE	365.2	AN	04/04/19 040	04084456	008469-07Bl
Solids, Total Suspen	1.0	1.0	ON	MG/L	NONE	160.2	NA	04/04/19 041	04124470	008469-12B1
Solids, Volatile Sus	1.0	1.0	NO	MG/L	NONE	160.4	AN	04/04/19 041	04124471	008469-12B1
Total Organic Carbon	0.50	1.0	ND	MG/L	NONE	415.1	NA	04/19/19 04304502	04502	008469-01B1

(a) DOD and/or NELAC Accredited Analyte Inorganic Method Blanks for 008469

Mt. Vernon, IL BLANK SPIKE/SPIKE DUPLICATE REPORT 400 Aviation Drive; P.O. Box 1566 ARDL, INC.

Lab Report No:	008469							Rep	Report Date:	: 04/11/2019
Project Name: MARK TWAIN LAKE Project No.:	RK TWAIN LAKE	Ane	Analysis: NP	PESTICIDE	PESTICIDES (8270SIM-MOD)	CM-MOD)	Anal	Analytical Method: Prep Method:	,	8270C 3510C
Matrix: Qo Amount Used: 10	QC Material 1000 mL		QC Batch: Level:	: B11037 LOW	37		Prep. Date: Analysis Da	t 	04/08/2019 04/10/2019	61
Param	Parameter	Spike	Spike Level	Spike % Rec	Duplicate Result	Duplicate Level	Duplicate % Rec	Recovery	RPD	RPD
Trifluralin	ıralin	2.44	4	19	i I	1 1	1	30-130	1	1 1
Atra	Atrazine	2.97	4	74	i i	1 1	!	30-130	1	!
Metri	Metribuzin	3.11	4	78	!!	!	i i	30-130	1	1
Alac	Alachlor	3.15	4	79	i 1	;	1	30-130	1	!
Metolachlor	achlor	3.36	4	84	ì	-	t t	30-130	! !	I I
Chlor	Chlorpyrifos	2.95	4	74	1	1	1 1	30-130	i i	i i
Cyana	Cyanazine	3.67	4	92	I I	1	1	30-130	1	
Pendime	Pendimethalin	3.27	4	82	!	1	!	30-130	;	t t
To the second se							,			
	SURROGI	SURROGATE RECOVERIES:		Spike %R		Duplicate %R	%R Limits			

30-130

82.5

Triphenylphosphate

(a) DOD-QSM Accredited Analyte.

^{&#}x27;*' indicates a recovery outside of standard limits. Spike Blanks for 008469-01, NP PESTICIDES (8270SIM-MOD)

62864 Mt. Vernon, IL LABORATORY CONTROL SAMPLE REPORT 400 Aviation Drive; P.O. Box 1566 ARDL, INC.

Report Date: 05/01/2019	
Rep	
Lab Report No: 008469	

Project Name:	MARK TWAIN LAKE	1 LAKE							NELAC Cert	NELAC Certified - IL100308
Analyte	LCS 1 Result	LCS 1 Level	LCS 1 Rec	LCS 2 Result	LCS 2 Level .	LCS 2 % Rec	% Rec Limits	Mean % Rec	Analytical Run	QC Lab Number
(a) Iron	4.8	5.0	95	;	ı	1	87-115	ŀ	P7190	008468-01C1
(a) Manganese	0.75	0.75	100	;	;	;	90-114	i i	P7190	008468-01C1
Ammonia Nitrogen	0.91	1.0	16	i i	;	1	80-120	;	04114463	008469-01C1
Nitrate as Nitrogen	1.0	1.0	103	;	;	1	80-120	;	04154479	008469-02C1
Phosphorus	0.63	0.67	98	;	1	;	80-120	8	04114464	008469-01C1
Phosphorus, -ortho	0.10	0.10	103	:	;	;	80-120	t I	04084456	008469-07C1
Total Organic Carbon	19.4	20.0	76	19.4	20.0	97	80-120	97	04304502	008469-01C1

NOTE: Any values tabulated above marked with an asterisk are outside of acceptable limits.

⁽a) DOD and/or NELAC Accredited Analyte

MATRIX SPIKE/SPIKE DUPLICATE REPORT

Lab Report No:

04/11/2019 Report Date: Mt. Vernon, IL 62864 400 Aviation Drive; P.O. Box 1566 ARDL, INC.

roject name: Project No.:	Project Name: MARK TWAIN LAKE Project No.:		Analysis:]		NF FESTICIDES (82/0SIM-MOD)			Allanych	rear mechod: Prep Method:	Analytical Method: 82/00 Prep Method: 3510C	
Field ID: Desc/Location:	Field ID: MTL-1 Desc/Location: MARK TWAIN LAKE		Prep. Amoun	Prep. Date: Amount Used:	04/08/2019 900 mL	0	A 1	ARDL Lab No.: Lab Filename:		008469-01	
Sample Date: Sample Time: Matrix:	04/02/2019 1252 WATER		% Moisture QC Batch: Level:	Moisture: ! Batch: :vel:	NA B11037 LOW		ୟ ୟ	Received I Analysis I		04/04/2019 04/10/2019	
		Sample	MS	MS	MS	MSD	MSD	MSD	% Rec		RPD
Para	Parameter	Result	Result	Level	% Rec	Result	Level	% Rec	Limits	RPD	Limit
Trifl	Trifluralin	QN.	2.6	4.44	58.5	2.51	4.44	56.5	30-130	3.5	30
Atra	Atrazine	N N	3.03	4.44	68.3	2.96	4.44	66.5	30-130	2.6	30
Metri	Metribuzin	ND	3.12	4.44	70.3	3.06	4.44	68.8	30-130	2.2	30
Alac	Alachlor	ND	2.99	4.44	67.3	2.99	4.44	67.3	30-130	0	30
Metola	Metolachlor	N Q	3.21	4.44	72.3	3.18	4.44	71.5	30-130	1	30
Chlorg	Chlorpyrifos	QN	2.69	4.44	60.5	2.66	4.44	59.8	30-130	1.2	30
Cyana	Cyanazine	N	3.7	4.44	83.3	3.6	4.44	81	30-130	2.7	30
Pendime	Pendimethalin	NO	2.89	4.44	65	2.83	4.44	63.8	30-130	1.9	30

URROGATE RECOVERIES:	MS %R	MSD %R	%R Limits
Triphenylphosphate	29	99	30-130

⁽a) DOD-QSM Accredited Analyte.

^{&#}x27;nc' indicates sample >4X spike level.

^{&#}x27;*' indicates a recovery outside of standard limits.
Matrix Spikes for 008469-01, NP PESTICIDES (8270SIM-MOD)

62864 400 Aviation Drive; P.O. Box 1566 Mt. Vernon, IL MATRIX SPIKE/SPIKE DUPLICATE REPORT ARDL, INC.

Lab Report No: 008469

Report Date: 05/01/2019

Project Name:		MARK TWAIN LAKE	N LAKE					-			NELAC	Certifi	NELAC Certified - IL100308
Analyte	Sample Matrix	Sample Result	MS Result	MS Level	MS Rec	MSD Result	MSD Level	MSD % Rec	% Rec Limits	RPD	RPD	Run	QC Lab Number
(a) Iron	WATER	2.4	3.6	1.0	125 *	3.4	1.0	102	87-115	9	20	P7190	008469-01MS
(a) Manganese	WATER	0.061	0.58	0.50	103	0.58	0.50	105	90-114	Н	20	P7190	008469-01MS
Ammonia Nitrogen	WATER	0.054	2.3	2.0	110	2.2	2.0	106	75-125	4	20	04114463	008469-01MS
Nitrate as Nitrogen	WATER	0.74	1.6	1.0	06	1.7	1.0	97	75-125	4	20	04154479	008469-02MS
Phosphorus	WATER	0.33	1.6	0.83	120 *	1.4	0.83	125	75-125	14	20	04114464	008469-01MS
Phosphorus, -ortho	WATER	0.33	0.42	0.10	16	0.43	0.10	66	75-125	2	20	04084456	008469-07MS

NOTE: Values tabulated above marked with an asterisk are explained in the associated narrative.

Inorganic Matrix Spikes for 008469

⁽a) DOD and/or NELAC Accredited Analyte.

62864 Mt. Vernon, IL 400 Aviation Drive; P.O. Box 1566 SAMPLE DUPLICATE REPORT ARDL, INC.

05/01/2019 Report Date: Lab Report No: 008469

NELAC Certified - IL100308 008469-11D1 008469-11D1 008469-12D1 008469-12D1 Number OC Lab Analytical 04114468 04114468 04124470 04124471 Run (Smp, D1, D2) Mean I I | | Percent Diff 22 * 10 MG/CU.M. MG/CU.M. MG/LMG/LUnits Duplicate Duplicate Second $\begin{smallmatrix}1&&1&&1&&1\\1&&1&&1&&1\end{smallmatrix}$ 2. 2. 2 2. 1. 5 2. 5 First MARK TWAIN LAKE Conc'n Sample 22.5 5.6 1.1 Chlorophyll-a, Corrected Solids, Total Suspended Solids, Volatile Suspend Pheophytin-a Project Name: Analyte

* indicates that agreement between duplicates is greater than 20%. See Case Narrative for exceptions. (a) DOD and/or NELAC Accredited Analyte

Sample Duplicates for 008469



Including as appropriate:

- COCs
- Cooler Receipts
- Airbills
- Email Communication / Instructions from Customer

ARDL Data Package 8469

ARDL, Inc.
P.O. Box 1566, 400 Aviation Drive, Mt. Vernon, IL 62864 (618) 244-3235 Phone (618) 244-1149 Fax

(618) 244-3235 Phone

CHAIN OF CUSTODY RECORD

NOIL	SPECIFY CHEMICALS ADDED AND FINAL PH IF KNOWN																		,	~	1
PRESERVATION	SPE CHEM ADDE FINAL KN(8																23	Cr	7	
PRE	ICED		X	X	X	X	X	X	X	X	X	X	X	X				7	3	\$\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	120
		REMARKS OR SAMPLE LOCATION												•				REDUCT X BOTTLES 10501ED ML33	MTL- X7 + 11ce versa	98)_
,																		*	from site		
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		DATE 2019	6-17		4-3	4-3	なって	2-17	4-3	7-7	4-3	4-2	6-7	e-4				Date	2	1	1114
PROJECT Mark Twain Lake	SAMPLERS: (Signature) Greeling and Schepker	SAMPLE NUMBER	MTL-1	MTL-5	MTL-13	MTL-9	MTL-11	MTL-12	MTL-15-0	MTL-22-0	MTL-22-15	MTL-33-0	MTL-66-0	MTL-77-0	AF	₹ÐL	Rep	Relinquished by: (Signature)	Relinquished by: (Signature)	Received for Laboratory by:	2 Dackern

& PURCHASE ORDER NO:

COOLER RECEIPT REPORT ARDL, INC.

AR	DL#:	Cooler# / a/	3 5/4		
Pro	ject: Mark Lwain Lake	Date Received: 44-3	-19 ley	, RA	- KD
Α.	PRELIMINARY EXAMINATION PHASE: Date cooler was opened: 44 - 4	4-19 (Signature)	Cachri	im	_
1.	Did cooler come with a shipping slip (airbill, etc.)?		YES	NO	
	If YES, enter carrier name and airbill number here:		aurier		
2.	Were custody seals on outside of cooler?				N/A
	How many and where?,Seal Date	:,Seal Name:			<u>.</u>
3.	Were custody seals unbroken and intact at the date and time of arrival?				(NA)
4.	Did you screen samples for radioactivity using a Geiger Counter?		YES	6	
5.	Were custody papers sealed in a plastic bag?		YES	10	
6.	Were custody papers filled out properly (ink, signed, etc.)?			NO	N/A
7.	Were custody papers signed in appropriate place by ARDL personnel?			NO	N/A
8.	Was project identifiable from custody papers? If YES, enter project name a	t the top of this form	VES.	NO	N/A
9.	Was a separate container provided for measuring temperature? YES	NOObserved Cooler Te	mp. <u>0.3</u>	2	_
В.	LOG-IN PHASE: Date samples were logged-in: 4-4-19	(Signature) Sach	orrection factor	3,0	c
10.	Describe type of packing in cooler:		4		
11.	Were all samples sealed in separate plastic bags?		YES	NO	N/A
12.	Did all containers arrive unbroken and were labels in good condition?				
13.	Were sample labels complete? Did all sample labels agree with custody papers?		(YES	, NO	
14.	Did all sample labels agree with custody papers?		VES	NO	
15.	Were correct containers used for the tests indicated?		(ES)	NO	
16.	Was pH correct on preserved water samples?		YES	NO	N/A
17.	Was a sufficient amount of sample sent for tests indicated?		YES	NO	
18.	Were bubbles absent in VOA samples? If NO, list by sample #:		YES	NO	(NA)
19.	Was the ARDL project coordinator notified of any deficiencies?		YES	NO	WA
	Comments and/or Corrective Action:		e Transfer		
		Fraction	Fraction		
-		Area #	Area #		
		Walkin			
		Walkin By Alc	Ву		
		On	On		
		On 4-4-19			
		Chain-of-Custody #	# _ W//	۵	
(B	y: Signature) Date:	Than or Suctody h		•	

COOLER RECEIPT REPORT ARDL, INC.

AR	DL#: 8469	Cooler	# 2 of 3			
						_
Pro	oject: MARK TWAIN LAKE	Date Re	eceived: $4-3$	-19 luj	. KK	D
A.	pject: MARK TWA 'N LAKE PRELIMINARY EXAMINATION PHASE: Date cooler was opened: 4-4	<u>-19</u> (s	ignature)	akru	n	
1.	Did cooler come with a shipping slip (airbill, etc.)?					
	If YES, enter carrier name and airbill number here:		Ca	unin		
2.	Were custody seals on outside of cooler?					N/A
	How many and where?,Seal Date:_		,Seal Name:			
3.	Were custody seals unbroken and intact at the date and time of arrival?			YES	NO	(NA)
4.	Did you screen samples for radioactivity using a Geiger Counter?			YES	NO.	
5.	Were custody papers sealed in a plastic bag?			YES	NO,	
6.	Were custody papers filled out properly (ink, signed, etc.)?				, NO	N/A
7.	Were custody papers signed in appropriate place by ARDL personnel?			(YES)	NO	N/A
8.	Was project identifiable from custody papers? If YES, enter project name at	the top of th	is form	YES	NO	N/A
9.	Was a separate container provided for measuring temperature? YES		A		·* ^	•
В.	LOG-IN PHASE: Date samples were logged-in: 4-4-19 (Signature)_	LA Caci	rrection factor_	0,0	C
10.						
11.	Were all samples sealed in separate plastic bags?			YES	(0)	N/A
12.	Did all containers arrive unbroken and were labels in good condition?			ÆS.	NO	
13.	Were sample labels complete?			¥ES) NO	
14.	Did all sample labels agree with custody papers?	•		(YES)	, NO	
15.	Were correct containers used for the tests indicated?			YES	NO	
16.	Was pH correct on preserved water samples?			YES	, NO	N/A
17.	Was a sufficient amount of sample sent for tests indicated?			YES	NO	
18.	Were bubbles absent in VOA samples? If NO, list by sample #:			YES	NO	N/A
19.	Was the ARDL project coordinator notified of any deficiencies?			YES	NO	N/A
	Comments and/or Corrective Action:			Transfer		
		Fra	ction	Fraction		
-		Are	a#	Area #		
		10	Jackin			
		Ву	Alkin dle 4-4-19	Ву		
		On	1 1 1	On		
			4-4-19			
		Cl	hain-of-Custody#	NI	A	
(F	By: Signature) Date:		,			

COOLER RECEIPT REPORT ARDL, INC.

	DL #: 8469	Coc Nur	oler# <u>3 4</u> nber of Coolers in Sl	$\frac{3}{2}$ hipment:కే	3	
Proj	ect: Mark Levaine Lake	Dat	e Received: 4-6	3-19 Luy	. RK	7
Α.	PRELIMINARY EXAMINATION PHASE: Date cooler was opened: 4 - 4	-19	(Signature)	Packer	im	<u></u>
	Did cooler come with a shipping slip (airbill, etc.)?					
	If YES, enter carrier name and airbill number here:		TO STATE OF THE ST	Causei	ev	
2.	Were custody seals on outside of cooler?					N/A
	How many and where?,Seal Date:_		,Seal Name:			
3.	Were custody seals unbroken and intact at the date and time of arrival?			YES	NO (NA
4.	Did you screen samples for radioactivity using a Geiger Counter?			YES	(NO)	
5.	Were custody papers sealed in a plastic bag?			YES	NO	
6.	Were custody papers filled out properly (ink, signed, etc.)?			ÆS	NO.	N/A
7.	Were custody papers signed in appropriate place by ARDL personnel?			ÝES	NO	N/A
8.	Was project identifiable from custody papers? If YES, enter project name at	he top	of this form	YES	NO	N/A
9.	Was a separate container provided for measuring temperature? YES	NO_	Observed Cooler T	emp. <u>0.7</u> Correction factor	C C	C
В.	LOG-IN PHASE: Date samples were logged-in: 4-4-19	Signat	ure) Mack	keim	0,00	
	Describe type of packing in cooler: <u>locate</u> ice					
11.	Were all samples sealed in separate plastic bags?			YES	NO	N/A
12.	Did all containers arrive unbroken and were labels in good condition?			YES) NO	
13.	Were sample labels complete?			(ES) NO	
14.	Did all sample labels agree with custody papers?			YES	NO	
15.	Were correct containers used for the tests indicated?			YES) NO	
16.	Was pH correct on preserved water samples?			YES) NO	N/A
17.	Was a sufficient amount of sample sent for tests indicated?			YES	NO	
18.	Were bubbles absent in VOA samples? If NO, list by sample #:			YES	NO	N/A
19.	Was the ARDL project coordinator notified of any deficiencies?			YES	NO	(N/A)
	Comments and/or Corrective Action:			le Transfer		
			Fraction	Fraction		
			Area #	Area #		
			Area # Walkin			
			By alc	Ву		
			On CUC	On		
			On 4-4-19			
			Chain-of-Custody	#	1	
(B)	y: Signature) Date:		Silain Si Guotody			



PO Box 1566 400 Aviation Drive Mt. Vernon, IL 62864 618-244-3235

www.ardlinc.com

Date: 7/9/19

Customer Name: SLCOE

Lab Name: APDL Inc

Project Name: Mark Twain Lake

Lab Name: ARDL, Inc.

Samples Received at ARDL: 5/30/19

ARDL Report No.: 8481

CASE NARRATIVE

Customer Sample No.	<u>Date</u> <u>Collected</u>	<u>Lab ID</u> <u>Number</u>	Analyses Requested
MTL-1	5/29/19	8481-01	NP Pesticides, Metals(1), Inorganics(2)
MTL-5	5/29/19	8481-02	NP Pesticides, Inorganics(2)
MTL-13	5/29/19	8481-03	NP Pesticides, Inorganics(2)
MTL-9	5/29/19	8481-04	NP Pesticides, Inorganics(2)
MTL-11	5/29/19	8481-05	NP Pesticides, Inorganics(2)
MTL-12	5/29/19	8481-06	NP Pesticides, Metals(1), Inorganics(2)
MTL-15-0	5/29/19	8481-07	NP Pesticides, Inorganics(2)(3)
MTL-22-0	5/29/19	8481-08	NP Pesticides, Inorganics(2)(3)
MTL-22-15	5/29/19	8481-09	Metals(1), Inorganics(2)
MTL-33-0	5/29/19	8481-10	NP Pesticides, Inorganics(2)(3)
MTL-66-0	5/29/19	8481-11	NP Pesticides, Inorganics(2)(3)
MTL-77-0	5/29/19	8481-12	NP Pesticides, Inorganics(2)(3)
IC MARINA	5/29/19	8481-13	E. Coli
BJ MARINA	5/29/19	8481-14	E. Coli

- (1) Including iron and manganese.
- (2) Including ammonia, nitrate, orthophosphate, total phosphorus, TOC, TSS, and TVSS.
- (3) Including chlorophyll-a and pheophytin-a.

The quality control data are summarized as follows:

NP PESTICIDE FRACTION - METHOD 8270-SIM

HOLDING TIME

Samples were prepared and analyzed within method specified holding times.

INITIAL CALIBRATION

The initial calibration passed criteria.

CONTINUING CALIBRATION

The continuing calibration verification (CCV) passed criteria for all analytes. The closing CCV passed criteria for all analytes.

PREPARATION BLANK

The blank met acceptance criteria.

LABORATORY CONTROL SAMPLE

The LCS analyses met recovery criteria.

MATRIX SPIKE

Atrazine recovery was outside limits (30-130%) in the MS at 18.5% All other parameters met recovery criteria.

"Test everything, keep the good" 1 Thes. 5:21

Page 1 of 2

Project Name: Mark Twain Lake ARDL Report No.: 8481

CASE NARRATIVE (Continued)

DUPLICATE

Duplicate analyses are reported as MS/MSD. The following parameters exceed the 30% RPD limit: Atrazine at 43.6%; Metribuzin at 46.4%; and Cyanazine at 43.6%. RPD of all other duplicate analyses met criteria.

INTERNAL STANDARD

All internal standard criteria were met.

SURROGATE

All surrogate recovery criteria were met.

INORGANIC FRACTION

TOC were analyzed by an accredited outside laboratory due to instrument status.

Nitrate analysis was performed slightly outside holding time due to instrumentation repairs. These results have been flagged appropriately.

PREPARATION BLANK

Results of the preparation blanks were within acceptable limits.

LABORATORY CONTROL SAMPLE

Percent recoveries of all LCS analyses were within control limits.

MATRIX SPIKE

Percent recovery of all matrix spikes and matrix spike duplicates.

DUPLICATE

All duplicate analyses are reported as MS/MSD except chlorophyll-a, pheophytin-a, TSS, and TVSS. RPD on all duplicate analyses were within control limits, with the exception of chlorophyll-a, which was within ± the reporting limit and therefore acceptable. RPD on all duplicate analyses were within control limits.

DATA REPORTING QUALIFIERS

The following data reporting qualifiers are used as required:

- ND Indicates compound was analyzed for but not detected.
- X Sample preparation and/or analysis was performed outside of holding time requirements.

REPORT ORGANIZATION

The data in this report appear by sample type (Field sample, preparation blank, laboratory control sample / spike blank, matrix spike /spike duplicate and sample duplicate). Within each sample type the data appear in the order that the analytical methods were discussed in this case narrative. Sample receipt information follows the analytical data.

Release of the data contained in this package has been authorized by the Technical Services Manager or his designee as verified by the following signature.

Dean S. Dickerson

Technical Services Manager

Page 2 of 2



Including as appropriate:

Field Sample Results

Batch QC

Prep Blank

LCS/Spike Blank

Matrix QC

MS/MSD

Sample Duplicate

ARDL Data Package

8481

N:\ARDL Case Narratives\ARDL Data Package Contents.pdf - Revised May 14, 2019

Authorized By: DSD-QAO

Lab Report No: 008481 Report Date: 06/06/2019

Project Name:	MARK TWAIN LA		Analysis: N		DES (82	70SIM-MC	D)
Project No.:		Analytical	Method: 8	3270C			
NELAC Certi:	fied - IL10030	8 Prep	Method: 3	3510C			
Field ID:	MTL-1		ARDL	Lab No.:	0084	81-01	
Desc/Location:	MARK TWAIN LA	KE	Lab E	Tilename:	E060	4905	
Sample Date:	05/29/2019		Recei	ved Date:	05/2	9/2019	
Sample Time:	1336		Prep.	Date:	06/03	3/2019	
Matrix:	WATER		Analy	ysis Date:	06/0	4/2019	
Amount Used:	1000 mL		Instr	rument ID:	AG5		
Final Volume:	1 mL		QC Ba	atch:	B110	57	
% Moisture:	NA		Level	-:	LOW		
					Data		Dilutior
Parameter		LOD	LOQ	Result	Flag	Units	Factor
Trifluralin		0.200	0.200	ND		UG/L	1
Atrazine		0.200	0.200	1.41		UG/L	1
Metribuzin		0.200	0.200	ND		UG/L	1
Alachlor		0.200	0.200	ND		UG/L	1
Metolachlor		0.200	0.200	0.630		UG/L	1
Chlorpyrifos		0.200	0.200	ND		UG/L	1
Cyanazine		0.200	0.200	ND		UG/L	1
Pendimethalin		0.200	0.200	ND		UG/L	1

SURROGATE RECOVERIES:	Limits	Results	
Triphenylphosphate	30-130	61%	İ
			1

Surrogate recoveries marked with '*' indicates they are outside standard limits.

ARDL, INC. 400 Aviation Drive; P.O. Box 1566 Mt. Vernon, Illinois 62864

Lab Report No: 0	008481						Ľ	Report Date:	: 07/09/2019	019
Project Name: MARK T Project No:	MARK IWAIN LAKE						Z	Analysis: Inorganics NELAC Certified - IL100308	: Inorganics fied - IL1003	ics 00308
ARDL No: 008481-01 Field ID: MTL-1 Received: 05/29/2019	01 2019	Samp] Samp Samp	Sampling Loc'n: Sampling Date: Sampling Time:		MARK TWAIN LAKE 05/29/2019 1336			Matrix: Moisture:	: WATER : NA	
Analyte	TOD	rop	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
(a) Iron	0.0400	0.0500		3.60	MG/L	3010A	6010C	06/06/19	06/12/19	P7210
(a) Manganese	0.00400	0.00500		0.0577	MG/L	3010A	6010C	06/06/19	06/12/19	P7210
Ammonia Nitrogen	0.0200	0.0300		0.058	MG/L	NONE	350.1	NA	06/03/19	06054619
Nitrate as Nitrogen	0.019	0.020	×	1.11	MG/L	NONE	GREEN	NA	07/01/19	07084677
Phosphorus	0.00800	0.0100		0.335	MG/L	365.2	365.2	06/10/19	06/11/19	06134638
Phosphorus, -ortho	0.00800	0.0100		0.166	MG/L	NONE	365.2	NA	05/30/19 (06054618
Solids, Total Suspended	led 1.33	1.33		5.73	MG/L	NONE	160.2	NA	06/03/19 (06054623
Solids, Volatile Suspen	en 1.33	1.33		ND	MG/L	NONE	160.4	NA	06/03/19 (06054624
Total Organic Carbon	0.500	1.00		0.9	MG/L	NONE	415.1	NA	06/10/19 (06174645

(a) DOD and/or NELAC Accredited Analyte.

Sample 008481-01, Inorganic Analyses

Lab Report No: 008481 Report Date: 06/06/2019

Project Name:	MARK TWAIN LAKE	Ana	lysis: N	PESTICI	DES (82	70SIM-MC	D)
Project No.:	Ar	alytical M	ethod: 82	270C			
NELAC Certi	fied - IL100308	Prep M	ethod: 3	510C			
Field ID:	MTL-5		ARDL	Lab No.:	00848	31-02	
Desc/Location:	MARK TWAIN LAKE		Lab F:	ilename:	E0604	1908	
Sample Date:	05/29/2019		Recei	ved Date:	05/29	9/2019	
Sample Time:	1245		Prep.	Date:	06/03	3/2019	
Matrix:	WATER		Analy	sis Date:	06/04	4/2019	
Amount Used:	900 mL		Instr	ument ID:	AG5		
Final Volume:	1 mL		QC Bat	ch:	B1105	57	
% Moisture:	NA		Level	:	LOW		
					Data		Dilution
Parameter		LOD	LOQ	Result	Flag	Units	Factor
Trifluralin		0.222	0.222	ND		UG/L	1
Atrazine		0.222	0.222	5.66		UG/L	1
Metribuzin		0.222	0.222	ND		UG/L	1
Alachlor		0.222	0.222	ND		UG/L	1
Metolachlor		0.222	0.222	1.00		UG/L	1
Chlorpyrifos		0.222	0.222	ND		UG/L	1
Cyanazine		0.222	0.222	ND		UG/L	1
Pendimethalin		0.222	0.222	ND		UG/L	1

SURROGATE RECOVERIES:	Limits	Results	
Triphenylphosphate	30-130	55%	j
			ļ

Surrogate recoveries marked with '*' indicates they are outside standard limits.

ARDL, INC. 400 Aviation Drive; P.O. Box 1566 Mt. Vernon, Illinois 62864

Lab Report No: 008481	481						ъ	Report Date:	: 07/09/2019	019
Project Name: MARK TWAIN LAKE Project No:	IN LAKE						2	Analysis: IELAC Certif	Analysis: Inorganics NELAC Certified - IL100308	ics 00308
ARDL No: 008481-02 Field ID: MTL-5 Received: 05/29/2019	2	Samplin Sampli Sampli	Sampling Loc'n: Sampling Date: Sampling Time:		MARK TWAIN LAKE 05/29/2019 1245			Matrix: Moisture:	MATER NA	
Analyte	LOD	TOO	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Ammonia Nitrogen Nitrate as Nitrogen	0.0200	0.0300	×	0.181	MG/L	NONE	350.1 GREEN	NA NA	06/03/19 06054619 07/01/19 07084677	06054619
Phosphorus	0.00800	0.0100		0.687	MG/L	365.2	365.2	06/10/19		06134638
Solids, Total Suspended	6.67	0.0100		78.0	MG/L MG/L	NONE	365.2 160.2	NA NA	05/30/19 06/03/19	06054618 06054623
Solids, Volatile Suspen	6.67	6.67		10.7	MG/L	NONE	160.4	NA	06/03/19	06054624
Total Organic Carbon	0.500	1.00		7.3	MG/L	NONE	415.1	NA	06/10/19	06174645

(a) DOD and/or NELAC Accredited Analyte.

Sample 008481-02, Inorganic Analyses

Lab Report No: 008481 Report Date: 06/06/2019

Project No.:	MARK TWAIN LAI	Analytical	Analysis: N Method: 8 Method: 3	270C	DES (82	70SIM-MC	DD)
Desc/Location: Sample Date: Sample Time: Matrix:	MTL-13 MARK TWAIN LAN 05/29/2019 1200 WATER 800 mL 1 mL NA	KE	Lab F Recei Prep. Analy		E0604 05/29 06/03	1909 9/2019 3/2019 1/2019	
Parameter		LOD	LOQ	Result	Data Flag	Units	Dilution Factor
Trifluralin		0.250	0.250	ND		UG/L	1
Atrazine		0.250	0.250	1.93		UG/L	1
Metribuzin		0.250	0.250	ND		UG/L	1
Alachlor		0.250	0.250	ND		UG/L	1
Metolachlor		0.250	0.250	0.725		UG/L	1
Chlorpyrifos		0.250	0.250	ND		UG/L	1
Cyanazine		0.250	0.250	ND		UG/L	1
Pendimethalin		0.250	0.250	ND		UG/L	1

SURROGATE RECOVERIES:	Limits	Results	
Triphenylphosphate	30-130	55%	İ

Surrogate recoveries marked with '*' indicates they are outside standard limits.

ARDL, INC. 400 Aviation Drive; P.O. Box 1566 Mt. Vernon, Illinois 62864

8481 Report Date: 07/09/2019	All LAKE NELAC Certified - IL100308	Sampling Loc'n: MARK TWAIN LAKE Sampling Date: 05/29/2019 Sampling Time: 1200	Prep Analysis Prep Analysis Run LOD LOQ Flag Result Units Method Method Date Date Number	0.0200 0.019 0.00800 0.00800 33.3 33.3
	ХЕ	Sampling Loc Sampling Da Sampling Ii	TOO	0.0300 0.020 0.0100 0.0100 33.3 33.3
Lab Report No: 008481	Project Name: MARK TWAIN LAKE Project No:	ARDL No: 008481-03 Field ID: MTL-13 Received: 05/29/2019	Analyte	Ammonia Nitrogen 0.00 Nitrate as Nitrogen 0.00 Phosphorus, -ortho 0.00 Solids, Total Suspended 33 Solids, Volatile Suspen 33 Total Organic Carbon 0.55

(a) DOD and/or NELAC Accredited Analyte.

Sample 008481-03, Inorganic Analyses

Lab Report No: 008481 Report Date: 06/06/2019

Project No.:	MARK TWAIN LAKE	Analytical		270C	DES (82	70SIM-MC	DD)
NELAC Certi	fied - IL100308	Prep	Method: 3	510C			
Field ID:	MTL-9		ARDL	Lab No.:	0084	81-04	
Desc/Location:	MARK TWAIN LAKE		Lab F	ilename:	E060	4910	
Sample Date:	05/29/2019		Recei	ved Date:	05/2	9/2019	
Sample Time:	1124		Prep.	Date:	06/03	3/2019	
Matrix:	WATER		Analy	sis Date:	06/0	4/2019	
Amount Used:	900 mL		Instr	ument ID:	AG5		
Final Volume:	1 mL		QC Ba	tch:	B110	57	
% Moisture:	NA		Level	:	LOW		
					Data		Dilution
Parameter		LOD	LOQ	Result	Flag	Units	Factor
Trifluralin		0.222	0.222	ND		UG/L	1
Atrazine		0.222	0.222	1.21		UG/L	1
Metribuzin		0.222	0.222	ND		UG/L	1
Alachlor		0.222	0.222	ND		UG/L	1
Metolachlor		0.222	0.222	0.711		UG/L	1
Chlorpyrifos		0.222	0.222	ND		UG/L	1
Cyanazine		0.222	0.222	ND		UG/L	1
Pendimethalin		0.222	0.222	ND		UG/L	1

SURROGATE RECOVERIES:	Limits	Results	
Triphenylphosphate	30-130	55%	j
			- 1

Surrogate recoveries marked with '*' indicates they are outside standard limits.

ARDL, INC. 400 Aviation Drive; P.O. Box 1566 Mt. Vernon, Illinois 62864

Lab Report No: 008481	481						4	Report Date:	: 07/09/2019	019
Project Name: MARK TWAIN LAKE Project No:	IN LAKE						Z	Analysis: Inorganics NELAC Certified - IL100308	: Inorganics fied - IL1003	ics 00308
ARDI No: 008481-04 Field ID: MIL-9	4	Sampling	ampling Loc'n: Sampling Date:		MARK TWAIN LAKE			Matrix: Moisture:	: WATER	
Received: 05/29/2019	19	Samp	Sampling Time:							
						Prep	Analysis	Prep	Analysis	Run
Analyte	LOD	TOÖ	Flag	Result	Units	Method	Method	Date	Date	Number
Ammonia Nitrogen	0.0200	0.0300		0.135	MG/L	NONE	350.1	NA	06/03/19	06054619
Nitrate as Nitrogen	0.019	0.020	×	0.446	MG/L	NONE	GREEN	NA	07/01/19	07084677
Phosphorus	0.0160	0.0200		0.888	MG/L	365.2	365.2	06/10/19	06/11/19	06134638
Phosphorus, -ortho	00800.0	0.0100		0.104	MG/L	NONE	365.2	NA	05/30/19	06054618
Solids, Total Suspended	33.3	33.3		480	MG/L	NONE	160.2	NA	06/03/19	06054623
Solids, Volatile Suspen	33.3	33.3		43.3	MG/L	NONE	160.4	NA	06/03/19	06054624
Total Organic Carbon	0.500	1.00		8°.3	MG/L	NONE	415.1	NA	06/10/19	06174645

(a) DOD and/or NELAC Accredited Analyte.

Sample 008481-04, Inorganic Analyses

Lab Report No: 008481 Report Date: 06/06/2019

,	MARK TWAIN LAKE		_	PESTICII	DES (827	70SIM-MO	D)
Project No.:	A fied - IL100308	nalytical M	ethod: 8. ethod: 3!				
NELAC CEICI.	ried - Ibioosoo	ьтер м	ethod: 3	310C			
Field ID:	MTL-11		ARDL 1	Lab No.:	00848	31-05	
Desc/Location:	MARK TWAIN LAKE		Lab F	ilename:	E0604	1911	
Sample Date:	05/29/2019		Recei	ved Date:	05/29	9/2019	
Sample Time:	1040		Prep.	Date:	06/03	3/2019	
Matrix:	WATER		Analys	sis Date:	06/04	1/2019	
Amount Used:	900 mL		Instr	ument ID:	AG5		
Final Volume:	1 mL		QC Bat	tch:	B1105	57	
% Moisture:	NA		Level	•	LOW		
			· · · · · · · · · · · · · · · · · · ·		Data		Dilution
Parameter		LOD	LOQ	Result	Flag	Units	Factor
Trifluralin		0.222	0.222	ND		UG/L	1
Atrazine		0.222	0.222	0.333		UG/L	1
Metribuzin		0.222	0.222	ND		UG/L	1
Alachlor		0.222	0.222	ND		UG/L	1
Metolachlor		0.222	0.222	0.478		UG/L	1
Chlorpyrifos		0.222	0.222	ND		UG/L	1
Cyanazine		0.222	0.222	ND		UG/L	1
Pendimethalin		0.222	0.222	ND		UG/L	1

SURROGATE RECOVERIES:	Limits	Results	
Triphenylphosphate	30-130	48%	
]

Surrogate recoveries marked with '*' indicates they are outside standard limits.

ARDL, INC. 400 Aviation Drive; P.O. Box 1566 Mt. Vernon, Illinois 62864

Project Name: MARK TWAIN LAKE	N LAKE							Analvsis:	: Inordanics	SO
Project No: ARDL No: 008481-05		Sampl	Sampling Loc'n:		MARK TWAIN LAKE		2	NELAC Certified - IL100308 Matrix: WATER	fied - IL1(0308
	ത	Samp	Sampling Date: Sampling Time:		05/29/2019 1040			Moisture:		
						Prep	Analysis	Prep	Analysis	Run
Analyte	LOD	TOO	Flag	Result	Units	Method	Method	Date	Date	Number
Ammonia Nitrogen	0.0200	0.0300		0.148	MG/L	NONE	350.1	NA	06/03/19 06054619	6054619
Nitrate as Nitrogen	0.019	0.020	×	0.211	MG/L	NONE	GREEN	NA	07/01/19 07084677	17084677
Phosphorus	0.00800	0.0100		0.683	MG/L	365.2	365.2	06/10/19	06/11/10	06134638
Phosphorus, -ortho	0.800.0	0.0100		0.148	MG/L	NONE	365.2	NA	05/30/19 (06054618
Solids, Total Suspended	20.0	20.0		242	MG/L	NONE	160.2	NA	06/03/19 (06054623
Solids, Volatile Suspen	20.0	20.0		26.0	MG/L	NONE	160.4	NA	06/03/19 (06054624
Total Organic Carbon	0.500	1.00		0,9	MG/T,	NONE	415 1	NA	06/10/19	06174645

(a) DOD and/or NELAC Accredited Analyte.

Sample 008481-05, Inorganic Analyses

Lab Report No: 008481 Report Date: 06/06/2019

Project No.:	MARK TWAIN LAKE	Analytical N	_		DES (82	70SIM-MC	D)
Field ID:	MTL-12		ARDL :	Lab No.:	0084	81-06	
Desc/Location:	MARK TWAIN LAKE	1 1	Lab F	ilename:	E060	4912	
Sample Date:	05/29/2019		Recei	ved Date:	05/2	9/2019	
Sample Time:	0928		Prep.	Date:	06/0	3/2019	
Matrix:	WATER		Analy	sis Date:	06/0	4/2019	
Amount Used:	800 mL		Instr	ument ID:	AG5		
Final Volume:	1 mL		QC Bat	tch:	B110	57	
% Moisture:	NA		Level	:	LOW		
					Data		Dilution
Parameter		LOD	LOQ	Result	Flag	Units	Factor
Trifluralin		0.250	0.250	ND		UG/L	1
Atrazine		0.250	0.250	1.59		UG/L	1
Metribuzin		0.250	0.250	ND		UG/L	1
Alachlor		0.250	0.250	ND		UG/L	1
Metolachlor		0.250	0.250	0.775		UG/L	1
Chlorpyrifos		0.250	0.250	ND		UG/L	1
Cyanazine		0.250	0.250	ND		UG/L	1
Pendimetha1in		0.250	0.250	ND		UG/L	1

SURROGATE RECOVERIES:	Limits	Results	_
Triphenylphosphate	30-130	65%	İ

Surrogate recoveries marked with '*' indicates they are outside standard limits.

⁽a) DOD-QSM Accredited Analyte.

ARDL, INC. 400 Aviation Drive; P.O. Box 1566 Mt. Vernon, Illinois 62864

Lab Report No: 008481	481						к,	Report Date:	: 07/09/2019	119
Project Name: MARK TWAIN LAKE Project No:	IN LAKE						Z	Analysis: ELAC Certif	Analysis: Inorganics NELAC Certified - IL100308	.cs 00308
ARDL No: 008481-06 Field ID: MTL-12 Received: 05/29/2019	6 1 9	Samplin Sampli Sampli	Sampling Loc'n: Sampling Date: Sampling Time:		MARK TWAIN LAKE 05/29/2019 0928			Matrix: Moisture:	: WATER : NA	
Analyte	LOD	OOT	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
(a) Iron (a) Manganese Ammonia Nitrogen Nitrate as Nitrogen Phosphorus, -ortho Solids, Total Suspended Solids, Volatile Suspen Total Organic Carbon	0.0400 0.00400 0.0200 0.019 0.00800 0.00800 6.67 6.67	0.0500 0.00500 0.0300 0.020 0.0100 6.67 6.67	×	5.47 0.112 0.134 1.02 0.383 0.153 70.0 7.33	MG/L MG/L MG/L MG/L MG/L MG/L MG/L MG/L	3010A 3010A NONE NONE 365.2 NONE NONE NONE	6010C 6010C 350.1 GREEN 365.2 365.2 160.2 160.4	06/06/19 06/06/19 NA NA 06/10/19 NA NA NA	06/12/19 06/12/19 06/03/19 (07/01/19 (05/30/19 (06/03/19 (06/03/19 (P7210 P7210 06054619 07084677 06134638 06054618 06054624

(a) DOD and/or NELAC Accredited Analyte.

Sample 008481-06, Inorganic Analyses

Lab Report No: 008481 Report Date: 06/06/2019

-	MARK TWAIN	LAKE		nalysis: N		DES (82	70SIM-MC	D)
Project No.:			Analytical	Method: 8	270C			
NELAC Certi:	fied - IL100	308	Prep	Method: 3	510C			
Field ID:	MTL-15-0	•		ARDL	Lab No.:	0084	81-07	
Desc/Location:	MARK TWAIN	LAKE		Lab F	ilename:	E060	4913	
Sample Date:	05/29/2019			Recei	ved Date:	05/2	9/2019	
Sample Time:	1105	4		Prep.	Date:	06/0	3/2019	
Matrix:	WATER			Analy	sis Date:	06/0	4/2019	
Amount Used:	1000 mL			Instr	ument ID:	AG5		
Final Volume:	1 mL			QC Ba	tch:	B110	57	
% Moisture:	NA			Level	:	LOW		
						Data		Dilution
Parameter			LOD	LOQ	Result	Flag	Units	Factor
Trifluralin			0.200	0.200	ND		UG/L	1
Atrazine			0.200	0.200	2.85		UG/L	1
Metribuzin			0.200	0.200	0.240		UG/L	1
Alachlor			0.200	0.200	ND		UG/L	1
Metolachlor			0.200	0.200	1.68		UG/L	1
Chlorpyrifos			0.200	0.200	ND		UG/L	1
Cyanazine			0.200	0.200	ND		UG/L	1
Pendimethalin			0.200	0.200	ND		UG/L	1

SURROGATE RECOVERIES:	Limits	Results	
Triphenylphosphate	30-130	66%	İ

Surrogate recoveries marked with '*' indicates they are outside standard limits.

ARDL, INC. 400 Aviation Drive; P.O. Box 1566 Mt. Vernon, Illinois 62864

Lab Report No: 008481	481						R	Report Date:	: 07/09/2019	19
Project Name: MARK TWAIN LAKE Project No:	IN LAKE						Z	Analysis: IELAC Certif	Analysis: Inorganics NELAC Certified - IL100308	cs 0308
ARDL No: 008481-07 Field ID: MIL-15-0 Received: 05/29/2019	7	Sampl Samp Samp	Sampling Loc'n: Sampling Date: Sampling Time:		MARK TWAIN LAKE 05/29/2019 1105			Matrix: Moisture:	: WAIER : NA	
Analyte	LOD	ōот	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Ammonia Nitrogen	0.0200	0.0300		0.108	MG/L	NONE	350.1	NA	06/03/19 0	06054619
Chlorophyll-a, Correcte	1.0	1.00		1.4	MG/CU.M.	10200H	10200H	05/30/19	06/03/19 0	06054617
Nitrate as Nitrogen	0.019	0.020	×	0.883	MG/L	NONE	GREEN	NA	07/01/19 0	07084677
Pheophytin-a	1.0	1.00		ON	MG/CU.M.	10200H	10200H	05/30/19	06/03/19 0	06054617
Phosphorus	0.00800	0.0100		0.461	MG/L	365.2	365.2	06/10/19	06/11/100	06134638
Phosphorus, -ortho	0.00800	0.0100		0.143	MG/L	NONE	365.2	NA	05/30/19 0	06054618
Solids, Total Suspended	4.0	4.00		31.2	MG/L	NONE	160.2	NA	06/03/19 0	06054623
Solids, Volatile Suspen	4.0	4.00		4.4	MG/L	NONE	160.4	NA	06/03/19 0	06054624
Total Organic Carbon	0.500	1.00		7.1	MG/L	NONE	415.1	NA	06/10/19 0	06174645

(a) DOD and/or NELAC Accredited Analyte.

Sample 008481-07, Inorganic Analyses

Lab Report No: 008481 Report Date: 06/06/2019

Project No.:	MARK TWAIN LÆ fied - IL10030	Ar	nalytical	Method: 82 Method: 35	270C	DES (827	70SIM-MO	D)
Field ID:					Lab No.:			
Desc/Location:		KE			ilename:			
-	05/29/2019				ved Date:	· ·	9/2019	
1	1418			_	Date:		3/2019	
Matrix:	WATER			_	sis Date:		1/2019	
Amount Used:	900 mL			Instr	ument ID:	AG5		
Final Volume:	1 mL			QC Bat	ch:	B1105	57	
% Moisture:	NA			Level	•	LOW		
						Data		Dilution
Parameter			LOD	LOQ	Result	Flag	Units	Factor
Trifluralin			0.222	0.222	ND		UG/L	1
Atrazine			0.222	0.222	1.71		UG/L	1
Metribuzin			0.222	0.222	ND		UG/L	1
Alachlor			0.222	0.222	ND		UG/L	1
Metolachlor			0.222	0.222	0.811		UG/L	1
Chlorpyrifos			0.222	0.222	ND		UG/L	1
Cyanazine			0.222	0.222	ND		UG/L	1
Pendimethalin			0.222	0.222	ND		UG/L	1

SURROGATE RECOVERIES:	Limits	Results	
Triphenylphosphate	30-130	56%	ĺ

Surrogate recoveries marked with '*' indicates they are outside standard limits.

⁽a) DOD-QSM Accredited Analyte.

ARDL, INC. 400 Aviation Drive; P.O. Box 1566 Mt. Vernon, Illinois 62864

Lab Report No: 008481	481						щ	Report Date:	: 07/09/2019	119
Project Name: MARK TWAIN LAKE Project No:	IN LAKE						Z	Analysis: ELAC Certifi	Analysis: Inorganics NELAC Certified - IL100308	.cs
ARDL No: 008481-08 Field ID: MTL-22-0 Received: 05/29/2019	19	Samplin Sampli Sampli	g I ng ng		MARK TWAIN LAKE 05/29/2019 1418			Matrix: Moisture:	: WATER	
Analyte	LOD	TOO	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Ammonia Nitrogen	0.0200	0.0300		0.0887	MG/L	NONE	350.1	NA	06/03/19	06054619
Chlorophyll-a, Correcte	1.0	1.00		1.8	MG/CU.M.	10200H	10200H	05/30/19	06/03/19 0	06054617
Nitrate as Nitrogen	0.019	0.020	×	1.06	MG/L	NONE	GREEN	NA	07/01/19 (07084677
Pheophytin-a	1.0	1.00		ND	MG/CU.M.	10200H	10200H	05/30/19	06/03/19 0	06054617
Phosphorus	0.00800	0.0100		0.379	MG/L	365.2	365.2	06/10/19	06/11/19 (06134638
Phosphorus, -ortho	0.00800	0.0100		0.189	MG/L	NONE	365.2	NA	05/30/19 (06054618
Solids, Total Suspended	1.33	1.33		5.2	MG/L	NONE	160.2	NA	06/03/19 0	06054623
Solids, Volatile Suspen	1.33	1.33		ND	MG/L	NONE	160.4	NA	06/03/19 0	6054624
Total Organic Carbon	0.500	1.00		6.1	MG/L	NONE	415.1	NA	06/10/19 0	06174645

(a) DOD and/or NELAC Accredited Analyte.

ARDL, INC. 400 Aviation Drive; P.O. Box 1566 Mt. Vernon, Illinois 62864

008481 Report Date: 07/09/2019	MARK TWAIN LAKE Analysis: Inorganics NELAC Certified - IL100308	81-09 Sampling Loc'n: MARK TWAIN LAKE Matrix: WATER 22-15 Sampling Date: 05/29/2019 Moisture: NA Sampling Time: 1418	Prep Analysis Prep Analysis Run LOD LOQ Flag Result Units Method Method Date Date Number	0 00
181	IN LAKE	0 0		0
Lab Report No: 0084	Project Name: MARK TWAI Project No:	ARDL No: 008481-09 Field ID: MTL-22-15 Received: 05/29/2019	Analyte	(a) Iron (a) Manganese Ammonia Nitrogen Nitrate as Nitrogen Phosphorus, -ortho Solids, Total Suspended Solids, Volatile Suspen

(a) DOD and/or NELAC Accredited Analyte.

Sample 008481-09, Inorganic Analyses

Lab Report No: 008481 Report Date: 06/06/2019

Project Name:	MARK TWAIN LAKE	Ana	lysis: NE	PESTICII	DES (827	0SIM-MO	D)
Project No.:	P	malytical M	ethod: 82	270C			
NELAC Certi:	fied - IL100308	Prep M	ethod: 35	510C			
Field ID:	MTL-33-0	···	ARDL I	Lab No.:	00848	31-10	
Desc/Location:	MARK TWAIN LAKE		Lab F	llename:	E0604	1915	
Sample Date:	05/29/2019		Recei	red Date:	05/29	/2019	
Sample Time:	1315		Prep.	Date:	06/03	3/2019	
Matrix:	WATER		Analys	sis Date:	06/04	1/2019	
Amount Used:	800 mL		Instr	ument ID:	AG5		
Final Volume:	1 mL		QC Bat	ch:	B1105	57	
% Moisture:	NA		Level	:	LOW		
		, , , , , , , , , , , , , , , , , , ,			Data		Dilution
Parameter		LOD	LOQ	Result	Flag	Units	Factor
Trifluralin		0.250	0.250	ND		UG/L	1
Atrazine		0.250	0.250	2.08		UG/L	1
Metribuzin		0.250	0.250	ND		UG/L	1
Alachlor		0.250	0.250	ND		UG/L	1
Metolachlor		0.250	0.250	1.04		UG/L	1
Chlorpyrifos		0.250	0.250	ND		UG/L	1
Cyanazine		0.250	0.250	ND		UG/L	1
Pendimethalin		0.250	0.250	ND		UG/L	1

SURROGATE RECOVERIES:	Limits	Results	
Triphenylphosphate	30-130	66%	
			1

Surrogate recoveries marked with '*' indicates they are outside standard limits.

ARDL, INC. 400 Aviation Drive; P.O. Box 1566 Mt. Vernon, Illinois 62864

Lab Report No: 008481	481						Щ	Report Date:	: 07/09/2019	119
Project Name: MARK TWAIN LAKE Project No:	IN LAKE						Z	Analysis: ELAC Certif	Analysis: Inorganics NELAC Certified - IL100308	.cs 10308
ARDL No: 008481-10 Field ID: MIL-33-0 Received: 05/29/2019	0 1	Sampl Samp Samp	Sampling Loc'n: Sampling Date: Sampling Time:		MARK TWAIN LAKE 05/29/2019 1315			Matrix: Moisture:	: WATER : NA	
Analyte	LOD	бот	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Ammonia Nitrogen	0.0200	0.0300		0.0393	MG/L	NONE	350.1	NA	06/03/190	06054619
Chlorophyll-a, Correcte	1.0	1.00		1.8	MG/CU.M.	10200H	10200H	05/30/19	06/03/19 0	06054617
Nitrate as Nitrogen	0.019	0.020	×	1.01	MG/L	NONE	GREEN	NA	07/01/19 0	07084677
Pheophytin-a	1.0	1.00		QN	MG/CU.M.	10200H	10200H	05/30/19	06/03/19 0	06054617
Phosphorus	0.800.0	0.0100		0.353	MG/L	365.2	365.2	06/10/19		06134638
Phosphorus, -ortho	0.00800	0.0100		0.195	MG/L	NONE	365.2	NA	05/30/19 0	06054618
Solids, Total Suspended	1.33	1.33		7.2	MG/L	NONE	160.2	NA	06/03/19 0	06054623
Solids, Volatile Suspen	1.33	1.33		NO	MG/L	NONE	160.4	NA	06/03/19 0	06054624
Total Organic Carbon	0.500	1.00		6.4	MG/L	NONE	415.1	NA	06/10/19 0	06174645

(a) DOD and/or NELAC Accredited Analyte.

Sample 008481-10, Inorganic Analyses

Lab Report No: 008481 Report Date: 06/06/2019

Project Name: Project No.:	MARK TWAIN LAKE	Ana Analytical M	_	P PESTICII 270C	DES (827	70SIM-MO	D)
NELAC Certi	fied - IL100308	Prep M	ethod: 3	510C			
Field ID:	MTL-66-0		ARDL 1	Lab No.:	00848	31-11	
Desc/Location:	MARK TWAIN LAKE		Lab F:	ilename:	E0604	1916	
Sample Date:	05/29/2019		Recei	ved Date:	05/29	9/2019	
Sample Time:	1045		Prep.	Date:	06/03	3/2019	
Matrix:	WATER		Analys	sis Date:	06/04	1/2019	
Amount Used:	900 mL		Instr	ument ID:	AG5		
Final Volume:	1 mL		QC Bat	tch:	B1105	57	
% Moisture:	NA		Level	:	LOW		
					Data		Dilution
Parameter		LOD	LOQ	Result	Flag	Units	Factor
Trifluralin		0.222	0.222	ND		UG/L	1
Atrazine		0.222	0.222	2.74		UG/L	1
Metribuzin		0.222	0.222	0.233		UG/L	1
Alachlor		0.222	0.222	ND		UG/L	1
Metolachlor		0.222	0.222	1.63		UG/L	1
Chlorpyrifos		0.222	0.222	ND		UG/L	1
Cyanazine		0.222	0.222	ND		UG/L	1
Pendimethalin		0.222	0.222	ND		UG/L	1

SURROGATE RECOVERIES:	Limits	Results	
Triphenylphosphate	30-130	57%	ĺ
			- 1

Surrogate recoveries marked with '*' indicates they are outside standard limits.

ARDL, INC. 400 Aviation Drive; P.O. Box 1566 Mt. Vernon, Illinois 62864

ARDI No: 008481-11 Sampling Loc'n: MARK TWAIN LAKE Field ID: MIL-66-0 Sampling ID: No: 05/29/2019 Sampling ID: No: 05/29/2019 Sampling ID: No: 05/29/2019 Sampling ID: No: 05/29/2019 Sampling ID: No: 05/29/2019 Sampling ID: No: 05/29/2019 Sampling ID: No: 05/29/2019 Sampling ID: No: 05/29/2019 Amalysis Run Method Method Method Date Date Number No: 05/29/2019 No: 05/29/2	ا ب	181						ф	Report Date:		119
19		N LAKE						N	Analysis ELAC Certi	: Inorgani fied - IL1(.cs 10308
19 Sampling Time: 1045 LOD LOQ Flag Result Units Method Method Date Date 0.0200 0.0300 0.0813 MG/L NONE 350.1 NA 06/03/19 0.010 0.020 X 0.865 MG/L NONE GREEN NA 07/01/19 0.00800 0.0100 0.409 MG/L 365.2 365.2 NA 05/30/19 0.00800 0.0100 0.156 MG/L NONE 365.2 NA 05/30/19 1.33 1.33 25.6 MG/L NONE 160.4 NA 06/03/19 1.33 1.33 3.07 MG/L NONE 160.4 NA 06/03/19 0.500 1.00 6.6 MG/L NONE 415.1 NA 06/10/19			Sampl	ing Loc		TWAIN LAKE			Matrix		
LOD Flag Result Units Prep Method Analysis Prep Date Analysis 0.0200 0.0300 0.0813 MG/L NONE 350.1 NA 06/03/19 1.0 1.00 1.7 MG/L NONE GREEN NA 07/01/19 0.019 0.020 X 0.865 MG/L NONE GREEN NA 07/01/19 1.0 1.00 ND MG/CU.M. 10200H 10200H 05/30/19 06/03/19 0.00800 0.0100 0.409 MG/L NONE 365.2 NA 06/03/19 1.33 1.33 25.6 MG/L NONE 160.2 NA 06/03/19 1.33 1.33 3.07 MG/L NONE 160.4 NA 06/03/19 0.500 1.00 6.6 MG/L NONE 160.4 NA 06/10/19		6	Samp	5 H		0107			MOTSCALE		
LOD LOQ Flag Result Units Method Method Date Date 0.0200 0.0300 0.0813 MG/L NONE 350.1 NA 06/03/19 1.0 1.00 1.7 MG/CU.M. 10200H 10200H 05/30/19 06/03/19 0.019 0.020 X 0.865 MG/L NONE GREEN NA 07/01/19 0.00800 0.0100 0.409 MG/L 365.2 365.2 06/10/19 06/03/19 0.00800 0.0100 0.156 MG/L NONE 365.2 NA 06/03/19 1.33 1.33 25.6 MG/L NONE 160.2 NA 06/03/19 1.33 1.33 3.07 MG/L NONE 415.1 NA 06/10/19							Prep	Analysis	Prep	Analysis	Run
0.0200 0.0300 0.0813 MG/L NONE 350.1 NA 06/03/19 1.0 1.00 x 0.865 MG/L NONE GREEN NA 07/01/19 0.019 0.020 x 0.865 MG/L NONE GREEN NA 07/01/19 0.00800 0.0100 0.409 MG/L 365.2 365.2 06/10/19 06/03/19 0.00800 0.0100 0.156 MG/L NONE 365.2 NA 05/30/19 1.33 1.33 3.07 MG/L NONE 160.2 NA 06/03/19 1.33 1.33 3.07 MG/L NONE 160.4 NA 06/03/19 0.500 1.00 6.6 MG/L NONE 160.4 NA 06/03/19	Analyte	LOD	TOO	Flag	Result	Units	Method	Method	Date	Date	Number
1.0 1.0 MG/CU.M. 10200H 10200H 05/30/19 06/03/19 0.019 0.020 X 0.865 MG/L NONE GREEN NA 07/01/19 1.0 1.00 ND MG/CU.M. 10200H 10200H 05/30/19 06/03/19 0.00800 0.0100 0.409 MG/L NONE 365.2 NA 05/30/19 0.00800 0.0100 0.156 MG/L NONE 365.2 NA 05/30/19 1.33 1.33 3.07 MG/L NONE 160.4 NA 06/03/19 0.500 1.00 6.6 MG/L NONE 160.4 NA 06/10/19	monia Nitrogen	0.0200	0.0300		0.0813	MG/L	NONE	350.1	NA		6054619
0.019 0.020 X 0.865 MG/L NONE GREEN NA 07/01/19 1.0 1.00 ND MG/CU.M. 10200H 10200H 05/30/19 06/03/19 0.00800 0.0100 0.156 MG/L NONE 365.2 NA 05/30/19 1.33 1.33 25.6 MG/L NONE 160.2 NA 06/03/19 1.33 1.33 3.07 MG/L NONE 160.4 NA 06/03/19 0.500 1.00 6.6 MG/L NONE 160.4 NA 06/10/19	lorophyll-a, Correcte	1.0	1.00		1.7	MG/CU.M.	10200H	10200H	05/30/19		6054617
1.0 ND MG/CU.M. 10200H 10200H 05/30/19 06/03/19 0.00800 0.0100 0.409 MG/L 365.2 365.2 06/10/19 06/11/19 0.00800 0.0100 0.156 MG/L NONE 365.2 NA 05/30/19 1.33 1.33 25.6 MG/L NONE 160.2 NA 06/03/19 1.33 1.33 3.07 MG/L NONE 160.4 NA 06/03/19 0.500 1.00 6.6 MG/L NONE 415.1 NA 06/10/19	trate as Nitrogen	0.019	0.020	×	0.865	MG/L	NONE	GREEN	NA		7084677
0.00800 0.0100 0.409 MG/L 365.2 365.2 06/10/19 06/11/19 0.00800 0.0100 0.156 MG/L NONE 365.2 NA 05/30/19 1.33 25.6 MG/L NONE 160.4 NA 06/03/19 1.33 3.07 MG/L NONE 160.4 NA 06/03/19 0.500 1.00 6.6 MG/L NONE 415.1 NA 06/10/19	eophytin-a	1.0	1.00		NO	MG/CU.M.	10200H	10200H	05/30/19		6054617
0.00800 0.0100 0.156 MG/L NONE 365.2 NA 05/30/19 1.33 1.33 25.6 MG/L NONE 160.2 NA 06/03/19 1.33 3.07 MG/L NONE 160.4 NA 06/03/19 0.500 1.00 6.6 MG/L NONE 415.1 NA 06/10/19		0.00800	0.0100		0.409	MG/L	365.2	365.2	06/10/19		6134638
1.33 1.33 25.6 MG/L NONE 160.2 NA 06/03/19 1.33 1.33 3.07 MG/L NONE 160.4 NA 06/03/19 0.500 1.00 6.6 MG/L NONE 415.1 NA 06/10/19		0.00800	0.0100		0.156	MG/L	NONE	365.2	NA		6054618
1.33 1.33 3.07 MG/L NONE 160.4 NA 06/03/19 0.500 1.00 6.6 MG/L NONE 415.1 NA 06/10/19	lids, Total Suspended	1.33	1.33		25.6	MG/L	NONE	160.2	NA		6054623
0.500 1.00 6.6 MG/L NONE 415.1 NA 06/10/19	lids, Volatile Suspen	1.33	1.33		3.07	MG/L	NONE	160.4	NA		6054624
	tal Organic Carbon	0.500	1.00		9.9	MG/L	NONE	415.1	NA		6174645

(a) DOD and/or NELAC Accredited Analyte.

Lab Report No: 008481 Report Date: 06/06/2019

Project No.:	MARK TWAIN LAK fied - IL100308	Analytica	Analysis: al Method: p Method:		DES (82	70SIM-MC	DD)
Field ID: Desc/Location: Sample Date:	MTL-77-0		ARDI Lab Rece	Lab No.: Filename: ived Date:	E0604	31-12 4917 9/2019 3/2019	
Matrix: Amount Used: Final Volume:	WATER 1000 mL 1 mL		Anal Inst QC E	ysis Date: rument ID: Batch:	06/04 AG5 B110	4/2019	
% Moisture: Parameter	NA	LOI	Leve LOQ	Result	LOW Data Flag	Units	Dilution Factor
Trifluralin		0.20	0.200	ND		UG/L	1
Atrazine		0.20	0.200	1.52		UG/L	1
Metribuzin		0.20	0.200	0.200		UG/L	1
Alachlor		0.20	0.200	ND		UG/L	1
Metolachlor		0.20	0.200	1.36		UG/L	1
Chlorpyrifos		0.20	0.200	ND		UG/L	1
Cyanazine		0.20	0.200	ND		UG/L	1
Pendimethalin		0.20	0.200	ND		UG/L	1

SURROGATE RECOVERIES:	Limits	Results	
Triphenylphosphate	30-130	53%	j

Surrogate recoveries marked with '*' indicates they are outside standard limits.

⁽a) DOD-QSM Accredited Analyte.

ARDL, INC. 400 Aviation Drive; P.O. Box 1566 Mt. Vernon, Illinois 62864

Lab Report No: 008481	481						щ	Report Date:	: 07/09/2019	139
Project Name: MARK TWAIN LAKE Project No:	IN LAKE						Z	Analysis: ELAC Certifi	Analysis: Inorganics NELAC Certified - IL100308	cs 0308
ARDI No: 008481-12	2	Sampl	Sampling Loc'n:		MARK TWAIN LAKE			Matrix:		
	19	Samp	sampling Time:		03/23/2013 1025			MOLSCUL	· ·	
						Prep	Analysis	Prep	Analysis	Run
Analyte	ГОР	TOO T	Flag	Result	Units	Method	Method	Date	Date	Number
Ammonia Nitrogen	0.0200	0.0300		0.133	MG/L	NONE	350.1	NA	06/03/19 0	06054619
Chlorophyll-a, Correcte	1.0	1.00		3.0	MG/CU.M.	10200H	10200H	05/30/19	06/03/19 0	06054617
Nitrate as Nitrogen	0.019	0.020	×	0.595	MG/I	NONE	GREEN	NA	07/01/19 0	07084677
Pheophytin-a	1.0	1.00		QN QN	MG/CU.M.	10200H	10200H	05/30/19	06/03/19 0	06054617
Phosphorus	0.00800	0.0100		0.526	MG/I	365.2	365.2	06/10/19	06/11/90	06134638
Phosphorus, -ortho	0.00800	0.0100		0.125	MG/I	NONE	365.2	NA	05/30/19 0	06054618
Solids, Total Suspended	. 6.67	6.67		76.0	MG/I	NONE	160.2	NA	06/03/19 0	06054623
Solids, Volatile Suspen	6.67	6.67		8.67	MG/I	NONE	160.4	NA	06/03/19 0	06054624
Total Organic Carbon	0.500	1.00		9.9	MG/Γ	NONE	415.1	NA	06/10/19 0	06174645

(a) DOD and/or NELAC Accredited Analyte.

Sample 008481-12, Inorganic Analyses

ARDL, INC. 400 Aviation Drive; P.O. Box 1566 Mt. Vernon, Illinois 62864

Report Date: 07/09/2019	Analysis: Inorganics NELAC Certified - IL100308	x: WATER e: NA	Analysis Run Date Number	05/29/19 06034603
port Dat	Analysi LAC Cert	Matrix: Moisture:	Prep Date	NA
Re	N		Analysis Method	1604
			Prep Method	NONE
		Sampling Loc'n: MARK TWAIN LAKE Sampling Date: 05/29/2019 Sampling Time: 1127	Units	COL/100 ML
		'n: MARK te: 05/29me: 1127	Result	350
		ampling Loc'n: Sampling Date: Sampling Time:	Flag	
		Samp Sam Sam	TOO	1.00
008481	WAIN LAKE	-13 INA 2019	LOD	1.0
	MARK I	008481-13 IC MARINA 05/29/2019	/te	
Lab Report No:	Project Name: MARK TWAIN LAKE Project No:	ARDL No: Field ID: Received:	Analyte	E. Coliform

(a) DOD and/or NELAC Accredited Analyte.

ARDL, INC. 400 Aviation Drive; P.O. Box 1566 Mt. Vernon, Illinois 62864

2019	nics 100308		Run Number	05/29/19 06034603
Report Date: 07/09/2019	Analysis: Inorganics NELAC Certified - IL100308	Matrix: WATER isture: NA	Analysis Date	05/29/19
eport Dat	Analysi ELAC Cert	Matrix: Moisture:	Prep Date	NA
Ж	N N		Analysis Method	1604
			Prep Method	NONE
		Sampling Loc'n: MARK TWAIN LAKE Sampling Date: 05/29/2019 Sampling Time: 1259	Units	COL/100 ML
		n: MARK te: 05/2 ne: 1259	Result	550
		ampling Loc'n: Sampling Date: Sampling Time:	Flag	
		Samp San San	ÕOT	1.00
008481	AIN LAKE	14 NA 019	TOD	1.0
No: 008	MARK TW	008481-14 BJ MARINA 05/29/2019	t e	
Lab Report No:	Project Name: MARK TWAIN LAKE Project No:	ARDL No: Field ID: Received:	Analyte	E. Coliform

(a) DOD and/or NELAC Accredited Analyte.

METHOD BLANK REPORT ARDL, Inc. 400 Aviation Drive; P.O. Box 1566 Mt. Vernon, Illinois 62864

Lab Report No: 008481 Report Date: 06/06/2019

NELAC Certified - IL100308 Prep Method: 3510C	-	MARK TWAIN LAKE		sis: NP PEST	TICIDES (8	270SIM-M	OD)
Field ID: NA	Project No.:		-				
Desc/Location: NA	NELAC Certi	fied - IL100308	Prep Met	hod: 3510C			
Sample Date: NA Received Date: NA Sample Time: NA Prep. Date: 06/03/2019 Matrix: QC Material Analysis Date: 06/04/2019 Amount Used: 1000 mL Instrument ID: AG5 Final Volume: 1 mL QC Batch: B11057 % Moisture: NA Level: LoW Data Parameter LOW Trifluralin 0.200 0.200 ND UG/L Atrazine 0.200 0.200 ND UG/L Metribuzin Alachlor 0.200 0.200 ND UG/L Metolachlor 0.200 0.200 ND UG/L Chlorpyrifos 0.200 0.200 ND UG/L Cyanazine 0.200 0.200 ND UG/L U	Field ID:	NA		ARDL Lab No	008	481-01B1	
Sample Time: NA Prep. Date: 06/03/2019 Matrix: QC Material Analysis Date: 06/04/2019 Amount Used: 1000 mL Instrument ID: AG5 Final Volume: 1 mL QC Batch: B11057 % Moisture: NA Low Low Data Parameter LOD LOQ Result Flag Units Trifluralin 0.200 0.200 ND UG/L Atrazine 0.200 0.200 ND UG/L Metribuzin 0.200 0.200 ND UG/L Alachlor 0.200 0.200 ND UG/L Metolachlor 0.200 0.200 ND UG/L Chlorpyrifos 0.200 0.200 ND UG/L Cyanazine 0.200 0.200 ND UG/L Cyanazine	Desc/Location:	NA		Lab Filenam	ne: E06	04903	
Matrix: QC Material Analysis Date: 06/04/2019 Amount Used: 1000 mL Instrument ID: AG5 Final Volume: 1 mL QC Batch: B11057 % Moisture: NA Level: LOW Data Parameter LOD LOQ Result Flag Units Trifluralin 0.200 0.200 ND UG/L Atrazine 0.200 0.200 ND UG/L Metribuzin 0.200 0.200 ND UG/L Alachlor 0.200 0.200 ND UG/L Metolachlor 0.200 0.200 ND UG/L Chlorpyrifos 0.200 0.200 ND UG/L Cyanazine 0.200 0.200 ND UG/L Cyanazine	Sample Date:	NA		Received Da	ate: NA		
Amount Used: 1000 mL	Sample Time:	NA		Prep. Date:	: 06/	03/2019	
Final Volume: 1 mL QC Batch: B11057 Level: LOW Parameter LOD LOQ Result Flag Units Trifluralin 0.200 0.200 ND UG/L Atrazine 0.200 0.200 ND UG/L Metribuzin 0.200 0.200 ND UG/L Alachlor 0.200 0.200 ND UG/L Alachlor 0.200 0.200 ND UG/L Chlorpyrifos 0.200 0.200 ND UG/L Cyanazine 0.200 0.200 ND UG/L Cyanazine 0.200 0.200 ND UG/L	Matrix:	QC Material		Analysis Da	ate: 06/	04/2019	
% Moisture: NA Level: LOW Parameter LOD LOQ Result Flag Units Trifluralin 0.200 0.200 ND UG/L Atrazine 0.200 0.200 ND UG/L Metribuzin 0.200 0.200 ND UG/L Alachlor 0.200 0.200 ND UG/L Metolachlor 0.200 0.200 ND UG/L Chlorpyrifos 0.200 0.200 ND UG/L Cyanazine 0.200 0.200 ND UG/L	Amount Used:	1000 mL		Instrument	ID: AG5		
Parameter LOD LOQ Result Flag Units Trifluralin 0.200 0.200 ND UG/L Atrazine 0.200 0.200 ND UG/L Metribuzin 0.200 0.200 ND UG/L Alachlor 0.200 0.200 ND UG/L Metolachlor 0.200 0.200 ND UG/L Chlorpyrifos 0.200 0.200 ND UG/L Cyanazine 0.200 0.200 ND UG/L	Final Volume:	1 mL		QC Batch:	B11	057	
Parameter LOD LOQ Result Flag Units Trifluralin 0.200 0.200 ND UG/L Atrazine 0.200 0.200 ND UG/L Metribuzin 0.200 0.200 ND UG/L Alachlor 0.200 0.200 ND UG/L Metolachlor 0.200 0.200 ND UG/L Chlorpyrifos 0.200 0.200 ND UG/L Cyanazine 0.200 0.200 ND UG/L	% Moisture:	NA		Level:	LOW		
Trifluralin 0.200 0.200 ND UG/L Atrazine 0.200 0.200 ND UG/L Metribuzin 0.200 0.200 ND UG/L Alachlor 0.200 0.200 ND UG/L Metolachlor 0.200 0.200 ND UG/L Chlorpyrifos 0.200 0.200 ND UG/L Cyanazine 0.200 0.200 ND UG/L						Data	
Atrazine 0.200 0.200 ND UG/L Metribuzin 0.200 0.200 ND UG/L Alachlor 0.200 0.200 ND UG/L Metolachlor 0.200 0.200 ND UG/L Chlorpyrifos 0.200 0.200 ND UG/L Cyanazine 0.200 0.200 ND UG/L	Parameter		LOD	LOQ	Result	Flag	Units
Metribuzin 0.200 0.200 ND UG/L Alachlor 0.200 0.200 ND UG/L Metolachlor 0.200 0.200 ND UG/L Chlorpyrifos 0.200 0.200 ND UG/L Cyanazine 0.200 0.200 ND UG/L	Trifluralin		0.200	0.200	ND		UG/L
Alachlor 0.200 0.200 ND UG/L Metolachlor 0.200 0.200 ND UG/L Chlorpyrifos 0.200 0.200 ND UG/L Cyanazine 0.200 0.200 ND UG/L	Atrazine		0.200	0.200	ND		UG/L
Metolachlor 0.200 0.200 ND UG/L Chlorpyrifos 0.200 0.200 ND UG/L Cyanazine 0.200 0.200 ND UG/L	Metribuzin		0.200	0.200	ND		UG/L
Chlorpyrifos 0.200 0.200 ND UG/L Cyanazine 0.200 0.200 ND UG/L	Alachlor		0.200	0.200	ND		UG/L
Cyanazine 0.200 0.200 ND UG/L	Metolachlor		0.200	0.200	ND		UG/L
	Chlorpyrifos		0.200	0.200	ND		UG/L
Pendimethalin 0.200 0.200 ND UG/L	Cyanazine		0.200	0.200	ND		UG/L
	Pendimethalin		0.200	0.200	ND		UG/L

SURROGATE RECOVERIES:	Limits	Results	
Triphenylphosphate	30-130	68%	

Surrogate recoveries marked with '*' indicates they are outside standard limits.

⁽a) DOD-QSM Accredited Analyte.

Mt. Vernon, IL 400 Aviation Drive; P.O. Box 1566 BLANK SUMMARY REPORT ARDL, INC.

62864

/2019	
07/09/201	
Report Date:	
Lab Report No: 008481	
Lab Report	

Project Name:	MARK IV	MARK TWAIN LAKE	ы					NELAC	Certifi	NELAC Certified - IL100308
Analyte	LOD	700T	Blank Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run	QC Lab Number
(a) Iron	0.040	0.050	Q.	MG/L	3010A	6010C	06/06/19	06/12/19	P7210	008481-01B1
(a) Manganese	0.004	0.005	ND	m MG/L	3010A	6010C	06/06/19	06/12/19	P7210	008481-01B1
Ammonia Nitrogen	0.020	0.030	N ON	MG/I	NONE	350.1	NA	06/03/19 0	06054619	008481-01B1
Chlorophyll-a, Corre	1.0	1.0	R	MG/CU.M.	10200H	10200H	05/30/19	06/03/19 0	06054617	008481-11B1
E. Coliform	1.0	1.0	R	COL/100 ML	NONE	1604	NA	05/29/19 0	06034603	008481-13B1
Nitrate as Nitrogen	0.019	0.020	N N	MG/L	NONE	GREEN	NA	07/01/19 0	07084677	008481-01B1
Pheophytin-a	1.0	1.0	R	MG/CU.M.	10200H	10200H	05/30/19	06/03/19 0	06054617	008481-11B1
Phosphorus	0.008	0.010	N N	MG/L	365.2	365.2	06/10/19	06/11/90	06134638	008481-04B1
Phosphorus, -ortho	0.008	0.010	N	MG/L	NONE	365.2	NA	05/30/19 0	06054618	008481-02B1
Solids, Total Suspen	1.0	1.0	N N	MG/L	NONE	160.2	NA	06/03/19 0	06054623	008481-06B1
Solids, Volatile Sus	1.0	1.0	ND	MG/I	NONE	160.4	NA	06/03/19 0	06054624	008481-06B1
Total Organic Carbon	0.50	1.0	ND	MG/L	NONE	415.1	NA	06/10/19 0	06174645	008481-01B1

(a) DOD and/or NELAC Accredited Analyte Inorganic Method Blanks for 008481

Mt. Vernon, IL BLANK SPIKE/SPIKE DUPLICATE REPORT 400 Aviation Drive; P.O. Box 1566 ARDL, INC.

62864

Lab Report No:	. 008481							Re	port Date	Report Date: 06/06/2019	119
Project Name: Project No.:	Project Name: MARK TWAIN LAKE Project No.:	Ana	Analysis: NP	PESTICID	PESTICIDES (8270SIM-MOD)	(M-MOD)	Ana1	ytical M Prep M	Analytical Method: 8270C Prep Method: 3510C	70C 10C	
Matrix: Amount Used:	OC Material 1000 mL		QC Batch: Level:	: B11057 LOW	057		Prep. Date: Analysis Da	Date: is Date:	Prep. Date: 06/03/2019 Analysis Date: 06/04/2019	19	
Section of the sectio		Spike	Spike	Spike	Duplicate	Duplicate	Duplicate	Recovery		RPD	Ì
щ	Parameter	Result	Level	* Rec	Result	Level	% Rec	Limits	RPD	Limit	
T	Trifluralin	2.59	4	65	-			30-130	1	1	
	Atrazine	2.24	4	56	1	1	1	30-130	}	1	
ž	Metribuzin	2.37	4	59	!	1	1	30-130	1	1	
	Alachlor	2.18	4	55	}	!	}	30-130	1	}	
Me	Metolachlor	2.57	4	64	}	1	}	30-130	1	}	
ដ	Chlorpyrifos	2.28	4	57	!	1	1	30-130	1	1	
O	Cyanazine	2.83	4	71	1	1	1	30-130	}	1	
Pen	Pendimethalin	2.69	4	29	1	}	!	30-130	1	!	

Duplicate %R %R Limits	30-130
Spike %R D	66.3
SURROGATE RECOVERIES:	Triphenylphosphate

⁽a) DOD-QSM Accredited Analyte.

^{&#}x27;*' indicates a recovery outside of standard limits. Spike Blanks for 008481-01, NP PESTICIDES (8270SIM-MOD)

62864 Mt. Vernon, IL LABORATORY CONTROL SAMPLE REPORT 400 Aviation Drive; P.O. Box 1566 Mt. ARDL, INC.

Lab Report No: 008481	3481	Report Date: 07/09/2019
Project Name:	MARK TWAIN LAKE	NELAC Certified - IL100308

QC Lab	Number	008481-01C1	008481-01C1	008481-01C1	008481-01C1	008481-04C1	008481-02C1	008481-01C1
Analytical	Run	P7210	P7210	06054619	07084677	06134638	06054618	06174645
Mean	% Rec	1	ļ	}	I	}	1	}
% Rec	Limits	87-115	90-114	80-120	80-120	80-120	80-120	76-120
LCS 2	% Rec		}	!	¦	ł	1	}
LCS 2	Level	1	ļ	ŀ	ŀ	ł	}	1
LCS 2	Result	1	}	1	ł	1	1	1
LCS 1	% Rec	102	106	94	100	26	66	06
LCS 1	Level	5.0	0.75	1.0	1.0	0.67	0.10	10.0
LCS 1	Result	5.1	08.0	0.94	1.0	0.65	660-0	0.6
	Analyte	(a) Iron	(a) Manganese	Ammonia Nitrogen	Nitrate as Nitrogen	Phosphorus	Phosphorus, -ortho	Total Organic Carbon

NOTE: Any values tabulated above marked with an asterisk are outside of acceptable limits.

⁽a) DOD and/or NELAC Accredited Analyte

	ž
REPORT	1566
CATE	9
DUPLICATE	C P
SPIKE	7
SPIKE/SPIKE	+
MATRIX	100 Arriation Drive.

06/06/2019 Analytical Method: 8270C Prep Method: 3510C Report Date: 62864 Mt. Vernon, IL 400 Aviation Drive; P.O. Box 1566 Analysis: NP PESTICIDES (8270SIM-MOD) ARDL, INC. Project Name: MARK TWAIN LAKE 008481 Lab Report No: Project No.:

Field ID: Desc/Location	Field ID: MTL-1 Desc/Location: MARK TWAIN LAKE		Prep. Date: Amount Used:		06/03/2019 1000 mL		AR	ARDL Lab No.: Lab Filename:	o.: 008,	008481-01	
Sample Date: Sample Time: Matrix:	05/29/2019 1336 WATER		% Moisture: QC Batch: Level:		NA B11057 LOW		Re	Received Date: Analysis Date:	Received Date: 05/29/2019 Analysis Date: 06/04/2019	05/29/2019 06/04/2019	
		Sample	MS	MS	MS	MSD	MSD	MSD	% Rec		RPD
Para	Parameter	Result	Result	Level	% Rec	Result	Level	% Rec	Limits	RPD	Limit
Trifl	Trifluralin	£	1.75	4	43.8	2.09	4	52.3	30-130	17.7	30
Atı	Atrazine	1.41	2.15	4	18.5 *	3.35	4	48.5	30-130	43.6 *	30
Meti	Metribuzin	£	1.39	4	34.8	2.23	4	55.8	30-130	46.4 *	30
Alā	Alachlor	£	1.37	4	34.3	1.79	4	44.8	30-130	26.6	30
Meto]	Metolachlor	0.630	2.04	4	35.3	2.67	4	51	30-130	26.8	30
Chlor	Chlorpyrifos	£	1.54	4	38.5	1.84	4	46	30-130	17.8	30
Cyar	Cyanazine	S S	1.65	4	41.3	2.57	4	64.3	30-130	43.6 *	30
Pendin	Pendimethalin	S S	1.78	4	44.5	2.12	4	53	30-130	17.4	30

&R Limits	30-130
MSD &R	54
MS %R	45
	٨.
SURROGATE RECOVERIES:	${\tt Triphenylphosphate}$

⁽a) DOD-QSM Accredited Analyte. 'nc' indicates sample >4X spike level.

^{&#}x27;*' indicates a recovery outside of standard limits.

62864 400 Aviation Drive; P.O. Box 1566 Mt. Vernon, IL MATRIX SPIKE/SPIKE DUPLICATE REPORT ARDL, INC.

07/09/2019 Report Date: Lab Report No: 008481

NELAC Certified - IL100308 008481-01MS 008481-01MS 008481-01MS 008481-01MS 008481-01MS 008481-04MS 008481-02MS QC Lab Number 06174645 07084677 06134638 06054618 06054619 P7210 P7210 Run Limit RPD 0 0 m 1 1 2 4 RPD 87-115 75-125 75-125 75-125 76-120 75-125 90-114 Limits % Rec 106 118 118 96 95 105 84 % Rec MSD 1.0 1.0 0.10 Level MSD 1.9 4.6 2.2 0.42 10.8 Result MSD 96 105 109 85 115 110 88 % Rec MS 1.0 2.0 1.0 0.10 Level МS 2.2 2.0 1.8 0.58 0.42 Result MARK TWAIN LAKE МS 0.89 0.058 0.058 0.31 1.1 Sample Result WATER WATER WATER WATER WATER WATER WATER Samp1e Matrix Project Name: Nitrate as Nitrogen Total Organic Carbon Phosphorus, -ortho Ammonia Nitrogen (a) Manganese Phosphorus (a) Iron Analyte

NOTE: Values tabulated above marked with an asterisk are explained in the associated narrative.

⁽a) DOD and/or NELAC Accredited Analyte.

62864 Mt. Vernon, IL SAMPLE DUPLICATE REPORT 400 Aviation Drive; P.O. Box 1566 ARDL, INC.

Lab Report No: 008481	Ţ						Report Date: 07/09/2019	07/09/2019
Project Name: MARK TWAIN LAKE	TWAIN LA	KE					NELAC Certified - IL100308	ed - IL100308
	Sample	First	Second		Percent	Mean	Analvtical	OC Lab
Analyte	Conc'n	Ouplicate	Duplicate	Units	Diff	Diff (Smp, D1, D2)	Run	Number
Chlorophyll-a, Corrected	1.7	1.1		MG/CU.M.	43*		06054617	008481-11D1
Pheophytin-a	QN QN	0		MG/CU.M.	NC	! !	06054617	008481-11D1
Solids, Total Suspended	70.0	68.0	1	MG/L	m	!	06054623	008481-06D1
Solids, Volatile Suspend	7.3	7.3	!	MG/L	0	1	06054624	008481-06D1

* indicates that agreement between duplicates is greater than 20%. See Case Narrative for exceptions. (a) DOD and/or NELAC Accredited Analyte

Sample Duplicates for 008481



Including as appropriate:

- COCs
- Cooler Receipts
- Airbills
- Email Communication / Instructions from Customer

ARDL Data Package 8481

Inc.
j
AR

P.O. Box 1566, 400 Aviation Drive, Mt. Vernon, IL 62864

(618) 244-3235 Phone

(618) 244-1149 Fax

CHAIN OF CUSTODY RECORD

PROJECT Mark Twain Lake		SAS		8									<u> </u>	PRESERVATION	
SAMPLERS: (Signature) PODO ON S G-Y Celling		E CONTAINI	POULL OF LAND	SACIO	0917	bo bo	N-SHAY	11004 12004 12004 1004 1004 1004 1004 10	OS			SAGONEGA	ICED	SPECIFY CHEMICALS ADDED AND FINAL PH IF KNOWN	80"
SAMPLE NUMBER	DATE TIME	COMP GRAB	SST.	40/47	200	EON.	J CAN	E C	WSW E. C.			/ NEWLYNNS OR SAMPLE LOCATION			
MTL-1	5/29/19/1336	×	×	×	X	X	×	×					X		
2) MTL-5	5/29/P1/245	×	×	×	X	X			N.M.				X		
MTL-13	5/29/19/1200	×	×	×	~	X							X		
MTL-9	5/2a/19/11/24	×	×	×	×	X							X		
) MTL-11	5/29/9/6/40	×	×	×	X	XX							X		
,) MTL-12	5/29/19/09/28	×	×	×	×	X	×			ASSA.			X		
MTL-15-0	5/29/10 11.05	×	X	×	X	X							X		
²) MTL-22-0	5/29/19 1418	×	X	×	×	X							X		
7) MTL-22-15	5/29/19 1478	×	×	×	X	×	×			Admini Roman			X		
9) MTL-33-0	5/29/19 1315	X	$X \mid X \mid$	X	X	XX							X		
) MTL-66-0		×	×	×	X	X	NA.						X		
2)MTL-77-0	I	×	X	×	X	X					1,551		X		
IC MARINA	5/29/19/1127	×			Naci i	MAN		×			NA SA		X		
(到BJ MARINA	5/29/P1 1259	×			4440		W	×					X		
Re					1945										
Refinquished by: (Signature)	Date Time	Received by: (Signature)	y: (Signa	ture)	A.A.	EMAI	KS/SI	ECIAL	INSTRU	REMARKS/SPECIAL INSTRUCTIONS					
1. 1.17	Time	Received by: (Mgn. Shippedg Ticket No	Signature 5/29 icket No.			Preserv Preserv	ved wit ved wit	*Preserved with H ₂ SO ₄ #Preserved with HNO ₃	#						
abi (Sprague)/	5450 O545	\													
o PURCHASE ORDER NO:	des130/19														
)									-,						

COOLER RECEIPT REPORT ARDL, INC.

AR	dl#: <i>8481</i>	Cod	oler#_3.43 mber of Coolers in Ship	<u> </u>		•
Pro	ject: Mark Levain Lake	Dat	te Received: <u>5-29</u>	-19 ley	Na	4
А.	PRELIMINARY EXAMINATION PHASE: Date cooler was opened: 5-29	-19	(Signature)	Loregry	-	
1.	Did cooler come with a shipping slip (airbill, etc.)?	• • • • • • • • • • • • • • • • • • • •	dle 5/301	/.9 <u>(P</u> \$)	NO.	
	If YES, enter carrier name and airbill number here:		Cauri	ev .		
2.	Were custody seals on outside of cooler?				NO	N/A
	How many and where?,Seal Date:		,Seal Name:			
3.	Were custody seals unbroken and intact at the date and time of arrival?			YES	NO	(NA)
4.	Did you screen samples for radioactivity using a Geiger Counter?			YES	NO	
5.	Were custody papers sealed in a plastic bag?			YES	(NO	
6,	Were custody papers filled out properly (ink, signed, etc.)?	, 		YES	NO	N/A
7.	Were custody papers signed in appropriate place by ARDL personnel?	••••		YES	NO	N/A
8.	Was project identifiable from custody papers? If YES, enter project name at t	he top	o of this form	YES	NO	N/A
9.	Was a separate container provided for measuring temperature? YES		2 2 6	rraction factor	ე ე. ტ	C
В.	LOG-IN PHASE: Date samples were logged-in: 5-30-19 (S	Signat	ture) Madrie	12		
10.	Describe type of packing in cooler: Lonse ice					.
11.	Were all samples sealed in separate plastic bags?			YES	NO,	N/A
12.	Did all containers arrive unbroken and were labels in good condition?			YES	NO	
13.	Were sample labels complete?				NO	
14.	Did all sample labels agree with custody papers?				NO	
15.	Were correct containers used for the tests indicated?	•••••		YES'	NO	
16.	Was pH correct on preserved water samples?	•••••		(ES)	, NO	N/A
17.	Was a sufficient amount of sample sent for tests indicated?			YES	NO	
18.	Were bubbles absent in VOA samples? If NO, list by sample #:		#1000 MINUS	YES	NO	(N/A
19.	Was the ARDL project coordinator notified of any deficiencies?	•••••		.;:YES	NO (N/A
	Comments and/or Corrective Action:			Transfer		
			Fraction	Fraction		
			Area #	Area #		
				7.11.54 //		
			Walkin By dle	Ву '		
	٠,		dle "	On		
		,	5-30-19	Off		
				27.13	,	
-	D. I		Chain-of-Custody #	_A/A	,	_
	y: Signature) Date:					

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COOLER RECEIPT REPORT ARDL, INC.

ARDL#: 8481	Cooler#/ of 3
	Cooler# / of 3 Number of Coolers in Shipment:3
Project: Mark, Luxin Lake	Date Received: 5-29-19 lug vaj
A. PRELIMINARY EXAMINATION PHASE: Date cooler was opened: 5-2	9-19 (Signature) alc for Fy
Did cooler come with a shipping slip (airbill, etc.)?	YES NO
If YES, enter carrier name and airbill number here:	Cornier
2. Were custody seals on outside of cooler?	YES NO N/A
How many and where?,Seal Date:	:,Seal Name:
3. Were custody seals unbroken and intact at the date and time of arrival?	
4. Did you screen samples for radioactivity using a Geiger Counter?	YES NO
Were custody papers sealed in a plastic bag?	YES NO
6. Were custody papers filled out properly (ink, signed, etc.)?	
7. Were custody papers signed in appropriate place by ARDL personnel?	
8. Was project identifiable from custody papers? If YES, enter project name a	t the top of this form
9. Was a separate container provided for measuring temperature? YES	NO V Observed Cooler Temp. O, 9 C Correction factor O, O C
B. LOG-IN PHASE: Date samples were logged-in: 5-30-19	(Signature) Lacheum
10. Describe type of packing in cooler; <u>loader in a</u>	
11. Were all samples sealed in separate plastic bags?	YES (NO N/A
12. Did all containers arrive unbroken and were labels in good condition?	YES NO
13. Were sample labels complete?	YES NO
14. Did all sample labels agree with custody papers?	(ES) NO
15. Were correct containers used for the tests indicated?	VES NO
16. Was pH correct on preserved water samples?	YES NO N/A
17. Was a sufficient amount of sample sent for tests indicated?	
18. Were bubbles absent in VOA samples? If NO, list by sample #:	YES NO (N/A
19. Was the ARDL project coordinator notified of any deficiencies?	YES NO NA
Comments and/or Corrective Action:	Sample Transfer
	Fraction Fraction
	Area # Area #
	Walkin
	Walkin By Ale By
	On On
·	On On 5/30/19
	Chain-of-Custody #
(By: Signature) Date:	

COOLER RECEIPT REPORT ARDL, INC.

AR	DL#: <u>848/ </u>	Cooler# 2 of 3			•
	•	Cooler# 2 4 3 Number of Coolers in Ship	oment: <u> </u>		
Pro	ject: Mark Levain Lake	Date Received: 5-2°			
A.	PRELIMINARY EXAMINATION PHASE: Date cooler was opened: 5-29	-/9 (Signature) Ala	for An	<u> </u>	
1.	Did cooler come with a shipping slip (airbill, etc.)?		// / / YES	NO) .
	If YES, enter carrier name and airbill number here:	Carrier	·)		
2.	Were custody seals on outside of cooler?			(NO)	N/A
	How many and where?,Seal Date:	,Seal Name:			
3.	Were custody seals unbroken and intact at the date and time of arrival?				(NA)
4.	Did you screen samples for radioactivity using a Geiger Counter?		YES	NO	
5.	Were custody papers sealed in a plastic bag?		YES	(NO)	
6.	Were custody papers filled out properly (lnk, signed, etc.)?	,	YES	NO	(N/A)
7.	Were custody papers signed in appropriate place by ARDL personnel?		YES	NO	(N/A
8.	Was project identifiable from custody papers? If YES, enter project name at t	he top of this form	YES	NO (N/A
9.	Was a separate container provided for measuring temperature? YES	NO Observed Cooler Ten	ъ. <u>`О.Я</u>	2	_
В.	LOG-IN PHASE: Date samples were logged-in: 5-30-19 (S	Signature) Hackre	rection factor <u>(</u>	3,0	C
10.	Describe type of packing in cooler:				
11.	Were all samples sealed in separate plastic bags?		YES	NO.	, . , N/A
12.	Did all containers arrive unbroken and were labels in good condition?			NO	
13.	Were sample labels complete?		YES	NO	
14.	Did all sample labels agree with custody papers?		ES	NO	
15.	Were correct containers used for the tests indicated?			, NO	
16.	Was pH correct on preserved water samples?		ÝEŠ	NO	N/A
17.	Was a sufficient amount of sample sent for tests indicated?		√ES	NO	
18.	Were bubbles absent in VOA samples? If NO, list by sample #:		YES	NO	(N/A)
19.	Was the ARDL project coordinator notified of any deficiencies?		.:YES	NO	(N/A)
	Comments and/or Corrective Action:	Sample	Transfer	***	
		Fraction	Fraction		
-		All Area #	Area #		
		Walken			
		By	Ву		
 	v,	On Steel	On		
-		5-30-19			
		Chain-of-Custody #	NIA	1	
(By	y: Signature) Date:	2. 2. 2. 2			

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PO Box 1566 400 Aviation Drive Mt. Vernon, IL 62864 618-244-3235

www.ardlinc.com

Date: 9/23/19

Lab Name: ARDL, Inc.

ARDL Report No.: 8513

Customer Name: SLCOE

Project Name: Mark Twain Lake

Samples Received at ARDL: 8/28/19

CASE NARRATIVE

Customer Sample No.	Date Collected	<u>Lab ID</u> <u>Number</u>	Analyses Requested
MTL-1	8/28/19	8513-01	NP Pesticides, Metals(1), Inorganics(2)
MTL-5	8/28/19	8513-02	NP Pesticides, Inorganics(2)
MTL-13	8/28/19	8513-03	NP Pesticides, Inorganics(2)
MTL-9	8/28/19	8513-04	NP Pesticides, Inorganics(2)
MTL-11	8/28/19	8513-05	NP Pesticides, Inorganics(2)
MTL-12	8/28/19	8513-06	NP Pesticides, Metals(1), Inorganics(2)
MTL-15-0	8/28/19	8513-07	NP Pesticides, Inorganics(2)(3)
MTL-22-0	8/28/19	8513-08	NP Pesticides, Inorganics(2)(3)
MTL-22-15	8/28/19	8513-09	Metals(1), Inorganics(2)
MTL-33-0	8/28/19	8513-10	NP Pesticides, Inorganics(2)(3)
MTL-66-0	8/28/19	8513-11	NP Pesticides, Inorganics(2)(3)
MTL-77-0	8/28/19	8513-12	NP Pesticides, Inorganics(2)(3)
IC MARINA	8/28/19	8513-13	E. Coli
BJ MARINA	8/28/19	8513-14	E. Coli

Including iron and manganese.

(2) Including ammonia, nitrate, orthophosphate, total phosphorus, TOC, TSS, and TVSS.

(3) Including chlorophyll-a and pheophytin-a.

The quality control data are summarized as follows:

NP PESTICIDE FRACTION - METHOD 8270-SIM

HOLDING TIME

Samples were prepared and analyzed within method specified holding times.

INITIAL CALIBRATION

The initial calibration passed criteria.

CONTINUING CALIBRATION

The continuing calibration verification (CCV) passed criteria for all analytes. The closing CCV passed criteria for all analytes.

PREPARATION BLANK

The blank met acceptance criteria.

LABORATORY CONTROL SAMPLE

The LCS analyses met recovery criteria.

MATRIX SPIKE

The matrix spike and matrix spike duplicate met recovery criteria.

"Test everything, keep the good" 1 Thes. 5:21

Page 1 of 2

Project Name: Mark Twain Lake ARDL Report No.: 8513

CASE NARRATIVE (Continued)

DUPLICATE

Duplicate analyses are reported as MS/MSD. RPD of the duplicate analyses met criteria.

INTERNAL STANDARD

All internal standard criteria were met.

SURROGATE

All surrogate recovery criteria were met.

INORGANIC FRACTION

TOC were analyzed by an accredited outside laboratory due to instrument status.

Nitrate was analyzed by Ion Chromatography using Method 300.0 due to instrument status. Samples were analyzed within holding times.

PREPARATION BLANK

Results of the preparation blanks were within acceptable limits.

LABORATORY CONTROL SAMPLE

Percent recoveries of all LCS analyses were within control limits.

MATRIX SPIKE

Percent recovery of all matrix spikes and matrix spike duplicates were within control limits, except 1 of 2 for iron and manganese.

DUPLICATE

All duplicate analyses are reported as MS/MSD except chlorophyll-a, pheophytin-a, TSS, and TVSS. RPD on all duplicate analyses were within control limits, except pheophytin-a, however the results were within ± detection limit, therefore acceptable.

DATA REPORTING QUALIFIERS

The following data reporting qualifiers are used as required:

- ND Indicates compound was analyzed for but not detected.
- Indicates an estimated value. This flag is used either when estimating a concentration or this flag indicates analyte(s) associated with a DOD-QSM specified non-compliance pertaining to matrix QC criteria.

REPORT ORGANIZATION

The data in this report appear by sample type (Field sample, preparation blank, laboratory control sample / spike blank, matrix spike /spike duplicate and sample duplicate). Within each sample type the data appear in the order that the analytical methods were discussed in this case narrative. Sample receipt information follows the analytical data.

Release of the data contained in this package has been authorized by the Technical Services Manager or his designee as verified by the following signature.

Dean S. Dickerson

Technical Services Manager



Including as appropriate:

Field Sample Results

Batch QC

Prep Blank

LCS/Spike Blank

Matrix QC

MS/MSD

Sample Duplicate

ARDL Data Package 8513

N:\ARDL Case Narratives\ARDL Data Package Contents.pdf - Revised June 21, 2019

Authorized By: DSD-QAO

Lab Report No: 008513 Report Date: 09/18/2019

Project Name:	MARK TWAIN LAKE	Ar	nalysis: NI	P PESTICII	DES (82	70SIM-MO	D)
Project No.:		Analytical	Method: 82	270C			
NELAC Certi	fied - IL100308	Prep	Method: 3	510C			
Field ID:	MTL-1		ARDL 1	Lab No.:	0085	13-01	
Desc/Location:	MARK TWAIN LAKE		Lab F:	ilename:	E091	7905	
Sample Date:	08/28/2019		Recei	ved Date:	08/28	3/2019	
Sample Time:	1512		Prep.	Date:	08/30	0/2019	
Matrix:	WATER		Analy	sis Date:	09/1	7/2019	
Amount Used:	1000 mL		Instr	ument ID:	AG5		
Final Volume:	1 mL		QC Bat	tch:	B110	92	
% Moisture:	NA		Level	:	LOW		
					Data		Dilution
Parameter		LOD	LOQ	Result	Flag	Units	Factor
Trifluralin		0.200	0.200	ND		UG/L	1
Atrazine		0.200	0.200	0.520		UG/L	1
Metribuzin		0.200	0.200	ND		UG/L	1
Alachlor		0.200	0.200	ND		UG/L	1
Metolachlor		0.200	0.200	2.09		UG/L	1
Chlorpyrifos		0.200	0.200	ND		UG/L	1
Cyanazine		0.200	0.200	ND		UG/L	1
Pendimethalin		0.200	0.200	ND		UG/L	1

SURROGATE RECOVERIES:	Limits	Results	
Triphenylphosphate	30-130	90%	j
			1

Surrogate recoveries marked with '*' indicates they are outside standard limits.

ARDL, INC. 400 Aviation Drive; P.O. Box 1566 Mt. Vernon, Illinois 62864

Lab Report No: 008	008513						д	Report Date:	: 09/23/2019	119
Project Name: MARK TWAIN LAKE Project No:	IN LAKE	And the second s		and the second s			Z	Analysis: ELAC Certifi	Analysis: Inorganics NELAC Certified - IL100308	1cs
ARDL No: 008513-01 Field ID: MTL-1 Received: 08/28/2019	1	Sampl Samp Samp	Sampling Loc'n: Sampling Date: Sampling Time:		MARK TWAIN LAKE 08/28/2019 1512			Matrix: Moisture:	: WATER : NA	
Analyte	LOD	TOO	Flag	Result	Units	Prep	Analysis Method	Prep Date	Analysis Date	Run Number
(a) Iron	0.0400	0.0500	ה	0.401	MG/L	3010A	6010C	09/05/19	09/12/19	P7262
(a) Manganese	0.00400	0.00500	p	0.0860	MG/L	3010A	6010C	09/05/19	09/12/19	P7262
Ammonia Nitrogen	0.0200	0.0300	þ	0.024	MG/L	NONE	350.1	NA	09/03/19 0	09054855
Nitrate as Nitrogen	0.800	1.00		ND	MG/L	NONE	300.0	NA	08/29/19 0	09054856
Phosphorus	0.00800	0.0100		0.0858	MG/L	365.2	365.2	09/12/19	09/13/19 0	09174893
Phosphorus, -ortho	0.00800	0.0100	p	0.0095	MG/L	NONE	365.2	NA	08/29/19 0	09034844
Solids, Total Suspended	4.0	4.00		5.2	MG/L	NONE	160.2	NA	09/03/19 0	09054849
Solids, Volatile Suspen	4.0	4.00		ND	MG/L	NONE	160.4	NA	09/03/19 0	09054850
Total Organic Carbon	0.500	1.00		0.9	MG/I	NONE	415.1	NA	09/09/19 0	09174894

(a) DOD and/or NELAC Accredited Analyte.

Sample 008513-01, Inorganic Analyses

Lab Report No: 008513 Report Date: 09/18/2019

	MARK TWAIN LAKE	Ana	lysis: NF	PESTICII	DES (827	70SIM-MO	D)
Project No.:		Analytical M	ethod: 82	270C			
NELAC Certi:	fied - IL100308	Prep M	ethod: 35	510C			
Field ID:	MTL-5		ARDL 1	Lab No.:	00851	13-02	
Desc/Location:	MARK TWAIN LAKE		Lab F	ilename:	E0917	7908	
Sample Date:	08/28/2019		Recei	ved Date:	08/28	3/2019	
Sample Time:	1512		Prep.	Date:	08/30)/2019	
Matrix:	WATER		Analys	sis Date:	09/17	7/2019	
Amount Used:	1000 mL		Instr	ument ID:	AG5		
Final Volume:	1 mL		QC Bat	ch:	B1109	92	
% Moisture:	NA		Level	:	LOW		
					Data		Dilution
Parameter		LOD	LOQ	Result	Flag	Units	Factor
Trifluralin		0.200	0.200	ND		UG/L	1
Atrazine		0.200	0.200	ND		UG/L	1
Metribuzin		0.200	0.200	ND		UG/L	1
Alachlor		0.200	0.200	ND		UG/L	1
Metolachlor		0.200	0.200	ND		UG/L	1
Chlorpyrifos		0.200	0.200	ND		UG/L	1
Cyanazine		0.200	0.200	ND		UG/L	1
Pendimethalin		0.200	0.200	ND		UG/L	1

SURROGATE RECOVERIES:	Limits	Results	
Triphenylphosphate	30-130	71%	j

Surrogate recoveries marked with '*' indicates they are outside standard limits.

ARDL, INC. 400 Aviation Drive; P.O. Box 1566 Mt. Vernon, Illinois 62864

Lab Report NO: 008513	۲.						1	Neport Date.		
Project Name: MARK TWAIN LAKE Project No:	N LAKE						Z	Analysis: Inorganics NELAC Certified - IL100308	: Inorganics fied - IL1003	lcs 00308
ARDL No: 008513-02 Field ID: MTL-5 Received: 08/28/2019	6	Sampling Samplir Samplir			MARK TWAIN LAKE 08/28/2019 1152			Matrix: Moisture:	: WATER : NA	
Analyte	LOD	TOO	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Ammonia Nitrogen	0.0200	0.0300		0.101	MG/L	NONE	350.1	NA	09/03/19	09054855
Nitrate as Nitrogen	0.800	1.00		ND	MG/L	NONE	300.0	NA	08/29/19	09054856
	0.00800	0.0100		0.583	MG/L	365.2	365.2	09/12/19	09/13/19	09174893
, -ortho	0.00800	0.0100		0.199	MG/L	NONE	365.2	NA	08/29/19	09034844
Solids, Total Suspended	6.67	6.67		39.3	MG/L	NONE	160.2	NA	09/03/19	09054849
Solids, Volatile Suspen	6.67	6.67		ON	MG/L	NONE	160.4	NA	09/03/19	09054850
Total Organic Carbon	0.500	1.00		6.5	MG/L	NONE	415.1	NA	09/09/19	09174894

(a) DOD and/or NELAC Accredited Analyte.

Lab Report No: 008513 Report Date: 09/18/2019

Project Name: Project No.:	MARK TWAIN LAKE	Analytical	nalysis: NE		DES (827	70SIM-MO	D)
_	fied - IL100308	_					
NELAC CETT.	ried - IPI00208	Prep	Method: 35	010C			
Field ID:	MTL-13		ARDL 1	Lab No.:	00853	13-03	
Desc/Location:	MARK TWAIN LAKE		Lab F	ilename:	E0917	7909	
Sample Date:	08/28/2019		Recei	ved Date:	08/28	3/2019	
Sample Time:	1512		Prep.	Date:	08/30)/2019	
Matrix:	WATER		Analys	sis Date:	09/1	7/2019	
Amount Used:	1000 mL		Instr	ument ID:	AG5		
Final Volume:	1 mL		QC Bat	ch:	B1109	92	
% Moisture:	NA		Level	:	LOW		
					Data		Dilution
Parameter		LOD	LOQ	Result	Flag	Units	Factor
Trifluralin		0.200	0.200	ND		UG/L	1
Atrazine		0.200	0.200	ND		UG/L	1
Metribuzin		0.200	0.200	ND		UG/L	1
Alachlor		0.200	0.200	ND		UG/L	1
Metolachlor		0.200	0.200	ND		UG/L	1
Chlorpyrifos		0.200	0.200	ND		UG/L	1
Cyanazine		0.200	0.200	ND		UG/L	1
Pendimethalin		0.200	0.200	ND		UG/L	1

SURROGATE RECOVERIES:	Limits	Results	-
Triphenylphosphate	30-130	74%	į

Surrogate recoveries marked with '*' indicates they are outside standard limits.

ARDL, INC. 400 Aviation Drive; P.O. Box 1566 Mt. Vernon, Illinois 62864

Lab Report No: 008513	513						щ	Report Date:	: 09/23/2019	019
Project Name: MARK TWAIN LAKE Project No:	IN LAKE						Z	Analysis: Inorganics NELAC Certified - IL100308	: Inorganics fied - IL1003	ics 00308
ARDL No: 008513-03 Field ID: MTL-13 Received: 08/28/2019	3	Sampl Samp Samp	Sampling Loc'n: Sampling Date: Sampling Time:		MARK TWAIN LAKE 08/28/2019 1235			Matrix: Moisture:	: WATER : NA	
Analyte	LOD	OOI	Flag	Result	Units	Prep Method	Analysis Method	Prep	Analysis Date	Run Number
Ammonia Nitrogen Nitrate as Nitrogen Phosphorus, -ortho Solids, Total Suspended Solids, Volatile Suspen Total Organic Carbon	0.0200 0.800 0.00800 0.00800 6.67 6.67	0.0300 1.00 0.0100 0.0100 6.67 6.67		0.0804 ND 0.54 0.181 77.3 10.0	MG/L MG/L MG/L MG/L MG/L MG/L	NONE NONE 365.2 NONE NONE NONE	350.1 300.0 365.2 365.2 160.2 160.4	NA NA 09/12/19 NA NA NA	09/03/19 08/29/19 09/13/19 08/29/19 09/03/19 09/09/19	09054855 09054856 09174893 09034844 09054849 09054850

(a) DOD and/or NELAC Accredited Analyte.

Sample 008513-03, Inorganic Analyses

Lab Report No: 008513 Report Date: 09/18/2019

Project Name:	MARK TWAIN LAKE	Ar	nalysis: NE	PESTICII	DES (82	70SIM-MO	D)
Project No.:		Analytical	Method: 82	270C			
NELAC Certi	fied - IL100308	Prep	Method: 35	510C			
Field ID:	MTL-9		ARDL I	Lab No.:	0085	13-04	· · · · · · · · · · · · · · · · · · ·
Desc/Location:	MARK TWAIN LAKE		Lab Fi	llename:	E091	7910	•
Sample Date:	08/28/2019		Recei	red Date:	08/28	3/2019	
Sample Time:	1512		Prep.	Date:	08/30	0/2019	
Matrix:	WATER		Analys	sis Date:	09/1	7/2019	
Amount Used:	1000 mL		Instr	ment ID:	AG5		
Final Volume:	1 mL		QC Bat	ch:	B110	92	
% Moisture:	NA		Level	:	LOW		
					Data		Dilution
Parameter		LOD	LOQ	Result	Flag	Units	Factor
Trifluralin		0.200	0.200	ND	***************************************	UG/L	1
Atrazine		0.200	0.200	ND		UG/L	1
Metribuzin		0.200	0.200	ND		UG/L	1
Alachlor	•	0.200	0.200	ND		UG/L	1
Metolachlor		0.200	0.200	0.420		UG/L	1
Chlorpyrifos		0.200	0.200	ND		UG/L	1
Cyanazine		0.200	0.200	ND		UG/L	1
Pendimethalin		0.200	0.200	ND		UG/L	1

SURROGATE RECOVERIES:	Limits	Results	1
Triphenylphosphate	30-130	87%	İ
			1

Surrogate recoveries marked with '*' indicates they are outside standard limits.

⁽a) DOD-QSM Accredited Analyte.

ARDL, INC. 400 Aviation Drive; P.O. Box 1566 Mt. Vernon, Illinois 62864

09/23/2019	Analysis: Inorganics NELAC Certified - IL100308	WATER NA	Analysis Run Date Number	09/03/19 09054855 08/29/19 09054856 09/13/19 09174893 08/29/19 09034844 09/03/19 09054849 09/03/19 09054850
Report Date:	Analysis: ELAC Certifie	Matrix: Moisture:	Prep An Date	NA 09/12/19 09/12/19 08 NA 08 NA 08 NA 08 NA 08 NA NA 08 NA NA 08 NA NA 08 NA NA 08
ŭ	N N		Analysis Method	350.1 300.0 365.2 365.2 160.2 160.4
			Prep Method	NONE NONE 365.2 NONE NONE NONE
		MARK TWAIN LAKE 08/28/2019 1318	Units	MG/L MG/L MG/L MG/L MG/L MG/L
			Result	0.101 ND 1.04 0.0899 213 20.0
		Sampling Loc'n: Sampling Date: Sampling Time:	Flag	
		Samp Sam Sam	rog	0.0300 1.00 0.0100 0.0100 6.67 6.67
13	N LAKE	თ	LOD	0.0200 0.800 0.00800 0.00800 6.67 0.500
Lab Report No: 008513	Project Name: MARK TWAIN LAKE Project No:	ARDL No: 008513-04 Field ID: MTL-9 Received: 08/28/2019	Analyte	Ammonia Nitrogen Nitrate as Nitrogen Phosphorus, -ortho Solids, Total Suspended Solids, Volatile Suspen Total Organic Carbon

(a) DOD and/or NELAC Accredited Analyte.

Lab Report No: 008513 Report Date: 09/18/2019

_	MARK TWAIN LAKE		nalysis: NE		DES (827	70SIM-MO	D)
Project No.:		Analytical					
NELAC Certi:	fied - IL100308	Prep	Method: 35	510C			
Field ID:	MTL-11		ARDL I	Lab No.:	00851	13-05	
Desc/Location:	MARK TWAIN LAKE		Lab F	llename:	E0917	7911	
Sample Date:	08/28/2019		Recei	red Date:	08/28	3/2019	
Sample Time:	1512		Prep.	Date:	08/30)/2019	
Matrix:	WATER		Analys	sis Date:	09/17	7/2019	
Amount Used:	900 mL		Instr	ument ID:	AG5		
Final Volume:	1 mL		QC Bat	ch:	B1109	92	
% Moisture:	NA		Level	:	LOW		
					Data		Dilution
Parameter		LOD	LOQ	Result	Flag	Units	Factor
Trifluralin		0.222	0.222	ND		UG/L	1
Atrazine		0.222	0.222	ND		UG/L	1
Metribuzin		0.222	0.222	ND		UG/L	1
Alachlor		0.222	0.222	ND		UG/L	1
Metolachlor		0.222	0.222	0.467		UG/L	1
Chlorpyrifos		0.222	0.222	ND		UG/L	1
Cyanazine		0.222	0.222	ND		UG/L	1
Pendimethalin		0.222	0.222	ND		UG/L	1

SURROGATE RECOVERIES:	Limits	Results	
Triphenylphosphate	30-130	77%	į
			1

Surrogate recoveries marked with '*' indicates they are outside standard limits.

ARDL, INC. 400 Aviation Drive; P.O. Box 1566 Mt. Vernon, Illinois 62864

Report Date: 09/23/2019	Analysis: Inorganics NELAC Certified - IL100308	Sampling Loc'n: MARK TWAIN LAKE Sampling Date: 08/28/2019 Sampling Time: 1406	Prep Analysis Prep Analysis Run LOD LOQ Flag Result Units Method Method Date Date Number	.0200 0.0300 0.161 MG/L NONE 350.1 NA 09/03/19 09054855	.800 1.00 ND MG/L NONE 300.0 NA 08/29/19 09054856	0.0100 0.562	0.0100 0.0847	10.0	10.0 10.0 15.0 MG/L NONE 160.4 NA 09/03/19 09054850	
	O	Sampling Lo Sampling D Sampling I		0.0300	1.00	0.0100	0.0100	10.0	10.0	000
513		LOD	0.0200	0.800	0.00800	0.00800	10.0	10.0	0	
Lab Report No: 008513	Project Name: MARK TWAIN LAKE Project No:	ARDL No: 008513-05 Field ID: MTL-11 Received: 08/28/2019	Analyte	Ammonia Nitrogen	Nitrate as Nitrogen	Phosphorus	, -ortho	Solids, Total Suspended	Solids, Volatile Suspen	

(a) DOD and/or NELAC Accredited Analyte.

Sample 008513-05, Inorganic Analyses

Lab Report No: 008513 Report Date: 09/18/2019

=	MARK TWAIN LAKE		-	PESTICI	DES (82	70SIM-MO	D)
Project No.:		Analytical M					
NELAC Certi:	fied - IL100308	Prep M	ethod: 35	510C			
Field ID:	MTL-12		ARDL 1	Lab No.:	00853	L3-06	
Desc/Location:	MARK TWAIN LAKE		Lab F:	ilename:	E0917	7912	
Sample Date:	08/28/2019		Recei	ved Date:	08/28	3/2019	
Sample Time:	1512		Prep.	Date:	08/30)/2019	
Matrix:	WATER		Analy	sis Date:	09/1	7/2019	
Amount Used:	1000 mL		Instr	ument ID:	AG5		
Final Volume:	1 mL		QC Bat	ch:	B1109	92	
% Moisture:	NA		Level	:	LOW		
					Data		Dilution
Parameter		LOD	LOQ	Result	Flag	Units	Factor
Trifluralin		0.200	0.200	ND		UG/L	1
Atrazine		0.200	0.200	0.430		UG/L	1
Metribuzin		0.200	0.200	ND		UG/L	1
Alachlor		0.200	0.200	ND		UG/L	1
Metolachlor		0.200	0.200	1.70		UG/L	1
Chlorpyrifos		0.200	0.200	ND		UG/L	1
Cyanazine		0.200	0.200	ND		UG/L	1
Pendimethalin		0.200	0.200	ND		UG/L	1

SURROGATE RECOVERIES:	Limits	Results	
Triphenylphosphate	30-130	76%	j

Surrogate recoveries marked with '*' indicates they are outside standard limits.

ARDL, INC. 400 Aviation Drive; P.O. Box 1566 Mt. Vernon, Illinois 62864

Lab Report No: 0	008513						Ľ	Report Date:	: 09/23/2019	019
Project Name: MARK TWAIN LAKE Project No:	WAIN LAKE						Z	Analysis: Inorganics NELAC Certified - IL100308	: Inorganics fied - IL1003	ics 30308
ARDL No: 008513-06 Field ID: MTL-12 Received: 08/28/2019	-06 2019	Sampl Samp Samp	Sampling Loc'n: Sampling Date: Sampling Time:		MARK TWAIN LAKE 08/28/2019 1605			Matrix: Moisture:	: WATER : NA	
Analyte	LOD	TOO	Flag R	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
(a) Iron	0.0400	0.0500		0.566	MG/L	3010A	6010C	09/05/19	09/12/19	P7262
(a) Manganese	0.00400	0.00500		0.152	MG/L	3010A	6010C	09/05/19	09/12/19	P7262
Ammonia Nitrogen	0.0200	0.0300	0	0.0433	MG/L	NONE	350.1	NA	09/03/19 (09054855
Nitrate as Nitrogen	0.800	1.00		ND	MG/L	NONE	300.0	NA	08/29/19 (09054856
Phosphorus	0.00800	0.0100		0.125	MG/L	365.2	365.2	09/12/19	09/13/19 (09174893
Phosphorus, -ortho	0.00800	0.0100	0	0.0199	MG/L	NONE	365.2	NA	08/29/19 0	09034844
Solids, Total Suspended	ed 4.0	4.00		14.4	MG/L	NONE	160.2	NA	09/03/19 0	09054849
Solids, Volatile Suspen	en 4.0	4.00		5.2	MG/L	NONE	160.4	NA	09/03/19 0	09054850
Total Organic Carbon	0.500	1.00		6.1	MG/L	NONE	415.1	NA	09/09/19 0	09174894

(a) DOD and/or NELAC Accredited Analyte.

Lab Report No: 008513 Report Date: 09/18/2019

Project Name: Project No.:	MARK TWAIN LAKE	Ar Analytical	nalysis: NI Method: 83		DES (827	70SIM-MO	D)
-	fied - IL100308	-	Method: 35				
Field ID:	MTL-15-0		ARDL 1	Lab No.:	00851	L3-07	
Desc/Location:	MARK TWAIN LAKE		Lab F	ilename:	E0917	7913	
Sample Date:	08/28/2019		Recei	ved Date:	08/28	3/2019	
Sample Time:	1512		Prep.	Date:	08/30)/2019	
Matrix:	WATER		Analys	sis Date:	09/17	7/2019	
Amount Used:	1000 mL		Instr	ument ID:	AG5		
Final Volume:	1 mL		QC Bat	tch:	B1109	92	
% Moisture:	NA		Level	•	LOW		
					Data		Dilution
Parameter		LOD	LOQ	Result	Flag	Units	Factor
Trifluralin		0.200	0.200	ND		UG/L	1
Atrazine		0.200	0.200	0.500		UG/L	1
Metribuzin		0.200	0.200	ND		UG/L	1
Alachlor		0.200	0.200	ND		UG/L	1
Metolachlor		0.200	0.200	1.42		UG/L	1
Chlorpyrifos		0.200	0.200	ND		UG/L	1
Cyanazine		0.200	0.200	ND		UG/L	1
Pendimethalin		0.200	0.200	ND		UG/L	1

SURROGATE RECOVERIES:	Limits	Results	
Triphenylphosphate	30-130	86%	ĺ

Surrogate recoveries marked with '*' indicates they are outside standard limits.

ARDL, INC. 400 Aviation Drive; P.O. Box 1566 Mt. Vernon, Illinois 62864

Lab Report No: 008	008513						т	Report Date:	: 09/23/2019	019
Project Name: MARK TWP Project No:	MARK TWAIN LAKE						Z	Analysis: Inorganics NELAC Certified - IL100308	: Inorganics fied - IL1003	ics 00308
ARDL No: 008513-07 Field ID: MIL-15-0 Received: 08/28/2019	07 0 019	Sampl Samp Samp	Sampling Loc'n: Sampling Date: Sampling Time:		MARK TWAIN LAKE 08/28/2019 1100			Matrix: Moisture:	: WATER : NA	
Analyte	LOD	TOO	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Ammonia Nitrogen	0.0200	0.0300		0.0459	MG/L	NONE	350.1	NA	09/03/19	09054855
Chlorophyll-a, Correcte	a 1.0	1.00		7.4	MG/CU.M.	10200H	10200H	08/29/19	09/09/19	09134882
Nitrate as Nitrogen	0.800	1.00		ON	MG/L	NONE	300.0	NA	08/29/19	09054856
Pheophytin-a	1.0	1.00		NO	MG/CU.M.	10200H	10200H	08/29/19	09/09/19	09134882
Phosphorus	0.00800	0.0100		0.129	MG/L	365.2	365.2	09/12/19	09/13/19 (09174893
Phosphorus, -ortho	0.00800	0.0100		0.0277	MG/L	NONE	365.2	NA	08/29/19 (09034844
Solids, Total Suspended	4.0	4.00		6.4	MG/L	NONE	160.2	NA	09/03/19 (09054849
Solids, Volatile Suspen	4.0	4.00		ND	MG/L	NONE	160.4	NA	09/03/19 (09054850
Total Organic Carbon	0.500	1.00		0.9	MG/L	NONE	415.1	NA	09/09/19 (09174894
						The second secon				

(a) DOD and/or NELAC Accredited Analyte.

Lab Report No: 008513 Report Date: 09/18/2019

_	MARK TWAIN LAKE		alysis: NE		DES (827	70SIM-MO	D)
Project No.:		Analytical					
NELAC Certi:	fied - IL100308	Prep	Method: 35	510C			
Field ID:	MTL-22-0		ARDL 1	Lab No.:	00851	13-08	
Desc/Location:	MARK TWAIN LAKE		Lab F	llename:	E0917	7914	
Sample Date:	08/28/2019		Recei	red Date:	08/28	3/2019	
Sample Time:	1512		Prep.	Date:	08/30)/2019	
Matrix:	WATER		Analys	sis Date:	09/17	7/2019	
Amount Used:	1000 mL		Instr	ument ID:	AG5		
Final Volume:	1 mL		QC Bat	ch:	B1109	92	
% Moisture:	NA		Level	:	LOW		
***					Data		Dilution
Parameter		LOD	LOQ	Result	Flag	Units	Factor
Trifluralin		0.200	0.200	ND		UG/L	1
Atrazine		0.200	0.200	0.510		UG/L	1
Metribuzin		0.200	0.200	ND		UG/L	1
Alachlor		0.200	0.200	ND		UG/L	1 .
Metolachlor		0.200	0.200	2.09		UG/L	1
Chlorpyrifos		0.200	0.200	ND		UG/L	1
Cyanazine		0.200	0.200	ND		UG/L	1
Pendimethalin		0.200	0.200	ND		UG/L	1

SURROGATE RECOVERIES:	Limits	Results	
Triphenylphosphate	30-130	88%	į
			I

Surrogate recoveries marked with '*' indicates they are outside standard limits.

ARDL, INC. 400 Aviation Drive; P.O. Box 1566 Mt. Vernon, Illinois 62864

4							the state of the s	*		
Project Name: MARK TWAIN LAKE Project No:	IN LAKE						Z	Analysis: Inor NELAC Certified -	: Inorganics fied - IL1003	ganics IL100308
	m -	Sampl Samp	Sampling Loc'n: Sampling Date:		MARK TWAIN LAKE 08/28/2019			Matrix: Moisture:	: WATER : NA	
Kecelved: U8/28/2019	ר א ע	Samp	samping Time:	ıme: 1345						
						Prep	Analysis	Prep	Analysis	Run
Analyte	LOD	TOO	Flag	Result	Units	Method	Method	Date	Date	Number
Ammonia Nitrogen	0.0200	0.0300		0.0759	MG/L	NONE	350.1	NA	09/03/19	09054855
Chlorophyll-a, Correcte	1.0	1.00		28.1	MG/CU.M.	10200H	10200H	08/29/19	09/09/19	09134882
Nitrate as Nitrogen	0.800	1.00		ND	MG/L	NONE	300.0	NA	08/29/19	09054856
Pheophytin-a	1.0	1.00		1.7	MG/CU.M.	10200H	10200H	08/29/19	09/09/19	09134882
Phosphorus	0.00800	0.0100		0.0642	MG/L	365.2	365.2	09/12/19	09/13/19	09174893
Phosphorus, -ortho	0.00800	0.0100	Ð	0.0095	MG/L	NONE	365.2	NA	08/29/19	09034844
Solids, Total Suspended	2.50	2.50		5.0	MG/L	NONE	160.2	NA	09/03/19	09054849
Solids, Volatile Suspen	2.50	2.50		2.75	MG/L	NONE	160.4	NA	09/03/19	09054850
Total Organic Carbon	0.500	1.00		0.9	MG/L	NONE	415.1	NA	09/09/19	09174894

(a) DOD and/or NELAC Accredited Analyte.

Sample 008513-08, Inorganic Analyses

ARDL, INC. 400 Aviation Drive; P.O. Box 1566 Mt. Vernon, Illinois 62864

Lab Report No: 008513	513						μ4	Report Date:	: 09/23/2019	019
Project Name: MARK TWAIN LAKE Project No:	IN LAKE						4	Analysis: Inorganics NELAC Certified - IL100308	: Inorganics fied - IL1003	ics 00308
ARDL No: 008513-09 Field ID: MTL-22-15 Received: 08/28/2019	9 5 19	Sampl Samp Samp	Sampling Loc'n: Sampling Date: Sampling Time:		MARK TWAIN LAKE 08/28/2019 1345			Matrix: Moisture:	: WATER : NA	
Analyte	LOD	TOÖ	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
(a) Iron (a) Manganese Ammonia Nitrogen Nitrate as Nitrogen Phosphorus, -ortho Solids, Total Suspended Solids, Volatile Suspen Total Organic Carbon	0.0400 0.00400 0.0200 0.800 0.00800 4.0 4.0	0.0500 0.00500 0.0300 1.00 0.0100 4.00 1.00		2.84 0.547 0.193 ND 0.389 0.144 21.2 ND 6.5	MG/L MG/L MG/L MG/L MG/L MG/L MG/L	3010A 3010A NONE NONE 365.2 NONE NONE NONE	6010C 6010C 350.1 300.0 365.2 365.2 160.2 160.4	09/05/19 09/05/19 NA 09/12/19 NA NA NA	09/12/19 09/12/19 09/03/19 08/29/19 09/03/19 09/03/19	P7262 P7262 09054855 09054856 09174893 09034844 09054849

(a) DOD and/or NELAC Accredited Analyte.

Sample 008513-09, Inorganic Analyses

Lab Report No: 008513 Report Date: 09/18/2019

~	MARK TWAIN LAKE		_	PESTICIE	DES (827	70SIM-MO	D)
Project No.:		Analytical Mo					
NELAC Certi:	fied - IL100308	Prep M	ethod: 35	510C			
Field ID:	MTL-33-0		ARDL 1	Lab No.:	00851	13-10	
Desc/Location:	MARK TWAIN LAKE		Lab F	ilename:	E0917	7915	
Sample Date:	08/28/2019		Receiv	ved Date:	08/28	3/2019	
Sample Time:	1512		Prep.	Date:	08/30)/2019	
Matrix:	WATER		Analys	sis Date:	09/17	7/2019	
Amount Used:	1000 mL		Instr	ument ID:	AG5		
Final Volume:	1 mL		QC Bat	ch:	B1109	92	
% Moisture:	NA		Level	:	LOM		
			-		Data		Dilution
Parameter		LOD	LOQ	Result	Flag	Units	Factor
Trifluralin		0.200	0.200	ND		UG/L	1
Atrazine		0.200	0.200	0.510		UG/L	1
Metribuzin		0.200	0.200	ND		UG/L	1
Alachlor		0.200	0.200	ND		UG/L	1
Metolachlor		0.200	0.200	2.01		UG/L	1
Chlorpyrifos		0.200	0.200	ND		UG/L	1
Cyanazine		0.200	0.200	ND		UG/L	1
Pendimethalin		0.200	0.200	ND		UG/L	1

SURROGATE RECOVERIES:	Limits	Results	
Triphenylphosphate	30-130	83%	ĺ
			ļ

Surrogate recoveries marked with '*' indicates they are outside standard limits.

ARDL, INC. 400 Aviation Drive; P.O. Box 1566 Mt. Vernon, Illinois 62864

Lab Report No: 008513	513						K	Report Date:	: 09/23/2019	119
Project Name: MARK TWAIN LAKE Project No:	IN LAKE						Z	Analysis: Inorganics NELAC Certified - IL100308	: Inorganics fied - IL1003	.cs 00308
ARDL No: 008513-10 Field ID: MTL-33-0 Received: 08/28/2019	0	Sampl Samp Samp	Sampling Loc'n: Sampling Date: Sampling Time:		MARK TWAIN LAKE 08/28/2019 1307			Matrix: Moisture:	: WATER : NA	
Analyte	LOD	COOL	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Ammonia Nitrogen Chlorophyll-a, Correcte Nitrate as Nitrogen Pheophytin-a Phosphorus, -ortho Solids, Total Suspended Solids, Volatile Suspen Total Organic Carbon	0.0200 1.0 0.800 1.0 0.00800 0.00800 4.0 4.0	0.0300 1.00 1.00 0.0100 0.0100 4.00 1.00		0.0415 43.6 ND 2.8 0.0772 0.0406 6.0 6.0	MG/L MG/CU.M. MG/L MG/L MG/L MG/L MG/L	NONE 10200H NONE 10200H 365.2 NONE NONE NONE	350.1 10200H 300.0 10200H 365.2 365.2 160.2 160.4	NA 08/29/19 NA 08/29/19 09/12/19 NA NA NA	09/03/19 (09/09/19 (09/09/19 (09/09/19 (09/03/19 (09/03/19 (09/03/19 (09/03/19 (09/09 (09/09/19) (09/09/19 (09/09/19 (09/09/19 (09/09/19 (09/09/19 (09/09/19 (09/09/19 (09/09/19 (09/09/19 (09/09/19 (09/09/19 (09/09/19 (09/09)) (09/09/19 (09/09/19 (09/09/19 (09/09/19 (09/09/19 (09/09/19 (09/09/19 (09/09/19 (09/09/19 (09/09/19 (09/09/19 (09/09/19 (09/09/19 (09/09/19 (09/09/19 (09/09/19 (09/09/19 (09/09/19 (09/09/19)	09054855 09134882 09054856 09134882 09174893 09054849 09054849

(a) DOD and/or NELAC Accredited Analyte.

Sample 008513-10, Inorganic Analyses

Lab Report No: 008513 Report Date: 09/18/2019

Project Name:	MARK TWAIN	LAKE		nalysis: N		DES (827	0SIM-MO	D)
Project No.:			Analytical	Method: 8	270C			
NELAC Certi:	fied - IL100	308	Prep	Method: 3	510C			
Field ID:	MTL-66-0			ARDL	Lab No.:	00851	13-11	
Desc/Location:	MARK TWAIN	LAKE		Lab F	ilename:	E0917	7916	
Sample Date:	08/28/2019			Recei	ved Date:	08/28	3/2019	
Sample Time:	1512			Prep.	Date:	08/30)/2019	
Matrix:	WATER			Analy	sis Date:	09/17	7/2019	
Amount Used:	1000 mL			Instr	ument ID:	AG5		
Final Volume:	1 mL			QC Ba	tch:	B1109	92	
% Moisture:	NA			Level	:	LOW		
						Data		Dilution
Parameter			LOD	LOQ	Result	Flag	Units	Factor
Trifluralin			0.200	0.200	ND		UG/L	1
Atrazine			0.200	0.200	0.470		UG/L	1
Metribuzin			0.200	0.200	ND		UG/L	1
Alachlor			0.200	0.200	ND		UG/L	1
Metolachlor			0.200	0.200	1.29		UG/L	1
Chlorpyrifos			0.200	0.200	ND		UG/L	1
Cyanazine			0.200	0.200	ND		UG/L	1
Pendimethalin			0.200	0.200	ND		UG/L	1

SURROGATE RECOVERIES:	Limits	Results	
Triphenylphosphate	30-130	76%	

Surrogate recoveries marked with '*' indicates they are outside standard limits.

ARDL, INC. 400 Aviation Drive; P.O. Box 1566 Mt. Vernon, Illinois 62864

(a) DOD and/or NELAC Accredited Analyte.

Sample 008513-11, Inorganic Analyses

Lab Report No: 008513 Report Date: 09/18/2019

-	MARK TWAIN LAKE		_	PESTICII	DES (82	70SIM-MO	D)
Project No.:		Analytical N					
NELAC Certi:	fied - IL100308	Prep N	Method: 35	510C			
Field ID:	MTL-77-0		ARDL 1	Lab No.:	00853	13-12	
Desc/Location:	MARK TWAIN LAKE		Lab F:	ilename:	E091	7917	
Sample Date:	08/28/2019		Recei	ved Date:	08/28	3/2019	
Sample Time:	1512		Prep.	Date:	08/30	0/2019	
Matrix:	WATER		Analy	sis Date:	09/1	7/2019	
Amount Used:	800 mL		Instr	ument ID:	AG5		
Final Volume:	1 mL		QC Bat	tch:	B1109	92	
% Moisture:	NA		Level	:	LOW		
					Data	·····	Dilution
Parameter		LOD	LOQ	Result	Flag	Units	Factor
Trifluralin		0.250	0.250	ND		UG/L	1
Atrazine		0.250	0.250	0.613		UG/L	1
Metribuzin		0.250	0.250	ND		UG/L	1
Alachlor		0.250	0.250	ND		UG/L	1
Metolachlor		0.250	0.250	2.04		UG/L	1
Chlorpyrifos		0.250	0.250	ND		UG/L	1
Cyanazine		0.250	0.250	ND		UG/L	1
Pendimethalin		0.250	0.250	ND		UG/L	1

SURROGATE RECOVERIES:	Limits	Results	
Triphenylphosphate	30-130	80%	
			1

Surrogate recoveries marked with '*' indicates they are outside standard limits.

ARDL, INC. 400 Aviation Drive; P.O. Box 1566 Mt. Vernon, Illinois 62864

Report Date: 09/23/2019	Analysis: Inorganics NELAC Certified - IL100308	Sampling Loc'n: MARK TWAIN LAKE Sampling Date: 08/28/2019 Sampling Time: 1152	Prep Analysis Prep Analysis Run OQ Flag Result Units Method Method Date Date Number	0.0
		r Loc'n: g Date: g Time:	ag	0.0300 0.0867 1.00 22.7 1.00 ND 1.5 0.0100 0.107 4.00 0.0251 4.00 ND
513	IN LAKE	2	LOD	0.0200 1.0 0.800 1.0 0.00800 0.00800 4.0
Lab Report No: 008513	Project Name: MARK TWAIN LAKE Project No:	ARDL No: 008513-12 Field ID: MTL-77-0 Received: 08/28/2019	Analyte	Ammonia Nitrogen Chlorophyll-a, Correcte Nitrate as Nitrogen Pheophytin-a Phosphorus, -ortho Solids, Total Suspended Solids, Volatile Suspen

(a) DOD and/or NELAC Accredited Analyte.

ARDL, INC. 400 Aviation Drive; P.O. Box 1566 Mt. Vernon, Illinois 62864

	80		Run Number	54854
2019	nics 1003			060
Report Date: 09/23/2019	Analysis: Inorganics NELAC Certified - IL100308	x: WATER e: NA	Analysis Date	08/28/19 09054854
sport Dat	Analysi ELAC Cert	Matrix: Moisture:	Prep Date	NA
Re	N		Prep Analysis Method Method	1604
		-	Prep Method	NONE
		MARK TWAIN LAKE 08/28/2019 1135	Units	COL/100 ML
			Result	37.0
		Sampling Loc'n: Sampling Date: Sampling Time:	Flag F	
		Samp San San	QOJ	1.00
13	N LAKE	6	LOD	1.0
No: 0085	MARK TWAI	008513-13 IC MARINA 08/28/2019	ф Т	and the state of t
Lab Report No: 008513	Project Name: MARK TWAIN LAKE Project No:	ARDL No: Field ID: Received:	Analyte	E. Coliform

(a) DOD and/or NELAC Accredited Analyte.

ARDL, INC. 400 Aviation Drive; P.O. Box 1566 Mt. Vernon, Illinois 62864

Project Name: MARK TWAIN Project No: ARDL No: 008513-14 Field ID: BJ MARINA Received: 08/28/2019 Analyte	ect Name: MARK TWAIN LAKE oject No: ARDL No: 008513-14 Field ID: BJ MARINA Received: 08/28/2019 Analyte LOD	N LAKE	Sampling Samplin Samplin	ate: 08 ime: 12 Result	Loc'n: MARK TWAIN LAKE g Date: 08/28/2019 g Time: 1250 ag Result Units	Prep Method	Analysis Method	Analysis: Inorganics NELAC Certified - IL100308 Matrix: WATER Moisture: NA Prep Analysis Ru Date Date Numb	Analysis: Inorganics NELAC Certified - IL1003 Matrix: WATER Moisture: NA Prep Analysis I Date Date Nu	ics 00308 Run Number
E. Coliform		1.0	1.00	32.0	COL/100 ML	NONE	1604	NA	08/28/19 09054854	0905

(a) DOD and/or NELAC Accredited Analyte.

METHOD BLANK REPORT ARDL, Inc. 400 Aviation Drive; P.O. Box 1566 Mt. Vernon, Illinois 62864

Lab Report No: 008513 Report Date: 09/18/2019

Project Name:	MARK TWAIN LAKE	-	is: NP PEST	CICIDES (8:	270SIM-M	OD)
Project No.:		Analytical Meth				
NELAC Certi:	fied - IL100308	Prep Meth	od: 3510C			
Field ID:	NA		ARDL Lab No	008	513-01B1	
Desc/Location:	NA		Lab Filenam	ne: E09	17903	
Sample Date:	NA		Received Da	ate: NA		
Sample Time:	NA		Prep. Date:	08/	30/2019	
Matrix:	QC Material		Analysis Da	ate: 09/	17/2019	
Amount Used:	1000 mL		Instrument	ID: AG5		
Final Volume:	1 mL		QC Batch:	B11	092	
% Moisture:	NA		Level:	LOW		
					Data	
Parameter		LOD	LOQ	Result	Flag	Units
Trifluralin		0.200	0.200	ND	, , , , , , , , , , , , , , , , , , , ,	UG/L
Atrazine		0.200	0.200	ND		UG/L
Metribuzin		0.200	0.200	ND		UG/L
Alachlor		0.200	0.200	ND		UG/L
Metolachlor		0.200	0.200	ND		UG/L
Chlorpyrifos		0.200	0.200	ND		UG/L
Cyanazine		0.200	0.200	ND		UG/L
Pendimethalin		0.200	0.200	ND		UG/L

SURROGATE RECOVERIES:	Limits	Results	
Triphenylphosphate	30-130	85%	ĺ
			1

Surrogate recoveries marked with '*' indicates they are outside standard limits.

⁽a) DOD-QSM Accredited Analyte.

Mt. Vernon, IL 400 Aviation Drive; P.O. Box 1566 BLANK SUMMARY REPORT ARDL, INC.

62864

09/23/2019
Report Date:
513
Lab Report No: 008513

Project Name:	MARK IV	MARK IWAIN LAKE	ы					NELAC 0	Certifie	NELAC Certified - IL100308
Analyte	LOD	TOD	Blank Result	Units	Prep	Analysis Method	Prep Date	Analysis Date	Run	QC Lab Number
(a) Iron	0.040	0.050	ND	MG/L	3010A	6010C	09/05/19	09/12/19	P7262	008513-01B1
(a) Manganese	0.004	0.005	NO	MG/L	3010A	6010C	09/05/19	09/12/19	P7262	008513-01B1
Ammonia Nitrogen	0.020	0.030	NO	MG/L	NONE	350.1	NA	09/03/19 09	09054855	008513-01B1
Chlorophyll-a, Corre	1.0	1.0	N	MG/CU.M.	10200H	10200H	08/29/19	09/09/19 09:	09134882	008513-08B1
E. Coliform	1.0	1.0	NO	COL/100 ML	NONE	1604	NA	08/28/19 090	09054854	008513-13B1
Nitrate as Nitrogen	0.80	1.0	ND	MG/L	NONE	300.0	NA	08/29/19 090	09054856	008513-01B1
Pheophytin-a	1.0	1.0	QN ON	MG/CU.M.	10200H	10200H	08/29/19	09/09/19 09:	09134882	008513-08B1
Phosphorus	0.008	0.010	QN	MG/L	365.2	365.2	09/12/19	09/13/19 093	09174893	008515-01B1
Phosphorus, -ortho	0.008	0.010	ND	MG/L	NONE	365.2	NA	08/29/19 090	09034844	008513-01B1
Solids, Total Suspen	1.0	1.0	NO	MG/L	NONE	160.2	NA	09/03/19 09(09054849	008513-03B1
Solids, Volatile Sus	1.0	1.0	QN	MG/L	NONE	160.4	NA	09/03/19 090	09054850	008513-03B1
Total Organic Carbon	0.50	1.0	N	MG/L	NONE	415.1	NA	09/09/19 093	09174894	008513-01B1
Total Organic Carbon	0.50	1.0	ND	MG/L	NONE	415.1	NA	09/10/19 09	09174895	008513-12B1

(a) DOD and/or NELAC Accredited Analyte Inorganic Method Blanks for 008513

Mt. Vernon, IL BLANK SPIKE/SPIKE DUPLICATE REPORT 400 Aviation Drive; P.O. Box 1566 ARDL, INC.

62864

09/18/2019 Limit RPD | | | | 1 1 Prep Method: 3510C Analytical Method: 8270C Report Date: 08/30/2019 Analysis Date: 09/17/2019 RPD 1 | | | | Recovery 30-130 30-130 30-130 Limits 30-130 30-130 30-130 30-130 30-130 Prep. Date: Duplicate % Rec 11111 1 1 Duplicate Level Analysis: NP PESTICIDES (8270SIM-MOD) 1 1 1 1 1 Duplicate Result 1 1 1 1 1 B11092 LOW Spike % Rec 90 72 88 88 79 91 QC Batch: Level: Spike Level Spike Result 2.99 2.89 3.52 3.2 3.17 3.52 3.62 Project Name: MARK TWAIN LAKE QC Material 1000 mL 008513 Chlorpyrifos Pendimethalin Metribuzin Trifluralin Metolachlor Atrazine Alachlor Cyanazine Parameter Lab Report No: Project No.: Amount Used: Matrix:

SURROGATE RECOVERIES:	Spike %R	Duplicate %R	%R Limits
Triphenylphosphate	83.3	;	30-130

^{&#}x27;*' indicates a recovery outside of standard limits. Spike Blanks for 008513-01, NP PESTICIDES (8270SIM-MOD)

400 Aviation Drive; P.O. Box 1566 Mt. Vernon, IL LABORATORY CONTROL SAMPLE REPORT ARDL, INC.

62864

Lab Report No: 008513	513								Report Dat	Report Date: 09/23/2019
Project Name:	MARK TWAIN LAKE	LAKE							NELAC Cert	NELAC Certified - IL100308
	LCS 1	LCS 1	LCS 1	LCS 2	LCS 2	LCS 2	% Rec	Mean	Analytical	QC Lab
Analyte	Result	Level	% Rec	Result	Level	% Rec	Limits	% Rec	Run	Number
(a) Iron	4.6	5.0	91		-		87-115		P7262	008513-01C1
(a) Manganese	0.73	0.75	76	}	1	1	90-114	1	P7262	008513-01C1
Ammonia Nitrogen	1.0	1.0	101	1	}	1	80-120	;	09054855	008513-01C1
Nitrate as Nitrogen	13.2	14.0	94	;	1	;	80-120	;	09054856	008513-01C1
Phosphorus	0.65	0.67	86	ŀ	1	;	80-120	1	09174893	008515-01C1
Phosphorus, -ortho	0.11	0.10	105	1	80 80	}	80-120	i	09034844	008513-01C1
Total Organic Carbon	6.9	10.0	93	1	ľ	+	76-120	}	09174894	008513-01C1
Total Organic Carbon	6.9	10.0	93	1	1	i	76-120	ì	09174895	008513-12C1

NOTE: Any values tabulated above marked with an asterisk are outside of acceptable limits.

Inorganic LCS Results for 008513

⁽a) DOD and/or NELAC Accredited Analyte

	MAL
	¥
REPORT	1566
	p
DUPLICATE	C p
SPIKE/SPIKE	And Assisting no strictly Do
SPIKE,	1
MATRIX	FIRE OOF

09/18/2019 Analytical Method: 8270C Prep Method: 3510C Report Date: 62864 Mt. Vernon, IL 400 Aviation Drive; P.O. Box 1566 Analysis: NP PESTICIDES (8270SIM-MOD) ARDL, INC. Project Name: MARK TWAIN LAKE 008513 Lab Report No: Project No.:

Field ID:	MIL-1	Prep. Date: 08/30/2019	08/30/2019	ARDL Lab No.: 008513-01
Desc/Location:	Desc/Location: MARK TWAIN LAKE	Amount Used: 1000 mL	1000 mL	Lab Filename:
Sample Date:	08/28/2019	% Moisture:	NA	Received Date: 08/28/2019
Sample Time:	1512	QC Batch:	B11092	Analysis Date: 09/17/2019
Matrix:	WATER	Level:	LOW	

RPD Limit	30	30	30	30	30	30	30	30
RPD	2.2	5.6	4.4	11.6	5.6	9.8	5.3	2.2
% Rec Limits	30-130	30-130	30-130	30-130	30-130	30-130	30-130	30-130
MSD % Rec	88.3	73.8	77.8	73.3	77.5	72.5	91.5	88.8
MSD Level	4	4	4	4	4	4	4	4
MSD Result	3.53	3.47	3.11	2.93	5.19	2.9	3.66	3.55
MS % Rec	90.3	78.8	81.3	82.3	85	79	96.5	8.06
MS Level	4	4	4	4	4	4	4	4
MS Result	3.61	3.67	3.25	3.29	5.49	3.16	3.86	3.63
Sample Result	QN	0.520	QN	QN	2.09	QN	QN	QN
Parameter	Trifluralin	Atrazine	Metribuzin	Alachlor	Metolachlor	Chlorpyrifos	Cyanazine	Pendimethalin

MSD %R %R Limits	82 30-130
MS &R MS	84
SURROGATE RECOVERIES:	Triphenylphosphate

^{&#}x27;*' indicates a recovery outside of standard limits.

62864 400 Aviation Drive; P.O. Box 1566 Mt. Vernon, IL MATRIX SPIKE/SPIKE DUPLICATE REPORT ARDL, INC.

09/23/2019
Report Date:
513
Lab Report No: 008513

Project Name:	ne:	MARK TWAIN LAKE	1 LAKE	:							NELAC	Certifi	NELAC Certified - IL100308
	Sample	Sample	MS	MS	MS	MSD	MSD	MSD	% Rec		RPD		QC Lab
Analyte	Matrix	Result	Result	Level	% Rec	Result	Level	% Rec	Limits	RPD	Limit	Run	Number
(a) Iron	WATER	0.40	1.2	1.0	* 92	1.4	1.0	96	87-115	16	20	P7262	008513-01MS
(a) Manganese	WATER	0.086	0.51	0.50	* 98	0.59	0.50	100	90-114	13	20	P7262	008513-01MS
Ammonia Nitrogen	WATER	J 0.024	2.1	2.0	102	2.1	2.0	102	75-125	0	20	09054855	008513-01MS
Nitrate as Nitrogen	WATER	QN	7.0	8.0	87	7.0	8.0	88	75-125	0	20	09054856	008513-01MS
Phosphorus	WATER	0.13	0.95	0.83	66	96.0	0.83	101	75-125	1	20	09174893	008513-11MS
Phosphorus, -ortho	WATER	J 0.0095	0.10	0.10	98	0.11	0.10	86	75-125	m	20	09034844	008513-01MS
Total Organic Carbon	WATER	6.0	10.5	5.0	90	10.8	5.0	96	76-120	т	20	09174894	008513-01MS

NOTE: Values tabulated above marked with an asterisk are explained in the associated narrative.

⁽a) DOD and/or NELAC Accredited Analyte.

62864 Mt. Vernon, IL SAMPLE DUPLICATE REPORT 400 Aviation Drive; P.O. Box 1566 ARDL, INC.

Lab Report No: 008513	513						Report Date: 09/23/2019	09/23/2019
Project Name: MARK TWAIN LAKE	K TWAIN LA	KE					NELAC Certifi	NELAC Certified - IL100308
	Sample	First	Second		Percent	Mean	Analytical	QC Lab
Analyte	Conc'n	Conc'n Duplicate Duplicate	Duplicate	Units	Diff	(Smp, D1, D2)	Run	Number
Chlorophyll-a, Corrected	d 28.1	29.0	1 1	MG/CU.M.	m		09134882	008513-08D1
Pheophytin-a	1.7	2.7	1	MG/CU.M.	45*	ļ	09134882	008513-08D1
Solids, Total Suspended	d 77.3	76.0	;	MG/L	2	-	09054849	008513-03D1
Solids, Volatile Suspend	d 10.0	9.3	 	MG/L	7	1 1	09054850	008513-03D1

See Case Narrative for exceptions. * indicates that agreement between duplicates is greater than 20%. (a) DOD and/or NELAC Accredited Analyte

Sample Duplicates for 008513



Including as appropriate:

- COCs
- Cooler Receipts
- Airbills
- Email Communication / Instructions from Customer

ARDL Data Package 8513

ARDL, Inc. P.O. Box 1566, 400 Aviation Drive, Mt. Vernon, IL 62864 (618) 244-3235 Phone (618) 244-1149 Fax

CHAIN OF CUSTODY RECORD

Continued Cont										ł	'											
		Lake					S		1												PRESI	RVATION
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	JER NO:		~		ipping Ti	cket No.																

COOLER RECEIPT REPORT ARDL, INC.

ARD	DL#:	Coo	ler # <u>/ める</u> nber of Coolers in Sh	inment: 3		
-	ect: Mark, Levaine Lake	Date	Received: S-	28-19		-
Α.	PRELIMINARY EXAMINATION PHASE: Date cooler was opened:	8-19	(Signature)	Lachrus	n	
	Did cooler come with a shipping slip (airbill, etc.)?					
	If YES, enter carrier name and airbill number here:		Con	uies)		
2.	Were custody seals on outside of cooler?				(NO	N/A
	How many and where?,Seal Date	ə:	,Seal Name:			
3.	Were custody seals unbroken and intact at the date and time of arrival?			YES	NO	(NA
4.	Did you screen samples for radioactivity using a Geiger Counter?			YES) NO	
5.	Were custody papers sealed in a plastic bag?			YES	NO	·
6.	Were custody papers filled out properly (ink, signed, etc.)?			VES.	NO	N/A
7.	Were custody papers signed in appropriate place by ARDL personnel?				NO	N/A
8.	Was project identifiable from custody papers? If YES, enter project name	at the top	of this form	(YES)	NO	N/A
9.	Was a separate container provided for measuring temperature? YES	NO	Observed Cooler To	emp	C	0
В.	LOG-IN PHASE: Date samples were logged-in: 8-29-19	_(Signati	ure) Wach	sorrection factor_t	٥,٥	
10.	Describe type of packing in cooler: <u>loase</u> ice					
11.	Were all samples sealed in separate plastic bags?			YES	NO	N/A
12.	Did all containers arrive unbroken and were labels in good condition?			YES	NO NO	
13.	Were sample labels complete?			¥ES	NO.	
14.	Did all sample labels agree with custody papers?			YES	NO	
15.	Were correct containers used for the tests indicated?			YES	NO	
16.	Was pH correct on preserved water samples?			VES	NO	N/A
17.	Was a sufficient amount of sample sent for tests indicated?				, NO	
18.	Were bubbles absent in VOA samples? If NO, list by sample #:			YES	NO	N/A
19.	Was the ARDL project coordinator notified of any deficiencies?			YES	NO	N/A
	Comments and/or Corrective Action:	7	Samp	le Transfer		
			Fraction	Fraction		
			Area #	Area #		
			Walkin			
		3	Ву	Ву		
-		-	On	On		
			8-29-19			
			Chain-of-Custody	# N/A		
(B	y: Signature) Date:		Shall of Sublody			

M:\ADMIN\FORMS\COOLER RECEIPT REPORT.doc Rev. 02/22/17

COOLER RECEIPT REPORT ARDL, INC.

ARI	DL#: 85/3	Cooler#2	ച്ച 3 lers in Shipment: ַ			
		Number of Coo	lers in Shipment:	<u>3</u>		-
Pro	ject: <u>Mark Swain</u> Lake		8-28-19			
A.	PRELIMINARY EXAMINATION PHASE: Date cooler was opened: <u>9-28</u>	(Signature)_	LA Cock	eim	ر	
1.	Did cooler come with a shipping slip (airbill, etc.)?					
	If YES, enter carrier name and airbill number here:		Cause	év		
2.	Were custody seals on outside of cooler?				NO.	N/A
	How many and where?,Seal Date:_	,Seal	Name:			
3.	Were custody seals unbroken and intact at the date and time of arrival?			YES	NO	NA
4.	Did you screen samples for radioactivity using a Geiger Counter?			YES	NO ,	
5.	Were custody papers sealed in a plastic bag?			YES	(NO)	
6.	Were custody papers filled out properly (ink, signed, etc.)?			YES	NO	N/A
7.	Were custody papers signed in appropriate place by ARDL personnel?			YES'	NO	N/A
8.	Was project identifiable from custody papers? If YES, enter project name at	he top of this form		YES	NO	N/A
9.	Was a separate container provided for measuring temperature? YES	NO Observe	ed Cooler Temp. // Correction for	5c)	C
В.	LOG-IN PHASE: Date samples were logged-in: 8-29-19	Signature)	Lachrum	10(01		
10.						
11.	Were all samples sealed in separate plastic bags?			YES	NO	N/A
12.	Did all containers arrive unbroken and were labels in good condition?			YES) NO	
13.	Were sample labels complete?			YES	NO	
14.	Did all sample labels agree with custody papers?			YES	NO	
15.	Were correct containers used for the tests indicated?			VES	NO	
16.	Was pH correct on preserved water samples?			YES	NO	N/A
17.	Was a sufficient amount of sample sent for tests indicated?			YES	NO	
18.	Were bubbles absent in VOA samples? If NO, list by sample #:			_YES	NO	N/A
19.	Was the ARDL project coordinator notified of any deficiencies?			YES	NO	(N/A)
	Comments and/or Corrective Action:	F-1854 P-6-1	Sample Trans			
		Fraction	Fracti	on		
-		Area #	Area #	,		
		walk				
	9	Ву	Ву			
_		On	le On			
			9-19			
		Chain-of	-Custody #	NA		
(E	By: Signature) Date:					

COOLER RECEIPT REPORT ARDL, INC.

ARI	DL#: <u> </u>	Cooler # 3 of 3 Number of Coolers in Shipment: 3		
Pro	ject: Mark Levain Lake	Date Received: $8 - 28 - 19$		
	PRELIMINARY EXAMINATION PHASE: Date cooler was opened: 8/28	1/19 (Signature) Dacheum		
1.	Did cooler come with a shipping slip (airbill, etc.)?	YES ((OV	
			10	
^	If YES, enter carrier name and airbill number here: Were custody seals on outside of cooler?			
2.				N/A
_	How many and where?,Seal Date:_			
3.	Were custody seals unbroken and intact at the date and time of arrival?			NA
4.	Did you screen samples for radioactivity using a Geiger Counter?		NO	
5.	Were custody papers sealed in a plastic bag?		10	
6.	Were custody papers filled out properly (ink, signed, etc.)?		NO	N/A
7.	Were custody papers signed in appropriate place by ARDL personnel?	(FES)	NO	N/A
8.	Was project identifiable from custody papers? If YES, enter project name at	1 1	Ю	N/A
9.	Was a separate container provided for measuring temperature? YES	NO Observed Cooler Temp. C C C C Correction factor O	ر ا	С
В.	LOG-IN PHASE: Date samples were logged-in: 8-29-19	Signature) Mackrum		
10.	Describe type of packing in cooler: <u>loases</u> ice			
11.	Were all samples sealed in separate plastic bags?	YES	(10)	N/A
12.	Did all containers arrive unbroken and were labels in good condition?	YES	NO	
13.	Were sample labels complete?	¥ES 1	NO	
14.	Did all sample labels agree with custody papers?	YES 1	O	
15.	Were correct containers used for the tests indicated?	¥ES 1	NO	
16.	Was pH correct on preserved water samples?	VES	NO	N/A
17.	Was a sufficient amount of sample sent for tests indicated?		NO	
18.	Were bubbles absent in VOA samples? If NO, list by sample #:	YES	NO	(N/A
19.			NO	(N/A
	Comments and/or Corrective Action:	Sample Transfer		
		Fraction Fraction		
		all		
		Area # Area #		
		By By		
		On On		
		8-29-19		
		./		
		Chain-of-Custody #		
(E	By: Signature) Date:			



PO Box 1566 400 Aviation Drive Mt. Vernon, IL 62864 618-244-3235

www.ardlinc.com

Customer Name: SLCOE

Date: 11/14/19

Project Name: Mark Twain Lake

Lab Name: ARDL, Inc.

Samples Received at ARDL: 10/24/19

ARDL Report No.: 8565

CASE NARRATIVE

Customer Sample No.	Date Collected	<u>Lab ID</u> <u>Number</u>	Analyses Requested
MTL-1	10/23/19	8565-01	NP Pesticides, Metals(1), Inorganics(2)
MTL-5	10/23/19	8565-02	NP Pesticides, Inorganics(2)
MTL-13	10/23/19	8565-03	NP Pesticides, Inorganics(2)
MTL-9	10/23/19	8565-04	NP Pesticides, Inorganics(2)
MTL-11	10/23/19	8565-05	NP Pesticides, Inorganics(2)
MTL-12	10/23/19	8565-06	NP Pesticides, Metals(1), Inorganics(2)
MTL-15-0	10/23/19	8565-07	NP Pesticides, Inorganics(2)(3)
MTL-22-0	10/24/19	8565-08	NP Pesticides, Inorganics(2)(3)
MTL-22-15	10/24/19	8565-09	Metals(1), Inorganics(2)
MTL-33-0	10/24/19	8565-10	NP Pesticides, Inorganics(2)(3)
MTL-66-0	10/24/19	8565-11	NP Pesticides, Inorganics(2)(3)
MTL-77-0	10/24/19	8565-12	NP Pesticides, Inorganics(2)(3)
IC MARINA	10/24/19	8565-13	E. Coli
BJ MARINA	10/24/19	8565-14	E. Coli

(1) Including iron and manganese.

(2) Including ammonia, nitrate, orthophosphate, total phosphorus, TOC, TSS, and TVSS.

(3) Including chlorophyll-a and pheophytin-a.

The quality control data are summarized as follows:

NP PESTICIDE FRACTION - METHOD 8270-SIM

HOLDING TIME

Samples were prepared and analyzed within method specified holding times.

INITIAL CALIBRATION

The initial calibration passed criteria.

CONTINUING CALIBRATION

The continuing calibration verification (CCV) passed criteria for all analytes. The closing CCV passed criteria for all analytes.

PREPARATION BLANK

The blank met acceptance criteria.

LABORATORY CONTROL SAMPLE

The LCS analyses met recovery criteria.

"Test everything, keep the good" 1 Thes. 5:21

Page 1 of 2

Project Name: Mark Twain Lake

ARDL Report No.: 8565

CASE NARRATIVE (Continued)

MATRIX SPIKE

The matrix spike and matrix spike duplicate met recovery criteria.

DUPLICATE

Duplicate analyses are reported as MS/MSD. RPD of the duplicate analyses met criteria.

INTERNAL STANDARD

All internal standard criteria were met.

SURROGATE

All surrogate recovery criteria were met.

INORGANIC FRACTION

TOC were analyzed by an accredited outside laboratory due to instrument status.

PREPARATION BLANK

Results of the preparation blanks were within acceptable limits.

LABORATORY CONTROL SAMPLE

Percent recoveries of all LCS analyses were within control limits.

MATRIX SPIKE

Percent recovery of all matrix spikes and matrix spike duplicates were within control limits.

DUPLICATE

All duplicate analyses are reported as MS/MSD except chlorophyll-a, pheophytin-a, TSS, and TVSS. RPD on all duplicate analyses were within control limits.

DATA REPORTING QUALIFIERS

The following data reporting qualifiers are used as required:

- ND Indicates compound was analyzed for but not detected.
- Indicates an estimated value. This flag is used either when estimating a concentration or this flag indicates analyte(s) associated with a DOD-QSM specified non-compliance pertaining to matrix QC criteria.

REPORT ORGANIZATION

The data in this report appear by sample type (Field sample, preparation blank, laboratory control sample / spike blank, matrix spike /spike duplicate and sample duplicate). Within each sample type the data appear in the order that the analytical methods were discussed in this case narrative. Sample receipt information follows the analytical data.

Release of the data contained in this package has been authorized by the Technical Services Manager or his designee as verified by the following signature.

Dean S. Dickerson

Technical Services Manager



Including as appropriate:
Field Sample Results
Batch QC
Prep Blank
LCS/Spike Blank
Matrix QC
MS/MSD
Sample Duplicate

ARDL Data Package 8565

N:\ARDL Case Narratives\ARDL Data Package Contents.pdf - Revised June 21, 2019

Authorized By: DSD-QAO

Lab Report No: 008565 Report Date: 10/30/2019

Project Name:	MARK TWAIN LAK	E A	nalysis: N	NP PESTICII	DES (827	70SIM-MO	D)
Project No.:		Analytical	Method: 8	3270C			
NELAC Certi:	fied - IL100308	Prep	Method: 3	3510C			
Field ID:	MTL-1	***************************************	ARDL	Lab No.:	00856	55-01	
Desc/Location:	MARK TWAIN LAK	Ξ	Lab I	Filename:	E1028	3922	
Sample Date:	10/23/2019		Rece	lved Date:	10/24	4/2019	
Sample Time:	1600		Prep	Date:	10/25	5/2019	
Matrix:	WATER		Analy	ysis Date:	10/28	3/2019	
Amount Used:	900 mL		Inst:	cument ID:	AG5		
Final Volume:	1 mL		QC Ba	atch:	B1113	33	
% Moisture:	NA		Leve	L:	LOW		
		A STATE OF THE STA			Data		Dilution
Parameter		LOD	LOQ	Result	Flag	Units	Factor
Trifluralin		0.222	0.222	ND	_	UG/L	1
Atrazine		0.222	0.222	0.644		UG/L	1
Metribuzin		0.222	0.222	ND		UG/L	1
Alachlor		0.222	0.222	ND		UG/L	1
Metolachlor		0.222	0.222	1.48		UG/L	1
Chlorpyrifos		0.222	0.222	ND		UG/L	1
Cyanazine		0.222	0.222	ND		UG/L	1
Pendimethalin		0.222	0.222	ND		UG/L	1

SURROGATE RECOVERIES:	Limits	Results	
Triphenylphosphate	30-130	93%	

Surrogate recoveries marked with '*' indicates they are outside standard limits.

ARDL, INC. 400 Aviation Drive; P.O. Box 1566 Mt. Vernon, Illinois 62864

Lab Report No:	008565						r ₄	Report Date:	: 11/14/2019	119
Project Name: MARK Project No:	MARK IWAIN LAKE						Z	Analysis: IELAC Certif	Analysis: Inorganics NELAC Certified - IL100308	.cs 10308
ARDL No: 00856 Field ID: MIL-1 Received: 10/24	008565-01 MIL-1 10/24/2019	Sampl Samp Samp	Sampling Loc'n: Sampling Date: Sampling Time:		MARK TWAIN LAKE 10/23/2019 1600			Matrix: Moisture:	: WATER : NA	
Analyte	ГОР	TOO	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
(a) Iron	0.0400	0.0500		0.370	MG/L	3010A	6010C	10/28/19	11/01/19	P7291
(a) Manganese	0.00400	0.00500	٦	0.0719	MG/L	3010A	6010C	10/28/19	11/01/19	P7291
Ammonia Nitrogen	0.0200	0.0300	,	0.0395	MG/L	NONE	350.1	NA	10/29/19 1	11055038
Nitrate as Nitrogen	0.0190	0.0200		0.128	MG/I	NONE	GREEN	NA	11/01/19 1	11055027
Phosphorus	0.00800	0.0100	J	0.0653	MG/L	365.2	365.2	11/08/19	11/08/19 1	11125046
Phosphorus, -ortho	0.00800	0.0100	J	0.0172	MG/L	NONE	365.2	NA	10/25/19 1	11055035
Solids, Total Suspended	nded 1.33	1.33		2.8	MG/L	NONE	160.2	NA	10/28/19 1	11055036
Solids, Volatile Suspen	spen 1.33	1.33		QN	MG/L	NONE	160.4	NA	10/28/19 1	11055037
Total Organic Carbon	n 0.500	1.00		5.7	MG/L	NONE	415.1	NA	11/04/19 I	TA464729

(a) DOD and/or NELAC Accredited Analyte.

Lab Report No: 008565 Report Date: 10/30/2019

Project Name: Project No.:	MARK TWAIN	LAKE	Analytical	nalysis: N Method: 8		DES (82	70SIM-MC	D)
NELAC Certi	fied - IL100	308	_	Method: 3				
Field ID:	MTL-5		Within William Control	ARDL	Lab No.:	0085	65-02	
Desc/Location:	MARK TWAIN	LAKE		Lab F	ilename:	E1028	3925	
Sample Date:	10/23/2019			Recei	ved Date:	10/2	4/2019	
Sample Time:	1305			Prep.	Date:	10/2	5/2019	
Matrix:	WATER			Analy	sis Date:	10/28	3/2019	
Amount Used:	900 mL			Instr	ument ID:	AG5		
Final Volume:	1 mL			QC Ba	tch:	B1113	33	
% Moisture:	NA			Level	:	LOW		
. 1-19		*				Data		Dilution
Parameter			LOD	LOQ	Result	Flag	Units	Factor
Trifluralin			0.222	0.222	ND		UG/L	1
Atrazine			0.222	0.222	ND	,	UG/L	1
Metribuzin			0.222	0.222	ND		UG/L	1
Alachlor			0.222	0.222	ND		UG/L	1
Metolachlor			0.222	0.222	1.42		UG/L	1
Chlorpyrifos			0.222	0.222	ND		UG/L	1
Cyanazine			0.222	0.222	ND		UG/L	1
Pendimethalin			0.222	0.222	ND		UG/L	1

SURROGATE RECOVERIES:	Limits	Results	
Triphenylphosphate	30-130	85%	j
			1

Surrogate recoveries marked with '*' indicates they are outside standard limits.

⁽a) DOD-QSM Accredited Analyte.

V

ARDL, INC. 400 Aviation Drive; P.O. Box 1566 Mt. Vernon, Illinois 62864

Lab Report No: 008565	565						щ	Report Date:	: 11/14/2019	019
Project Name: MARK TWAIN LAKE Project No:	IN LAKE						24	Analysis: NELAC Certifie	Analysis: Inorganics NELAC Certified - IL100308	ics 00308
ARDL No: 008565-02 Field ID: MTL-5 Received: 10/24/2019	2	Sampling Sampling Sampling			MARK TWAIN LAKE 10/23/2019 1305			Matrix: Moisture:	MATER NA	
Analyte	LOD	TOO	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Ammonia Nitrogen Nitrate as Nitrogen Phosphorus Phosphorus, -ortho Solids, Total Suspended Solids, Volatile Suspen Total Organic Carbon	0.0200 0.0190 0.00800 1.33 1.33 0.500	0.0300 0.0200 0.0100 1.33 1.33	ь	0.0251 0.369 0.156 0.0773 4.53 ND 6.0	MG/L MG/L MG/L MG/L MG/L MG/L	NONE NONE 365.2 NONE NONE NONE	350.1 GREEN 365.2 365.2 160.2 160.4 415.1	NA NA 11/08/19 NA NA NA	10/29/19 11055038 11/01/19 11055027 11/08/19 11125046 10/25/19 11055035 10/28/19 11055036 10/28/19 11055037	11055038 11055027 11125046 11055035 11055036 11055037 TA464729

(a) DOD and/or NELAC Accredited Analyte.

Lab Report No: 008565 Report Date: 10/30/2019

-	MARK TWAIN LAKE		nalysis: N		DES (82	70SIM-MO	D)
Project No.:		Analytical	Method: 8	270C			
NELAC Certi	fied - IL100308	Prep	Method: 3	510C			
Field ID:	MTL-13		ARDL	Lab No.:	0085	65-03	
Desc/Location:	MARK TWAIN LAKE		Lab F	ilename:	E102	3926	
Sample Date:	10/23/2019		Recei	ved Date:	10/2	4/2019	
Sample Time:	1215		Prep.	Date:	10/2	5/2019	
Matrix:	WATER		Analy	sis Date:	10/2	3/2019	
Amount Used:	900 mL		Instr	ument ID:	AG5		
Final Volume:	1 mL		QC Ba	tch:	B111:	33	
% Moisture:	NA		Level	:	LOW		
					Data		Dilution
Parameter		LOD	LOQ	Result	Flag	Units	Factor
Trifluralin		0.222	0.222	ND		UG/L	1
Atrazine		0.222	0.222	ND	'	UG/L	1
Metribuzin		0.222	0.222	ND		UG/L	1
Alachlor		0.222	0.222	ND		UG/L	1
Metolachlor		0.222	0.222	ND		UG/L	1
Chlorpyrifos		0.222	0.222	ND		UG/L	1
Cyanazine		0.222	0.222	ND		UG/L	1
Pendimethalin		0.222	0.222	ND		UG/L	1

SURROGATE RECOVERIES:	Limits	Results	
Triphenylphosphate	30-130	78%	. 1

Surrogate recoveries marked with '*' indicates they are outside standard limits.

ARDL, INC. 400 Aviation Drive; P.O. Box 1566 Mt. Vernon, Illinois 62864

Lab Report No: 00	008565						r c	Report Date:	: 11/14/2019	019
Project Name: MARK TW Project No:	MARK TWAIN LAKE						N	Analysis: ELAC Certifi	Analysis: Inorganics NELAC Certified - IL100308	ics 30308
ARDL No: 008565-03 Field ID: MTL-13 Received: 10/24/2019	-03	Sampling Samplin Samplin	ing Localing Daling I	Loc'n: MARK	MARK TWAIN LAKE 10/23/2019 1215			Matrix: Moisture:	: WATER : NA	
Analyte	ГОР	ÖOT	F]ag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Ammonia Nitrogen	0.0200	0.0300		0.0386	MG/L	NONE	350.1	NA		11055038
Nitrate as Nitrogen	0.0190	0.0200		0.633	MG/L	NONE	GREEN	NA		11055027
Phosphorus	0.00800	0.0100		0.259	MG/L	365.2	365.2	11/08/19		11125046
Phosphorus, -ortho	0.00800	0.0100		0.0956	MG/L	NONE	365.2	NA	10/25/19	11055035
Solids, Total Suspended	ed 2.50	2.50		12.8	MG/L	NONE	160.2	NA	10/28/19	11055036
Solids, Volatile Suspen	en 2.50	2.50		2.75	MG/L	NONE	160.4	NA	10/28/19	11055037
Total Organic Carbon	0.500	1.00		7.2	MG/L	NONE	415.1	NA	11/04/19	TA464729

(a) DOD and/or NELAC Accredited Analyte.

Lab Report No: 008565 Report Date: 10/30/2019

Project Name:	MARK TWAIN LAKE	Ar	nalysis: NI	PESTICII	DES (82	70SIM-MO	D)
Project No.:	*	Analytical	Method: 82	270C			
NELAC Certi:	fied - IL100308	Prep	Method: 3	510C			
Field ID:	MTL-9	***************************************	ARDL	Lab No.:	0085	65-04	
Desc/Location:	MARK TWAIN LAKE		Lab F	ilename:	E1028	3927	
Sample Date:	10/23/2019		Recei	ved Date:	10/2	4/2019	
Sample Time:	1155		Prep.	Date:	10/25	5/2019	
Matrix:	WATER		Analy	sis Date:	10/28	3/2019	
Amount Used:	900 mL		Instr	ument ID:	AG5		
Final Volume:	1 mL		QC Bat	tch:	B1113	33	
% Moisture:	NA		Level	:	LOW		
	WWW.				Data		Dilution
Parameter		LOD	LOQ	Result	Flag	Units	Factor
Trifluralin		0.222	0.222	ND		UG/L	1
Atrazine		0.222	0.222	ND		UG/L	1
Metribuzin		0.222	0.222	ND		UG/L	1
Alachlor		0.222	0.222	ND		UG/L	1
Metolachlor		0.222	0.222	ND		UG/L	1
Chlorpyrifos		0.222	0.222	ND		UG/L	1
Cyanazine		0.222	0.222	ND		UG/L	1
Pendimethalin		0.222	0.222	ND		UG/L	1

SURROGATE RECOVERIES:	Limits	Results	-
Triphenylphosphate	30-130	65%	Ì

Surrogate recoveries marked with '*' indicates they are outside standard limits.

ARDL, INC. 400 Aviation Drive; P.O. Box 1566 Mt. Vernon, Illinois 62864

Lab Report No: 008565	565						Ä	Report Date:	: 11/14/2019	019
Project Name: MARK TWAIN LAKE Project No:	IN LAKE						Z Z	Analysis: ELAC Certifie	Analysis: Inorganics NELAC Certified - IL100308	0308
ARDL No: 008565-04 Field ID: MTL-9 Received: 10/24/2019	19	Sampling Samplin Samplin	ampling Loc Sampling Da	Loc'n: MARK 10/23 1155	MARK TWAIN LAKE 10/23/2019 1155			Matrix: Moisture:	: WATER : NA	
Analyte	LOD	LOQ	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Ammonia Nitrogen Nitrate as Nitrogen Phosphorus, -ortho Solids, Total Suspended Solids, Volatile Suspen Total Organic Carbon	0.0200 0.0190 0.00800 0.00800 3.33 3.33 0.500	0.0300 0.0200 0.0100 0.0100 3.33 3.33 1.00		0.0355 0.287 0.306 0.0564 15.7 ND	MG/L MG/L MG/L MG/L MG/L MG/L	NONE NONE 365.2 NONE NONE NONE	350.1 GREEN 365.2 365.2 160.2 160.4	NA NA 11/08/19 NA NA NA NA	10/29/19 11/01/19 11/08/19 10/25/19 10/28/19 11/04/19	11055038 11105027 11125046 11055035 11055036 11055037

(a) DOD and/or NELAC Accredited Analyte.

Lab Report No: 008565 Report Date: 10/30/2019

Project Name:	MARK TWAIN LAKE	Ana	alysis: NI	PESTICII	DES (82	70SIM-MO	D)
Project No.:		Analytical N	Method: 82	270C			
NELAC Certi:	fied - IL100308	Prep M	Method: 3	510C			
Field ID:	MTL-11		ARDL	Lab No.:	0085	65-05	
Desc/Location:	MARK TWAIN LAKE		Lab F	ilename:	E1028	3928	
Sample Date:	10/23/2019		Recei	ved Date:	10/24	4/2019	
Sample Time:	1117		Prep.	Date:	10/25	5/2019	
Matrix:	WATER		Analy	sis Date:	10/28	3/2019	
Amount Used:	900 mL		Instr	ument ID:	AG5		
Final Volume:	1 mL		QC Bat	tch:	В1113	33	
% Moisture:	NA		Level	:	LOW		
					Data	***************************************	Dilution
Parameter		LOD	LOQ	Result	Flag	Units	Factor
Trifluralin		0.222	0.222	ND		UG/L	1
Atrazine		0.222	0.222	ND		UG/L	1
Metribuzin		0.222	0.222	ND		UG/L	1
Alachlor		0.222	0.222	ND		UG/L	1 .
Metolachlor		0.222	0.222	ND		UG/L	1
Chlorpyrifos		0.222	0.222	ND		UG/L	1
Cyanazine		0.222	0.222	ND		UG/L	1
Pendimethalin		0.222	0.222	ND		UG/L	1

SURROGATE RECOVERIES:	Limits	Results	
Triphenylphosphate	30-130	72%	ĺ

Surrogate recoveries marked with '*' indicates they are outside standard limits.

ARDL, INC. 400 Aviation Drive; P.O. Box 1566 Mt. Vernon, Illinois 62864

Lab Report No: 008565	565						14	Report Date:	: 11/14/2019	019
Project Name: MARK TWAIN LAKE Project No:	IN LAKE						2	Analysis: Inorganics NELAC Certified - IL100308	: Inorganics fied - IL1003	ics 00308
ARDL No: 008565-05 Field ID: MTL-11 Received: 10/24/2019	5	Sampl Samp Samp	Sampling Loc'n: Sampling Date: Sampling Time:		MARK TWAIN LAKE 10/23/2019 1117			Matrix: Moisture:	: WATER : NA	
Analyte	ГОР	TOOT	F. lag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Ammonia Nitrogen Nitrate as Nitrogen Phosphorus, Phosphorus, -ortho Solids, Total Suspended Solids, Volatile Suspen Total Organic Carbon	0.0200 0.0190 0.00800 0.00800 4.0 4.0	0.0300 0.0200 0.0100 4.00 1.00	r)	0.0243 0.357 0.293 0.0253 50.8 7.2 6.7	MG/L MG/L MG/L MG/L MG/L MG/L	NONE NONE 365.2 NONE NONE NONE	350.1 GREEN 365.2 365.2 160.2 160.4 415.1	NA NA 11/08/19 NA NA NA	10/29/19 11055038 11/01/19 11055027 11/08/19 11125046 10/24/19 11055034 10/28/19 11055036 10/28/19 11055037 11/07/19 TA465045	11055038 11055027 11125046 11055034 11055036 11055037 TA465045

(a) DOD and/or NELAC Accredited Analyte.

Sample 008565-05, Inorganic Analyses

Lab Report No: 008565 Report Date: 10/30/2019

_	MARK TWAIN LAKE		nalysis: NI		DES (82	70SIM-MO	D)
Project No.:		Analytical					
NELAC Certi:	fied - IL100308	Prep	Method: 35	510C			
Field ID:	MTL-12		ARDL 1	Lab No.:	0085	55 - 06	
Desc/Location:	MARK TWAIN LAKE		Lab F	llename:	E1028	3929	
Sample Date:	10/23/2019		Recei	ved Date:	10/24	4/2019	
Sample Time:	1345		Prep.	Date:	10/25	5/2019	
Matrix:	WATER		Analy	sis Date:	10/28	3/2019	
Amount Used:	900 mL		Instr	ument ID:	AG5		
Final Volume:	1 mL		QC Bat	ch:	B1113	33	
% Moisture:	NA		Level	:	LOW		
		ACCES AND		the section of the se	Data		Dilution
Parameter		LOD	LOQ	Result	Flag	Units	Factor
Trifluralin		0.222	0.222	ND		UG/L	1
Atrazine		0.222	0.222	0.700		UG/L	1
Metribuzin		0.222	0.222	ND		UG/L	1
Alachlor		0.222	0.222	ND		UG/L	1
Metolachlor		0.222	0.222	1.66		UG/L	1
Chlorpyrifos		0.222	0.222	ND		UG/L	1
Cyanazine		0.222	0.222	ND		UG/L	1
Pendimethalin		0.222	0.222	ND		UG/L	1

SURROGATE RECOVERIES:	Limits	Results	
Triphenylphosphate	30-130	98%	
1			1

Surrogate recoveries marked with '*' indicates they are outside standard limits.

ARDL, INC. 400 Aviation Drive; P.O. Box 1566 Mt. Vernon, Illinois 62864

Lab Report No: 008565	565						Щ	Report Date:		119
	TANK!						A	AMALYSES:	AMELAC Certified - IL100308	0308
ARDI No: 008565-06 Field ID: MTI12	9	Sampl	Sampling Loc'n:		MARK IWAIN LAKE			Matrix:	: WATER	
	19	Samp	Sampling Time:		4					
						Prep	Analysis	Prep	Analysis	Run
Analyte	LOD	TOOT	Flag	Result	Units	Method	Method	Date	Date	Number
(a) Iron	0.0400	0.0500		0.594	MG/L	3010A	6010C	10/28/19	11/01/19	P7291
(a) Manganese	0.00400	0.00500		0.0800	MG/L	3010A	6010C	10/28/19	11/01/19	P7291
Ammonia Nitrogen	0.0200	0.0300	b	0.0269	MG/L	NONE	350.1	NA	10/29/19 1	11055038
Nitrate as Nitrogen	0.0190	0.0200		0.074	MG/L	NONE	GREEN	NA	11/01/19 1	11055027
Phosphorus	0.00800	0.0100		0.0911	MG/I	365.2	365.2	11/08/19	11/08/19 1	11125046
Phosphorus, -ortho	0.00800	0.0100		0.0198	MG/L	NONE	365.2	NA	10/25/19 1	11055035
Solids, Total Suspended	1.33	1.33		8.4	MG/L	NONE	160.2	NA	10/28/19 1	11055036
Solids, Volatile Suspen	1.33	1.33		1.6	MG/L	NONE	160.4	NA	10/28/19 1	11055037
Total Organic Carbon	0.500	1.00		6.2	MG/L	NONE	415.1	NA	11/07/19	TA465045

(a) DOD and/or NELAC Accredited Analyte.

Lab Report No: 008565 Report Date: 10/30/2019

Project Name: Project No.:	MARK TWAIN I	AKE	Ar Analytical	nalysis: NI		DES (82	70SIM-MO	D)
-	fied - IL1003	808	_	Method: 3				
Field ID:	MTL-15-0		MANAGO CO.	ARDL 1	Lab No.:	0085	55-07	<u>-</u>
Desc/Location:	MARK TWAIN I	AKE		Lab F	ilename:	E1028	3930	
Sample Date:	10/23/2019			Recei	ved Date:	10/2	1/2019	
Sample Time:	0900			Prep.	Date:	10/2	5/2019	
Matrix:	WATER			Analy	sis Date:	10/28	3/2019	
Amount Used:	900 mL			Instr	ument ID:	AG5		
Final Volume:	1 mL			QC Bat	tch:	B111:	33	
% Moisture:	NA			Level	:	LOW		
			***************************************			Data	***************************************	Dilution
Parameter			LOD	LOQ	Result	Flag	Units	Factor
Trifluralin			0.222	0.222	ND		UG/L	1
Atrazine			0.222	0.222	0.544		UG/L	1
Metribuzin			0.222	0.222	ND		UG/L	1
Alachlor			0.222	0.222	ND		UG/L	1
Metolachlor			0.222	0.222	1.02		UG/L	1
Chlorpyrifos			0.222	0.222	ND		UG/L	1
Cyanazine			0.222	0.222	ND		UG/L	1
Pendimethalin			0.222	0.222	ND		UG/L	1

SURROGATE RECOVERIES:	Limits	Results	
Triphenylphosphate	30-130	89%	

Surrogate recoveries marked with '*' indicates they are outside standard limits.

⁽a) DOD-QSM Accredited Analyte.

ARDL, INC. 400 Aviation Drive; P.O. Box 1566 Mt. Vernon, Illinois 62864

Lab Report No: 008	008565						щ	Report Date:	: 11/14/2019	119
Project Name: MARK TWA Project No:	MARK IWAIN LAKE		The state of the s				2	Analysis: Inorganics NELAC Certified - IL100308	: Inorganics fied - IL1003	.cs 10308
ARDL No: 008565-07 Field ID: MIL-15-0 Received: 10/24/2019	07 0 019	Sampl Samp Samp	Sampling Loc'n: Sampling Date: Sampling Time:		MARK TWAIN LAKE 10/23/2019 0900			Matrix: Moisture:	: WATER : NA	
Analyte	LOD	TOO	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Ammonia Nitrogen	0.0200	0.0300		0.0601	MG/L	NONE	350.1	NA	10/29/19 11055038	1055038
Chlorophyll-a, Correcte	a 1.0	1.00		2.7	MG/CU.M.	10200H	10200H	10/25/19	11/04/19 1	11055040
Nitrate as Nitrogen	0.0190	0.0200		0.305	MG/L	NONE	GREEN	NA	11/01/19 1	11055027
Pheophytin-a	1.0	1.00		N CN	MG/CU.M.	10200H	10200H	10/25/19	11/04/19 1	11055040
Phosphorus	0.00800	0.0100		0.156	MG/L	365.2	365.2	11/08/19	11/08/19 1	11125046
Phosphorus, -ortho	0.00800	0.0100		0.0306	MG/I	NONE	365.2	NA	10/24/19 1	11055034
Solids, Total Suspended	d 2.50	2.50		15.8	MG/L	NONE	160.2	NA	10/28/19 1	11055036
Solids, Volatile Suspen	n 2.50	2.50		2.5	MG/L	NONE	160.4	NA	10/28/19 1	11055037
Total Organic Carbon	0.500	1.00		6.1	MG/L	NONE	415.1	NA	11/07/19 I	TA465045

(a) DOD and/or NELAC Accredited Analyte.

Lab Report No: 008565 Report Date: 10/30/2019

Project Name: Project No.:	MARK TWAIN	LAKE	Ar Analytical	nalysis: Ni Method: 8		DES (827	70SIM-MO	D)
NELAC Certi:	fied - IL100	308	_	Method: 3				
Field ID:	MTL-22-0			ARDL :	Lab No.:	00856	55-08	
Desc/Location:	MARK TWAIN	LAKE		Lab F	ilename:	E1028	3931	
Sample Date:	10/24/2019			Recei	ved Date:	10/24	4/2019	
Sample Time:	1200			Prep.	Date:	10/25	5/2019	
Matrix:	WATER			Analy	sis Date:	10/28	3/2019	
Amount Used:	900 mL	7		Instr	ument ID:	AG5		
Final Volume:	1 mL			QC Ba	tch:	B1113	33	
% Moisture:	NA			Level	:	LOW		
						Data		Dilution
Parameter			LOD	LOQ	Result	Flag	Units	Factor
Trifluralin			0.222	0.222	ND		UG/L	1
Atrazine			0.222	0.222	0.656		UG/L	1
Metribuzin			0.222	0.222	ND		UG/L	1
Alachlor			0.222	0.222	ND		UG/L	1
Metolachlor			0.222	0.222	1.47		UG/L	1
Chlorpyrifos			0.222	0.222	ND		UG/L	1
Cyanazine			0.222	0.222	ND		UG/L	1
Pendimethalin			0.222	0.222	ND		UG/L	1

SURROGATE RECOVERIES:	Limits	Results	
Triphenylphosphate	30-130	94%	.

Surrogate recoveries marked with '*' indicates they are outside standard limits.

⁽a) DOD-QSM Accredited Analyte.

ARDL, INC. 400 Aviation Drive; P.O. Box 1566 Mt. Vernon, Illinois 62864

Lab Report No: 008565	565						щ	Report Date:	: 11/14/2019	019
Project Name: MARK TWAIN LAKE Project No:	IN LAKE						Z	Analysis: Inorganics NELAC Certified - IL100308	: Inorganics fied - IL1003	ics 00308
ARDL No: 008565-08 Field ID: MTL-22-0 Received: 10/24/2019	19	Sampling Samplin Samplin	ש מ		MARK TWAIN LAKE 10/24/2019 1200			Matrix: Moisture:	: WATER : NA	
Analyte	ГОР	TOOT	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Ammonia Nitrogen	0.0200	0.0300	ט	0.0207	MG/L	NONE	350.1	NA	10/29/19 11055038	11055038
Chlorophyll-a, Correcte	1.0	1.00		4.1	MG/CU.M.	10200H	10200H	10/25/19	11/04/19 11055040	11055040
Nitrate as Nitrogen	0.0190	0.0200		0.091	MG/L	NONE	GREEN	NA	11/01/19	11055027
Pheophytin-a	1.0	1.00		1.3	MG/CU.M.	10200H	10200H	10/25/19	11/04/19	11055040
Phosphorus	0.00800	0.0100		0.0653	MG/L	365.2	365.2	11/08/19	11/08/19	11125046
Phosphorus, -ortho	0.800.0	0.0100		0.0198	MG/L	NONE	365.2	NA	10/25/19	11055035
Solids, Total Suspended	2.0	2.00		3.2	MG/L	NONE	160.2	NA	10/28/19	11055036
Solids, Volatile Suspen	2.0	2.00		NO	MG/L	NONE	160.4	NA	10/28/19	11055037
Total Organic Carbon	0.500	1.00		5.9	MG/L	NONE	415.1	NA	11/07/19	TA465045

(a) DOD and/or NELAC Accredited Analyte.

Sample 008565-08, Inorganic Analyses

ARDL, INC. 400 Aviation Drive; P.O. Box 1566 Mt. Vernon, Illinois 62864

Lab Report No:	008565						<u>ଝ</u>	Report Date:	: 11/14/2019	019
Project Name: MARK Project No:	MARK IWAIN LAKE						Z	Analysis: Inorganics NELAC Certified - IL100308	: Inorganics fied - IL1003	ics 00308
ARDL No: 0085 Field ID: MTL- Received: 10/2	008565-09 MTL-22-15 10/24/2019	Sam Sar	Sampling Loc'n: Sampling Date: Sampling Time:		MARK TWAIN LAKE 10/24/2019 1200			Matrix: Moisture:	: WATER : NA	
Analyte	LOD	LOQ	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
(a) Iron	0.0400	0 0.0500		906.0	MG/L	3010A	6010C	10/28/19	11/01/19	P7291
(a) Manganese	0.00400	0 0.00500		0.342	MG/L	3010A	6010C	10/28/19	11/01/19	P7291
Ammonia Nitrogen	0.0200	0 0.0300		0.0473	MG/L	NONE	350.1	NA	10/29/19	11055038
Nitrate as Nitrogen	0.0190	0 0.0200		0.076	MG/L	NONE	GREEN	NA	11/01/19	11055027
Phosphorus	0.00800	0 0.0100		0.104	MG/L	365.2	365.2	11/08/19	11/08/19	11125046
Phosphorus, -ortho	0.00800	0 0.0100		0.0224	MG/L	NONE	365.2	NA	10/25/19	11055035
Solids, Total Suspended	nded 2.50	2.50		6.75	MG/L	NONE	160.2	NA	10/28/19	11055036
Solids, Volatile Suspen	spen 2.50	2.50		N ON	MG/L	NONE	160.4	NA	10/28/19	11055037
Total Organic Carbon	n 0.500	1.00		0.9	MG/L	NONE	415.1	NA	11/07/19	TA465045

(a) DOD and/or NELAC Accredited Analyte.

Sample 008565-09, Inorganic Analyses

Lab Report No: 008565 Report Date: 10/30/2019

Project Name:	MARK TWAIN LAKE	Ana	lysis: NE	PESTICIO	DES (827	70SIM-MO	D)
Project No.:	P	nalytical M	ethod: 82	270C			
NELAC Certi:	fied - IL100308	Prep M	ethod: 35	510C			
Field ID:	MTL-33-0		ARDL I	Lab No.:	00856	55-10	
Desc/Location:	MARK TWAIN LAKE		Lab F	ilename:	E1028	3932	
Sample Date:	10/24/2019		Recei	ved Date:	10/24	1/2019	
Sample Time:	1105		Prep.	Date:	10/25	5/2019	
Matrix:	WATER		Analys	sis Date:	10/28	3/2019	
Amount Used:	1000 mL		Instr	ument ID:	AG5		
Final Volume:	1 mL		QC Bat	ch:	B1113	33	
% Moisture:	NA		Level	:	LOW		
					Data		Dilution
Parameter		LOD	LOQ	Result	Flag	Units	Factor
Trifluralin		0.200	0.200	ND		UG/L	1
Atrazine		0.200	0.200	0.550		UG/L	1
Metribuzin		0.200	0.200	ND		UG/L	1
Alachlor		0.200	0.200	ND		UG/L	1
Metolachlor		0.200	0.200	1.33		UG/L	1
Chlorpyrifos		0.200	0.200	ND		UG/L	1
Cyanazine		0.200	0.200	ND		UG/L	1
Pendimethalin		0.200	0.200	ND		UG/L	1

SURROGATE RECOVERIES:	Limits	Results	
Triphenylphosphate	30-130	84%	

Surrogate recoveries marked with '*' indicates they are outside standard limits.

⁽a) DOD-QSM Accredited Analyte.

ARDL, INC. 400 Aviation Drive; P.O. Box 1566 Mt. Vernon, Illinois 62864

Lab Report No: 008565	565						Ľ,	Report Date:	: 11/14/2019	019
Project Name: MARK TWAIN LAKE Project No:	IN LAKE						Z	Analysis: ELAC Certif	Analysis: Inorganics NELAC Certified - IL100308	ics 00308
ARDL No: 008565-10 Field ID: MTL-33-0 Received: 10/24/2019	0 19	Sampl Samp Samp	Sampling Loc'n: Sampling Date: Sampling Time:		MARK TWAIN LAKE 10/24/2019 1105			Matrix: Moisture:	: WATER : NA	
Analyte	LOD	TOO	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Ammonia Nitrogen Chlorophyll-a, Correcte Nitrate as Nitrogen	0.0200 1.0 0.0190	0.0300 1.00 0.0200		0.0377 3.6 0.103	MG/CU.M. MG/CU.M.	NONE 10200H NONE	350.1 10200H GREEN	NA 10/25/19 NA	10/29/19 11/04/19 11/01/19	11055038 11055040 11055027
Pheophytin-a Phosphorus	1.0	1.00		ND 0 ±0 653	MG/CU.M. MG/L	10200H 365.2	10200H 365.2	10/25/19 11/08/19	11/04/19	L1055040 L1125046
Phosphorus, -ortho Solids, Total Suspended	0.00800	0.0100		0.0224	MG/L MG/L	NONE	365.2	NA	10/25/19	11055035 11055036
Solids, Volatile Suspen	2.0	2.00		QN	MG/L	NONE	160.4	NA		11055037
Total Organic Carbon	0.500	1.00		5.9	MG/L	NONE	415.1	NA	11/07/19	TA465045

(a) DOD and/or NELAC Accredited Analyte.

Lab Report No: 008565 Report Date: 10/30/2019

	MARK TWAIN LAKE		nalysis: NE		DES (82	70SIM-MO	D)
Project No.:		Analytical					
NELAC Certi:	fied - IL100308	Prep	Method: 35	510C			
Field ID:	MTL-66-0		ARDL 1	Lab No.:	00856	65–11	***************************************
Desc/Location:	MARK TWAIN LAKE		Lab F	ilename:	E1028	3933	
Sample Date:	10/24/2019		Receiv	ved Date:	10/24	4/2019	
Sample Time:	0830		Prep.	Date:	10/25	5/2019	
Matrix:	WATER		Analys	sis Date:	10/28	3/2019	
Amount Used:	1000 mL		Instr	ument ID:	AG5		
Final Volume:	1 mL		QC Bat	cch:	B1113	33	
% Moisture:	NA		Level	:	LOW		
	WARREST TO THE REST OF THE PARTY OF THE PART				Data		Dilution
Parameter		LOD	LOQ	Result	Flag	Units	Factor
Trifluralin		0.200	0.200	ND		UG/L	1
Atrazine		0.200	0.200	0.410		UG/L	1
Metribuzin		0.200	0.200	ND		UG/L	1
Alachlor		0.200	0.200	ND		UG/L	1
Metolachlor		0.200	0.200	0.690		UG/L	1
Chlorpyrifos		0.200	0.200	ND		UG/L	1
Cyanazine		0.200	0.200	ND		UG/L	1
Pendimethalin		0.200	0.200	ND		UG/L	1

SURROGATE RECOVERIES:	Limits	Results	
Triphenylphosphate	30-130	80%	

Surrogate recoveries marked with '*' indicates they are outside standard limits.

ARDL, INC. 400 Aviation Drive; P.O. Box 1566 Mt. Vernon, Illinois 62864

Lab Report No: 008565	565						щ	Report Date:	: 11/14/2019	019
Project Name: MARK TWAIN LAKE Project No:	IN LAKE						Z	Analysis: Inorganics NELAC Certified - IL100308	: Inorganics fied - IL1003	ics 00308
ARDL No: 008565-11 Field ID: MIL-66-0 Received: 10/24/2019	1 19	Sampl Samp Samp	Sampling Loc'n: Sampling Date: Sampling Time:		MARK TWAIN LAKE 10/24/2019 0830			Matrix: Moisture:	: WATER : NA	
Analyte	LOD	TOO	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Ammonia Nitrogen	0.0200	0.0300		0.0588	MG/L	NONE	350.1	NA	10/29/19	11055038
Chlorophyll-a, Correcte	1.0	1.00		2.3	MG/CU.M.	10200H	10200H	10/25/19	11/04/19	11055040
Nitrate as Nitrogen	0.0190	0.0200		0.391	MG/L	NONE	GREEN	NA	11/01/19	11055027
Pheophytin-a	1.0	1.00		ZZ	MG/CU.M.	10200H	10200H	10/25/19	11/04/19	11055040
Phosphorus	0.00800	0.0100		0.173	MG/L	365.2	365.2	11/08/19	11/08/19	11125046
Phosphorus, -ortho	0.00800	0.0100		0.0276	MG/I	NONE	365.2	NA	10/25/19	11055035
Solids, Total Suspended	2.50	2.50		13.5	MG/I	NONE	160.2	NA	10/28/19	11055036
Solids, Volatile Suspen	2.50	2.50		ND	MG/I	NONE	160.4	NA	10/28/19	11055037
Total Organic Carbon	0.500	1.00		6.2	MG/I	NONE	415.1	NA	11/07/19	TA465045

(a) DOD and/or NELAC Accredited Analyte.

Sample 008565-11, Inorganic Analyses

Lab Report No: 008565 Report Date: 10/30/2019

Project Name:	MARK TWAIN LAKE	An	alysis: NE	PESTICII	DES (827	70SIM-MO	D) .
Project No.:		Analytical :	Method: 82	270C			
NELAC Certi:	fied - IL100308	Prep	Method: 35	510C			
Field ID:	MTL-77-0		ARDL I	Lab No.:	00856	65–12	
Desc/Location:	MARK TWAIN LAKE		Lab Fi	ilename:	E1028	3934	
Sample Date:	10/24/2019		Recei	red Date:	10/24	4/2019	
Sample Time:	0818		Prep.	Date:	10/25	5/2019	
Matrix:	WATER		Analys	sis Date:	10/28	3/2019	
Amount Used:	900 mL		Instr	ment ID:	AG5		
Final Volume:	1 mL		QC Bat	ch:	B1113	33	
% Moisture:	NA		Level	:	LOW		
					Data		Dilution
Parameter		LOD	LOQ	Result	Flag	Units	Factor
Trifluralin		0,222	0.222	ND		UG/L	1
Atrazine		0.222	0.222	0.444		UG/L	1
Metribuzin		0.222	0.222	ND		UG/L	1
Alachlor	•	0.222	0.222	ND		UG/L	1
Metolachlor		0.222	0.222	0.822		UG/L	1
Chlorpyrifos		0.222	0.222	ND		UG/L	1
Cyanazine		0.222	0.222	ND		UG/L	1
Pendimethalin		0.222	0.222	ND		UG/L	1

SURROGATE RECOVERIES:	Limits	Results	
Triphenylphosphate	30-130	71%	İ
			1

Surrogate recoveries marked with '*' indicates they are outside standard limits.

ARDL, INC. 400 Aviation Drive; P.O. Box 1566 Mt. Vernon, Illinois 62864

Lab Report No: 008565	565						Ж	Report Date:	: 11/14/2019	019
Project Name: MARK TWAIN LAKE Project No:	IN LAKE						Z	Analysis: Inorganics NELAC Certified - IL100308	: Inorganics fied - IL1003	ics 30308
ARDL No: 008565-12 Field ID: MTL-77-0 Received: 10/24/2019	61	Sampl: Sampl Sampl	Sampling Loc'n: Sampling Date: Sampling Time:		MARK TWAIN LAKE 10/24/2019 0818			Matrix: Moisture:	: WATER : NA	
Analyte	LOD	700T	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Ammonia Nitrogen Chlorophyll-a, Correcte Nitrate as Nitrogen Pheophytin-a Phosphorus Phosphorus, -ortho Solids, Total Suspended Solids, Volatile Suspen Total Organic Carbon	0.0200 1.0 0.0190 1.0 0.0800 4.0 4.0	0.0300 1.00 1.00 0.0100 0.0100 4.00		0.0395 3.4 0.341 ND 0.164 0.0276 17.6 ND	MG/L MG/CU.M. MG/L MG/L MG/L MG/L MG/L MG/L	NONE 10200H NONE 10200H 365.2 NONE NONE NONE	350.1 10200H GREEN 10200H 365.2 365.2 160.2 160.4	NA 10/25/19 NA 10/25/19 11/08/19 NA NA NA	10/29/19 11/04/19 11/04/19 11/08/19 10/25/19 10/28/19 11/07/19	11055038 11055040 11055027 11055040 11125046 11055035 11055037 1A465045

(a) DOD and/or NELAC Accredited Analyte.

Sample 008565-12, Inorganic Analyses

ARDL, INC. 400 Aviation Drive; P.O. Box 1566 Mt. Vernon, Illinois 62864

	80		Run Number	35012
/2019	anics L1003(9 1028
11/14,	Inorgaied - I	WATER NA	Analysis Date	10/24/19 10285012
Report Date: 11/14/2019	Analysis: Inorganics NELAC Certified - IL100308	Matrix: WATER Moisture: NA	Prep Date	NA
Re	EN.		Prep Analysis Method Method	1604
			Prep Method	NONE
		Sampling Loc'n: MARK TWAIN LAKE Sampling Date: 10/24/2019 Sampling Time: 0936	Units	COL/100 ML
		ampling Loc'n: MARK TWAIN Sampling Date: 10/24/2019 Sampling Time: 0936	Result	350
		ampling Loc'n: Sampling Date: Sampling Time:	Flag Re	
		mpling amplin		
		Sar	TOOT	1.00
565	IN LAKE	19 9	LOD	1.0
No: 008	MARK IWA	008565-13 IC MARINA 10/24/2019	Φ	
Lab Report No: 008565	Project Name: MARK TWAIN LAKE Project No:	ARDL No: 008565-13 Field ID: IC MARINA Received: 10/24/201	Analyte	E. Coliform

(a) DOD and/or NELAC Accredited Analyte.

ARDL, INC. 400 Aviation Drive; P.O. Box 1566 Mt. Vernon, Illinois 62864

Report Date: 11/14/2019	Analysis: Inorganics NELAC Certified - IL100308	WATER NA	Analysis Run Date Number	10/24/19 10285012
ort Date:	Analysis: AC Certif	Matrix: Moisture:	Prep Date	NA
Rep	NEL		Analysis Method	1604
			Prep Analysi Method Method	NONE
		Loc'n: MARK TWAIN LAKE 7 Date: 10/24/2019 7 Time: 1128	Units	COL/100 ML
		n: MARK :e: 10/24	Result	175
		Sampling Loc'n: Sampling Date: Sampling Time:	Flag	
		Samp. Samj	TOT	1.00
008565	MARK IWAIN LAKE	008565-14 BJ MARINA 10/24/2019	TOD	1.0
Lab Report No: 008565	Project Name: MARK Project No:	ARDL No: 008565-14 Field ID: BJ MARINA Received: 10/24/201	Analyte	E. Coliform

(a) DOD and/or NELAC Accredited Analyte.

METHOD BLANK REPORT ARDL, Inc. 400 Aviation Drive; P.O. Box 1566 Mt. Vernon, Illinois 62864

Lab Report No: 008565 Report Date: 10/30/2019

_	MARK TWAIN LAKE	-	is: NP PEST	CICIDES (8:	270SIM-M	OD)
Project No.:		Analytical Meth				
NELAC Certi:	fied - IL100308	Prep Meth	od: 3510C			
Field ID:	NA		ARDL Lab No	008	565-01B1	
Desc/Location:	NA		Lab Filenam	ne: E10:	28920	
Sample Date:	NA		Received Da	ate: NA		
Sample Time:	NA		Prep. Date:	10/	25/2019	
Matrix:	QC Material		Analysis Da	ate: 10/	28/2019	
Amount Used:	1000 mL		Instrument	ID: AG5		
Final Volume:	1 mL		QC Batch:	B11:	133	
% Moisture:	NA		Level:	LOW		
					Data	
Parameter		LOD	LOQ	Result	Flag	Units
Trifluralin	A CONTRACTOR OF THE CONTRACTOR	0.200	0.200	ND		UG/L
Atrazine		0.200	0.200	ND		UG/L
Metribuzin		0.200	0.200	ND		UG/L
Alachlor		0.200	0.200	ND		UG/L
Metolachlor		0.200	0.200	ND		UG/L
Chlorpyrifos		0.200	0.200	ND		UG/L
Cyanazine	,	0.200	0.200	ND		UG/L
Pendimethalin		0.200	0.200	ND		UG/L

SURROGATE RECOVERIES:	Limits	Results	
Triphenylphosphate	30-130	94%	Ì

Surrogate recoveries marked with '*' indicates they are outside standard limits.

Mt. Vernon, IL 400 Aviation Drive; P.O. Box 1566 BLANK SUMMARY REPORT ARDL, INC.

11/14/2019
Report Date:
Lab Report No: 008565
rt No:
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La

Project Name:	MARK IV	MARK IWAIN LAKE	ഥ					NELA	NELAC Certified -	ed - IL100308
Analyte	LOD	Ğ07	Blank Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run	QC Lab Number
(a) Iron	0.040	0.050	B	MG/L	3010A	6010C	10/28/19	11/01/19	P7291	008565-01B1
(a) Manganese	0.004	0.005	QN QN	MG/L	3010A	6010C	10/28/19	11/01/19	P7291	008565-01B1
Ammonia Nitrogen	0.020	0.030	NO	MG/L	NONE	350.1	NA	10/29/19	11055038	008565-01B1
Chlorophyll-a, Corre	1.0	1.0	ON N	MG/CU.M.	10200H	10200H	10/25/19	11/04/19	11055040	008565-11B1
E. Coliform	1.0	1.0	R	COL/100 ML	NONE	1604	NA	10/24/19	10285012	008565-13B1
Nitrate as Nitrogen	0.019	0.020	R	MG/L	NONE	GREEN	NA	11/01/19	11055027	008565-01B1
Pheophytin-a	1.0	1.0	ON ON	MG/CU.M.	10200H	10200H	10/25/19	11/04/19	11055040	008565-11B1
Phosphorus	0.008	0.010	Q.	MG/L	365.2	365.2	11/08/19	11/08/19	11125046	008565-02B1
Phosphorus, -ortho	0.008	0.010	R	MG/L	NONE	365.2	NA	10/24/19	11055034	008565-07B1
Phosphorus, -ortho	0.008	0.010	R	MG/L	NONE	365.2	NA	10/25/19	11055035	008565-01B1
Solids, Total Suspen	1.0	1.0	R	MG/L	NONE	160.2	NA	10/28/19	11055036	008565-03B1
Solids, Volatile Sus	1.0	1.0	R	MG/L	NONE	160.4	NA	10/28/19	11055037	008565-03B1
Total Organic Carbon	0.50	1.0	R	MG/L	NONE	415.1	NA	11/04/19	TA464729	008565-01B1
Total Organic Carbon	0.50	1.0	QN	MG/L	NONE	415.1	NA	11/07/19	TA465045	008565-05B1

(a) DOD and/or NELAC Accredited Analyte Inorganic Method Blanks for 008565

Mt. Vernon, IL BLANK SPIKE/SPIKE DUPLICATE REPORT 400 Aviation Drive; P.O. Box 1566 ARDL, INC.

Lab Report No:	: 008565							Rer	oort Date:	Report Date: 10/30/2019
Project Name: Project No.:	Project Name: MARK TWAIN LAKE Project No.:	Ana	Analysis: NP PESTICIDES (8270SIM-MOD)	ESTICIDE	18 (8270SI	M-MOD)	Anal)	ytical Me Prep Me	Analytical Method: 8270C Prep Method: 3510C	DO:
Matrix: Amount Used:	QC Material 1000 mL		QC Batch: Level:	B11133 LOW	.33		Prep. Date: Analysis Da	Date: is Date:	Prep. Date: 10/25/2019 Analysis Date: 10/28/2019	6 6
	Parameter	Spike Result	Spike Level	Spike % Rec	Duplicate Result	Duplicate Level	Duplicate % Rec	Recovery	RPD	RPD Limit
<u>k</u> ⊶l	Trifluralin	2.68	4	67		1		30-130	4	1
	Atrazine	3.19	4	80	1	!	!	30-130	1	1
	Metribuzin	3.32	4	83	1	ļ	}	30-130	1	1
	Alachlor	3.31	4	83	1	-	}	30-130	1	1
zi	Metolachlor	3.58	4	06	-	1	1	30-130	1	ł
0	Chlorpyrifos	3.2	4	80	1	1	!	30-130	ŀ	ŀ
	Cyanazine	4	4	100	+	1	ţ	30-130	}	1
Pe	Pendimethalin	3.57	4	68	}	1	1	30-130	1	!

%R Limits	30-130	
Duplicate %R	1	
Spike %R	92.3	
SURROGATE RECOVERIES:	Triphenylphosphate	

^{&#}x27;*' indicates a recovery outside of standard limits. Spike Blanks for 008565-01, NP PESTICIDES (8270SIM-MOD)

62864 LABORATORY CONTROL SAMPLE REPORT 400 Aviation Drive; P.O. Box 1566 Mt. Vernon, IL ARDL, INC.

Lab Report No: 008565 Project Name: M	565 MARK TWAIN LAKE	l LAKE							Report Da	Report Date: 11/14/2019 NELAC Certified - IL100308
	LCS 1 Result	LCS 1 Level	LCS 1 % Rec	LCS 2 Result	LCS 2 Level	LCS 2 % Rec	% Rec Limits	Mean % Rec	Analytical Run	QC Lab Number
	5.1	5.0	101	1		1	87-115		P7291	008565-01C1
	0.78	0.75	104	1	1	;	90-114	1	P7291	008565-01C1
	1.0	1.0	101	1	1	;	80-120	+	11055038	008565-01C1
	J.0	1.0	103	1	1	;	80-120	1	11055027	008565-01C1
	0.64	0.67	96	ŀ	1	}	80-120	1	11125046	008565-02C1
	0.1	0.10	100	ł	1	1	80-120	}	11055034	008565-07C1
	060.0	0.10	06	1	1	ŀ	80-120	ŀ	11055035	008565-01C1
	10.7	10.0	107	1	1	!	76-120	1	TA464729	008565-01C1
	10.7	10.0	107	}	1	1	76-120	}	TA465045	008565-05C1

NOTE: Any values tabulated above marked with an asterisk are outside of acceptable limits.

Inorganic LCS Results for 008565

⁽a) DOD and/or NELAC Accredited Analyte

	Vernon, IL
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REPORT	1566
ATE	Box
DUPLICATE	P.0.
SPIKE/SPIKE	Drive;
	Aviation
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MAT	400
	INC.
	ARDI,

Lab Reputr NO: 000303								7 10 10 10 10 10 10 10 10 10 10 10 10 10	keport Date:	E 102/05/01
Project Name: MARK TWAIN LAKE Project No.:		Analysis:	NP PESTICIDES		(8270SIM-MOD)		Analytical Prep	ical Method: Prep Method:	1: 8270C 1: 3510C	
Field ID: MTL-1 Desc/Location: MARK TWAIN LAKE Sample Date: 10/23/2019 Sample Time: 1600 Matrix: WATER		Prep. Date Amount Use % Moisture QC Batch: Level:	7	10/25/2019 900 mL NA B11133 LOW		N N N N N	ARDL Lab No.: Lab Filename: Received Date: Analysis Date:	1	008565-01 10/24/2019 10/28/2019	
	Sample	MS	MS	MS	MSD	MSD	MSD	% Rec		RPD
Parameter	Result	Result	Level	* Rec	Result	Level	% Rec	Limits	RPD	Limit
Trifluralin	QN	3.3	4.44	74.3	3.89	4.44	87.5	30-130	16.4	30
Atrazine	0.644	3.92	4.44	73.8	4.37	4.44	83.8	30-130	10.7	30
Metribuzin	Q	3.52	4.44	79.3	3.92	4-44	88.3	30-130	10.7	30
Alachlor	Ø	3.4	4.44	76.5	3.78	4.44	85	30-130	10.5	30
Metolachlor	1.48	5.14	4.44	82.5	5.62	4.44	93.3	30-130	6.8	30
Chlorpyrifos	Ø	3.16	4.44	71	3.72	4.44	83.8	30-130	16.5	30
Cyanazine	QN	4.07	4.44	91.5	4.58	4.44	103	30-130	11.8	30
Pendimethalin	Ø	3.49	4.44	78.5	4.12	4.44	92.8	30-130	16.6	30

SURROGAIE RECOVERIES:	MS &R	MSD &R	&R Limits
Triphenylphosphate	86	95	30-130

^{&#}x27;*' indicates a recovery outside of standard limits.
Matrix Spikes for 008565-01, NP PESTICIDES (8270SIM-MOD)

62864 400 Aviation Drive; P.O. Box 1566 Mt. Vernon, IL MATRIX SPIKE/SPIKE DUPLICATE REPORT ARDL, INC.

Report Date: 11/14/2019 Lab Report No: 008565

Project Name:	And the second s	MARK IWAIN LAKE	N LAKE								NELAC	NELAC Certified -	ied - IL100308
	Sample	Sample	MS	MS	MS	MSD	MSD	MSD	% R C		RPD		QC Lab
Analyte	Matrix	Result	Result	Level	% Rec	Result	Level	% Rec	Limits	RPD	Limit	Run	Number
(a) Iron	WATER	0.37	1.5	1.0	111	1.5	1.0	112	87-115		20	P7291	008565-01MS
(a) Manganese	WATER	0.072	09.0	0.50	105	09.0	0.50	107	90-114	Н	20	P7291	008565-01MS
Ammonia Nitrogen	WATER	0.040	2.1	2.0	102	2.1	2.0	105	75-125	ю	20	11055038	008565-01MS
Nitrate as Nitrogen	WATER	0.13	0.89	1.0	16	0.88	1.0	75	75-125	H	20	11055027	008565-01MS
Phosphorus	WATER	0.16	1.0	0.83	105	1.0	0.83	106	75-125	н	20	11125046	008565-02MS
Phosphorus, -ortho	WATER	0.017	0.12	0.10	66	0.12	0.10	105	75-125	ľ	20	11055035	008565-01MS
Total Organic Carbon	WATER	5.7	10.5	5.0	96	10.5	5.0	96	76-120	0	20	TA464729	008565-01MS
Total Organic Carbon	WATER	6.7	11.4	5.0	94	11.7	5.0	100	76-120	m	20	TA465045	008565-05MS

NOTE: Values tabulated above marked with an asterisk are explained in the associated narrative.

⁽a) DOD and/or NELAC Accredited Analyte.

62864 SAMPLE DUPLICATE REPORT 400 Aviation Drive; P.O. Box 1566 Mt. Vernon, IL ARDL, INC.

Lab Report No: 008565	565						Report Date: 11/14/2019	11/14/2019
Project Name: MARK IWAIN LAKE	K TWAIN LA	KE					NELAC Certifi	NELAC Certified - IL100308
	Sample	ਜ ir st	Second		Percent	Mean	Analytical	QC Lab
Analyte	Conc'n	Conc'n Duplicate	Duplicate	Units	Diff	(Smp, D1, D2)	Run	Number
Chlorophyll-a, Corrected	id 2.3	2.8		MG/CU.M.	20	=======================================	11055040	008565-11D1
Pheophytin-a	ON	0	!	MG/CU.M.	NC	-	11055040	008565-11D1
Solids, Total Suspended	id 12.8	12.0	!	MG/L	9	! !	11055036	008565-03D1
Solids, Volatile Suspend	id 2.8	2.5	!	MG/L	10	-	11055037	008565-03D1

(a) DOD and/or NELAC Accredited Analyte Sample Duplicates for 008565



Including as appropriate:

- COCs
- Cooler Receipts
- Airbills
- Email Communication / Instructions from Customer

ARDL Data Package

CHAIN OF CUSTODY RECORD

ARDL, Inc. P.O. Box 1566, 400 Aviation Drive, Mt. Vernon, IL 62864 (618) 244-3235 Phone (618) 244-1149 Fax

(618) 244-1149 Fax

PRESERVATION	SPECIFY CHEMICALS ADDED AND FINAL PH IF KNOWN	SAMPLE LOCATION	X	X	X	X	X	X	X	X	X	X	X	X	X	X				
																		UCTIONS:		
	- QS - 110 - WY.	WSW E CO	×		700A 700A 700A 700A 700A				100A 100A 100A 100A						×	X		REMARKS/SPECIAL INSTRUCTIONS:	th H2SO4 th HNO3	
	N-EHN'N	SON SON SON SON SON SON SON SON SON SON	XXX	×	×	X	X	XXX	×	×	X	X	X	X				VEMARKS/S	*Preserved with H ₂ SO ₄ #Preserved with HNO ₃	
S	POST POOL	2013 2013 3013	X	X	×	XX	X	X	×	×	×	X	×	X				F		
	CONTAIN		X	×	×	X	×	X	X	X	X	XXX	XXX	XXX	X		1	ceived by: Signal	Received by: (Signature)	Shipping Ticket No.
		COMP	× 5001	× 7051	1215 ×	× 24	111) ×	1345 ×	× 3069	× 2941			× 8%	× 818	x webc	X		R	Time Rece	
		DATE	16 0x 25	104-23	GX-22	C(2)	777	8-7.3	4-33	76-5	277	78-30	7	77-1	2540 24-7	77.5		Date	Date (2)	
PROJECT Mark Twain Lake	SAMPLERS: (Signature)	SAMPLE NUMBER	MTL-1	MTL-5 10	MTL-13 (0	MTL-9	MTL-11	MTL-12	MTL-15-0	MTL-22-0	MTL-22-15 (c	MTL-33-0 (6	MTL-66-0	MTL-77-0	IC MARINA	BJ MARINA 16		Relinquished by: (Signature)	S. Relinquished by. (Signature)	Received for Laboratory by:

o PURCHASE ORDER NO: O

COOLER RECEIPT REPORT ARDL, INC.

RDL #:		Cooler# / 43 Number of Coolers in	<i>ż</i>					
roject: <u>Mark Lwain</u> Lake		Date Received: 10						
PRELIMINARY EXAMINATION PHASE: Date coole	er was opened: 10 - Z	<u> </u>	Lackrun	<u> </u>				
Did cooler come with a shipping slip (airbill, etc.)?								
If YES, enter carrier name and airbill number	here:		Causier					
Were custody seals on outside of cooler?				NO N/A				
How many and where?	,Seal Date:	,Seal Name:						
Were custody seals unbroken and intact at the date	and time of arrival?		YES	NO (NA)				
Did you screen samples for radioactivity using a Gel	ger Counter?		YES	NO				
Were custody papers sealed in a plastic bag?			YES	NO				
Were custody papers sealed in a plastic bag? Were custody papers filled out properly (ink, signed,	etc.)?		YES (NO N/A				
Were custody papers signed in appropriate place by	ARDL personnel?		YES	NO N/A				
Was project identifiable from custody papers? If YES	S, enter project name at	the top of this form		NO N/A				
Was a separate container provided for measuring tel				, O C				
LOG-IN PHASE: Date samples were logged-in: / 0	0-25-19	(Signature) <i>Share</i>	chrum					
D. Describe type of packing in cooler: <u>loase</u>								
11. Were all samples sealed in separate plastic bags?								
12. Did all containers arrive unbroken and were labels in good condition?								
3. Were sample labels complete?				NO				
4. Did all sample labels agree with custody papers?	VES	NO						
5. Were correct containers used for the tests indicated?	?		YES	NO				
6. Was pH correct on preserved water samples?			YES	NO N/A				
7. Was a sufficient amount of sample sent for tests indi	icated?		(YES)	NO				
8. Were bubbles absent in VOA samples? If NO, list b	y sample #:		YES	NO (N/A)				
9. Was the ARDL project coordinator notified of any de	eficiencies?		YES	NO3 (WA)				
Comments and/or Corrective A	ction:	Sa	mple Transfer					
of Carrections + white ones	nat	Fraction	Fraction					
milialed or dated	· · · · · · · · · · · · · · · · · · ·	Area #	Area #					
		Wallin						
		By On	Ву					
		On	On					
		10/25/19						
		Chain of Cont	ody# NA					
(D. Cinneture)	25 10	Chain-of-Custo	ody #					
By: Signature)	73-17							

COOLER RECEIPT REPORT ARDL, INC.

ARI	dl#:	Coo	er# 2 af - ber of Coolers in	3	÷	
		Num	ber of Coolers in	Shipment:	<u> </u>	_
Pro	ject: <u>Mark Lucien</u> Lake	Date	Received: 10	-24-19	-	,
Α	PRELIMINARY EXAMINATION PHASE: Date cooler was opened: 10 - 34	4-19	_(Signature)	Lackrec	n	
1.	Did cooler come with a shipping slip (airbill, etc.)?					}
	If YES, enter carrier name and airbill number here:			Palese	ev	
2.	Were custody seals on outside of cooler?			YE	s (NO	N/A
	How many and where?,Seal Date:_		,Seal Name:_	<u> </u>		
3.	Were custody seals unbroken and intact at the date and time of arrival?					(NA)
4.	Did you screen samples for radioactivity using a Geiger Counter?			YE	0N 8	
5,	Were custody papers sealed in a plastic bag?			YE	s No	;
6.	Were custody papers filled out properly (ink, signed, etc.)?			YE	s NO) N/A
7.	Were custody papers signed in appropriate place by ARDL personnel?			E	S NO	N/A
8.	Was project identifiable from custody papers? If YES, enter project name at	the top	of this form	Œ	S NO	N/A
9.	Was a separate container provided for measuring temperature? YES	_NO	Observed Coole	r Temp. <u>2. 9</u> Correction factor	_c <	_
В.	LOG-IN PHASE: Date samples were logged-in: 10-25-19 (Signatu	ire) AHlac	Reem .	0.0	c
10.	Describe type of packing in cooler:					
11.	Were all samples sealed in separate plastic bags?			YE	s No	, N/A
12.	Did all containers arrive unbroken and were labels in good condition?			YE	S NO	
13.	Were sample labels complete?			Æ	S NO	
14.	Did all sample labels agree with custody papers?			YE	ON &	
15.	Were correct containers used for the tests indicated?			K E	ON a	
16.	Was pH correct on preserved water samples?	••••••		YE	S NO	N/A
17.	Was a sufficient amount of sample sent for tests indicated?			YE	S NO	
18.	Were bubbles absent in VOA samples? If NO, list by sample #:			YE	ES NO	NA
19.	Was the ARDL project coordinator notified of any deficiencies?	•••••		YE	ES NO	> N/A
	Comments and/or Corrective Action:			nple Transfer		
6	Carrections + Westernew wat		Fraction	Fraction		
1	iritialed or dated.		Area #	Area #		
			Walkin			
			By A.O.	Ву		
-			On Cle	On		
			10-25-1	7		-
			Ohain of Ovet-		1	
/=	By: Signature) Ale Date: 10/25/19		Chain-of-Custo	dy #	<u>v</u>	
	By: Signature) Ale Date: 10/25/19					

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COOLER RECEIPT REPORT ARDL, INC.

AR	DL#: 8565	Cooler # $3A3$	_ 4							
		Number of Coolers in Ship	oment:		_					
Pro	eject: Mark, Lvain Lake	Date Received: 10-3	4-19							
A.	PRELIMINARY EXAMINATION PHASE: Date cooler was opened: 10-24	-/9 (Signature)	chrum							
1.	Did cooler come with a shipping slip (airbill, etc.)?				,					
	If YES, enter carrier name and airbill number here:		Causier	<u> </u>						
2.	Were custody seals on outside of cooler?		YES	(NO	N/A					
	How many and where?,Seal Date:	,Seal Name:								
3.	Were custody seals unbroken and intact at the date and time of arrival?	,	YES	NO (NA					
4.	Did you screen samples for radioactivity using a Geiger Counter?		(ES	NO						
5.	Were custody papers sealed in a plastic bag?		YES	NO						
6.	Were custody papers filled out properly (lnk, signed, etc.)?		YES	(NO)	N/A					
7.	Were custody papers signed in appropriate place by ARDL personnel?		YES	NO	N/A					
8.	Was project identifiable from custody papers? If YES, enter project name at the	he top of this form	YES	NO	N/A					
9.	Was a separate container provided for measuring temperature? YES	NO Observed Cooler Ter	np. //4 (0					
В.	LOG-IN PHASE: Date samples were logged-in: 10-25-19 (S	Signature) <u>Lackre</u>	SW							
10.	10. Describe type of packing in cooler: Loase ice									
11.	11. Were all samples sealed in separate plastic bags?									
12.	12. Did all containers arrive unbroken and were labels in good condition?									
13.										
14.	Did all sample labels agree with custody papers?		ÝES	NO						
15.	Were correct containers used for the tests indicated?		(E S)	NO						
16.	Was pH correct on preserved water samples?		¥E\$	NO	N/A					
17.	Was a sufficient amount of sample sent for tests indicated?		¥£\$	NO						
18.	Were bubbles absent in VOA samples? If NO, list by sample #:	W ² /58 /	YES	NO	(N/A					
19.	Was the ARDL project coordinator notified of any deficiencies?		YES	NO	N/A					
	Comments and/or Corrective Action:	Sample	Transfer							
6	Carrections + curileoners nat	Fraction	Fraction							
6	nitialed or dated	All Area #	Area #							
		1 7 7	Alea #		İ					
-		By	By		\dashv					
		Ille								
		On	On							
		10/23/19								
		Chain-of-Custody#	NA							
(E	By: Signature) dlc Date: 10-25-19									

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