

2019 Water Quality Monitoring Report

U.S. Army Corps of Engineers Saint Louis District

Water Quality Conditions in the Mississippi and Illinois Rivers: 2012-2019



February 2020

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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 USACE's 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.

Under Section 303(d) of the 1972 Clean Water Act, states, territories, and authorized tribes are required to develop a list of water quality impaired areas. These waters on the list do not meet water quality standards, even after point sources of pollution have installed the minimum required levels of pollution control technology. The law requires that these jurisdictions establish priority rankings for water on the lists and develop action plans named Total Maximum Daily Loads, to guide water quality improvement.

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INTRODUCTION

The Mississippi River is, in many ways, the nation's best known and most important river system. The river drains all or part of 31 states, two Canadian Provinces, or approximately 40% of the lower 48 states. The river serves as a migratory flyway for more than 40% of all North American waterfowl and shorebirds, while also providing habitat for 260 species of fish, 50 mammal species, 145 species of amphibians and reptiles, and 38 species of mussels (Weller and Russell, 2016). Anthropogenic services provided by the river includes food and fiber production, recreation, commercial transportation, and drinking water to 18 million Americans (Thorp et al. 2010).

Water quality is of paramount importance for sustaining ecological integrity and services provided by the Mississippi River. 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. Additionally, channel maintenance (bank stabilization, dredging, locks and dams, etc.) may also disrupt the way in which the river processes and transports pollutants (USACE 2017).

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 USACE's civil works projects on the Mississippi and Illinois Rivers. 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.
- 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 on the Mississippi and Illinois Rivers. The report describes conditions observed in 2019, as well as reference data collected from 2010-2018. Additional historical data are available upon request.

SAINT LOUIS DISTRICT WQMP COVERAGE

Upper Mississippi River (RM 200 – 301)

The Saint Louis District manages the lower 100 miles of the Upper Mississippi River (UMR;), which is defined as the river reach between Locks and Dam 22 near Saverton, Missouri (RM: 301), and Melvin Price Locks and Dam in Alton, Illinois (RM: 200). Flow and depth on the UMR are regulated by two additional locks and dams near Clarksville (RM: 274) and Winfield (RM: 242), Missouri. The primary function of lock and dam projects on the UMR is navigation. The UMR is also altered by dredge maintenance, river training structures, and a confined levee system. The Illinois River is a major tributary to the UMR near Grafton, Illinois (RM: 218).



Figure 1: Upper Mississippi River study area. During 2019, USACE personnel monitored water quality at seven locations in the Upper Mississippi River. Chemical, biological, and physical samples were collected during four sampling events.

Saint Louis Harbor (RM 160 – 200)

Saint Louis Harbor (SLH) is defined as the river reach of the Mississippi River between Melvin Price Locks and Dam near Alton, Illinois (RM: 200), and the confluence of the Meramec River near Arnold, Missouri (RM: 160). SLH includes Locks No. 27, situated at the southern end of the Chain of Rocks Canal. The primary mission for Locks No. 27 is navigation, and has little influence on flow and depth. Nevertheless, SLH is greatly altered by dredge maintenance, river training structures, and a confined levee system. The Missouri River is a major tributary to SLH near North Saint Louis (RM: 195).



Figure 2: Saint Louis Harbor study area. During 2019, USACE personnel monitored water quality at six locations in Saint Louis Harbor. Chemical, biological, and physical samples were collected during four sampling events.

Middle Mississippi River (RM 000 - 160)

The Middle Mississippi River (MMR) is recognized as the most southern stretch of the Mississippi River managed by CEMVS. The MMR spans from the Meramec River confluence (RM: 160) to the Ohio River Confluence (RM: 0). The MMR is often referred to as the Open River (OPR), as flow is not impeded by lock and dams; although, the MMR is greatly altered by dredge maintenance, river training structures, and a confined levee system. Major tributaries include the Kaskaskia River (RM: 117) and the Big Muddy River (RM: 76).



Figure 3: Middle Mississippi River study area. During 2019, USACE personnel monitored water quality at four locations in the Middle Mississippi River. Chemical, biological, and physical samples were collected during four sampling events.

Illinois River (RM 000 - 80)

The Saint Louis District is responsible for channel maintenance on the lower 80 miles of the Illinois River (ILR). This segment of the ILR runs between the La Grange Lock and Dam (RM: 80) and the confluence with the Mississippi River (RM: 0). Although there are no impeding structures within the reach, this section of the ILR is greatly altered by dredge maintenance, river training structures, and a confined levee system.



Figure 4: Illinois River study area. During 2019, USACE personnel monitored water quality at five locations in the Illinois River. Chemical, biological, and physical samples were collected during four sampling events.

Major Tributaries

In addition to the ILR, major tributaries to the Mississippi River influenced by USACE Civil Works projects include the Salt River, Missouri River (MOR), Kaskaskia River (KAS), and Big Muddy River. This report includes confluence data for MOR and KAS (Appendix B). Water quality data for the Salt River (near Mark Twain Lake), Kaskaskia River (near Carlyle and Shelbyville Lakes), and the Big Muddy River (near Rend Lake) are available upon request.

Sample Location Summary Table

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

River Segment	Sample ID	River Mile	Latitude	Longitude
Upper Mississippi River	UMR-DP	294	39.563869	-91.167790
	UMR-LA	283	39.451961	-91.042300
	UMR-9	273	39.371348	-90.898987
	UMR-LM	252	39.136591	-90.704520
	UMR-7	240	38.981771	-90.679969
	UMR-6	231	38.866632	-90.601036
	UMR-5	213	38.932151	-90.342744
Saint Louis Harbor	UMR-3	200	38.865860	-90.152529
	UMR-2*	196	38.824712	-90.163694
	UMR-1	191	38.761549	-90.138858
	SLH-3	191	38.755932	-90.171958
	SLH-2	177	38.588778	-90.206328
	SLH-1	169	38.484427	-90.279552
Middle Mississippi River	OPR-5	150	38.235914	-90.363781
	OPR-4	110	37.898308	-89.830695
	OPR-3	90	37.721974	-89.609790
	OPR-2	53	37.315170	-89.512540
Illinois River	ILR-9	71	39.830091	-90.565591
	ILR-8	55	39.630530	-90.609060
	ILR-7	32	39.297826	-90.609012
	ILR-6	19	39.156435	-90.614168
	ILR-2	5	38.965781	-90.542952

*UMR-2 is taken from the Missouri River, two miles upstream of the Mississippi River confluence at RM 196. Data from UMR-2 were not evaluated for this report but are available in Appendix B.

METHODS AND ANALYSIS: SAMPLE COLLECTION, STATISTICAL ANALYSIS, & QUALITY ASSURANCE

Data Collection and Historical Reference Data

During 2019, water quality samples were collected and analyzed for 22 locations during four sampling events (n=88; Table 1). Two duplicate samples were also collected during each sampling period for quality control purposes (n=8; Appendix C). 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. Lab packages were reviewed by USACE personnel for quality assurance. Data from all lab packages were deemed usable for this assessment. Memorandums documenting each sampling event are located in Appendix A. Memorandums highlight problems experienced in the field, issues with laboratory data, and important lessons learned during fieldwork.

For the purpose of this report, historical reference data refers to water quality data collected during the previous seven years (2012-2018) on the Mississippi River, and previous four years (2015-2018) on the Illinois River. Historical reference data are assumed to represent the current condition of the Mississippi and Illinois Rivers.

Statistical Analysis and Comparison to Applicable Water Quality Standards

Statistical analyses were performed on water quality monitoring data collected for 21 locations, and classified as ILR (n= 5), MMR (n=4), SLH (n=5), and UMR (n=7). Tributary data collected from the MOR (UMR-2) are not included in summary tables; however, data are available in Appendix B. Descriptive statistics were calculated to describe central tendencies and corresponding 95% confidence intervals for the geometric mean. Monitoring results were compared to applicable water quality standard criteria established by state agencies pursuant to the Federal Clean Water Act. If a state water quality standard criterion was not available, recommended criteria from the literature were considered. A one-sample Mann-Whitney Rank Sum Test with continuity correction was used to determine if a parameter was within an acceptable water quality criterion.

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 every 20 samples collected.

Internal checks are also used for field work. 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.

METHODS AND ANALYSIS: WATER QUALITY PARAMETERS

Parameters used to characterize water quality have been generally accepted criteria for assessing aquatic life and human health. Parameters evaluated are designated as:

- 1. Physical Criteria (e.g., flow, temperature, suspended sediment)
- 2. Chemical Criteria (e.g., dissolved oxygen, nitrogen, phosphorous)
- 3. Biological Criteria (e.g., E. coli bacteria, chlorophyll, pheophytin)

Physical Criteria

Surface Water Flow (Flow) can be described as the continuous movement of water in runoff or open channels. For larger navigable rivers, flow is often quantified as discharge, which is the volume of water that passes through a channel cross section during a duration of time (e.g., cubic feet per second). River stage or elevation is also an important metric to consider when analyzing flow, as it describes water capacity for channels, culverts, and other structures.

Stream flow has a strong influence on flooding, stream geomorphology, and aquatic life (USEPA 2016). Common analytical functions of flow data includes calculation of Total Maximum Daily Loads (TMDL) for pollutants and model calibrations. The calculation of TMDL at any point in a stream requires a parameters concentration and stream flow. Most watershed restoration efforts use TMDL as a measure of success.

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 Missouri and Illinois are less than 33°C or within 2.5°C of the seasonal norm.

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 column. To accurately determine the types and quantities of suspended solids, VSS are analyzed.



Figure 5: Confluence of the Missouri and Mississippi River. Historically, sediment inputs from the Missouri River result in significant TSS increases in the Mississippi River.

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. Neither Missouri nor Illinois currently have a standard criterion for NVSS or VSS.

Chemical Criteria

Dissolved Oxygen (DO) refers to the measurement of free oxygen molecules (O₂) that are not bonded to any other elements; thus, oxygen bonded in water (H₂O) 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 (CO₂ + H₂O (CH₂O) + O₂) 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.

Figure 6: Dissolved oxygen (O_2) vs oxygen bonded in water (H_2O) .

Fish and invertebrates utilize DO for respiration through gills and cutaneous breathing, and plants 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 mg/L, while most inland fish species require a minimum DO of 4 mg/L. The DO water quality criterion for Missouri and Illinois is \geq 5mg/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 acidic 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. Comparably, when pH exceeds 9.5 (alkaline), aquatic fish and invertebrate begins to rapidly decrease and beyond 10, fish become extirpated. The pH water quality criteria for Missouri and Illinois ranges from 6.5 - 9.0.

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 (mV). Positive readings indicate increased oxidizing potential and negative readings indicate 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 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.

Conductivity is a measure of water's ability to conduct electrical current. In its purest 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.

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.

Nitrogen 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 waterbody's trophic status. Algae and other plants use NO3-N as a food source, thus excess levels of NO3-N can promote increases in algal production and hypereutrophic conditions.

In general, NO3-N does not have a *direct* effect on fish or aquatic insects. Missouri and Illinois have both 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.

Nitrite is formed by the complete oxidation of ammonium ions by benthic and planktonic microorganisms (*Nitrosomonas*). Although elevated levels of NO2-N can be toxic to

aquatic life, they are rarely observed in freshwater systems at undesirable levels as they are rapidly converted to NO3-N by benthic and planktonic microorganisms (*Nitrobacter*).

Total Ammonia Nitrogen (TAN) 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).

Nitrogen as Total Kjeldahl (TKN) describes the amount of organic nitrogen and TAN in water. Organic nitrogen is the byproduct of living organisms, and includes natural materials such as proteins and peptides, nucleic acids and urea, and numerous synthetic organic materials. Typical organic nitrogen concentrations vary from a few milligrams per liter in the Mississippi and Illinois Rivers, to more than 20 mg/L in raw sewage. There are currently no state or federal standard criteria for TKN.

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.

Biological Criteria

Chlorophyll a (CHL_a) is a measure of the amount of algae growing in a water body, 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. Some algae also produce toxins that can be of public health concern when found in high concentrations.

Pheophytin a (PHEO a) 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.

Trophic Status is determined using a modified **Trophic State Index (TSI)**, as described by Carlson (1977). Trophic State Index is calculated from secchi-depth transparency (turbidity was converted to secchi depth using equation $y = 1.0817x^{-0.398}$), 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:

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) = $10(6 - (\ln (48/TP)/\ln 2))$

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
80-100	Hypereutrophic

Laboratory Methods and Water Quality Criteria Summary Table

<u>Metric</u>	Abbreviation	Analysis Method	Water Quality Criteria	Source
Ammonia Nitrogen	NH ₃	EPA Method 350.1	Temp and pH dependent (Generally < 15 mg/L)	United States EPA
Chlorophyll a	Chl_a	SM Method 10200H	Less than 25mg/cm ³ (Eutrophic Upper Limit)	Carlson 1977
Depth	Depth	Multiparameter Meter	Measurements reported at ~1 meter	
Dissolved Oxygen	DO	Multiparameter Meter	Greater than 5.0mg/L	Missouri DNR/Illinois EPA
Dissolved Oxygen Saturated	DO%	Multiparameter Meter	Range: 50 – 140%	Brown 1970
Nitrate as Nitrogen	NO ₃	Green Method	See Total Nitrogen	EPA Region 7
Nitrite as Nitrogen	NO ₂	EPA Method 354.1	See Total Nitrogen	EPA Region 7
Non-Volatile Suspended Solids	NVSS	TSS - VSS	See Total Suspended Solids	Illinois EPA
Orthophosphate	Ortho	EPA Method 365.2		
Pheophytin a	Pheo_a	SM Method 10200H		
Potential of Hydrogen	рН	Multiparameter Meter	Range: 6.5 – 9.0pH	Missouri DNR/Illinois EPA
Specific Conductivity	SpCond	Multiparameter Meter	500 uS/cm	
Temperature	Temp	Multiparameter Meter	Less than 32-2/9 °C	Missouri DNR
Total Dissolved Solids	TDS	Multiparameter Meter	Less than 500 mg/L	Illinois EPA
Total Kjeldahl Nitrogen	TKN	EPA Method 351.2	See Total Nitrogen	EPA Region 7
Total Nitrogen	TN	TKN+ NO2-N+NO3-N	Range: 2 mg/L to 6 mg/L	EPA Region 7
Total Organic Carbon	тос	EPA Method 415.1		
Total Phosphorus	ТР	EPA Method 365.2	Less than 0.10 mg/L	EPA 1986 (Gold Book)
Total Solids	TS	TSS + TDS	Less than 500 mg/L	Brown 1970
Total Suspended Solids	TSS	EPA Method 160.2	Less than 116 mg/L	Illinois EPA
Turbidity	Turb	Multiparameter Meter		
Volatile Suspended Solids	VSS	EPA Method 160.4	See Total Suspended Solids	Illinois EPA

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

*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.

SUMMARY RESULTS: PHYSICAL CRITERIA



River Discharge and Stage Summary





Figure 8: Saint Louis Harbor at St Louis, MO (USGS 07010000). The National Weather Service recognizes river flood stage at 30'.



River Discharge and Stage Summary: Continued

Figure 9: Middle Mississippi River at Chester, IL (USGS 07020500). The National Weather Service recognizes river flood stage at 27'.



Figure 10: Illinois River at Valley City, IL (USGS 05586100). The National Weather Service recognizes river flood stage at 14'.



Turbidity and River Discharge Relationship (2018-2019)

<u>2018</u>							<u>2019</u>			
Metric	Reach	n	Median	Mean	CI (95%)	n	Median	Mean	CI (95%)	
Turbidity	ILR	24	46.51	76.64	27.90	20	27.45	99.22	66.64	
	UMR	28	38.79	36.98	6.86	18	53.38	70.89	29.27	
	SLH	16	35.63	44.04	14.39	20	58.18	83.18	31.53	
	MMR	8	38.36	47.93	16.84	15	90.79	87.97	27.12	

Figure 11: Turbidity during years 2018 and 2019 (MVS_EC-EQ began collecting turbidity in 2018). Turbidity data were not normally distributed and do not appear to have a linear relationship with river discharge. A non-linear function could be used to better describe the relationship. This study does not acknowledge a water quality criterion for turbidity.



Total Suspended Solids Summary (Organic vs Inorganic)

			<u>201</u>		<u>2019</u>				
Metric	Reach	n	Median	Mean	CI (95%)	n	Median	Mean	CI (95%)
Inorganic	ILR	60	56.35	80.72	20.54	20	37.00	169.85	132.73
(NVSS)	UMR	156	62.05	69.19	7.60	26	32.40	110.53	50.07
	SLH	111	76	128.73	27.85	20	72.20	167.24	82.28
	MMR	46	92.45	123.00	28.03	15	184.00	191.50	64.10
Organic	ILR	60	7.40	8.62	1.29	20	4.49	12.89	7.95
(VSS)	UMR	156	7.55	8.19	0.64	26	8.40	11.60	3.36
	SLH	110	8.4	12.82	2.33	19	9.33	13.61	4.83
	MMR	46	9.67	11.94	2.34	15	15.00	14.49	4.32

Figure 12: Volatile (Organic) and Non-Volatile (Inorganic) Suspended Solids. This study does not acknowledge a criterion for Non-Volatile Suspended Solids or Volatile Suspended Solids. Total Suspended Solids study criterion was 116 mg/L.

Total Solids (TSS + TDS)



Total Suspended Solids: 2012-2018

Total Suspended Solids: 2019

		<u>2012</u>	2-2018 Tota	Suspende	ed Solids		2019 Total Suspended Solids				
Metric	Reach	n	Median	Mean	CI (95%)	n	Median	Mean	CI (95%)		
TSS	ILR	60	63.20	89.34	21.74	20	41.40	182.75	140.66		
	UMR	156	68.65	77.38	8.14	26	40.20	122.14	53.31		
	SLH	110	85.75	142.72	30.19	19	84.00	189.66	89.47		
	MMR	46	99.8	134.94	30.23	15	199.00	205.99	68.33		
TDS	ILR	24	468.23	455.45	20.62	20	429.00	414.80	24.72		
	UMR	28	324.50	327.95	8.85	26	306.00	304.81	12.75		
	SLH	16	414.40	404.28	29.57	20	338.50	349.00	18.67		
	MMR	8	395.50	396.82	11.41	15	345.00	360.87	17.34		

Figure 13: A Wilcoxon Signed Ranks Test indicated that Total Suspended Solids (TSS) on the Middle Mississippi River during 2019 was significantly greater than 116 mg/L (Z = 95, p < 0.05). Values for TSS at all study reaches were greatest during the winter sampling event, which took place during the buildup of the 2019 flood event. All Total Dissolved Solid values were significantly less than the study criterion of 500 mg/L in 2019.



Seasonal Water Temperature: Average, Highs, and Lows: 2012 - 2019

		<u>2012</u>	2-2018 Seaso	onal Tem	<u>peratures</u>	<u>20</u>	2019 Seasonal Temperatures				
Season	Reach	n	Median	Mean	CI (95%)	n	Median	Mean	CI (95%)		
Winter	ILR	12	3.75	4.04	0.45	5	2.17	2.20	0.38		
	UMR	14	1.45	1.46	0.67	7	1.17	1.35	0.52		
	SLH	10	3.15	3.34	0.96	5	2.44	2.49	0.90		
	MMR	4	4.33	4.29	1.25	4	2.69	2.81	0.58		
Spring	ILR	24	14.58	14.71	1.47	-	-	-	-		
	UMR	28	12.15	12.63	1.22	-	-	-	-		
	SLH	22	12.42	13.12	1.22	-	-	-	-		
	MMR	10	11.81	12.77	1.48	-	-	-	-		
Summer	ILR	24	26.97	27.28	0.43	10	25.65	25.48	0.52		
	UMR	84	26.33	26.07	0.29	12	24.70	25.11	0.73		
	SLH	63	26.48	26.28	0.32	10	25.30	25.36	0.67		
	MMR	28	26.93	26.52	0.46	7	24.90	26.39	1.99		
Fall	ILR	-	-	-	-	5	3.40	3.38	0.06		
	UMR	18	20.47	21.65	1.36	7	2.00	1.93	0.24		
	SLH	9	21.35	22.55	1.36	4	4.00	3.88	1.01		
	MMR	4	23.21	22.81	3.07	4	4.00	4.00	0.13		

Figure 14: Solid green line represents average temperature, and green shaded area shows the high and low monthly temperatures from 2012-2018. Red and purple dots represent high and low temperatures observed during 2019. Figure includes all river segments. All temperature observations were classified as acceptable by criteria used for this study.

SUMMARY RESULTS: CHEMICAL CRITERIA



Seasonal Dissolved Oxygen: 2012 - 2019

		<u>Dis</u>	solved Oxy		Dissolved	Oxygen: 2	<u>019</u>		
Season	Reach	n	Median	Mean	CI (95%)	n	Median	Mean	CI (95%)
Winter	ILR	12	13.05	12.83	1.13	5	12.24	12.63	1.14
	UMR	13	14.09	14.37	0.57	7	12.59	12.66	0.27
	SLH	10	13.95	13.90	0.62	5	12.73	12.63	0.37
	MMR	4	13.59	13.34	1.16	4	12.57	12.54	0.31
Spring	ILR	24	9.82	9.92	0.40	-	-	-	-
	UMR	28	10.88	10.78	0.39	-	-	-	-
	SLH	21	10.12	10.25	0.45	-	-	-	-
	MMR	10	9.85	9.84	0.65	-	-	-	-
Summer	ILR	24	5.71	5.33	0.67	10	6.55	6.62	0.37
	UMR	84	6.99	7.38	0.33	12	9.31	8.36	1.34
	SLH	63	6.88	6.84	0.27	10	6.17	6.39	0.72
	MMR	28	6.62	6.81	0.28	7	6.43	6.18	0.31
Fall	ILR	-	-	-	-	5	12.34	12.32	0.07
	UMR	21	7.71	7.84	0.59	7	13.65	13.70	0.16
	SLH	9	7.76	7.52	0.83	5	12.66	12.46	0.69
	MMR	4	7.14	7.94	3.26	4	12.60	12.58	0.13

Figure 15: All values reported for dissolved oxygen during 2019 were within the acceptable criteria used in this study (> 5 mg/L).







		<u>pH: 2</u>	2012-2018	<u>pH: 2019</u>					
Reach	n	Median	Mean	CI (95%)	n	Median	Mean	CI (95%)	
ILR	60	8.19	8.15	0.06	20	7.70	7.76	0.10	
UMR	144	8.12	8.14	0.06	26	7.81	8.02	0.20	
SLH	104	8.11	8.10	0.08	20	7.78	7.89	0.14	
UMR	46	7.98	7.91	0.18	15	7.86	7.83	0.08	

Figure 16: All values reported for pH during 2019 were within the acceptable criteria used in this study (6.5 – 9.0).

Specific Conductance and Oxidation Reduction Potential Summary



		H	listorical Wate	er Quality: 20		Water Quality: 2019			
Metric	Reach	n	Median	Mean	CI (95%)	n	Median	Mean	CI (95%)
SpCond	ILR	60	714.70	695.11	25.04	20	660.55	638.31	39.99
	UMR	144	442.85	437.18	10.57	26	470.60	468.90	19.60
	SLH	103	526.00	527.70	20.20	20	520.60	536.87	28.70
	MMR	46	529.45	508.53	26.41	15	530.60	555.23	26.69
ORP	ILR	60	292.50	273.94	30.04	20	220.45	266.39	70.05
	UMR	144	365.00	343.87	20.65	26	220.95	212.79	30.50
	SLH	103	355.70	342.56	24.30	20	213.00	267.23	67.60
	MMR	46	361.50	338.73	42.24	15	185.30	223.54	50.93

Figure 17: Summary data for Specific Conductance (SpCond) and Oxidation Reduction Potential (ORP). Values for SpCond are reported in microsiemens per centimeter at 25°Celsius. Values for ORP are reported in millivolts (mV). This report does not acknowledge a water quality criterion for SpCond or ORP.



Phosphate as Phosphorus:2019



Orthophosphate:2012-2018





MMR

SLH

UMR

ILR

Orthophosphate:2019

		Re	each		Reach					
			Water Qual	Water Quality Data: 2019						
Metric	Reach	n	Median	Mean	CI (95%)	n	Median	Mean	CI (95%)	
ТР	ILR	60	0.38	0.40	0.04	20	0.41	0.85	0.44	
	UMR	156	0.29	0.31	0.02	26	0.29	0.63	0.26	
	SLH	111	0.36	0.42	0.04	20	0.48	0.59	0.21	
	MMR	46	0.37	0.40	0.06	15	0.51	0.63	0.22	
PO4	ILR	60	0.15	0.16	0.02	20	0.26	0.27	0.06	
	UMR	156	0.10	0.10	0.01	26	0.07	0.11	0.04	
	SLH	111	0.13	0.14	0.01	20	0.13	0.19	0.09	
	MMR	46	0.12	0.14	0.02	15	0.14	0.15	0.05	

Figure 18: The median value for total phosphorus in 2019 exceeded the proposed criterion of 0.10 mg/L at all river segments (p<0.05). This study does not acknowledge a water quality criterion for orthophosphate.

Seasonal Ammonia Nitrogen



EPA Aquatic Life Criteria: 2019 Total Ammonia Nitrogen

		<u>Tota</u>	I Ammonia	a Nitrogen:	<u>2012-2018</u>	Total Ammonia Nitrogen: 2019				
Season	Reach	n	Mean	Median	CI (95%)	n	Mean	Median	CI (95%)	
Winter	ILR	12	0.21	0.18	0.04	5	0.38	0.46	0.21	
	UMR	14	0.28	0.32	0.08	7	0.32	0.31	0.04	
	SLH	10	0.22	0.26	0.07	5	0.21	0.21	0.07	
	MMR	4	0.21	0.19	0.07	4	0.18	0.18	0.04	
Spring	ILR	24	0.08	0.09	0.02	-	-	-	-	
	UMR	28	0.07	0.07	0.01	-	-	-	-	
	SLH	22	0.09	0.10	0.02	-	-	-	-	
	MMR	10	0.10	0.11	0.05	-	-	-	-	
Summer	ILR	24	0.07	0.07	0.02	10	0.07	0.14	0.18	
	UMR	93	0.08	0.09	0.02	12	0.05	0.06	0.02	
	SLH	66	0.08	0.09	0.02	10	0.03	0.05	0.03	
	MMR	28	0.07	0.11	0.07	7	0.04	0.04	0.02	
Fall	ILR	-	-	-	-	5	0.03	0.03	0.01	
	UMR	21	0.08	0.09	0.02	7	0.02	0.03	0.01	
	SLH	13	0.10	.010	0.02	5	0.03	0.05	0.06	
	MMR	4	0.07	0.07	0.03	4	0.02	0.03	0.01	

Figure 19: Total Ammonia Nitrogen (TAN) is evaluated using EPA Aquatic Life Ambient Water Quality Criteria for Ammonia - Freshwater (EPA 2013). All 2019 measurements for TAN were below EPA threshold criteria.

Nitrate and Nitrate Nitrogen Summary



			Nitroge	n: 2012-20	18		Nitrogen: 2019			
Metric	Reach	n	Mean	Median	CI (95%)	n	Mean	Median	CI (95%)	
NO2-N	ILR	-	-	-	-	20	0.03	0.12	0.08	
	UMR	-	-	-	-	26	0.03	0.13	0.07	
	SLH	-	-	-	-	20	0.03	0.12	0.08	
	MMR	-	-	-	-	15	0.02	0.12	0.1	
NO3-N	ILR	60	2.85	2.99	0.37	20	2.56	2.60	0.3	
	UMR	156	2.33	2.59	0.29	26	2.11	2.06	0.3	
	SLH	111	1.99	2.21	0.26	20	1.33	1.68	0.3	
	MMR	46	2.05	2.12	0.34	15	1.66	1.70	0.2	
NO2+N03	ILR	-	-	-	-	20	2.59	2.72	0.2	
	UMR	-	-	-	-	26	2.14	2.18	0.3	
	SLH	-	-	-	-	20	1.50	1.81	0.3	
	MMR	-	-	-	-	15	1.68	1.82	0.2	

Figure 20: Nitrate (NO3-N) was collected at all river segments during the historical reference period. Both Illinois and Missouri recommend NO3-N not exceed 10 mg/L (human health criteria). Collection of nitrite (NO2-N) began in 2019. This study does not identify specific water quality criteria for NO2-N.

Total Kjeldahl Nitrogen and Total Nitrogen Summary







			Nitroge	n: 2012-201		Nitrogen: 2019				
Metric	Reach	n	Mean	Median	CI (95%)	n	Mean	Median	CI (95%)	
TKN	ILR	60	0.96	1.07	0.13	20	0.98	1.38	0.41	
	UMR	156	1.00	1.06	0.04	26	1.05	1.15	0.19	
	SLH	111	0.94	1.07	0.08	20	1.16	1.36	0.39	
	MMR	46	0.92	1.03	0.11	15	0.83	0.83	0.19	
TN	ILR	-	-	-	-	20	4.02	4.10	0.42	
	UMR	-	-	-	-	26	3.47	3.34	0.42	
	SLH	-	-	-	-	20	2.80	3.17	0.66	
	MMR	-	-	-	-	15	2.51	2.65	0.32	

Figure 21: Total Nitrogen (TN) is derived from the sum of NO2-N, NO3-N, and TKN. Based on literature review and guidance from the United States Environmental Protection Agency, this study recognizes an acceptable range for TN as 2 mg/L to 6 mg/L (aquatic life criteria). Overall, TN was within the acceptable range during 2019. This study does not acknowledge a criterion for Total Kjeldahl Nitrogen (TKN).
Seasonal Total Organic Carbon



Total Organic Carbon:2012 - 2018	
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Total Organic Carbon:2019

		<u>To</u>	tal Organic	: Carbon: 2	<u>012-2018</u>		Total Orga	nic Carbon:	<u>2019</u>
Season	Reach	n	Mean	Median	CI (95%)	n	Mean	Median	CI (95%)
Winter	ILR	12	3.85	3.89	0.28	5	4.90	4.84	0.49
	UMR	14	4.75	4.61	0.20	7	4.90	4.94	0.64
	SLH	10	4.00	4.03	0.41	5	3.90	3.82	0.39
	MMR	4	3.90	3.85	0.40	4	3.50	3.52	0.70
Spring	ILR	24	4.30	4.33	0.23	-	-	-	-
	UMR	28	4.60	4.75	0.28	-	-	-	-
	SLH	22	4.45	4.75	0.68	-	-	-	-
	MMR	10	4.70	4.51	0.37	-	-	-	-
Summer	ILR	24	4.60	4.57	0.27	10	3.95	3.96	0.09
	UMR	93	5.40	5.46	0.26	12	4.80	4.63	0.26
	SLH	66	4.30	4.52	0.21	10	4.40	4.45	0.23
	MMR	28	4.50	4.61	0.34	7	4.10	4.11	0.38
Fall	ILR	-	-	-	-	5	4.70	4.66	0.14
	UMR	21	6.50	6.51	0.32	7	5.90	5.90	0.30
	SLH	13	5.80	5.13	0.83	5	5.30	5.20	0.44
	MMR	4	4.30	4.20	1.96	4	4.80	4.85	0.42

Figure 22: This study does not acknowledge a criterion for Total Organic Carbon (TOC).

SUMMARY RESULTS: BIOLOGICAL CRITERIA



Chlorophyll a and Pheophytin Summary

		<u>v</u>	Vater Qualit	y Data: 201	<u>2-2018</u>		<u>Water Qu</u>	ality Data: 2	<u>019</u>
Metric	Reach	n	Median	Mean	CI (95%)	n	Median	Mean	CI (95%)
CHLa	ILR	60	16.50	23.04	5.22	20	13.60	11.54	3.08
	UMR	156	7.60	14.92	2.81	26	7.30	23.05	10.57
	SLH	111	8.50	11.05	2.10	20	8.30	12.73	6.35
	MMR	46	7.65	10.17	2.62	15	7.80	8.71	2.01
Pheo	ILR	60	8.15	7.92	1.42	30	2.55	3.01	1.25
	UMR	155	2.90	5.67	0.73	26	1.90	5.66	2.61
	SLH	111	3.10	5.24	0.88	20	2.05	3.42	1.60
	MMR	46	3.30	5.01	1.16	15	1.00	1.79	0.64

Figure 23: Chlorophyll_a (CHLa) and Pheophytin summary data. Overall, 2019 CHLa observations were not statistically greater than the water quality criteria acknowledged by this study. There were no criteria used for evaluating Pheophytin.



Carlson Trophic State Index: 2018 – 2019

<40 = Oligotrophic ____ 40-60 = Mesotrophic ____ 60-70 = Eutrophic ____ >80 Hypereutrophic

<u>State</u>	Description	<u>Chla</u>	<u>TP</u>	<u>Turb</u>
Oligotrophic	Clear water and oxygenated hypolimnion throughout the year, minimal primary production.	Less than 2.5mg/m³	Less than 0.01mg/L	Less than 1.0 FNU
Mesotrophic	Moderately clear water, but Increasing probability of anoxia during the summer, increased primary production.	2.5- 8.0mg/m³	0.01 – 0.08mg/L	1.0- 12 FNU
Eutrophic	Decreased transparency, anoxic summer hypolimnion, extensive macrophyte and algal production, warm water fishery.	8.0- 25.0mg/m³	0.08- 0.10mg/L	12 – 25.0 FNU
Hypereutrophic	Turbid water, anoxic hypolimnion, frequent algal blooms, few macrophytes, fish kills during summer.	Greater than 25.0mg/m³	Greater than 0.10mg/L	Greater than 25.0 FNU

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 and patterns. 0This is particularly important for evaluating conditions in 2019 which were influenced by historical flooding at a regional scale. The Mississippi River at Saint Louis spent 126 days above flood stage (30'), which shattered the previous record of 104 days set in 1993.

Suspended sediments were a primary concern during the winter sampling event, which took place during the buildup of the 2019 flood event (week of March 10; Figure 13). During the sampling event, average TSS from all samples collected was 416 mg/L, which was significantly greater than this study's proposed criterion of 116 mg/L. Total suspended solids did however descend to ordinary levels during the summer sampling event ($\bar{x} = 76.85$), which occurred towards the end the flood event. As previously discussed, suspended solids are of high concern because they affect physical (e.g. temperature, light penetration), chemical (e.g. nutrients, trace metals, dissolved oxygen) and biological (e.g. habitat, photosynthesis) properties of aquatic ecosystems.

Total phosphorus levels were also a concern during the winter sampling event which took place during the buildup of the 2019 flood event. Total phosphorus can be released from the sediment into the overlying water column, and the exchange of phosphorus across the sediment–water interface is closely related to the sediment biogeochemistry for the systems. Additional inputs may have resulted from upland runoff. Thus, the simultaneous elevated levels of TSS and TP were expected.

Sixteen of the twenty-seven TP samples collected during the 2019 winter sampling event exceeded *all* TP values observed from 2012–2018. Phosphorus is considered to be a limiting nutrient for primary producers (e.g., plants and algae); thus elevated levels of TP can stimulate rapid growth of algae which may cause depletion of DO during respiration and decaying processes. Given the cold temperatures and rapid flow, depleted DO was not an issue during the winter 2019.

Concentrations for Chl_a observed on the UMR reach during the September sampling event ($\bar{x} = 64.33$) were relatively high when compared to historical reference data. Although neither the state of Illinois nor Missouri have numerical criteria designated for Chl_a, this study recognizes values exceeding 25 mg/m³ having the potential for stimulating hypereutrophic conditions. Nevertheless, such conditions were not observed during the sampling event.

All remaining parameters evaluated during the 2019 water quality monitoring effort were within designated criteria or within historical reference norms. It is recommended that a minimum of four seasonal water quality monitoring events are performed during 2020. Lastly, sediment from within the navigation channel should also be evaluated at all 22 monitoring locations. One aspect of dredging that has not been adequately investigated

by CEMVS is the relation between sediment disturbance and release of sediment-bound contaminants into the overlying water column.

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APPENDIX A: WATER QUALITY SAMPLING EVENT MEMORANDUMS

CEMVS-EC-EQ

15 March 2019

MEMORANDUM FOR RECORD

SUBJECT: River Water Quality Sampling (Winter Event ¹/₄)

RIVERS WINTER SAMPLING EVENT 1/4

The first of four 2019 sampling events for the Mississippi and Illinois Rivers took place from 03/11/2019 - 03/13/2019. Rising river levels impeded boat ramp access for several sites, thus those samples were collected from the shoreline. There was a significant rain event leading up to the winter sampling event (03/09/2019) that dropped over an inch of rain across most of the study area.

ILLINOIS RIVER (RM 0-80)

Samples for the ILR were collected on 3/11/2019 by Ben Greeling and Rick Archeski. Samples IL-07 and IL-08 were collected from shore due to flooding on boat ramps.



USGS 05586100 ILLINOIS RIVER AT VALLEY CITY, IL

- IL-02: Date 3/11/2019 Time 14:10:00 PM Seechi 3 inches Depth 23 feet
- IL-06: Date_3/11/2019 Time_13:30:00 PM Seechi_5 inches Depth_25 feet
- IL-07: Date_3/11/2019 Time_12:50:00 PM Seechi_NA inches in Depth_NA
- IL-08: Date_3/11/2019 Time_12:00:00 PM Seechi_NA inches Depth_NA
- IL-09: Date_3/11/2019 Time_10:50:00 AM Seechi_5 inches Depth_32 feet

UPPER MISSISSIPPI RIVER (RM: 201 – 301)

Samples from the Upper Mississippi River were collected on 13 March 2019 by Ben Greeling, Rick Archeski, and Travis Schepker. Samples UMR-5 and UMR-7 were collected from shore due to debris on boat ramps. The remaining UMR sites were collected from the navigation channel. Duplicate sample UMR-15 was collected with UMR-9.



USGS 05587450 Mississippi River at Grafton, IL

- UMR-5: Date_3/13/2019 Time_16:00:00 PM Seechi_NA inches Depth_NA feet
- UMR-6: Date_3/13/2019 Time_16:45:00 PM Seechi_6 inches Depth_35 feet
- UMR-7: Date_3/13/2019 Time_15:15:00 PM Seechi_NA inches Depth_NA feet •
- UMR-LM: Date 3/13/2019 Time 14:30:00 PM Seechi NA inches Depth NA feet •
- UMR-9: Date_3/13/2019 Time_12:50:00 PM Seechi_6 inches Depth_25 feet • • UMR-15: Duplicate collected with UMR-9
- UMR-LA: Date_3/13/2019 Time_12:00:00 PM Seechi_6 inches Depth_22 feet
- UMR-DP: Date_3/13/2019 Time_10:30:00 AM Seechi_6 inches Depth_25 feet

SAINT LOUIS HARBOR (RM: 161 – 200)

Samples from Saint Louis Harbor were collected on 11 March and 12 March 2019 by Ben Greeling and Travis Schepker. All samples were collected from the navigation channel except UMR-2, which was collected from the service base dredging dock. Duplicate sample SLH-15 was collected with SLH-1.





- UMR-1: Date_3/11/2019 Time_17:16:00 PM Seechi_6 inches Depth_25 feet
- UMR-2: Date_3/11/2019 Time_17:42:00 PM Seechi_4 inches Depth_20 feet
- UMR-3: Date_3/11/2019 Time_16:30:00 PM Seechi_6 inches Depth_47 feet
- SLH-1: Date_3/12/2019 Time_15:30:00 PM Seechi_5 inches Depth_45 feet
 - SLH-15: Duplicate collected with SLH-1
- SLH-2: Date_3/12/2019 Time_16:30:00 PM Seechi_NA inches Depth_NA feet
- SLH-3: Date_3/11/2019 Time_16:54:00 PM Seechi_4 inches Depth_27 feet

MIDDLE MISSISSIPPI RIVER (RM 0 - 161)

Samples from the Middle Mississippi River were collected on 12 March 2019 by Ben Greeling and Travis Schepker. Location OPR-3 was collected from the shore line as a result of the boat ramp being covered by large wood debris. The remaining OPR sites were collected from the navigation channel.



• OPR-2: Date_3/12/2019 Time_10:46:00 AM Seechi_4 inches Depth_40 feet

- OPR-3: Date_3/12/2019 Time_09:15:00 AM Seechi_4 inches Depth_8 feet
- OPR-4: Date_3/12/2019 Time_13:30:00 PM Seechi_4 inches Depth_45 feet
- OPR-5: Date_3/12/2019 Time_14:30:00 PM Seechi_4 inches Depth_45 feet

CEMVS-EC-EQ

11 July 2019

MEMORANDUM FOR RECORD

SUBJECT: River Water Quality Sampling (Summer Event 2/4)

RIVERS SUMMER SAMPLING EVENT 2/4

Historical high water levels have made 2019 water quality sampling in MVS Rivers problematic thus far (See Supplemental Figures). Winter sampling was completed as water levels approached flood stages, and spring samples were not collected resulting from record flooding throughout the region. All samples during this sampling event were collected from land, opposed to a boat in the navigation channel. A goal for this sampling period was to sample near the routine sample locations in areas with adequate flow/current. UMR-7, UMR-LM, and OPR-5 were not sampled since there were not accessible locations to the river that had adequate current/flow.

ILLINOIS RIVER

Samples for the ILR were collected on 07/01/2019 by Travis Schepker and Andy Patton. All samples were collected by land in areas with adequate flow. Exact locations are listed below:



USGS 05586100 ILLINOIS RIVER AT VALLEY CITY, IL

- Valley City Station at 1200: Gauge Height 20.65 ft and Discharge 70,000 cfs
 - ILR-2 Time: 1500 Date: 7/01/2019 Collected at Brussels Ferry (38.966983, -90.495172)
 - ILR-6 Time: 1655 Date: 7/01/2019 Collected in Hardin (39.156066, -90.616210)
 - ILR-7 Time: 1736 Date: 7/01/2019 Collected near Kampville (39.306558, -90.611839)
 - ILR-8 Time: 1830 Date: 7/01/2019 Collected above Florence Bridge (39.63271, -90.60918)
 - ILR-9 Time: 1915 Date: 7/01/2019 Collected at regular location

UPPER MISSISSIPPI RIVER

Samples for UMR were collected on 07/01/2019 and 07/02/2019 by Travis Schepker and Andy Patton. All samples were collected by land in areas with adequate flow. However, UMR-7 and UMR-LM were not collected since there were not accessible locations to the river that had adequate current/flow. Exact locations are listed below:



USGS 05587450 Mississippi River at Grafton, IL

- Grafton Gauge Station at 1200: Gauge Height 26.40 ft and Discharge 345,000 cfs
 - UMR-5 Time: 1230 Date: 7/01/2019 Collected near Lockhaven (38.939567, -90.334676)
 - UMR-6 Time: 1215 Date: 7/02/2019 Collected near South Shore (38.867272, -90.52420)
 - UMR-7 NOT COLLECTED
 - UMR-LM NOT COLLECTED
 - UMR-9 Time: 0940 Date: 7/02/2019 Collected at regular location
 - UMR-LA Time: 0911 Date: 7/02/2019 Collected at regular location
 - UMR-DP Time: 0815 Date: 7/02/2019 Collected near Saverton (39.639680, -91.253515)

SAINT LOUIS HARBOR

Samples for SLH were collected on 07/01/2019 by Travis Schepker and Andy Patton. All samples were collected by land in areas with adequate flow. Exact locations are listed below:



USGS 07010000 Mississippi River at St. Louis, MO

- Saint Louis Gauge Station at 1200: Gauge Height 38.12 ft and Discharge 710,000 cfs
 - SLH-1 Time: 0800 Date: 7/01/2019 Collected above JB Bridge (38.486178, -90.279331)
 - SLH-2 Time: 0715 Date: 7/01/2019 Collected at regular location
 - SLH-3 Time: 1015 Date: 7/01/2019 Collected above 270 bridge (38.775070, -90.173439)
 - UMR-1 Time: 0915 Date: 7/01/2019 Collected at regular location
 - UMR-2 Time: 1234 Date: 7/02/2019 Collected in St Charles (38.780517, -90.479677)
 UMR-15 collected with UMR-2
 - UMR-3 Time: 1100 Date: 7/01/2019 Collected at NGRREC (38.866641, -90.142933)
 - SLH-15 collected with UMR-3

MIDDLE MISSISSIPPI RIVER

Samples for the MMR were collected on 07/11/2019 by Ben Greeling and Grace Rodgers. All samples were collected from land. OPR-5 was not collected since there were not accessible locations to the river that had adequate current/flow. Exact locations are listed below:



USGS 07020500 Mississippi River at Chester, IL

- Chester Gauge Station at 1200: Gauge Height 35.02 ft and discharge 605,000 cfs
 - OPR-2 Time:1045 Date: 7/11/2019 Collected above Cape bridge (37.29558, -89.519564)
 - OPR-3 Time:1313 Date: 7/11/2019 Collected at Grand Tower (37.630132, -89.505696)
 - OPR-4 Time:1415 Date: 7/11/2019 Collected at regular location
 - OPR-5 Not Collected

Travis J Schepker

Environmental Specialist

CEMVS-EC-EQ

13 September 2019

MEMORANDUM FOR RECORD

SUBJECT: River Water Quality Sampling (Summer Event 3/4)

RIVERS SUMMER SAMPLING EVENT 3/4

Sampling conducted on the Illinois and Mississippi rivers during September of 2019 was completed with minimal problems. All samples were taken within or near the navigation channel by boat with exception to SLH-2 (taken from USACE Port). Laboratory and insitu samples were collected from the upper meter. Flow was relatively high in the open river, thus profile samples were difficult to obtain for some locations.

ILLINOIS RIVER (RM 0-80)

Samples for the ILR were collected on 09/04/2019 by Travis Schepker and Ben Greeling. All samples were collected from the navigation channel. No reported issues.



USGS 05586100 ILLINOIS RIVER AT VALLEY CITY, IL

- ILR-2: Date_9/4/2019 Time_12:43:10 PM Seechi_14 in Depth 15 ft
- ILR-6: Date_9/4/2019 Time_11:51:24 AM Seechi_12 in Depth_13 ft
- ILR-7: Date_ 9/4/2019 Time_ 11:06:16 AM Seechi_ 12 in Depth_ 14 ft
- ILR-8: Date _ 9/4/2019 Time _ 10:06:10 AM Seechi _ 12 in Depth _ 14 ft
- ILR-9: Date 9/4/2019 Time 8:59:49 AM Seechi 12 in Depth 12 ft

UPPER MISSISSIPPI RIVER (RM: 201 – 301)

Samples for UMR were collected on 09/05/2019 by Travis Schepker and Ben Greeling. All samples were collected by boat within the navigation channel. No reported issues.



USGS 05587450 Mississippi River at Grafton, IL

- UMR-5: Date_9/5/2019 Time_4:02:22 PM Seechi_18 in Depth_NA ft
- UMR-6: Date 9/5/2019 Time 3:00:41 PM Seechi 18 in Depth NA ft
- UMR-7: Date 9/5/2019 Time 1:46:25 PM Seechi 16 in Depth NA ft
- UMR-LM: Date 9/5/2019 Time 12:47:00 PM Seechi 17 in Depth NA ft
- UMR-9: Date_9/5/2019 Time_9:03:45 AM Seechi_16 in Depth_NA ft
- UMR-LA: Date_9/5/2019 Time_9:43:24 AM Seechi_16 in Depth_NA ft
- UMR-DP: Date_9/5/2019 Time_10:40:53 AM Seechi_14 in Depth_NA ft • UMR-15: Duplicate collected with UMR-DP

SAINT LOUIS HARBOR (RM: 161 – 200)

Samples from SLH were collected on 09/03/2019 and 09/09/2019 by Travis Schepker, Ben Greeling, and Grace Rodgers. All samples were collected from the navigation channel, with exception to SLH 2 which was collected from the USACE port. No major issues to report.



USGS 07010000 Mississippi River at St. Louis, MO

- SLH-1: Date_9/3/2019 Time_ 3:24:23 PM Seechi:_ 8 in Depth_ NA
- SLH-2: Date_9/3/2019 Time_ 1:13:02 PM Seechi:_ NA in Depth_ NA

 SLH-15: Collected with SLH-2
- SLH-3: Date_9/9/2019 Time_ 8:46:10 AM Seechi:_ 8 in Depth_ 26 ft
- UMR-1: Date_ 9/9/2019 Time_ 9:09:51 AM Seechi_ 13 in Depth_28 ft
- UMR-2: Date_9/9/2019 Time_9:35:06 AM Seechi_6 in Depth_NA ft
- UMR-3: Date_ 9/9/2019 Time_ 9:58:56 AM Seechi_ 14 in Depth_ NA ft

MIDDLE MISSISSIPPI RIVER (RM 0 - 161)

Samples for the MMR were collected on 09/3/2019 by Travis Schepker and Grace Rodgers. All samples were collected from the navigation channel. No issues were reported.



- OPR-2: Date _ 9/3/2019 Time _ 10:34:40 AM Seechi _ 8 inches Depth _ ft
- OPR-3: Date_9/3/2019 Time_8:55:33 AM Seechi_8 inches Depth_ft
- OPR-4: Date_9/3/2019 Time_12:34:54 PM Seechi_8 inches Depth_ft
- OPR-5: Date_9/3/2019 Time_2:13:04 PM Seechi_8 inches Depth_ft

Travis J Schepker Environmental Specialist

CEMVS-EC-EQ

5 December 2019

MEMORANDUM FOR RECORD

SUBJECT: River Water Quality Sampling (Fall Event 4/4)

RIVERS SUMMER SAMPLING EVENT 4/4

Sampling conducted on the Illinois and Mississippi rivers during November of 2019 was completed with minimal issues. The turbidity sensor was not functioning properly on 11/18/2019 (UMR day). Laboratory and *insitu* samples were collected from the upper meter. Flow was relatively high in the open river, thus profile samples were difficult to obtain for some locations. Several boat launches were silted in from summer flooding, and therefore several samples were collected from the shoreline. Samples collected from the thalweg and shoreline are documented below.

ILLINOIS RIVER (RM 0-80)

Samples for the ILR were collected on 11/19/2019 by Travis Schepker and Grace Rodgers. All samples were collected from the navigation channel. Weather was cloudy/sunny with 16mph winds and 50 degrees F at noon. No reported issues.





- ILR-2: Date_11/19/2019 Time_14:15:00 Seechi_ 12 in Depth_ 20 ft_ Nav Channel
- ILR-6: Date_11/19/2019 Time_13:15:00 Seechi_12 in Depth_20 ft_Nav Channel
- ILR-7: Date_11/19/2019 Time_12:22:00 Seechi_12 in Depth_19 ft_Nav Channel
- ILR-8: Date_11/19/2019 Time_11:00:00 Seechi_ 17 in Depth_ 20 ft_ Nav Channel
- ILR-9: Date_11/19/2019 Time_09:30:00 Seechi_ 17 in Depth_ 26 ft_ Nav Channel

UPPER MISSISSIPPI RIVER (RM: 201 - 301)

Samples for UMR were collected on 11/18/2019 by Travis Schepker and Ben Greeling. Some boat ramps were silted in, thus several samples were collected from the shoreline. The YSI turbidity sensor was not functioning properly, therefore turbidity samples are not available. Weather was partly cloudy, wind speed 5 mph, and 42 degrees F at noon. No additional meaningful issues to report.



- UMR-5: Date_11/18/2019 Time_15:46:00 Seechi_ 18 in Depth_ 20 ft_ Nav Channel
- UMR-6: Date_11/18/2019 Time_14:30:00 Seechi_NA in Depth_NA ft_Shoreline
- UMR-7: Date_11/18/2019 Time_13:40:00 Seechi_NA in Depth_NA ft_Boat Dock
- UMR-LM: Date_11/18/2019 Time_13:17:00 Seechi_NA in Depth_NA ft_Shoreline
- UMR-9: Date_11/18/2019 Time_11:51:00 Seechi_17 in Depth_23 ft_Nav Channel
 UMR-15: Duplicate collected with UMR-9
- UMR-LA: Date_11/18/2019 Time_11:00:00 Seechi_18 in Depth_30 ft_Nav Channel
- UMR-DP: Date_11/18/2019 Time_10:00:00 Seechi_15 in Depth_23 ft_Nav Channel

SAINT LOUIS HARBOR (RM: 161 - 200)

Samples from SLH were collected on 11/19/2019 and 11/20/2019 by Travis Schepker, Ben Greeling, and Grace Rodgers. Weather during both days were fair skies, average temperatures in the mid-40s, and wind speeds of 8 mph. Some boat ramps were silted in, thus several samples were collected from the shoreline. There were no additional meaningful issues to report.



- SLH-1: Date_11/19/2019 Time_13:45:00 Seechi_10 in Depth_45 ft_Nav Channel
 SLH-15 Collected with SLH-1
- SLH-2: Date_11/20/2019 Time_17:00:00 Seechi_NA in Depth_NA ft_Service Base
- SLH-3: Date_11/19/2019 Time_14:20:00 Seechi_ NA in Depth_ NA ft_ Shoreline
- UMR-1: Date_11/19/2019 Time_16:20:00 Seechi_NA in Depth_NA ft_Shoreline
- UMR-2: Date_11/19/2019 Time_17:00:00 Seechi_NA in Depth_NA ft_Shoreline
- UMR-3: Date_11/19/2019 Time_16:00:00 Seechi_NA in Depth_NA ft_Shoreline

MIDDLE MISSISSIPPI RIVER (RM 0 - 161)

Samples for the MMR were collected on 11/20/2019 by Travis Schepker and Ben Greeling. The weather was partly cloudy, temperature 56 degrees, and wind speed 15 mph at noon. All samples were collected from the navigation channel. OPR-3 was collected from the shoreline at Grand Tower. No additional meaningful issues were reported.



- OPR-3: Date_11/20/2019 Time_11:20:00 Seechi_NA inches Depth_NA ft_Shoreline
- OPR-4: Date_11/20/2019 Time_13:40:00 Seechi_10 inches Depth_40 ft_Nav Channel
- OPR-5: Date_11/20/2019 Time_14:40:00 Seechi_10 inches Depth_45 ft_Nav Channel

Travis J Schepker Environmental Specialist **APPENDIX B: FIELD DATA**

Date	Location	Depth	Temp	Redox	Cond	DO	DOmgL	pН	TDSmgL	FNU
3/11/2019	IL-2	1.13	2.33	472.30	557.30	89.00	12.17	7.84	362.00	420.95
3/11/2019	IL-6	1.16	2.17	503.00	572.60	88.70	12.18	7.81	372.00	395.64
3/11/2019	IL-7	1.28	2.61	498.30	601.50	90.20	12.24	7.65	391.00	340.53
3/11/2019	IL-8	1.41	2.11	515.70	632.60	89.30	12.28	7.51	411.00	251.62
3/11/2019	IL-9	1.07	1.78	538.30	649.80	102.70	14.26	7.41	422.00	247.01
3/11/2019	SLH-3	0.99	1.89	482.50	518.00	91.90	12.73	7.91	337.00	213.42
3/11/2019	UMR-1	1.01	2.44	467.50	608.70	94.20	12.84	7.94	396.00	79.95
3/11/2019	UMR-3	1.08	1.83	507.00	500.20	93.00	12.91	7.78	325.00	165.56
3/11/2019	UMR-2	0.99	4.06	411.50	517.30	93.40	12.20	7.96	336.00	153.30
3/12/2019	OPR-2	1.09	2.50	347.90	572.90	93.30	12.72	7.85	372.00	122.99
3/12/2019	OPR-3	1.10	2.67	453.80	554.30	93.10	12.62	7.55	360.00	131.62
3/12/2019	OPR-4	1.22	2.72	321.30	525.20	92.50	12.53	7.92	341.00	171.20
3/12/2019	OPR-5	0.96	3.33	288.50	490.10	92.00	12.27	7.93	319.00	169.02
3/12/2019	SLH-1	1.10	2.67	345.70	498.40	92.10	12.49	7.96	324.00	187.31
3/12/2019	SLH-2	1.30	3.61	500.90	531.40	92.00	12.17	7.87	345.00	186.82
3/13/2019	UMR-5	1.34	2.44	334.40	389.00	90.20	12.32	7.76	253.00	189.09
3/13/2019	UMR-6	1.17	1.17	285.00	421.70	90.30	12.76	7.89	274.00	146.52
3/13/2019	UMR-7	1.12	1.39	154.10	394.50	89.70	12.59	7.81	256.00	147.44
3/13/2019	UMR-9	1.02	1.06	240.10	424.90	88.00	12.48	8.03	276.00	140.57
3/13/2019	UMR-DP	1.01	0.78	241.80	442.60	91.60	13.09	7.64	288.00	128.58
3/13/2019	UMR-LA	1.16	0.94	206.90	461.00	91.30	12.98	7.91	300.00	116.64
3/13/2019	UMR-LM	1.05	1.67	311.30	381.20	89.10	12.42	7.82	248.00	854.84
7/1/2019	IL-2	0.21	26.10	215.40	522.80	76.50	6.19	7.65	340.00	18.60
7/1/2019	IL-6	1.08	25.90	225.40	536.80	76.20	6.18	7.70	349.00	15.84
7/1/2019	IL-7	1.13	26.20	228.50	540.70	84.70	6.83	7.70	351.00	14.22
7/1/2019	IL-8	1.00	26.40	220.40	551.50	90.70	7.30	7.85	358.00	13.07
7/1/2019	IL-9	0.19	26.00	238.80	521.70	76.10	6.17	7.66	339.00	12.45
7/1/2019	SLH-1	1.07	26.40	251.20	462.90	69.50	5.59	7.75	301.00	98.27
7/1/2019	SLH-2	1.17	26.50	203.70	461.60	68.50	5.50	7.77	300.00	97.48
7/1/2019	SLH-3	0.27	26.50	215.20	458.00	69.40	5.58	7.59	298.00	66.47
7/1/2019	UMR-1	0.09	25.70	163.70	511.70	68.80	5.60	7.76	333.00	12.53
7/1/2019	UMR-3	0.55	25.90	219.70	518.70	80.80	6.56	7.65	337.00	17.81
7/1/2019	UMR-5	1.05	25.70	221.20	523.10	74.30	6.05	7.73	340.00	17.82

Date	Location	Depth	Temp	Redox	Cond	DO	DOmgL	pН	TDSmgL	FNU
7/2/2019	UMR-6	1.12	27.20	192.80	456.30	69.80	5.53	7.81	297.00	39.35
7/2/2019	UMR-9	1.18	26.10	228.20	470.80	78.10	6.31	7.78	306.00	81.27
7/2/2019	UMR-DP	1.16	26.10	161.60	499.30	81.30	6.58	8.06	325.00	71.16
7/2/2019	UMR-LA	0.97	26.50	219.20	363.90	72.50	5.83	7.62	237.00	67.40
7/2/2019	UMR-2	0.69	27.50	244.00	492.00	69.90	5.51	7.54	320.00	87.75
7/11/2019	OPR-2	0.28	28.20	230.10	530.60	73.70	5.74	7.70	345.00	51.35
7/11/2019	OPR-3	0.26	28.80	224.80	524.40	74.60	5.75	7.70	341.00	54.35
7/11/2019	OPR-4	0.34	29.00	219.00	523.30	78.20	6.00	7.81	340.00	50.69
9/3/2019	OPR-2	0.98	24.90	146.70	537.50	78.10	6.46	8.06	349.00	90.79
9/3/2019	OPR-3	1.10	24.60	139.20	530.10	77.30	6.43	8.05	345.00	97.48
9/3/2019	OPR-4	1.15	24.80	179.30	515.00	78.00	6.46	7.86	335.00	93.18
9/3/2019	OPR-5	1.36	24.40	135.90	519.10	77.00	6.43	7.87	337.00	138.63
9/3/2019	SLH-1	1.37	24.50	188.00	519.90	78.50	6.54	7.84	338.00	130.41
9/3/2019	SLH-2	0.99	24.10	510.60	521.30	76.20	6.39	7.76	339.00	159.20
9/4/2019	IL-2	1.27	25.40	126.50	745.80	72.40	5.93	7.86	485.00	22.75
9/4/2019	IL-6	1.19	24.90	95.80	750.60	76.80	6.34	8.06	488.00	27.31
9/4/2019	IL-7	1.28	24.80	115.40	746.80	81.80	6.77	8.09	485.00	27.59
9/4/2019	IL-8	1.10	24.60	111.20	740.80	89.30	7.42	8.15	482.00	30.73
9/4/2019	IL-9	0.85	24.50	125.10	689.60	84.30	7.02	8.17	448.00	36.17
9/5/2019	UMR-5	1.27	24.80	123.80	543.20	110.80	9.18	8.47	353.00	17.95
9/5/2019	UMR-6	1.28	24.60	112.30	470.00	132.00	10.98	8.73	305.00	17.86
9/5/2019	UMR-7	1.02	24.40	119.00	470.50	129.40	10.79	8.74	306.00	18.40
9/5/2019	UMR-9	1.02	24.00	102.80	473.80	114.50	9.63	8.86	308.00	19.16
9/5/2019	UMR-DP	1.32	23.90	104.40	474.00	113.70	9.58	8.88	308.00	20.17
9/5/2019	UMR-LA	1.26	24.00	112.00	468.10	112.30	9.44	8.86	304.00	17.41
9/5/2019	UMR-LM	1.10	24.10	119.90	470.00	123.80	10.38	8.75	306.00	19.23
9/9/2019	SLH-3	1.10	24.90	106.10	550.80	92.10	7.61	8.51	358.00	49.89
9/9/2019	UMR-1	1.11	24.60	112.70	544.80	71.70	5.96	8.20	354.00	20.16
9/9/2019	UMR-3	1.05	24.50	99.10	472.40	102.70	8.55	8.77	307.00	16.56
9/9/2019	UMR-2	1.16	25.30	133.90	605.90	81.80	6.71	8.04	394.00	86.78
11/18/2019	UMR-5	1.08	2.00	220.70	506.20	98.90	13.65	7.72	329.00	
11/18/2019	UMR-6	0.94	2.30	317.30	509.90	97.90	13.42	7.72	331.00	
11/18/2019	UMR-7	1.04	2.10	282.00	508.90	98.90	13.63	7.48	331.00	

Date	Location	Depth	Temp	Redox	Cond	DO	DOmgL	pН	TDSmgL	FNU
11/18/2019	UMR-9	1.07	1.70	301.80	517.60	99.70	13.89	7.74	336.00	
11/18/2019	UMR-DP	1.03	1.60	276.70	519.30	99.70	13.90	7.35	338.00	
11/18/2019	UMR-LA	1.00	1.70	261.00	520.90	99.20	13.80	7.55	339.00	
11/18/2019	UMR-LM	1.20	2.10	282.20	510.00	99.00	13.63	7.67	331.00	
11/19/2019	IL-2	1.06	3.40	198.30	671.30	92.70	12.34	7.60	436.00	29.89
11/19/2019	IL-6	1.09	3.40	202.10	676.40	92.30	12.26	7.59	440.00	30.72
11/19/2019	IL-7	1.00	3.40	217.30	680.60	93.00	12.37	7.57	442.00	20.41
11/19/2019	IL-8	1.08	3.30	220.50	684.30	92.70	12.37	7.50	445.00	15.06
11/19/2019	IL-9	1.14	3.40	259.50	692.70	92.30	12.27	7.73	450.00	13.75
11/19/2019	SLH-3	1.05	2.90	182.50	574.60	96.60	13.02	7.71	373.00	29.74
11/19/2019	UMR-1	1.08	4.70	183.40	544.90	89.80	11.55	7.75	354.00	18.46
11/19/2019	UMR-3	0.81	3.20	210.80	617.00	94.80	12.66	7.78	401.00	47.93
11/19/2019	UMR-2	1.01	5.00	182.80	733.20	95.60	12.17	7.80	477.00	39.41
11/20/2019	OPR-2	1.01	4.00	162.80	620.90	95.30	12.47	7.88	404.00	39.01
11/20/2019	OPR-3	0.42	4.10	156.60	618.40	96.20	12.56	7.90	402.00	40.30
11/20/2019	OPR-4	1.10	3.90	161.90	625.30	96.30	12.64	7.71	406.00	32.91
11/20/2019	OPR-5	1.12	4.00	185.30	641.30	96.70	12.65	7.65	417.00	36.09
11/20/2019	SLH-1	0.99	4.00	176.30	637.80	96.80	12.67	7.76	415.00	30.55
11/20/2019	SLH-2	1.39	4.60	217.90	684.20	96.30	12.40	7.81	445.00	35.07

APPENDIX C: LABORATORY DATA



Environmental | Analytical | Management | Safety

Customer Name: SLCOE

Project Name: Illinois & Mississippi Rivers

Samples Received at ARDL: 3/12/19

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

www.ardlinc.com

Date: 4/9/19

Lab Name: ARDL, Inc.

ARDL Report No.: 8462

CASE NARRATIVE

<u>Customer</u> Sample No.	<u>Date</u> Collected	<u>Lab ID</u> Number	Analyses Requested
IL-2	3/11/19	8462-01	Inorganics(1)
IL-6	3/11/19	8462-02	Inorganics(1)
IL-7	3/11/19	8462-03	Inorganics(1)
IL-8	3/11/19	8462-04	Inorganics(1)
IL-9	3/11/19	8462-05	Inorganics(1)
UMR-1	3/11/19	8462-06	Inorganics(1)
UMR-2	3/11/19	8462-07	Inorganics(1)
UMR-3	3/11/19	8462-08	Inorganics(1)
SLH-3	3/11/19	8462-09	Inorganics(1)

(1) Including ammonia, chlorophyll/pheophytin, nitrate, nitrite, TKN, TOC, orthophosphate, total phosphorus, TSS, and TVSS.

The quality control data are summarized as follows:

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

DUPLICATE

Duplicate analyses are reported as MS/MSD, except chlorophyll/pheophytin, TSS, and TVSS. RPD of the duplicate analyses met criteria.

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

Page 1 of 2

Project Name: Illinois & Mississippi Rivers

ARDL Report No.: 8462

CASE NARRATIVE (Continued)

DATA REPORTING QUALIFIERS

The following data reporting qualifiers are used as required:

ND - Indicates parameter was analyzed for but not detected. The sample quantitation limit has been corrected for weight, dilution and/or percent moisture.

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

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 8462 – Inorganics

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

> 008462 Lab Report No:

ILLINOIS RIVER/MISSISSIPPI RIVER

Project Name: Project No:

04/02/2019 Report Date: NELAC Certified - IL100308

Analysis: Inorganics

ARDL No: 008462-01	1	Sampl	ing Loc	ni ILLIN	OIS RIVER			Matrix	: WATER	
Field ID: IL-2 Received: 03/12/201	19	samp Samp	ling Ti	Te: 03/11 me: 1410	ST07/.			MOLSTUFE	. NA	
						Prep	Analysis	Prep	Analysis	Run
Analyte	LOD	год	Flag	Result	Units	Method	Method	Date	Date	Number
Ammonia Nitrogen	0.0200	0.0300		0.351	MG/L	NONE	350.1	NA	03/13/19 (03144408
Chlorophyll-a, Correcte	1.0	1.00		QN	MG/CU.M.	10200H	10200H	03/12/19	03/25/19 (03274439
Kjeldahl Nitrogen	0.950	1.00		3.16	MG/L	351.2	351.2	03/20/19	03/21/19 (03254428
Nitrate as Nitrogen	0.0570	0.0600		2.51	MG/L	NONE	GREEN	NA	03/18/19 (03204419
Nitrite as Nitrogen	0.0200	0.0200		0.025	MG/L	NONE	354.1	NA	03/12/19 (03134405
Pheophytin-a	1.0	1.00		3.6	MG/CU.M.	10200H	10200H	03/12/19	03/25/19 (03274439
Phosphorus	0.0160	0.0200		3.07	MG/L	365.2	365.2	03/26/19	03/27/19 (03294448
Phosphorus, -ortho	0.00800	0.0100		0.332	MG/L	NONE	365.2	NA	03/12/19 (03154409
Solids, Total Suspended	20.0	20.0		1070	MG/L	NONE	160.2	NA	03/14/19 (03184416
Solids, Volatile Suspen	20.0	20.0	~	60.0	MG/L	NONE	160.4	NA	03/14/19 (03184417
Total Organic Carbon	0.500	1.00		5.2	MG/L	NONE	415.1	NA	03/20/19 (03294444

(a) DOD and/or NELAC Accredited Analyte.

Sample 008462-01, Inorganic Analyses

Page 1 of 1

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

Lab Report No: 008462

ILLINOIS RIVER/MISSISSIPPI RIVER

Project Name:

04/02/2019 Report Date: Analysis: Inorganics

t No:							Z	IELAC Certi	fied - ILl	00308
)8462-02 6		Samp1 Samp	ing Loc ling Da	c'n: ILLIN ate: 03/11	VOIS RIVER L/2019			Matrix Moisture	:: WATER :: NA	
/12/201	თ	Samp	ling Ti	ime: 1330						
						Prep	Analysis	Prep	Analysis	Run
	LOD	Γοδ	Flag	Result	Units	Method	Method	Date	Date	Number
	0.0200	0.0300		0.359	MG/L	NONE	350.1	NA	03/13/19	03144408
orrecte	1.0	1.00		QN	MG/CU.M.	10200H	10200H	03/12/19	03/25/19	03274439
ď	0.380	0.400		3.06	MG/L	351.2	351.2	03/20/19	03/21/19	03254428
gen	0.0570	0.0600		2.19	MG/L	NONE	GREEN	NA	03/18/19	03204419
gen	0.0200	0.0200		0.026	MG/L	NONE	354.1	NA	03/12/19	03134405
	1.0	1.00		QN	MG/CU.M.	10200H	10200H	03/12/19	03/25/19	03274439
	0.0160	0.0200		2.43	MG/L	365.2	365.2	03/26/19	03/27/19	03294448
ho	0.00800	0.0100		0.376	MG/L	NONE	365.2	NA	03/12/19	03154409
spended	20.0	20.0		778	MG/L	NONE	160.2	NA	03/14/19	03184416
Suspen	20.0	20.0		48.0	MG/L	NONE	160.4	NA	03/14/19	03184417
rbon	0.500	1.00		5.2	MG/L	NONE	415.1	NA	03/20/19	03294444

(a) DOD and/or NELAC Accredited Analyte.

Sample 008462-02, Inorganic Analyses

Page 1 of 1

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

Lab Report No: 008462

ILLINOIS RIVER/MISSISSIPPI RIVER

Project Name: Project No:

Report Date: 04/02/2019

NELAC Certified - IL100308

Analysis: Inorganics

ARDL No: 008462-03 Field ID: IL-7 Received: 03/12/201	61	Sampl Samp Samp	ing Loc ling Da ling Ti	'n: ILLIN te: 03/11 me: 1250	IOIS RIVER ./2019			Matrix Moisture	: WATER : NA	
Analyte	LOD	ГОО	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Ammonia Nitrogen	0.0200	0.0300		0.38	MG/L	NONE	350.1	NA	03/13/19 0	3144408
Chlorophyll-a, Correcte	1.0	1.00		5.1	MG/CU.M.	10200H	10200H	03/12/19	03/25/19 0	3274439
Kjeldahl Nitrogen	0.380	0.400		2.65	MG/L	351.2	351.2	03/20/19	03/21/19 0	3254428
Nitrate as Nitrogen	0.0570	0.0600		2.56	MG/L	NONE	GREEN	NA	03/18/19 0	3204419
Nitrite as Nitrogen	0.0200	0.0200		0.032	MG/L	NONE	354.1	NA	03/12/19 0	3134405
Pheophytin-a	1.0	1.00		QN	MG/CU.M.	10200H	10200H	03/12/19	03/25/19 0	3274439
Phosphorus	0.0240	0.0300		2.74	MG/L	365.2	365.2	03/26/19	03/27/19 0	3294448
Phosphorus, -ortho	0.00800	0.0100		0.385	MG/L	NONE	365.2	NA	03/12/19 0	3154409
Solids, Total Suspended	20.0	20.0		522	MG/L	NONE	160.2	NA	03/14/19 0	3184416
Solids, Volatile Suspen	20.0	20.0		34.0	MG/L	NONE	160.4	NA	03/14/19 0	3184417
Total Organic Carbon	0.500	1.00		4.6	MG/L	NONE	415.1	NA	03/20/19 0	3294444

(a) DOD and/or NELAC Accredited Analyte.

Sample 008462-03, Inorganic Analyses

Page 1 of 1

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

Lab Report No: 008462

ILLINOIS RIVER/MISSISSIPPI RIVER

Project Name: Project No:

Report Date: 04/02/2019

Analysis: Inorganics NELAC Certified - IL100308

ARDL No: 008462-04 Field ID: IL-8 Received: 03/12/201	4 H 6	Samp1 Samp Samp	ing Loc ling Da ling Ti	:'n: ILLIN lte: 03/11 me: 1200	IOIS RIVER ./2019			Matrix Moisture	: WATER : NA	
Analyte	LOD	ГОД	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Ammonia Nitrogen	0.0200	0.0300		0.443	MG/L	NONE	350.1	NA	03/13/19	03144408
Chlorophyll-a, Correcte	1.0	1.00		6.8	MG/CU.M.	10200H	10200H	03/12/19	03/25/19	03274439
Kjeldahl Nitrogen	0.190	0.200		2.22	MG/L	351.2	351.2	03/20/19	03/21/19	03254428
Nitrate as Nitrogen	0.0570	0.0600		2.5	MG/L	NONE	GREEN	NA	03/18/19	03204419
Nitrite as Nitrogen	0.0200	0.0200		0.032	MG/L	NONE	354.1	NA	03/12/19	03134405
Pheophytin-a	1.0	1.00		UN	MG/CU.M.	10200H	10200H	03/12/19	03/25/19	03274439
Phosphorus	0.00800	0.0100		1.21	MG/L	365.2	365.2	03/26/19	03/27/19	03294448
Phosphorus, -ortho	0.00800	0010.0		0.465	MG/L	NONE	365.2	NA	03/12/19	03154409
Solids, Total Suspended	7.69	7.69		162	MG/L	NONE	160.2	NA	03/14/19	03184416
Solids, Volatile Suspen	7.69	7.69		12.3	MG/L	NONE	160.4	NA	03/14/19	03184417

(a) DOD and/or NELAC Accredited Analyte.

Sample 008462-04, Inorganic Analyses

Page 1 of 1

03/20/19 03294444

NA

415.1

NONE

MG/L

4.3

1.00

0.500
400 Aviation Drive; P.O. Box 1566 Mt. Vernon, Illinois 62864 ARDL, INC.

Lab Report No: 008462

ILLINOIS RIVER/MISSISSIPPI RIVER

Project Name: Project No:

04/02/2019 Report Date: NELAC Certified - IL100308

Analysis: Inorganics

ARDL No: 008462-05 Field ID: IL-9 Received: 03/12/201	61	Sampl Samp Samp	ing Loc ling Da ling Ti	'n: ILLIN te: 03/11 me: 1050	IOIS RIVER ./2019			Matrix Moisture	: WATER : NA	
Analyte	ГОД	ΓΟŐ	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Ammonia Nitrogen	0.0200	0.0300		0.75	MG/L	NONE	350.1	NA	03/13/19 0	3144408
Chlorophyll-a, Correcte	1.0	1.00		2.5	MG/CU.M.	10200H	10200H	03/12/19	03/25/19 0	3274439
Kjeldahl Nitrogen	0.380	0.400		2.88	MG/L	351.2	351.2	03/20/19	03/21/19 0	3254428
Nitrate as Nitrogen	0.0570	0.0600		2.46	MG/L	NONE	GREEN	NA	03/18/19 0	3204419
Nitrite as Nitrogen	0.0200	0.0200		0.028	MG/L	NONE	354.1	NA	03/12/19 0	3134405
Pheophytin-a	1.0	1.00		QN	MG/CU.M.	10200H	10200H	03/12/19	03/25/19 0	3274439
Phosphorus	0.0160	0.0200		2.17	MG/L	365.2	365.2	03/26/19	03/27/19 0	3294448
Phosphorus, -ortho	0.00800	0.0100		0.543	MG/L	NONE	365.2	NA	03/12/19 0	3154409
Solids, Total Suspended	11.1	11.1		556	MG/L	NONE	160.2	NA	03/14/19 0	3184416
Solids, Volatile Suspen	11.1	11.1		35.6	MG/L	NONE	160.4	NA	03/14/19 0	3184417
Total Organic Carbon	0.500	1.00		4.9	MG/L	NONE	415.1	NA	03/20/19 0	3294444

(a) DOD and/or NELAC Accredited Analyte.

Sample 008462-05, Inorganic Analyses

Page 1 of 1

03/20/19 03294444

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

008462 Lab Report No: ILLINOIS RIVER/MISSISSIPPI RIVER

Project Name: Project No:

04/02/2019 Report Date: NELAC Certified - IL100308

Analysis: Inorganics

ARDL No: 008462-06	10	Sampl	ing Loc	CSSIM : "	ISSIPPI RIVER	~		Matrix	: WATER	
Field ID: UMR-1		Samp	ling Da	te: 03/11	L/2019			Moisture	- NA	
Received: 03/12/201	6	Samp	iT guil	me: 1716						
			a and a second and a second a			Prep	Analysis	Prep	Analysis	Run
Analyte	LOD	ГОQ	Flag	Result	Units	Method	Method	Date	Date	Number
Ammonia Nitrogen	0.0200	0.0300		0.196	MG/L	NONE	350.1	NA	03/13/19	03144408
Chlorophyll-a, Correcte	1.0	1.00		3.4	MG/CU.M.	10200H	10200H	03/12/19	03/25/19	03274439
Kjeldahl Nitrogen	0.190	0.200		1.18	MG/L	351.2	351.2	03/20/19	03/21/19	03254428
Nitrate as Nitrogen	0.0570	0.0600		2.63	MG/L	NONE	GREEN	NA	03/18/19	03204419
Nitrite as Nitrogen	0.0200	0.0200		0.022	MG/L	NONE	354.1	NA	03/12/19	03134405
Pheophytin-a	1.0	1.00		ДN	MG/CU.M.	10200H	10200H	03/12/19	03/25/19	03274439
Phosphorus	0.00800	0.0100		0.548	MG/L	365.2	365.2	03/26/19	03/27/19	03294448
Phosphorus, -ortho	0.00800	0.0100		0.179	MG/L	NONE	365.2	NA	03/12/19	03154409
Solids, Total Suspended	5.0	5.00		62.5	MG/L	NONE	160.2	NA	03/14/19	03184416
Solids, Volatile Suspen	5.0	5.00		5.0	MG/L	NONE	160.4	NA	03/14/19	03184417
Total Organic Carbon	0.500	1.00		3.4	MG/L	NONE	415.1	NA	03/20/19	03294444

MG/L

(a) DOD and/or NELAC Accredited Analyte.

Sample 008462-06, Inorganic Analyses

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

> 008462 Lab Report No:

ILLINOIS RIVER/MISSISSIPPI RIVER

Project Name: Project No: s

04/02/2019 Report Date: NELAC Certified - IL100308

Analysis: Inorganics

		1	, .							
AKUL NO: UU8462-U		rdmax	od Loc	STM :u.;	LISSIPPI KLVEB	r		Matrix	: WATER	
Y-XIMO :UL DIST'		samp	en guiti	are: 03/1	T/707A			MOLSTURE	: NA	
Received: 03/12/201	19	Samp	ling Ti	lme: 1742						
Analyte	LOD	ГОО	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Ammonia Nitrogen	0.0200	0.0300		0.079	MG/L	NONE	350.1	NA	03/13/19 0	3144408
Chlorophyll-a, Correcte	1.0	1.00		10.1	MG/CU.M.	10200H	10200H	03/12/19	03/25/19 0	3274439
Kjeldahl Nitrogen	0.190	0.200		1.42	MG/L	351.2	351.2	03/20/19	03/21/19 0	3254428
Nitrate as Nitrogen	0.0570	0.0600		1.12	MG/L	NONE	GREEN	NA	03/18/19 0	3204419
Nitrite as Nitrogen	0.0200	0.0200		0.020	MG/L	NONE	354.1	NA	03/12/19 0	3134405
Pheophytin-a	1.0	1.00		QN	MG/CU.M.	10200H	10200H	03/12/19	03/25/19 0	3274439
Phosphorus	0.00800	0.0100		1.06	MG/L	365.2	365.2	03/26/19	03/27/19 0	3294448
Phosphorus, -ortho	0.00800	00100		0.0929	MG/L	NONE	365.2	NA	03/12/19 0	3154409
Solids, Total Suspended	11.1	11.1		339	MG/L	NONE	160.2	NA	03/14/19 0	3184416
Solids, Volatile Suspen	11.1	11.1		20.0	MG/L	NONE	160.4	NA	03/14/19 0	3184417
Total Organic Carbon	0.500	1.00		4.0	MG/L	NONE	415.1	NA	03/20/19 0	3294444

(a) DOD and/or NELAC Accredited Analyte.

Sample 008462-07, Inorganic Analyses

Page 1 of 1

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

Lab Report No: 008462

ILLINOIS RIVER/MISSISSIPPI RIVER

Project Name: Project No:

04/02/2019 Report Date: NELAC Certified - IL100308

Analysis: Inorganics

ARDL NO: 008462-08	~	Sampl	ing Loc	"n: MISSI	ISSIPPI RIVEN	~		Matrix	: WATER	
Field ID: UMR-3 Received: 03/12/201	6	Samp Samp	ling Da	te: 03/11 me: 1630	1/2019			Moisture	: NA	
Analyte	LOD	ГОД	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Numbe <i>r</i>
Ammonia Nitrogen	0.0200	0.0300		0.251	MG/L	NONE	350.1	NA	03/13/19	03144408
Chlorophyll-a, Correcte	1.0	1.00		5.1	MG/CU.M.	10200H	10200H	03/12/19	03/25/19	03274439
Kjeldahl Nitrogen	0.190	0.200		1.98	MG/L	351.2	351.2	03/20/19	03/21/19	03254428
Nitrate as Nitrogen	0.0570	0.0600		2.35	MG/L	NONE	GREEN	NA	03/18/19	03204419
Nitrite as Nitrogen	0.0200	0.0200		0.025	MG/L	NONE	354.1	NA	03/12/19	03134405
Pheophytin-a	1.0	1.00		CIN	MG/CU.M.	10200H	10200H	03/12/19	03/25/19	03274439
Phosphorus	0.00800	0.0100		1.35	MG/L	365.2	365.2	03/26/19	03/27/19	03294448
Phosphorus, -ortho	0.00800	0.0100		0.229	MG/L	NONE	365.2	NA	03/12/19	03154409
Solids, Total Suspended	20.0	20.0		576	MG/L	NONE	160.2	NA	03/14/19	03184416
Solids, Volatile Suspen	20.0	20.0		28.0	MG/L	NONE	160.4	NA	03/14/19	03184417
Total Organic Carbon	0.500	1.00		3.6	MG/L	NONE	415.1	NA	03/20/19	03294444

(a) DOD and/or NELAC Accredited Analyte.

Sample 008462-08, Inorganic Analyses

Page 1 of 1

Lab Report No: 008462

ILLINOIS RIVER/MISSISSIPPI RIVER

Project Name: Project No:

Report Date: 04/02/2019

NELAC Certified - IL100308

Analysis: Inorganics

APDI, NO. 008462-06		Cameb		TASTM . HISST	сатррт ртудр			Ma + vi	. МАТЕР	
Field ID: SLH-3		. Samp-	ling Da	te: 03/11	/2019			Moisture	NALEN :	
Received: 03/12/201	19	Samp	ing Ti	.me: 1654						
						Prep	Analysis	Ртер	Analysis	Run
Analyte	LOD	год	Flag	Result	Units	Method	Method	Date	Date	Number
Ammonia Nitrogen	0.0200	0.0300		0.272	MG/L	NONE	350.1	NA	03/13/19	03144408
Chlorophyll-a, Correcte	1.0	1.00		QN	MG/CU.M.	10200H	10200H	03/12/19	03/25/19	03274439
Kjeldahl Nitrogen	0.190	0.200		2.3	MG/L	351.2	351.2	03/20/19	03/21/19	03254428
Nitrate as Nitrogen	0.0570	0.0600		2.83	MG/L	NONE	GREEN	NA	03/18/19	03204419
Nitrite as Nitrogen	0.0200	0.0200		0.024	MG/L	NONE	354.1	NA	03/12/19	03134405
Pheophytin-a	1.0	1.00		1.8	MG/CU.M.	10200H	10200H	03/12/19	03/25/19	03274439
Phosphorus	0.0160	0.0200		1.6	MG/L	365.2	365.2	03/26/19	03/27/19	03294448
Phosphorus, -ortho	0.00800	0.0100		0.232	MG/L	NONE	365.2	NA	03/12/19	03154409
Solids, Total Suspended	20.0	20.0		478	MG/L	NONE	160.2	NA	03/14/19	03184416
Solids, Volatile Suspen	20.0	20.0		26.0	MG/L	NONE	160.4	NA	03/14/19	03184417

(a) DOD and/or NELAC Accredited Analyte.

Sample 008462-09, Inorganic Analyses

Page 1 of 1

03/20/19 03294444

NA

415.1

NONE

MG/L

в. б

1.00

0.500

Total Organic Carbon

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

Lab Report No: 008462

Report Date: 04/02/2019

62864

RIVER	
V/MISSISSIPPI	
NOIS RIVER	
TLLL	
Project Name:	

IL100308
1
Certified
NELAC

			Blank		Ргер	Analysis	Prep	Analysis		QC Lab	1
Analyte	LOD	ТоQ	Result	Units	Method	Method	Date	Date	Run	Number	
Ammonia Nitrogen	0.020	0.030	QN	MG/L	NONE	350.1	NA	03/13/19 0	03144408	008462-01B1	1
Chlorophyll-a, Corre	1.0	1.0	QN	MG/CU.M.	10200H	10200H	03/12/19	03/25/19 0	3274439	008462-01B1	
Kjeldahl Nitrogen	0.19	0.20	QN	MG/L	351.2	351.2	03/20/19	03/21/19 0	3254428	008462-01B1	
Nitrate as Nitrogen	0.019	0.020	QN	MG/L	NONE	GREEN	NA	03/18/19 0	3204419	008462-03B1	
Nitrite as Nitrogen	0.020	0.020	QN	MG/L	NONE	354.1	NA	03/12/19 0	03134405	008462-06B1	
Pheophytin-a	1.0	1.0	QN	MG/CU.M.	10200H	10200H	03/12/19	03/25/19 0	3274439	008462-01B1	
Phosphorus	0.008	0.010	Q	MG/L	365.2	365.2	03/26/19	03/27/19 0	3294448	008462-04B1	
Phosphorus, -ortho	0.008	0.010	QN	MG/L	NONE	365.2	NA	03/12/19 0	3154409	008462-04B1	
Solids, Total Suspen	1.0	1.0	QN	MG/L	NONE	160.2	NA	03/14/19 0	03184416	008462-01B1	
Solids, Volatile Sus	1.0	1.0	QN	MG/L	NONE	160.4	NA	03/14/19 0	3184417	008462-01B1	
Total Organic Carbon	0.50	1.0	QN	MG/L	NONE	415.1	NA	03/20/19 0	3294444	008462-01B1	

(a) DOD and/or NELAC Accredited Analyte Inorganic Method Blanks for 008462

ARI	JL, INC.	400 Av	LABOKA riation	Drive	P.O.	Box 1	Б ККРО 566	кт Mt. Ve	rnon, IL	62864
Lab Report No: 00	8462								Report Da	te: 04/02/2019
Project Name:	SIONITI	RIVER/M	ISSISSIP	PI RIVE	e.				NELAC Cer	tified - IL100308
	LCS 1	LCS 1	LCS 1	LCS 2	LCS 2	LCS 2	- C - K - K	Mean	Analytical	gc Lab
Analyte	Result	Level	% Rec	Result	Level	% Rec	Limits	% Rec	Run	Number
Ammonia Nitrogen	96.0	1.0	98	I		E	80-120	-	03144408	008462-01C1
tjeldahl Nitrogen	0.81	1.0	81	ł	1 1	I I	80-120	i t	03254428	008462-01C1
Vitrate as Nitrogen	0.98	1.0	98	;	1	;	80-120	1 1	03204419	008462-03C1
Vitrite as Nitrogen	0.95	1.0	95	1	:	;	80-120	1	03134405	008462-06C1
shosphorus	0.75	0.67	112	;	;	;	80-120	:	03294448	008462-04C1
Phosphorus, -ortho	0.10	0.10	101	1	1	;	80-120	;	03154409	008462-04C1
Total Organic Carbon	9.4	10.0	94	;	;	;	76-120	1	03294444	008462-01C1
NOTE: Any values (a) DOD and/or NE	tabulated above LAC Accredited A	marked with nalyte	an asteri	sk are outs	ide of acc	eptable li	mits.			

Inorganic LCS Results for 008462

	ARDL,	INC.	400 AV	ikik sl iation	Prive;	.0.4	Box 1	TE KEL 566 D	okr It. Veri	non,	Э Ц	52864	
Lab Report N	0: 00846	5								Repor	t Date	e: 04/0	2/2019
Project Name		SIONITI	RIVER/MI	Idississ	PI RIVER						NELAC	Certifi	ed - IL100308
	Sample	Sample	SM	SM	SM	MSD	MSD	MSD	% Rec		RPD		QC Lab
Analyte	Matrix	Result	Result	Level	% Rec	Result	Level	% Rec	Limits	RPD	Limit	Run	Number
Ammonia Nitrogen	WATER	0.35	2.4	2.0	102	2.4	2.0	103	75-125	ы	20	03144408	008462-01MS
Kjeldahl Nitrogen	WATER	3.2	3.9	0.80	86	3.8	0.80	80	75-125	ы	20	03254428	008462-01MS
Nitrate as Nitrogen	WATER	2.6	3.3	1.0	79	3.4	1.0	83	75-125	ы	20	03204419	008462-03MS
Nitrite as Nitrogen	WATER	0.022	1.0	1.0	100	1.1	1.0	105	75-125	ស	20	03134405	008462-06MS
Phosphorus	WATER	1.2	2.2	0.83	114	2.2	0.83	119	75-125	7	20	03294448	008462-04MS
Phosphorus, -ortho	WATER	0.47	0.57	0.10	108	0.56	0.10	66	75-125	7	20	03154409	008462-04MS
Total Organic Carbon	WATER	5.2	10.2	5.0	100	10.3	5.0	102	76-120	Ч	20	03294444	008462-01MS

NOTE: Values tabulated above marked with an asterisk are explained in the associated narrative. (a) DOD and/or NELAC Accredited Analyte.

(a) DOD alla/OI NETTAC ACCIENTICA ALIATYCE.

Inorganic Matrix Spikes for 008462

Page 1 of 1

ARDL Report 8462 - Page 15 of 20

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

Lab Report No: 008462

Report Date: 04/02/2019

RIVER
MISSISSIM
RIVER/
ILLINOIS
Name:
Project

NELAC Certified - IL100308

Analyte	Sample Conc'n	First Duplicate	Second Duplicate	Units	Percent Diff	Mean (Smp,D1,D2)	Analytical Run	QC Lab Number
Chlorophyll-a, Corrected	QN	10.1	1	MG/CU.M.	NC	1	03274439	008462-01D1
Pheophytin-a	3.6	0	1	MG/CU.M.	0	1	03274439	008462-01D1
Solids, Total Suspended	1070	1070	1 1	MG/L	0	1	03184416	008462-01D1
Solids, Volatile Suspend	60.0	62.0	1	MG/L	m	;	03184417	008462-01D1

(a) DOD and/or NELAC Accredited Analyte Sample Duplicates for 008462

Sample Receipt Information

Including as appropriate:

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

ARDL Data Package 8462 – Inorganics

ARDL, Inc	P.O.	. Box 1566, 4 (618) 244-	400 Aviatic 3235 Phon	n Drive, e (61	Mt. V 8) 24	ernon, 4-114	9 Fax	864	ŀ			ŀ	Ļ	Ĺ		0	HAIN	OF CUST	DDY R	ECO	RD
PROJECT Illinois River			1EK2		11			~											£	RESERV.	ATION
(bruleRS: (Signature)	Sche	pku	CONTAIN		CON SS	N	Od.	EHNIN	OS ALLOS	00	\sim			\searrow		_			ICED	ADD FIND	ECIFY MICALS ED AND AL pH IF VOWN
SAMPLE NUMBER	DATE	TIME	NO. OF GRAB COMP	4.351	4 *	2010		SIN	CHOOL		\sim			\sim		SAJ	REMAN OR MPLE LC	RKS CATION			
IL-2	3/11/19	itic	X	X	XX	X	×	X	X										X		
IL-6		1330	X	X	XX	X	X		X										X		
IL-7		05 KI	X	X	XX	X	X	PN -	X										X		
IL-8		00001	X	X	XX	X	X		X										X		
IL-9	_	1050	X	X	XX	X	X	r v	X										X		
ALL																					
UmR-1	3/11/9	9121	X	X	X	X	X	4	~						ms/m	150	Pew TA.	Ner Re	ie, ve	0	
に ろう	,	6771	*	X	オン	X	*	~	>												
LIMR-3		1630	\times	χ	×	×	×	-	>												
564-3	-	1654	×	x X	×	×	×	7 ×							NO M	m/sim	50 0	ONTAINC	e Re	1:20	ed
					_						+	_							+	_	
Relinquished by: (Signature)	Date	Time	Received	by. (Sign	ature	- /	REN	1 ARK	S/SPE	CIAL	INSTR	UCTIO	:SNC								
(Sur Marine	61/11/5	18is	1)alleree	NM	err	2	*Dro	pernec	with 1	H-SO											
Reinquished by: (Signature)	3/11/19	11me 1950	Received	by: (Sign	ature)		110	201 100	TINTA	40.0211											
Received for Laboratory by: (Signature)	3/Date	Time 0ろ子の	Shipping'	Ficket No	ċ																
J DV RENAUTI																					

8462

PURCHASE ORDER NO:

COOLER RECEIPT REPORT ARDL, INC.

ARDL #:	Cooler # $1 $	
Project: <u>IlliNois River (See Commen</u> TS	Date Received: <u>3-11-19 Ley we</u> f	
A DELIMINARY EXAMINATION PHASE. Data cooler was apared: 2-17	-19 (Signatura) Life a Asican.	
Preclaminary Examinary for Prase. Date cooler was opened.	VES NO	-
If YES, enter carrier name and airbill number here:	l'aller	
2. Were custody seals on outside of cooler?	YES NO! N	Į/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	IA)
4. Did you screen samples for radioactivity using a Geiger Counter?	NO	
5. Were custody papers sealed in a plastic bag?	YES NO	
6. Were custody papers filled out properly (ink, signed, etc.)?		I/A
7. Were custody papers signed in appropriate place by ARDL personnel?		/A
8. Was project identifiable from custody papers? If YES, enter project name at	t the top of this form	/A
9. Was a separate container provided for measuring temperature? YES	NO Observed Cooler TempC	~
B. LOG-IN PHASE: Date samples were logged-in: 3-12-19	(Signature) A achteum	<u> </u>
10. Describe type of packing in cooler:		_
11. Were all samples sealed in separate plastic bags?		J/A
12. Did all containers arrive unbroken and were labels in good condition?		
13. Were sample labels complete?	VES NO	
14. Did all sample labels agree with custody papers?	ammento YES NO	
15. Were correct containers used for the tests indicated?	NO	
16. Was pH correct on preserved water samples?		I/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	I/A
19. Was the ARDL project coordinator notified of any deficiencies?		I/A
Comments and/or Corrective Action:	Sample Transfer	7
8) first & sete ID'S had Containers	Fraction Fraction	
marked as Illinois River	all	
hast 4 site ID's had Container	Area # Area #	
Marile as III,55,55, pp. River	Ву Ву	
	dle,	
	3 - 17 - 19 On	
-		
	Chain-of-Custody #/A	
(By: Signature) dle Date: 3/12/19		

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1

COOLER RECEIPT REPORT ARDL, INC.

AR	DL #:	Cooler # <i>Z af_ Z</i> Number of Coolers in Shipment:	
Pro	ect: <u>III:NOIS River</u> (see Commented)	Date Received: <u>3-11-19 Lug</u> No	aj
Α.	PRELIMINARY EXAMINATION PHASE: Date cooler was opened: 3-12	-19 (Signature) A Hackteem	
1.	Did cooler come with a shipping slip (airbill, etc.)?		\$
	If YES, enter carrier name and airbill number here:	Caucier	
2.	Were custody seals on outside of cooler?		N/A
	How many and where?,Seal Date:,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?	VES NO	
5.	Were custody papers sealed in a plastic bag?		\rangle
6.	Were custody papers filled out properly (ink, signed, etc.)?		N/A
7.	Were custody papers signed in appropriate place by ARDL personnel?	VES NO	N/A
8.	Was project identifiable from custody papers? If YES, enter project name at t	the top of this form) N/A
9.	Was a separate container provided for measuring temperature? YES	NO Observed Cooler Temp Correction factor C	
В.	LOG-IN PHASE: Date samples were logged-in: 3-12-19 (S	Signature)	
10.	Describe type of packing in cooler:		
11.	Were all samples sealed in separate plastic bags?) N/A
12.	Did all containers arrive unbroken and were labels in good condition?		
13.	Were sample labels complete?	NO	
14.	Did all sample labels agree with custody papers?	mments NO	
15.	Were correct containers used for the tests indicated?	VES NO	
16.	Was pH correct on preserved water samples?	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	N/A
	Comments and/or Corrective Action:	Sample Transfer	
Ë)	erst 5 S. Te ID's had Containers	Fraction Fraction	
11	alled as Illinois Kiver.	Area # Area #	
1	racked as Mississippi River _	Walkin	
		P	

Chain-of-Custody # ____/A

3-12-19

On

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dle Date: 3/12/19

[Received I CONTAINED; NOTED ON

Cof C;

(By: Signature)

On

•-



Environmental (Analytical | Management |

Customer Name: SLCOE

Project Name: Lower River

Samples Received at ARDL: 3/13/19

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

www.ardlinc.com

Date: 4/9/19

Lab Name: ARDL, Inc.

ARDL Report No.: 8463

CASE NARRATIVE

Customer	Date	Lab ID	
Sample No.	Collected	Number	Analyses Requested
OPR-2 RM 44	3/12/19	8463-01	Inorganics(1)
OPR-3 RM 80	3/12/19	8463-02	Inorganics(1)
OPR-4 RM 110	3/12/19	8463-03	Inorganics(1)
OPR-5 RM 150	3/12/19	8463-04	Inorganics(1)
SLH-2 RM 177	3/12/19	8463-05	Inorganics(1)
SLH-1 RM 162	3/12/19	8463-06	Inorganics(1)
SLH-15 RM 120	3/12/19	8463-07	Inorganics(1)

(1) Including ammonia, chlorophyll/pheophytin, nitrate, nitrite, TKN, TOC, orthophosphate, total phosphorus, TSS, and TVSS.

The quality control data are summarized as follows:

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

Only an MS sample data evaluation was performed for the TOC analysis. Percent recoveries of all matrix spikes and matrix spike duplicates were within control limits, except 1 of 2 for TKN.

DUPLICATE

Duplicate analyses are reported as MS/MSD, except chlorophyll/pheophytin, TSS, and TVSS. RPD of the duplicate analyses met criteria, with exception of chlorophyll.

Project Name: Lower River

ARDL Report No.: 8463

CASE NARRATIVE (Continued)

DATA REPORTING QUALIFIERS

The following data reporting qualifiers are used as required:

ND - Indicates parameter was analyzed for but not detected. The sample quantitation limit has been corrected for weight, dilution and/or percent moisture.

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

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

8463 – Inorganics

Lab Report No: 008463

LOWER RIVER

Project Name: Project No:

Report Date: 04/02/2019

NELAC Certified - IL100308

Analysis: Inorganics

ARDL No: 008463-0. Field ID: 0PR-2 RM	1 44	Sampl Samp	ing Loc ling Da	c'n: LOWER ate: 03/12	RIVER /2019			Matrix Moisture	: WATER : NA	
Received: 03/13/20:	61	Samp	Ting T	ime: 0946						
						Prep	Analysis	Prep	Analysis	Run
Analyte	LOD	ToQ	Flag	Result	Units	Method	Method	Date	Date	Number
Ammonia Nitrogen	0.0200	0.0300		0.159	MG/L	NONE	350.1	NA	03/13/19	03144407
Chlorophyll-a, Correcte	1.0	1.00		7.8	MG/CU.M.	10200H	10200H	03/12/19	03/25/19	03274440
Kjeldahl Nitrogen	0.190	0.200		1.15	MG/L	351.2	351.2	03/20/19	03/21/19	03254428
Nitrate as Nitrogen	0.0380	0.0400		2.11	MG/L	NONE	GREEN	NA	03/19/19	03204421
Nitrite as Nitrogen	0.0200	0.0200		0.026	MG/L	NONE	354.1	NA	03/13/19	03154411
Pheophytin-a	1.0	1.00		UN	MG/CU.M.	10200H	10200H	03/12/19	03/25/19	03274440
Phosphorus	0.00800	0.0100		0.847	MG/L	365.2	365.2	03/26/19	03/27/19	03294448
Phosphorus, -ortho	0.00800	0.0100		0.106	MG/L	NONE	365.2	NA	03/13/19	03154410
Solids, Total Suspended	10.0	10.0		295	MG/L	NONE	160.2	NA	03/14/19	03184416
Solids, Volatile Suspen	10.0	10.0		20.0	MG/L	NONE	160.4	NA	03/14/19	03184417
Total Organic Carbon	0.500	1.00		3.1	MG/L	NONE	415.1	NA	03/20/19	03294444

(a) DOD and/or NELAC Accredited Analyte.

Sample 008463-01, Inorganic Analyses

Lab Report No: 008463

Report Date: 04/02/2019

Project Name: LOWE. Project No:	R RIVER							И	Analysis ELAC Certi	: Inorgar fied - ILJ	iics 00308
ARDL No: 0084 Field ID: OPR- Received: 03/1	63-02 3 RM 80 3/2019		Sampl Samp Samp	ing Loc ling Da ling Ti	'n: LOWER te: 03/12 me: 0915	R RIVER 2/2019			Matrix Moisture	:: WATER :: NA	
Analyte		do,	ГОД	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Ammonia Nitrogen	0.	0200	0.0300		0.202	MG/L	NONE	350.1	NA	03/13/19	03144407
Chlorophyll-a, Corr	ecte 1	0.	1.00		7.6	MG/CU.M.	10200H	10200H	03/12/19	03/25/19	03274440
Kjeldahl Nitrogen	.0	190	0.200		0.932	MG/L	351.2	351.2	03/20/19	03/21/19	03254428
Nitrate as Nitrogen	0.	0380	0.0400		1.89	MG/L	NONE	GREEN	NA	03/19/19	03204421
Nitrite as Nitrogen	0.	0200	0.0200		DND	MG/L	NONE	354.1	NA	03/13/19	03154411
Pheophytin-a	-1	0.1	1.00		DN	MG/CU.M.	10200H	10200H	03/12/19	03/25/19	03274440
Phosphorus	0.0	00800	0.0100		0.877	MG/L	365.2	365.2	03/26/19	03/27/19	03294448
Phosphorus, -ortho	0.0	00800	0.0100		0.0135	MG/L	NONE	365.2	NA	03/13/19	03154410
Solids, Total Suspe	nded 1	1.1	11.1		288	MG/L	NONE	160.2	NA	03/14/19	03184416
Solids, Volatile Su	spen 1	1.1	11.1		17.8	MG/L	NONE	160.4	NA	03/14/19	03184417
Total Organic Carbo	о. С	500	1.00		3.2	MG/L	NONE	415.1	NA	03/20/19	03294444

(a) DOD and/or NELAC Accredited Analyte.

Sample 008463-02, Inorganic Analyses

Lab Report No: 008463

LOWER RIVER

Project Name:

Report Date: 04/02/2019

Analysis: Inorganics

Project No:							Z	ELAC Certi	fied - ILL	00308
ARDL No: 008463-03	8	Sampl	ing Loc	z'n: LOWER	RIVER			Matrix	: WATER	
Field ID: OPR-4 RM	110	Samp	ling Da	ate: 03/12	/2019			Moisture	: NA	
Received: 03/13/201	19	Samp	Iing Ti	ime: 1330						
						Prep	Analysis	Prep	Analysis	Run
Analyte	LOD	ТОД	Flag	Result	Units	Method	Method	Date	Date	Number
Ammonia Nitrogen	0.0200	0.0300		0.194	MG/L	NONE	350.1	NA	03/13/19	03144407
Chlorophyll-a, Correcte	1.0	1.00		5.1	MG/CU.M.	10200H	10200H	03/12/19	03/25/19	03274440
Kjeldahl Nitrogen	0.190	0.200		1.59	MG/L	351.2	351.2	03/20/19	03/21/19	03254428
Nitrate as Nitrogen	0.0380	0.0400		2.01	MG/L	NONE	GREEN	NA	03/19/19	03204421
Nitrite as Nitrogen	0.0200	0.0200		0.021	MG/L	NONE	354.1	NA	03/13/19	03154411
Pheophytin-a	1.0	1.00		QN	MG/CU.M.	10200H	10200H	03/12/19	03/25/19	03274440
Phosphorus	0.00800	0.0100		1.42	MG/L	365.2	365.2	03/26/19	03/27/19	03294448
Phosphorus, -ortho	0.00800	0010.0		0.444	MG/L	NONE	365.2	NA	03/13/19	03154410
Solids, Total Suspended	14.3	14.3		454	MG/L	NONE	160.2	NA	03/14/19	03184416
Solids, Volatile Suspen	14.3	14.3		28.6	MG/L	NONE	160.4	NA	03/14/19	03184417
Total Organic Carbon	0.500	1.00		3.8	MG/L	NONE	415.1	NA	03/20/19	03294444

(a) DOD and/or NELAC Accredited Analyte.

Sample 008463-03, Inorganic Analyses

Lab Report No: 008463

LOWER RIVER

Project Name: Project No:

Report Date: 04/02/2019

NELAC Certified - IL100308 Analysis: Inorganics

ARDL No: 008463	-04	Sampl	ing Loc	r'n: LOWER	E RIVER			Matrix	: WATER	
Field ID: OPR-5	RM 150	Samp	Ling Da	ite: 03/12	:/2019			Moisture	: NA	
Received: 03/13/	2019	Samp	iT guil	.me: 1430						
						Ртер	Analysis	Prep	Analysis	Run
Analyte	LOD	ГОД	Flag	Result	Units	Method	Method	Date	Date	Number
Ammonia Nitrogen	0.0200	0.0300		0.158	MG/L	NONE	350.1	NA	03/13/19 (03144407
Chlorophyll-a, Correc	te 1.0	1.00		5.1	MG/CU.M.	10200H	10200H	03/12/19	03/25/19 (03274440
Kjeldahl Nitrogen	0.190	0.200		1.34	MG/L	351.2	351.2	03/20/19	03/21/19	3254428
Nitrate as Nitrogen	0.0190	0.0200		1.51	MG/L	NONE	GREEN	NA	03/19/19	03204421
Nitrite as Nitrogen	0.0200	0.0200		0.028	MG/L	NONE	354.1	NA	03/13/19 (3154411
Pheophytin-a	1.0	1.00		QN	MG/CU.M.	1020H	10200H	03/12/19	03/25/19 (3274440
Phosphorus	0.00800	0.0100		1.61	MG/L	365.2	365.2	03/26/19	03/27/19 (3294448
Phosphorus, -ortho	0.00800	0010.0		0.146	MG/L	NONE	365.2	NA	03/13/19 (3154410
Solids, Total Suspend	ed 20.0	20.0		410	MG/L	NONE	160.2	NA	03/14/19 (3184416
Solids, Volatile Susp	en 20.0	20.0		26.0	MG/L	NONE	160.4	NA	03/14/19 (3184417
Total Organic Carbon	0.500	1.00		4.0	MG/L	NONE	415.1	NA	03/20/19 (3294444

(a) DOD and/or NELAC Accredited Analyte.

Sample 008463-04, Inorganic Analyses

Page 1 of 1

Lab Report No: 008463

LOWER RIVER

Project Name: Project No:

Report Date: 04/02/2019

NELAC Certified - IL100308

Analysis: Inorganics

ARDL No: 008463-05		Sampl	ing Loc	n: LOWER	RIVER			Matrix	: WATER	
Fleid ID: SLH-2 RM	T77	Samp	тлд ла.	te: 03/12	6702/			MOLSTURE	: NA	
Received: 03/13/201	19	Samp	ling Ti	me: 1630						
						Prep	Analysis	Prep	Analysis	Run
Analyte	LOD	ГОД	Flag	Result	Units	Method	Method	Date	Date	Number
Ammonia Nitrogen	0.0200	0.0300		0.135	MG/L	NONE	350.1	NA	03/13/19 (03144407
Chlorophyll-a, Correcte	1.0	1.00		5.1	MG/CU.M.	10200H	10200H	03/12/19	03/25/19 (03274440
Kjeldahl Nitrogen	0.190	0.200		1.81	MG/L	351.2	351.2	03/20/19	03/21/19 (03254428
Nitrate as Nitrogen	0.0190	0.0200		1.27	MG/L	NONE	GREEN	NA	03/19/19	03204421
Nitrite as Nitrogen	0.0200	0.0200		0.021	MG/L	NONE	354.1	NA	03/13/19 (03154411
Pheophytin-a	1.0	1.00		ND	MG/CU.M.	10200H	1020H	03/12/19	03/25/19 (03274440
Phosphorus	0.00800	0.0100		1.36	MG/L	365.2	365.2	03/26/19	03/27/19 (03294448
Phosphorus, -ortho	0.00800	0.0100		0.143	MG/L	NONE	365.2	NA	03/13/19 (03154410
Solids, Total Suspended	12.5	12.5		385	MG/L	NONE	160.2	NA	03/14/19 (03184416
Solids, Volatile Suspen	12.5	12.5		27.5	MG/L	NONE	160.4	NA	03/14/19 (03184417
Total Organic Carbon	0.500	1.00		4.1	MG/L	NONE	415.1	NA	03/20/19 (03294444

(a) DOD and/or NELAC Accredited Analyte.

Sample 008463-05, Inorganic Analyses

Lab Report No: 008463

LOWER RIVER

Project Name:

Report Date: 04/02/2019

Analysis: Inorganics

Project No:							Z	ELAC Certi	fied - IL1	00308
ARDL No: 008463-06 Field ID: SLH-1 RM Received: 03/13/201	5 162 19	Samp1 Samp Samp	ing Loc ling Da Ting Ta	:'n: LOWER ate: 03/12 me: 1530	. RIVER //2019			Matrix Moisture	: WATER : NA	
Analyte	LOD	год	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Ammonia Nitrogen	0.0200	0.0300		0.207	MG/L	NONE	350.1	NA	03/13/19	03144407
Chlorophyll-a, Correcte	1.0	1.00		5.1	MG/CU.M.	10200H	10200H	03/12/19	03/25/19	03274440
Kjeldahl Nitrogen	0.190	0.200		1.29	MG/L	351.2	351.2	03/20/19	03/21/19	03254428
Nitrate as Nitrogen	0.0190	0.0200		1.73	MG/L	NONE	GREEN	NA	03/19/19	03204421
Nitrite as Nitrogen	0.0200	0.0200		0.027	MG/L	NONE	354.1	NA	03/13/19	03154411
Pheophytin-a	1.0	1.00		ЛD	MG/CU.M.	10200H	10200H	03/12/19	03/25/19	03274440
Phosphorus	0.00800	0.0100		1.24	MG/L	365.2	365.2	03/26/19	03/27/19	03294448
Phosphorus, -ortho	0.00800	0.0100		0.143	MG/L	NONE	365.2	NA	03/13/19	03154410
Solids, Total Suspended	20.0	20.0		492	MG/L	NONE	160.2	NA	03/14/19	03184416
Solids, Volatile Suspen	20.0	20.0		28.0	MG/L	NONE	160.4	NA	03/14/19	03184417
Total Organic Carbon	0.500	1.00		4.1	MG/L	NONE	415.1	NA	03/20/19	03294444

(a) DOD and/or NELAC Accredited Analyte.

Sample 008463-06, Inorganic Analyses

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

Lab Report No: 008463

LOWER RIVER

Project Name:

04/02/2019 Report Date: Analysis: Inorganics

Project No:								Z	IELAC Certi	fied - IL1	00308
ARDL NO:	008463-07		Sampl	ing Lo	c'n: LOWE	R RIVER			Matrix	: WATER	
Field ID:	SLH-15 RM	120	Samp	ling Di	ate: 03/1	2/2019			Moisture	: NA	
Received:	03/13/201	6	Samp	ling T	ime: 0830						
							Prep	Analysis	Prep	Analysis	Run
Analyt	Ð	LOD	ТоÕ	Flag	Result	Units	Method	Method	Date	Date	Number
Ammonia Nitroge	n	0.0200	0.0300		0.183	MG/L	NONE	350.1	NA	03/13/19	03144407
Chlorophyll-a,	Correcte	1.0	1.00		2.5	MG/CU.M.	10200H	10200H	03/12/19	03/25/19	03274440
Kjeldahl Nitrog	jen.	0.190	0.200		1.62	MG/L	351.2	351.2	03/20/19	03/21/19	03254428
Nitrate as Nit1	rogen	0.0190	0.0200		1.8	MG/L	NONE	GREEN	NA	03/19/19	03204421
Nitrite as Nit1	rogen	0.0200	0.0200		QN	MG/L	NONE	354.1	NA	03/13/19	03154411
Pheophytin-a		1.0	1.00		2.8	MG/CU.M.	10200H	10200H	03/12/19	03/25/19	03274440
Phosphorus		0.00800	0.0100		1.52	MG/L	365.2	365.2	03/26/19	03/27/19	03294448
Phosphorus, -01	rtho	0.00800	0.0100		0.135	MG/L	NONE	365.2	NA	03/13/19	03154410
Solids, Total S	Suspended	14.3	14.3		476	MG/L	NONE	160.2	NA	03/14/19	03184416
Solids, Volatil	le Suspen	14.3	14.3		28.6	MG/L	NONE	160.4	NA	03/14/19	03184417
Total Organic (Carbon	0.500	1.00		4.0	MG/L	NONE	415.1	NA	03/20/19	03294444

(a) DOD and/or NELAC Accredited Analyte.

Sample 008463-07, Inorganic Analyses

Page 1 of 1

Total Organic Carbon

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

Lab Report No: 008463

LOWER RIVER

Project Name:

Report Date: 04/02/2019

NELAC Certified - IL100308

			Blank		Prep	Analysis	Prep	Analysis		QC Lab
Analyte	LOD	ГОQ	Result	Units	Method	Method	Date	Date Ru	E	Number
Ammonia Nitrogen	0.020	0.030	QN	MG/L	NONE	350.1	NA	03/13/19 0314	4407	008463-01B1
Chlorophyll-a, Corre	1.0	1.0	Q	MG/CU.M.	10200H	10200H	03/12/19	03/25/19 0327	4440	008463-01B1
Kjeldahl Nitrogen	0.19	0.20	QN	MG/L	351.2	351.2	03/20/19	03/21/19 0325	64428	008462-01B1
Nitrate as Nitrogen	0.019	0.020	QN	MG/L	NONE	GREEN	NA	03/19/19 0320	442 1	008463-02B1
Nitrite as Nitrogen	0.020	0.020	ND	MG/L	NONE	354.1	NA	03/13/19 0315	54411	008463-02B1
Pheophytin-a	1.0	1.0	UN	MG/CU.M.	10200H	10200H	03/12/19	03/25/19 0327	74440	008463-01B1
Phosphorus	0.008	0.010	ND	MG/L	365.2	365.2	03/26/19	03/27/19 0329	94448	008462-04B1
Phosphorus, -ortho	0.008	0.010	ND	MG/L	NONE	365.2	NA	03/13/19 0315	54410	008463-03B1
Solids, Total Suspen	1.0	1.0	QN	MG/L	NONE	160.2	NA	03/14/19 0318	84416	008462-01B1
Solids, Volatile Sus	1.0	1.0	ND	MG/L	NONE	160.4	NA	03/14/19 0318	84417	008462-01B1
Total Organic Carbon	0.50	1.0	QN	MG/L	NONE	415.1	NA	03/20/19 0329	94444	008462-01B1

(a) DOD and/or NELAC Accredited Analyte Inorganic Method Blanks for 008463

Lab Report No: 00	8463								Report Da	te: 04/02/2019
Project Name:	LOWER RIVI	ER							NELAC Cer	tified - 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
Ammonia Nitrogen	0.99	1.0	66	8 9	1	1	80-120	1	03144407	008463-01C1
Kjeldahl Nitrogen	0.81	1.0	81	1	I I	1	80-120	:	03254428	008462-01C1
Nitrate as Nitrogen	Ч	1.0	100	;	ľ	1	80-120	1	03204421	008463-02C1
Nitrite as Nitrogen	0.97	1.0	97	;	;	!	80-120	8	03154411	008463-02C1
Phosphorus	0.75	0.67	112	}	!	;	80-120	;	03294448	008462-04C1
Phosphorus, -ortho .	0.10	0.10	103	:	;	:	80-120	;	03154410	008463-03C1
Total Organic Carbon	9.4	10.0	94	;	!	:	76-120	1	03294444	008462-01C1
· · · · · · · · · · · · · · · · · · ·										
NOTE: Any values ((a) DOD and/or NE)	tabulated above mi LAC Accredited Ani	arked with alyte	an asteri:	sk are out:	side of acc	ceptable 1	imits.			

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F .	Vernon,
REPORJ	Mt.
CATE	1566
DUPLI	. Box
TKE	Р.О
PIKE/SI	Drive;
MATRIX SI	Aviation
	400
	INC.
	ARDL,

Lab Report No: 008463

Project Name:

Report Date: 04/02/2019

LOWER RIVER

NELAC Certified - IL100308

- 14	Sample	Sample	SM	SM	SM	MSD	USM	MSD	% Rec		RPD		QC Lab
Analyte	Matrix	Result	Result	Level	% Rec	Result	Level	% Rec	Limits	RPD	Limit	Run	Number
Ammonia Nitrogen	WATER	0.16	2.2	2.0	104	2.2	2.0	104	75-125	0	20	03144407	008463-01MS
Kjeldahl Nitrogen	WATER	1.2	1.9	0.80	95	2.2	0.80	133 *	75-125	15	20	03254428	008463-01MS
Nitrate as Nitrogen	WATER	1.9	2.9	1.0	106	3.0	1.0	TTT	75-125	10	20	03204421	008463-02MS
Nitrite as Nitrogen	WATER	CIN	ы	1.0	100	0.97	1.0	97	75-125	7	20	03154411	008463-02MS
Phosphorus	WATER	1.4	2.1	0.83	78	2.2	0.83	92	75-125	ß	20	03294448	008463-03MS
Phosphorus, -ortho	WATER	0.44	0.57	0.10	125	0.55	0.10	107	75-125	e	20	03154410	008463-03MS
Total Organic Carbon	WATER	3.2	8.2	5.0	100	e t	;	;	76-120	;	;	03294444	008463-02MS

(a) DOD and/or NELAC Accredited Analyte.

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

Inorganic Matrix Spikes for 008463

	/02/2019	- IL100308	QC Lab Number	08463-01D1 108463-01D1 108463-07D1 108463-07D1
on, IL 62864	eport Date: 04	BLAC Certified	Analytical Run	03274440 03274440 03184416 03184417 03184417
r 5 Mt. Verno	Ж	N	Mean (Smp, D1, D2)	
E REPORI Box 1566			Percent Diff	77 * NC
DUPLICAT e; P.O.			Units	MG/CU.M. MG/CU.M. MG/L MG/L
SAMPLE cion Driv			Second Mplicate	
400 Aviat		-	First Duplicate D	17.6 0 509 30.0
INC.	т	RIVER	Sample Conc'n	7.8 ND 476 28.6
ARDL,	Lab Report No: 00846	Project Name: LOWER	Analyte	Chlorophyll-a, Corrected Pheophytin-a Solids, Total Suspended Solids, Volatile Suspend

See Case Narrative for exceptions. * indicates that agreement between duplicates is greater than 20%. (a) DOD and/or NELAC Accredited Analyte Sample Duplicates for 008463

Sample Receipt Information

Including as appropriate:

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

ARDL Data Package 8463 – Inorganics

<i>₿463</i> DDY RECORD	PRESERVATION	RPECIFY SPECIFY CHEMICALS ADDED AND FINAL PH IF KNOWN		X	X	X	X	X	X	X						
CHAIN OF CUSTO			REMARKS OR SAMPLE LOCATION													
														 UCTIONS:		
864		ARTIN SOLUTION	HADAND SIN NSIN NSIN NSIN SIS	X	X	X	X	X	X X	X				 IARKS/SPECIAL INSTR	served with H2SO4	
ve, Mt. Vernon, IL 62: (618) 244-1149 Fax	No.	100 1-100 100 - 1-100 100 - 100 100 - 100	5-1-1-0	XXXXX	X X X X	XXXXX	X X X X	XXXX	X X X X	XXXXX			-	 r 1 & Minderer	ignature) - *Pre	No.
, 400 Aviation Dri 4-3235 Phone	IEKS	CONTAIN	COMP GRAB	XX	X X	X X	XX	XX	X X	XX				 Received by: (S	Received by: (S	Shipping Ticket
P.O. Box 1566 (618) 24		Breeting	DATE TIME 2019	3-12946	S-12 9 15	3-12 330	3 12 1430	3-12 1630	3-12 8ad	3-12 230				Slig Silg Sils	2/12/19 16:57	Date Time
ARDL, Inc.	PROJECT Lower River	SAMPLERS: (Signature) T. Schertar	SAMPLE NUMBER	OPR-2 RM 44	OPR-3 RM 80	OPR-4 RM 110	OPR-5 RM 150	SLH-2 RM 177 // 30	SLH-1 RM 162 530	SLH-15 RM 120				Relinquished by: (Signature)	Relinquished by: (Signature)	Received for Laporatory by: (Signature) Release

PURCHASE ORDER NO:

COOLER RECEIPT REPORT ARDL, INC.

AF	DL #:	Cooler # <u>/ A</u> 2 Number of Coolers in Shi	pment:	7	_
Pro	oject: Lower River	Date Received: <u>3-12</u>	-19 lug-	va	ŕ
Α.	PRELIMINARY EXAMINATION PHASE: Date cooler was opened: 3-13	<u> 3-19 (Signature) /// /</u>	achrus	n_	
1.	Did cooler come with a shipping slip (airbill, etc.)?		YES	(NO)	I
	If YES, enter carrier name and airbill number here:	Cauries			
2.	Were custody seals on outside of cooler?		YES	NO	, N/A
	How many and where?,Seal Date:,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?			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 of this form	YES	NO	N/A
9.	Was a separate container provided for measuring temperature? YES	NO Observed Cooler Ter	mp. <u>0.3</u> c		_
В.	LOG-IN PHASE: Date samples were logged-in: 3-13-19 (S	Signature)	Mmc		
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?			NO	
14.	Did all sample labels agree with custody papers?		VES	NO	
15.	Were correct containers used for the tests indicated?		VES	NO	
16.	Was pH correct on preserved water samples?			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:	Sample	Transfor		
	· · · · · · · · · · · · · · · · · · ·		Indianalei		
		Fraction	Fraction		
		Fraction Cll Area #	Fraction Area #		
		Fraction All Area # Walken	Fraction Area #		

Chain-of-Custody #

ue

3-13-19

On

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

Date:

(By: Signature)

On

COOLER RECEIPT REPORT ARDL, INC.

ARDL #: <u>\$463</u>	Cooler # <u>2 4 2</u> Number of Coolers in Shipment: <u>2</u>
Project: Lower River	Date Received: 3-12-19 Lug Naj
A. <u>PRELIMINARY EXAMINATION PHASE</u> : Date cooler was opened: <u>3</u> -	13-19 (Signature) Alachrum
1. Did cooler come with a shipping slip (airbill, etc.)?	
If YES, enter carrier name and airbill number here:	(auxies)
2. Were custody seals on outside of cooler?	YES (NO) N/A
How many and where?	e: ,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 Geiger Counter? 	
5. Were custody papers sealed in a plastic bag?	YES NO
 Were custody papers filled out properly (ink, signed, etc.)? 	YES NO N/A
7. Were custody papers signed in appropriate place by ARDL personnel?	
8. Was project identifiable from custody papers? If YES, enter project name	at the top of this form
9. Was a separate container provided for measuring temperature? YES	NO Observed Cooler TempCC
B. LOG-IN PHASE: Date samples were logged-in: <u>3-13-19</u>	_(Signature)
10. Describe type of packing in cooler:	-
11. Were all samples sealed in separate plastic bags?	
12. Did all containers arrive unbroken and were labels in good condition?	
13. Were sample labels complete?	(TES NO
14. Did all sample labels agree with custody papers?	
15. Were correct containers used for the tests indicated?	VES NO
16. Was pH correct on preserved water samples?	
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?	
Comments and/or Corrective Action:	Sample Transfer
· · · · ·	Fraction Fraction
	Area # Area #
	11/alkin
	By By
· · · · · · · · · · · · · · · · · · ·	On On
· · · · · · · · · · · · · · · · · · ·	3-13-19

Chain-of-Custody # ___/A

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Date:

(By: Signature)



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

www.ardlinc.com

Date: 4/9/19

Project Name: Upper Mississippi River

Customer Name: SLCOE

Samples Received at ARDL: 3/13/19

Lab Name: ARDL, Inc. ARDL Report No.: 8464

CASE NARRATIVE

Customer	Date	Lab ID	
Sample No.	Collected	Number	Analyses Requested
UMR-5 MILE 212.5	3/13/19	8464-01	Inorganics(1)
UMR-6 MILE 231	3/13/19	8464-02	Inorganics(1)
UMR-15	3/13/19	8464-03	Inorganics(1)
UMR-7 MILE 241	3/13/19	8464-04	Inorganics(1)
UMR-LM RM 251	3/13/19	8464-05	Inorganics(1)
UMR-9 MILE 273	3/13/19	8464-06	Inorganics(1)
UMR-LA RM 283	3/13/19	8464-07	Inorganics(1)
UMR-DP RM 294	3/13/19	8464-08	Inorganics(1)

(1) Including ammonia, chlorophyll/pheophytin, nitrite, nitrate, TKN, TOC, orthophosphate, total phosphorus, TSS, and TVSS.

The quality control data are summarized as follows:

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 total phosphorus.

DUPLICATE

Duplicate analyses are reported as MS/MSD, except chlorophyll/pheophytin, TSS, and TVSS. RPD of the duplicate analyses met criteria, except chlorophyll.

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

Project Name: Upper Mississippi River

ARDL Report No.: 8464

CASE NARRATIVE (Continued)

DATA REPORTING QUALIFIERS

The following data reporting qualifiers are used as required:

- ND Indicates parameter was analyzed for but not detected. The sample quantitation limit has been corrected for weight, dilution and/or percent moisture.
- 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.

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

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 8464 – Inorganics

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

Lab Report No: 008464

UPPER MISSISSIPPI RIVER

Project Name: Project No:

Report Date: 04/02/2019

NELAC Certified - IL100308

Analysis: Inorganics

ARDL NO:	008464-01		Sampl	ing Loc	'n: UPPER	IddISSISSIM	RIVER		Matrix	: WATER	
Field ID:	UMR-5 MIL	E 212.5	Samp	ling Da	te: 03/13	/2019			Moisture	: NA	
Received:	03/14/201	وآ	Samp	ling Ti	me: 1645						
							Prep	Analysis	Prep	Analysis	Run
Analyt	Û	LOD	ГОД	Flag	Result	Units	Method	Method	Date	Date	Number
Ammonia Nitroge	n	0.0200	0.0300		0.362	MG/L	NONE	350.1	NA	03/20/19 (03214422
Chlorophyll-a,	Correcte	1.0	1.00		5.1	MG/CU.M.	10200H	10200H	03/14/19	03/28/19 (3294451
Kjeldahl Nitrog	en	0.380	0.400		2.22	MG/L	351.2	351.2	03/20/19	03/21/19 0	3254429
Nitrate as Nitr	ogen	0.0380	0.0400		1.76	MG/L	NONE	GREEN	NA	03/25/19 (03264430
Nitrite as Nitr	ogen	0.0200	0.0200		0.025	MG/L	NONE	354.1	NA	03/14/19 (3154412
Pheophytin-a		1.0	1.00		QN	MG/CU.M.	10200H	10200H	03/14/19	03/28/19 (3294451
Phosphorus		0.0160	0.0200		1.77	MG/L	365.2	365.2	03/26/19	03/27/19 (3294449
Phosphorus, -or	tho	0.00800	0.0100		0.518	MG/L	NONE	365.2	· NA	03/14/19 (3154413
Solids, Total S	uspended	20.0	20.0		512	MG/L	NONE	160.2	NA	03/18/19 (03274432
Solids, Volatil	e Suspen	20.0	20.0		36.0	MG/L	NONE	160.4	NA	03/18/19 (03274433
Total Organic C	arbon	0.500	1.00		5.0	MG/L	NONE	415.1	NA	03/20/19 (03294444

(a) DOD and/or NELAC Accredited Analyte.

Sample 008464-01, Inorganic Analyses

Page 1 of 1

03/20/19 03294444

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

> 008464 Lab Report No:

UPPER MISSISSIPPI RIVER

Project Name: Project No:

04/02/2019 Report Date: NELAC Certified - IL100308

Analysis: Inorganics

ARDL No: 0(Field ID: UN	08464-02 MR-6 MIL	E 231	Sampl Samp	ing Loc ling Da	c'n: UPP ate: 03/	ER MISSISSIPPI 13/2019	L RIVER		Matrix Moisture	: WATER : NA	
Received: 03	3/14/201	ሻ	Samp	ling T	ime: 160	0					
							Ртер	Analysis	Prep	Analysis	Run
Analyte		LOD	ТоQ	Flag	Result	Units	Method	Method	Date	Date	Number
Ammonia Nitrogen		0.0200	0.0300		0.338	MG/L	NONE	350.1	NA	03/20/19 (03214422
Chlorophyll-a, Cc	orrecte	1.0	1.00		6.8	MG/CU.M.	10200H	1,0200H	03/14/19	03/28/19 (3294451
Kjeldahl Nitroger	c!	0.190	0.200		1.42	MG/L	351.2	351.2	03/20/19	03/21/19 (3254429
Nitrate as Nitrog	gen	0.0380	0.0400		1.6	MG/L	NONE	GREEN	NA	03/25/19 (03264430
Nitrite as Nitroc	gen	0.0200	0.0200		0.022	MG/L	NONE	354.1	NA	03/14/19 (03154412
Pheophytin-a		1.0	1.00		QN	MG/CU.M.	10200H	10200H	03/14/19	03/28/19 (03294451
Phosphorus		0.0160	0.0200		2.55	MG/L	365.2	365.2	03/26/19	03/27/19 (03294449
Phosphorus, -orti	u u	0.00800	0.0100		0.237	MG/L	NONE	365.2	NA	03/14/19 (03154413
Solids, Total Sus	spended	20.0	20.0		314	MG/L	NONE	160.2	NA	03/18/19 (03274432
Solids, Volatile	Suspen	20.0	20.0		26.0	MG/L	NONE	160.4	NA	03/18/19 (03274433
Total Organic Cai	rbon	0.500	1.00		5.6	MG/L	NONE	415.1	NA	03/20/19 (03294444

(a) DOD and/or NELAC Accredited Analyte.

Sample 008464-02, Inorganic Analyses

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03/20/19 03294444
Lab Report No: 008464

UPPER MISSISSIPPI RIVER

Project Name: Project No:

Report Date: 04/02/2019

NELAC Certified - IL100308

Analysis: Inorganics

ARDL No: 008464-03 Field ID: UMR-15 Received: 03/14/201	61	Sampl Samp Samp	ing Loc ling Da ling Ti	'n: UPPER te: 03/13 me: 0945	k MISSISSIPD	I RIVER		Matrix Moisture	: WATER : NA	
Analyte	LOD	ГОД	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Ammonia Nitrogen	0.0200	0.0300		0.314	MG/L	NONE	350.1	NA	03/20/19 0	3214422
Chlorophyll-a, Correcte	1.0	1.00		6.8	MG/CU.M.	10200H	10200H	03/14/19	03/28/19 0	3294451
Kjeldahl Nitrogen	0.190	0.200		1.49	MG/L	351.2	351.2	03/20/19	03/21/19 0	3254429
Nitrate as Nitrogen	0.0380	0.0400		2.01	MG/L	NONE	GREEN	NA	03/25/19 0	3264430
Nitrite as Nitrogen	0.0200	0.0200		0.029	MG/L	NONE	354.1	NA	03/14/19 0	3154412
Pheophytin-a	1.0	1.00		QN	MG/CU.M.	10200H	10200H	03/14/19	03/28/19 0	3294451
Phosphorus	0.00800	0.0100		0.609	MG/L	365.2	365.2	03/26/19	03/27/19 0	3294449
Phosphorus, -ortho	0.00800	0.0100		0.183	MG/L	NONE	365.2	NA	03/14/19 0	3154413
Solids, Total Suspended	20.0	20.0		312	MG/L	NONE	160.2	NA	03/18/19 0	3274432
Solids, Volatile Suspen	20.0	20.0		22.0	MG/L	NONE	160.4	NA	03/18/19 0	3274433

(a) DOD and/or NELAC Accredited Analyte.

Sample 008464-03, Inorganic Analyses

Page 1 of 1

03/20/19 03294444

NA

415.1

NONE

MG/L

4.5

1.00

0.500

Total Organic Carbon

Lab Report No: 008464

UPPER MISSISSIPPI RIVER

Project Name: Project No:

Report Date: 04/02/2019

NELAC Certified - IL100308

Analysis: Inorganics

ARDL No: 00	8464-04		Sampl	ing Loc	"n: UPPEI	T MTSSISSIM S	RIVER		Matrix	WATER	
Field ID: UM	R-7 MIL	E 241	Samp	ling Da	tte: 03/1	3/2019	5 40 mmg 4 mmg 5 M 10		Moisture	: NA	
Received: 03	/14/201	6	Samp	ling Ti	.me: 1515						
							Prep	Analysis	Prep	Analysis	Run
Analyte		гор	ГОД	Flag	Result	Units	Method	Method	Date	Date	Number
Ammonia Nitrogen		0.0200	0.0300		0.345	MG/L	NONE	350.1	NA	03/20/19	03214422
Chlorophyll-a, Co.	rrecte	1.0	1.00		3.4	MG/CU.M.	10200H	10200H	03/14/19	03/28/19	03294451
Kjeldahl Nitrogen		0.190	0.200		1.72	MG/L	351.2	351.2	03/20/19	03/21/19	03254429
Nitrate as Nitrog	en	0.0380	0.0400		1.71	MG/L	NONE	GREEN	NA	03/25/19	03264430
Nitrite as Nitrog	en	0.0200	0.0200		0.027	MG/L	NONE	354.1	NA	03/14/19	03154412
Pheophytin-a		1.0	1.00		DN	MG/CU.M.	10200H	1020H	03/14/19	03/28/19	03294451
Phosphorus		0.0160	0.0200		1.62	MG/L	365.2	365.2	03/26/19	03/27/19	03294449
Phosphorus, -orth	0	0.00800	0.0100		0.271	MG/L	NONE	365.2	NA	03/14/19	03154413
Solids, Total Sus	pended	20.0	20.0		330	MG/L	NONE	160.2	NA	03/18/19	03274432
Solids, Volatile	Suspen	20.0	20.0		20.0	MG/L	NONE	160.4	NA	03/18/19	03274433
Total Organic Cari	bon	0.500	1.00		6.0	MG/L	NONE	415.1	NA	03/20/19	03294444

(a) DOD and/or NELAC Accredited Analyte.

Sample 008464-04, Inorganic Analyses

008464 Lab Report No: UPPER MISSISSIPPI RIVER

Project Name: Project No:

04/02/2019 Report Date: NELAC Certified - IL100308

Analysis: Inorganics

ARDL No: 008464	- 05	Samp	ling Loc	:'n: UPPE	R MISSISSIPP	I RIVER		Matrix	:: WATER	
Field ID: UMR-LN	I RM 251	Sam	pling Da	tte: 03/1	3/2019			Moisture	: NA	
Received: 03/14/	2019	Sam	iT guilq	.me: 1430						
						Prep	Analysis	Prep	Analysis	< Run
Analyte	LOD	Тоо	Flag	Result	Units	Method	Method	Date	Date	Number
Ammonia Nitrogen	0.0200	0.0300		0.324	MG/L	NONE	350.1	NA	03/20/19	03214422
Chlorophyll-a, Correc	te 1.0	1.00		5.3	MG/CU.M.	10200H	10200H	03/14/19	03/28/19	03294451
Kjeldahl Nitrogen	0.190	0.200		1.55	MG/L	351.2	351.2	03/20/19	03/21/19	03254429
Nitrate as Nitrogen	0.0380	0.0400		1.6	MG/L	NONE	GREEN	NA	03/25/19	03264430
Nitrite as Nitrogen	0.0200	0.0200		QN	MG/L	NONE	354.1	NA	03/14/19	03154412
Pheophytin-a	1.0	1.00		QN	MG/CU.M.	10200H	10200H	03/14/19	03/28/19	03294451
Phosphorus	0.00800	0.0100		1.46	MG/L	365.2	365.2	03/26/19	03/27/19	03294449
Phosphorus, '-ortho	0.00800	0.0100		0.0693	MG/L	NONE	365.2	NA	03/14/19	03154413
Solids, Total Suspend	led 20.0	20.0		258	MG/L	NONE	160.2	NA	03/18/19	03274432
Solids, Volatile Susp	en 20.0	20.0		QN	MG/L	NONE	160.4	NA	03/18/19	03274433
Total Organic Carbon	0.500	1.00		4.8	MG/L	NONE	415.1	NA	03/21/19	03294445

4.8

Total Organic Carbon

(a) DOD and/or NELAC Accredited Analyte.

Sample 008464-05, Inorganic Analyses

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

Lab Report No: 008464

UPPER MISSISSIPPI RIVER

Project Name: Project No:

04/02/2019 Report Date: NELAC Certified - IL100308

Analysis: Inorganics

ARDL No: 008464-0 Field ID: UMR-9 MI	6 L.E. 273	Samp1 Samp	ing Loc ling Dat	'n: UPPER ce: 03/13	MISSISSIPPI /2019	L RIVER		Matrix Moisture	: WATER : NA	
Received: 03/14/20	19	Samp	ling Tir	ne: 1250						
						Prep	Analysis	Prep	Analysis	Run
Analyte	LOD	дол	Flag	Result	Units	Method	Method	Date	Date	Number
Ammonia Nitrogen	0.0200	0.0300		0.283	MG/L	NONE	350.1	NA	03/20/19 0	3214422
Chlorophyll-a, Correcte	1.0	1.00		7.2	MG/CU.M.	10200H	10200H	03/14/19	03/28/19 0	3294451
Kjeldahl Nitrogen	0.190	0.200		1.98	MG/L	351.2	351.2	03/26/19	03/27/19 0	3274434
Nitrate as Nitrogen	0.0380	0.0400		1.85	MG/L	NONE	GREEN	NA	03/25/19 0	3264430
Nitrite as Nitrogen	0.0200	0.0200		0.020	MG/L	NONE	354.1	NA	03/14/19 0	3154412
Pheophytin-a	1.0	1.00		QN	MG/CU.M.	10200H	10200H	03/14/19	03/28/19 0	3294451
Phosphorus	0.00800	0.0100		1.13	MG/L	365.2	365.2	03/26/19	03/27/19 0	3294449
Phosphorus, -ortho	0.00800	0.0100		0.14	MG/L	NONE	365.2	NA	03/14/19 0	3154413
Solids, Total Suspended	20.0	20.0		304	MG/L	NONE	160.2	NA	03/18/19 0	3274432
Solids, Volatile Suspen	20.0	20.0		20.0	MG/L	NONE	160.4	NA	03/18/19 0	3274433
Total Organic Carbon	0.500	1.00		4.9	MG/L	NONE	415.1	NA	03/21/19 0	3294445

(a) DOD and/or NELAC Accredited Analyte.

Sample 008464-06, Inorganic Analyses

Page 1 of 1

Lab Report No: 008464

Report Date: 04/02/2019

Project Name: UPPER MISSISSIPPI RIVER Project No:

Analysis: Inorganics NELAC Certified - IL100308

WATER

Matrix:

UPPER MISSISSIPPI RIVER

Sampling Loc'n:

008464-07

ARDL No:

Field ID: UMR-LA RN Received: 03/14/201	м 283 19	Samp Samp	ling Da ling Ti	tte: 03/13 .me: 1200	/2019			Moisture	: NA	
Analyte	LOD	год	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Ammonia Nitrogen	0.0200	0.0300		0.256	MG/L	NONE	350.1	NA	03/20/19 0	3214422
Chlorophyll-a, Correcte	1.0	1.00		6.8	MG/CU.M.	10200H	10200H	03/14/19	03/28/19 0	3294451
Kjeldahl Nitrogen	0.190	0.200		1.8	MG/L	351.2	351.2	03/26/19	03/27/19 0	3274434
Vitrate as Nitrogen	0.0380	0.0400		2.11	MG/L	NONE	GREEN	NA	03/25/19 0	3264430
Nitrite as Nitrogen	0.0200	0.0200		0.029	MG/L	NONE	354.1	NA	03/14/19 0	3154412
Pheophytin-a	1.0	1.00		QN	MG/CU.M.	10200H	10200H	03/14/19	03/28/19 0	3294451
shosphorus	0.00800	0.0100		1.25	MG/L	365.2	365.2	03/26/19	03/27/19 0	3294449
Phosphorus, -ortho	0.00800	0.0100		0.041	MG/L	NONE	365.2	NA	03/14/19 0	3154413
Solids, Total Suspended	20.0	20.0		230	MG/L	NONE	160.2	NA	03/18/19 0	3274432

03/18/19 03274433 03/21/19 03294445

NA NA

160.4 415.1

NONE

MG/L MG/L

4.1 4.1

20.0 1.00

20.0 0.500

Solids, Volatile Suspen Total Organic Carbon (a) DOD and/or NELAC Accredited Analyte.

Sample 008464-07, Inorganic Analyses

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

Lab Report No: 008464

UPPER MISSISSIPPI RIVER

Project Name: Project No:

04/02/2019 Report Date: NELAC Certified - IL100308

Analysis: Inorganics

				14.4 March 14.4						
ARDL No: 008464-0	α	Samp]	ling Loc	a'n: UPPE	R MISSISSIPP.	I RIVER		Matrix	: WATER	
Field ID: UMR-DP RI	M 294	Sam	oling Da	ate: 03/1	3/2019			Moisture	: NA	
Received: 03/14/20.	19	Samp	ing T	ime: 1030						
						Prep	Analysis	Prep	Analysis	Run
Analyte	LOD	ТоÕ	Flag	Result	Units	Method	Method	Date	Date	Number
Ammonia Nitrogen	0.0200	0.0300		0.276	MG/L	NONE	350.1	NA	03/20/19	03214422
Chlorophyll-a, Correcte	1.0	1.00		3.4	MG/CU.M.	10200H	10200H	03/14/19	03/28/19	03294451
Kjeldahl Nitrogen	0.190	0.200		1.74	MG/L	351.2	351.2	03/26/19	03/27/19	03274434
Nitrate as Nitrogen	0.0380	0.0400		2.11	MG/L	NONE	GREEN	NA	03/25/19	03264430
Nitrite as Nitrogen	0.0200	0.0200		0.029	MG/L	NONE	354.1	NA	03/14/19	03154412
Pheophytin-a	1.0	1.00		QN	MG/CU.M.	10200H	10200H	03/14/19	03/28/19	03294451

03/27/19 03294449

03/26/19 ΝA

365.2

365.2

365.2 NONE NONE NONE NONE

MG/L MG/L MG/L MG/L MG/L

> 0.0608 276

4.2 QZ

1.24

0.0100 0.0100

0.00800 0.00800 20.0 20.0 0.500

20.0 20.0 1.00

Solids, Total Suspended Solids, Volatile Suspen Total Organic Carbon

Phosphorus, -ortho

Phosphorus

03/14/19 03154413 03/18/19 03274432 03/18/19 03274433 03/21/19 03294445

NA NA NA

160.4 415.1

160.2

(a) DOD and/or NELAC Accredited Analyte.

Sample 008464-08, Inorganic Analyses

Page 1 of 1

ARDL Report 8464 - Page 11 of 19

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

Lab Report No: 008464

Project Name:

UPPER MISSISSIPPI RIVER

Report Date: 04/02/2019

NELAC Certified - IL100308

			Blank		Ргер	Analysis	Prep	Analysis		QC Lab
Analyte	LOD	ТОÕ	Result	Units	Method	Method	Date	Date Rur	đ	Number
Ammonia Nitrogen	0.020	0.030	QN	MG/L	NONE	350.1	NA	03/20/19 03214	422	008464-01B1
Chlorophyll-a, Corre	1.0	1.0	QN	MG/CU.M.	10200H	10200H	03/14/19	03/28/19 03294	451	008464-02B1
Kjeldahl Nitrogen	0.19	0.20	QN	MG/L	351.2	351.2	03/20/19	03/21/19 03254	429	008464-01B1
Kjeldahl Nitrogen	0.19	0.20	QN	MG/L	351.2	351.2	03/26/19	03/27/19 03274	434	008467-01B1
Nitrate as Nitrogen	0.019	0.020	QN	MG/L	NONE	GREEN	NA	03/25/19 03264	430	008464-02B1
Nitrite as Nitrogen	0.020	0.020	ND	MG/L	NONE	354.1	NA	03/14/19 03154	412	008464-03B1
Pheophytin-a	1.0	1.0	QN	MG/CU.M.	10200H	10200H	03/14/19	03/28/19 03294	451	008464-02B1
Phosphorus	0.008	0.010	CN	MG/L	365.2	365.2	03/26/19	03/27/19 03294	449	008464-07B1
Phosphorus, -ortho	0.008	0.010	QN	MG/L	NONE	365.2	NA	03/14/19 03154	413	008464-02B1
Solids, Total Suspen	1.0	1.0	QN	MG/L	NONE	160.2	NA	03/18/19 03274	432	008464-08B1
Solids, Volatile Sus	1.0	1.0	QN	MG/L	NONE	160.4	NA	03/18/19 03274	ţ433	008464-08B1
Total Organic Carbon	0.50	1.0	QN	MG/L	NONE	415.1	NA	03/20/19 03294	444	008462-01B1
Total Organic Carbon	0.50	1.0	DN	MG/L	NONE	415.1	NA	03/21/19 03294	ţ445	008464-05B1

(a) DOD and/or NELAC Accredited Analyte Inorganic Method Blanks for 008464

ARD	L, INC.	400 Av	LABORA	TORY C Drive	ONTROL	SAMPI Box 1	LE REPO)RT Mt. Ve	rnon, IL	62864
Lab Report No: 006	3464								Report Da	te: 04/02/2019
Project Name:	UPPER MIS	IddISSISS	L RIVER						NELAC Cer	tified - 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
Ammonia Nitrogen Visiaian Nitrogen	0.78	0.1 T	α σ Γ	; ;	; ;		021-08	1 I 1 I	03214429	
Kjeldahl Nitrogen	76.0	1.0	76	I	1	1	80-120	1	03274434	008467-01C1
Nitrate as Nitrogen	0.91	1.0	91	ł	s T	r t	80-120	1	03264430	008464-02C1
Nitrite as Nitrogen	0.92	1.0	92	4 1	;	}	80-120	:	03154412	008464-03C1
Phosphorus	0.71	0.67	106	:	1	:	80-120	1	03294449	008464-07C1
Phosphorus, -ortho	0.11	0.10	106	1	1 E	1	80-120	I I	03154413	008464-02C1
Total Organic Carbon	9.4	10.0	94	1	-	;	76-120	;	03294444	008462-01C1
Total Organic Carbon	10.4	10.0	104	;	;	I I	76-120	ł	03294445	008464-05C1
NOTE: Any values t (a) DOD and/or NEI	abulated above AC Accredited A	marked with nalyte	an asteris	k are outs	ide of acc	ceptable 1	imits.			

Inorganic LCS Results for 008464

	62864
	긥
Ē	Vernon,
REPOR!	Mt.
CATE	1566
UPLI	Box
IKE D	Р.О.
IKE/SP:	Drive;
TRIX SP	iation
MA	0 Av
	40
	INC.
	ARDL,

Lab Report No: 008464

Project Name:

UPPER MISSISSIPPI RIVER

Report Date: 04/02/2019

NELAC Certified - IL100308

Analyte	Sample Matrix	Sample Result	MS Result	MS Level	MS Rec	MSD Result	MSD Level	MSD % Rec	% Rec Limits	RPD	RPD Limit	Run	QC Lab Number
Ammonia Nitrogen	WATER	0.36	2.5	2.0	105	2.4	2.0	102	75-125	e	20	03214422	008464-01MS
Kjeldahl Nitrogen	WATER	2.2	3.0	0.80	66	3.0	0.80	100	75-125	0	20	03254429	008464-01MS
Nitrate as Nitrogen	WATER	1.6	2.5	1.0	92	2.7	1.0	106	75-125	ດ	20	03264430	008464-02MS
Nitrite as Nitrogen	WATER	0.029	1.0	1.0	98	1.0	1.0	66	75-125	Ч	20	03154412	008464-03MS
Phosphorus	WATER	1.3	2.1	0.83	106	2.5	0.83	146 *	75-125	14	20	03294449	008464-07MS
Phosphorus, -ortho	WATER	0.24	0.33	0.10	95	0.34	0.10	105	75-125	e	20	03154413	008464-02MS
Total Organic Carbon	WATER	4.8	6.9	5.0	101	9.7	5.0	97	76-120	17	20	03294445	008464-05MS

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

(a) DOD and/or NELAC Accredited Analyte.

Inorganic Matrix Spikes for 008464

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

Lab Report No: 008464

Report Date: 04/02/2019

Project Name: UPPER MISSISSIPPI RIVER

NELAC Certified - IL100308

		and the second se	11.1. 1.1.1.					
	Sample	First	Second		Percent	Mean	Analytical	QC Lab
Analyte	Conc'n	Duplicate	Duplicate	Units	Diff	(Smp,D1,D2)	Run	Number
Chlorophyll-a, Corrected	6.8	10.1	l	MG/CU.M.	*6°	I	03294451	008464-02D1
Pheophytin-a	DN	0	I I	MG/CU.M.	NC	!	03294451	008464-02D1
Solids, Total Suspended	276	290	l I	MG/L	ъ	!	03274432	008464-08D1
Solids, Volatile Suspend	UN	20.0	ł	MG/L	NC	1	03274433	008464-08D1

Page 1 of 1 See Case Narrative for exceptions. * indicates that agreement between duplicates is greater than 20%. (a) DOD and/or NELAC Accredited Analyte Sample Duplicates for 008464

ARDL Report 8464 - Page 15 of 19

Sample Receipt Information

Including as appropriate:

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

ARDL Data Package 8464 – Inorganics

ARDL, Inc	P.O. Box (618	1566, 40 3) 244-3	0 Aviati 235 Phor	on Driv	'e, Mt. (618)	Verno 244-11	n, IL (49 Fa	52864 K							СНА	IN OF	CUSTO	DV R	ECO	RD
PROJECT Upper Mississippi River			S83	010		N												HA	ESERV	ATION
SAMPLERS: (Signature)						20	<i>O</i> o		NEI	/		/						D	CHE	ECIFY MICALS
Schepher & a	Sreel.	5	E COM	100	SS		EN.	NN	004		/		-					ICE	N N N N N N N N N N N N N N N N N N N	AL PH IF
SAMPLE NUMBER	DATE TI	R.		~Q.	lico	91	d.	EON	itan	_		>		ŝ	RE	MARKS OR E LOCAT	NOL	L		
	2019		GR GR		*	/*	*	Q		/	-		-							
UMB-1 Chain of Rocks Canal		-	K	×	×	X	X	*	_		-							X		
UNR 2 Confluence			*	X	*	X	×	×										X		
-UINIR-5 MILLE 200-			*	×	×	X	×	×										X		
UMR-5 Mile 212.5	313 16	24	×	×	X		X	×												
UMR-6 Mile 231	3-13 16	00	X	×	×		X	×												
UMR-15	3-12 96	15	×	×	ĸ	X	X	×												
UMR-7 Mile 241	3-13 15	15	×	X	X		×	×												
UMR-LM RM 251	3 13 14	30	×	×	X	~	X	+											_	
UMR-9 Mile 273	3-13 13	150	X	×	×	X	X	X												
UMR-LA RM 283	3-13 12	00	×	×	X	X	X	+												
UMR- DP RM 294	3-13 10.	30	×	×	X	X	X	×												
			x	X	K	X	×	×										Х		
			_																	
Relinquished by: (Signature)	Date Ti 2-/3 /8	10 H	Professed	by:clos	Batur	()	22 .0	MAR	KS/SPE	CIALID	ISTRU	CTION	ŝ							
Relinquished by: (Signature)	Date Ti 3-17-19-01	me I	Received	by/(Si	gnatur	()	*	eserv	ed with I	I2SO4										
Received for Laboratory by: (Signature)	Jutte Date Ti	20 See	Shipping	Ticket	No.		1													
A DI SEA WALL	/ !!						4													

ARDL Report 8464 - Page 17 of 19

PURCHASE ORDER NO:

8464

COOLER RECEIPT REPORT ARDL, INC.

AR	CDL #: <u>8464</u> N	ooler # <u>/ 4 2</u> umber of Coolers in Shipment:	2	
Pro	Dject: UPPer Mississippi River Da	ate Received: <u>3-13-19 lu</u>	1 N	aj.
A.	PRELIMINARY EXAMINATION PHASE: Date cooler was opened: 3-14-1	<u>9 (</u> Signature) <u>J.Klaichrein</u>	v	<u> </u>
1.	Did cooler come with a shipping slip (airbill, etc.)?	YES	G (NO	2
	If YES, enter carrier name and airbill number here:	Calerier		
2.	Were custody seals on outside of cooler?	YE	6 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	S NO	NA.
4.	Did you screen samples for radioactivity using a Geiger Counter?		D NO	
5.	Were custody papers sealed in a plastic bag?	YES	5 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?	YES	E NO	N/A
8.	Was project identifiable from custody papers? If YES, enter project name at the to	op of this form	NO NO	N/A
9.	Was a separate container provided for measuring temperature? YESNO	Observed Cooler Temp. 1.3		
В.	LOG-IN PHASE: Date samples were logged-in: <u>3-14-19</u> (Signation)	ature)Correction racior		<u> </u>
10.	Describe type of packing in cooler:			
11.	Were all samples sealed in separate plastic bags?		5 (NO	, N/A
12.	Did all containers arrive unbroken and were labels in good condition?		È no	
13.	Were sample labels complete?		> NO	
14.	Did all sample labels agree with custody papers?	YES) NO	
15.	Were correct containers used for the tests indicated?		> NO	
16.	Was pH correct on preserved water samples?		È no	N/A
17.	. Was a sufficient amount of sample sent for tests indicated?		δ NO	
18.	Were bubbles absent in VOA samples? If NO, list by sample #:	YES	S NO	(<u>N/</u> A)
19.	Was the ARDL project coordinator notified of any deficiencies?	YES	S NO	(N/A
	Comments and/or Corrective Action:	Sample Transfer	•••••••••	
No	ote: Changes on Cafe wat initialed	Fraction Fraction		
U	2 dated:	Area # Area #		
		Walkin		
		By By		

On

3-14-19

Chain-of-Custody #

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

de

(By: Signature)

Date: 3-14-19

n' /A

On

COOLER RECEIPT REPORT ARDL, INC.

AF	RDL #: 3464 Cooler # $2af 2$ Number of Coolers in Shipment: 2	,	
Pro	oject: <u>Upper Mississipp</u> ; River Date Received: <u>3-13-19 lup</u>	va	, 4
A.	PRELIMINARY EXAMINATION PHASE: Date cooler was opened: 3-14-19 (Signature)	v	
1.	Did cooler come with a shipping slip (airbill, etc.)?YES	NO	Х.
	If YES, enter carrier name and airbill number here:	v.	
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?	, 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?	NO	N/A
8.	Was project identifiable from custody papers? If YES, enter project name at the top of this form	NO	N/A
9.	Was a separate container provided for measuring temperature? YESNO Observed Cooler Temp $O.3$ (C _	•
В.	LOG-IN PHASE: Date samples were logged-in: 3-14-19 (Signature) Khackberm	$\underline{)}$	<u>)</u> с
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?	NO	
14.	Did all sample labels agree with custody papers?	NO	
15.	Were correct containers used for the tests indicated?	NO	
16.	Was pH correct on preserved water samples?	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: Sample Transfer		
	Fraction Fraction		
	<i>Cell</i> Area # Area #		
	Walkin		
	Ву Ву		
	On On		

Chain-of-Custody # ____/A

3-14-19

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

Date:

(By: Signature)



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

www.ardlinc.com

Date: 7/31/19

Environmental | Analytical | Management | Safety

Customer Name: SLCOE

Project Name: Upper Mississippi River

Samples Received at ARDL: 7/2/19

Lab Name: ARDL, Inc. ARDL Report No.: 8485

CASE NARRATIVE

<u>Customer</u> Sample No.	<u>Date</u> Collected	<u>Lab ID</u> Number	Analyses Requested
UMR-1 CHAIN OF ROCKS CANAL	7/1/19	8485-01	Inorganics(1)
UMR-2 CONFLUENCE	7/2/19	8485-02	Inorganics(1)
UMR-3-MILE 200	7/1/19	8485-03	Inorganics(1)
UMR-5 MILE 212.5	7/1/19	8485-04	Inorganics(1)
UMR-6 MILE 231	7/2/19	8485-05	Inorganics(1)
UMR-15	7/2/19	8485-06	Inorganics(1)
UMR-9 MILE 273	7/2/19	8485-07	Inorganics(1)
UMR-LA RM 283	7/2/19	8485-08	Inorganics(1)
UMR-DP RM 294	7/2/19	8485-09	Inorganics(1)
SLH-3	7/1/19	8485-10	Inorganics(1)
SLH-2	7/1/19	8485-11	Inorganics(1)
SLH-1	7/1/19	8485-12	Inorganics(1)
SLH-15	7/1/19	8485-13	Inorganics(1)

(1) Including ammonia, chlorophyll/pheophytin, nitrite, nitrate, TKN, TOC, orthophosphate, total phosphorus, TSS, and TVSS.

The quality control data are summarized as follows:

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

Duplicate analyses are reported as MS/MSD, except chlorophyll/pheophytin, TSS, and TVSS. RPD of the duplicate analyses met criteria.

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

Project Name: Upper Mississippi River

ARDL Report No.: 8485

CASE NARRATIVE (Continued)

DATA REPORTING QUALIFIERS

The following data reporting qualifiers are used as required:

- ND Indicates parameter was analyzed for but not detected. The sample quantitation limit has been corrected for weight, dilution and/or percent moisture.
- 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.

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

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 8485 - Inorganics

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

Authorized By: DSD-QAO

ARDL Report 8485 - Page 3 of 28

Lab Report No:	00848	55						ц	keport Date	: 07/30/2	019
Project Name: UPPI Project No:	ER MISS	I IddISSIS	RIVER						Analysis VELAC Certi	: Inorgan fied - IL1	ics 00308
ARDL No: 008, Field ID: UMR- Received: 07/(485-01 -1 CHAI 02/2019	IN OF ROCH	Sampl KS CA Samp Samp	ing Loc ling Da ling Ta	:'n: UPPE ate: 07/0 .me: 0915	R MISSISSIPPJ 1/2019	I RIVER		Matrix Moisture	: WATER : NA	
Analyte		LOD	год	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Ammonia Nitrogen	0 1 0	0.0200	0.0300		UN C C S	MC/CII M	NONE	350.1 10200H	NA 07/03/10	07/10/19	07104682
Chlorophyll-a, corr Kjeldahl Nitrogen	recte	0.190	0.200		1.16	MG/CU.M. MG/L	ди200н 351.2	10200A	07/08/19	07/09/19	07104685
Nitrate as Nitroger	C.	0.0380	0.0400		2.16	MG/L	NONE	GREEN	NA	07/09/19	07244731
Nitrite as Nitroger	c	0.0200	0.0200		0.029	MG/L	NONE	354.1	NA	07/02/19	07224724
Pheophytin-a		1.0	1.00		10.9	MG/CU.M.	10200H	10200H	07/03/19	07/08/19	07114690
Phosphorus	0	00800.0	0.0100		0.271	MG/L	365.2	365.2	07/18/19	07/19/19	07214718
Phosphorus, -ortho	0	00800.0	0.0100		0.074	MG/L	NONE	365.2	NA	07/02/19	07054674
Solids, Total Suspe	ended	2.86	2.86		17.4	MG/L	NONE	160.2	NA	07/03/19	07104688
Solids, Volatile Su	uspen	2.86	2.86		6.86	MG/L	NONE	160.4	NA	07/03/19	07104689
Total Organic Carbo	uc	0.500	1.00		4.9	MG/L	NONE	415.1	NA	01/10/10	07184717

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

ARDL, INC.

(a) DOD and/or NELAC Accredited Analyte.

Sample 008485-01, Inorganic Analyses

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

Lab Report No: 008485

Report Date: 07/30/2019

Project Name: Project No:	UPPER MIS	I I A A I A A A A A A A A A A A A A A A	RIVER					N	Analysis ELAC Certi	: Inorgani fied - IL1(Lcs 00308
ARDL No: Field ID: Received:	008485-02 UMR-2 CON 07/02/201	FLUENCE 9	Sampl Samp Samp	Ling Loc Jing Da Ling Ti	c'n: UPP ate: 07/ ime: 123	ER MISSISSIPPI 02/2019 4	I RIVER		Matrix Moisture	: WATER : NA	
Analy	t e	LOD	LOQ	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Ammonia Nitrog	en	0.0200	0.0300		0.0397	MG/L	NONE	350.1	NA	07/10/19 (07104682
Chlorophyll-a,	Correcte	1.0	1.00		56.7	MG/CU.M.	10200H	10200H	07/03/19	07/08/19 (07114690
Kjeldahl Nitro	gen	0.190	0.200		2.08	MG/L	351.2	351.2	07/08/19	07/09/19	07104685
Nitrate as Nit	rogen	0.0190	0.0200		1.01	MG/L	NONE	GREEN	NA	07/09/19 (07244730
Nitrite as Nit	rogen	0.0200	0.0200		0.020	MG/L	NONE	354.1	NA	07/03/19 (07224723
Pheophytin-a		1.0	1.00		25.3	MG/CU.M.	10200H	10200H	07/03/19	07/08/19 (07114690
Phosphorus		0.00800	0.0100		1.07	MG/L	365.2	365.2	07/18/19	07/19/19	07214718
Phosphorus, -o	rtho	0.00800	0.0100		0.117	MG/L	NONE	365.2	NA	07/03/19 (07054673
Solids, Total	Suspended	10.0	10.0		402	MG/L	NONE	160.2	NA	07/03/19 0	07104688
Solids, Volati	le Suspen	10.0	10.0		39.0	MG/L	NONE	160.4	NA	07/03/19 0	07104689
Total Organic	Carbon	0.500	1.00		5.5	MG/L	NONE	415.1	NA	07/10/19 (07184717

(a) DOD and/or NELAC Accredited Analyte.

Sample 008485-02, Inorganic Analyses

Lab Report 1	No: 008	485						ц	eport Date	: 07/30/20	119
Project Name: Project No:	UPPER MI	IddISSISS	RIVER					Z	Analysis ELAC Certi	: Inorgan fied - IL1(ics 00308
ARDL No: Field ID: 1 Received: (008485-0: UMR-3 MII 07/02/201	3 LE 200 19	Samp1 Samp Samp	ing Loc ling Da ling Ti	"n: UPPF tte: 07/0 me: 1100	ER MISSISSIPPI 01/2019	RIVER		Matrix Moisture	: WATER : NA	
Analyt	0)	LOD	ΓΟδ	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Ammonia Nitroge Chlorophyll-a, Kjeldahl Nitrog Nitrate as Nitr Pheophytin-a Phosphorus, -or Solids, Total S Solids, Volatil	n Correcte en ogen ogen tho uspended s Suspen arbon	0.0200 1.0 0.380 0.0380 0.0380 0.0380 0.0380 0.03800 0.0200 0.0200 0.00800 0.00800 0.00800	0.0300 1.00 0.400 0.0400 0.0200 1.00 0.0100 2.00 2.00 1.00		ND 13.6 4.0 3.62 0.054 2.3 0.276 0.134 4.0 3.8	MG/L MG/CU.M. MG/L MG/L MG/L MG/L MG/L MG/L MG/L MG/L	NONE 10200H 351.2 NONE NONE 10200H 365.2 NONE NONE NONE NONE	350.1 10200H 351.2 GREEN 354.1 10200H 365.2 365.2 365.2 365.2 160.4 415.1	NA 07/03/19 07/08/19 NA NA 07/18/19 NA NA NA NA	07/10/19 07/08/19 07/09/19 07/09/19 07/02/19 07/02/19 07/19/19 07/02/19 07/02/19 07/02/19 07/02/19 07/02/19	77104682 77114690 77104685 77244731 77214731 77214718 77104688 77104688 77104688 77104689 77104689
Total Organic C	arbon	0.500	1.00		3.8	MG/L	NONE	415.1	NA		07/10/19

(a) DOD and/or NELAC Accredited Analyte.

Sample 008485-03, Inorganic Analyses

Lab Report No: 008485

UPPER MISSISSIPPI RIVER

Project Name: Project No:

Report Date: 07/30/2019

NELAC Certified - IL100308

Analysis: Inorganics

ARDL No: Field ID:	008485-04 UMR-5 MIL	l E 212.5	Samp1 Samp.	ing Loc ling Da	:'n: UPPER te: 07/01	K MISSISSIPPI /2019	I RIVER		Matrix	: WATER : NA	
Received:	07/02/201	6	Samp	ling Ti	me: 1230						
							Prep	Analysis	Prep	Analysis	Run
Analyt	t e	LOD	ΓΟΟ	Flag	Result	Units	Method	Method	Date	Date	Number
Ammonia Nitrog(en	0.0200	0.0300		ND	MG/L	NONE	350.1	NA	07/10/19 0	07104682
Chlorophyll-a,	Correcte	1.0	1.00		13.2	MG/CU.M.	10200H	10200H	07/03/19	07/08/19 (07114690
Kjeldahl Nitrog	gen	0.190	0.200		1.22	MG/L	351.2	351.2	07/08/19	07/09/19 (07104685
Nitrate as Niti	rogen	0.0380	0.0400		3.71	MG/L	NONE	GREEN	NA	07/09/19 (07244731
Nitrite as Nit1	rogen	0.0200	0.0200		0.037	MG/L	NONE	354.1	NA	07/03/19 (07224723
Pheophytin-a		1.0	1.00		2.1	MG/CU.M.	10200H	10200H	07/03/19	07/08/19 0	07114690
Phosphorus		0.00800	0.0100		0.288	MG/L	365.2	365.2	07/18/19	07/19/19	07214718
Phosphorus, -oi	rtho	0.00800	0.0100		0.142	MG/L	NONE	365.2	NA	07/03/19 0	07054673
Solids, Total S	Suspended	2.86	2.86		24.6	MG/L	NONE	160.2	NA	07/03/19 0	07104688
Solids, Volatij	le Suspen	2.86	2.86		4.0	MG/L	NONE	160.4	NA	07/03/19 0	07104689
Total Organic (Carbon	0.500	1.00		3.8	MG/L	NONE	415.1	NA	07/10/19 0	07184717

(a) DOD and/or NELAC Accredited Analyte.

Sample 008485-04, Inorganic Analyses

Lab Report No: 008485

UPPER MISSISSIPPI RIVER

Project Name: Project No:

Report Date: 07/30/2019

NELAC Certified - IL100308

Analysis: Inorganics

ARDL No: 008485-0. Field ID: UMR-6 MI: Received: 07/02/20:	5 LE 231 19	Sampl Samp Samp	ing Loc ling Da ling Ti	.'n: UPPEH tte: 07/02 .me: 1215	R MISSISSIPP. 2/2019	I RIVER		Matrix Moisture	: WATER : NA	
Analyte	LOD	ΓΟŐ	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Ammonia Nitrogen	0.0200	0.0300		0.0547	MG/L	NONE	350.1	NA	07/10/19 0	7104682
Chlorophyll-a, Correcte	1.0	1.00		16.3	MG/CU.M.	10200H	10200H	07/03/19	07/08/19 0	7114690
Kjeldahl Nitrogen	0.190	0.200		1.14	MG/L	351.2	351.2	07/08/19	0 61/60/10	7104685
Nitrate as Nitrogen	0.0380	0.0400		2.64	MG/L	NONE	GREEN	NA	0 61/60/10	7244731
Nitrite as Nitrogen	0.0200	0.0200		0.030	MG/L	NONE	354.1	NA	07/03/19 0	7224723
Pheophytin-a	1.0	1.00		5.3	MG/CU.M.	10200H	10200H	07/03/19	07/08/19 0	7114690
Phosphorus	0.00800	0.0100		0.366	MG/L	365.2	365.2	07/18/19	07/19/19 0	7214718
Phosphorus, -ortho	0.00800	0.0100		0.114	MG/L	NONE	365.2	NA	07/03/19 0	7054673
Solids, Total Suspended	4.0	4.00		67.6	MG/L	NONE	160.2	NA	07/03/19 0	7104688
Solids, Volatile Suspen	4.0	4.00		9.2	MG/L	NONE	160.4	NA	07/03/19 0	7104689
Total Organic Carbon	0.500	1.00		4.8	MG/L	NONE	415.1	NA	0/110/19 0	7184717

(a) DOD and/or NELAC Accredited Analyte.

Sample 008485-05, Inorganic Analyses

Lab Report No: 008485

UPPER MISSISSIPPI RIVER

Project Name: Project No:

Report Date: 07/30/2019

NELAC Certified - IL100308

Analysis: Inorganics

ARDL No: 008485-00 Field ID: UMR-15 Received: 07/02/201	6	Samp] Samp Samp	ing Loc ling Da ling Ti	c'n: UPPER ate: 07/02 ime: 1120	/2019	I RIVER		Matrix Moisture	: WATER : NA	
Analyte	LOD	LOQ	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Ammonia Nitrogen	0.0200	0.0300		0.0389	MG/L	NONE	350.1	NA	0 01/10/10 0	17104682
Chlorophyll-a, Correcte	1.0	1.00		26.5	MG/CU.M.	10200H	10200H	07/03/19	07/08/19 (7114690
Kjeldahl Nitrogen	0.190	0.200		2.71	MG/L	351.2	351.2	07/08/19	07/09/19	7104685
Nitrate as Nitrogen	0.0190	0.0200		1.06	MG/L	NONE	GREEN	NA	07/09/19	7244730
Nitrite as Nitrogen	0.0200	0.0200		ND	MG/L	NONE	354.1	NA	07/03/19 (17224723
Pheophytin-a	1.0	1.00		5.3	MG/CU.M.	10200H	10200H	07/03/19	07/08/19 0	7114690
Phosphorus	0.00800	0.0100		1.05	MG/L	365.2	365.2	07/18/19	07/19/19 0	7214718
Phosphorus, -ortho	0.00800	0.0100		0.109	MG/L	NONE	365.2	NA	07/03/19 (7054673
Solids, Total Suspended	10.0	10.0		363	MG/L	NONE	160.2	NA	07/03/19 0	7104688

(a) DOD and/or NELAC Accredited Analyte.

Sample 008485-06, Inorganic Analyses

Page 1 of 1

07/03/19 07104689 07/10/19 07184717

NA NA NA

160.2 160.4 415.1

NONE NONE NONE

MG/L MG/L MG/L

363 38.0 5.3

10.0 10.0 1.00

10.0 10.0 0.500

Solids, Total Suspended Solids, Volatile Suspen Total Organic Carbon

Lab Report N	0: 0084	85						Ж	eport Date	: 07/30/2	019
Project Name: U. Project No:	PPER MIS	Iddissis	RIVER					Z	Analysis ELAC Certi	: Inorgan fied - IL1	ics 00308
ARDL No: 0	08485-07		Sampl	ing Loc	:'n: UPPI	ER MISSISSIPPI	L RIVER		Matrix	: WATER	
Field ID: U Received: 0	MR-9 MIL 7/02/201	Е 273 9	Samp Samp	ling Dā ling Ti	ate: 07/(ime: 0940	02/2019 0			Moisture	: NA	
							Prep	Analysis	Prep	Analysis	Run
Analyte		LOD	ТОО	Flag	Result	Units	Method	Method	Date	Date	Number
Ammonia Nitrogen		0.0200	0.0300		QN	MG/L	NONE	350.1	NA	07/10/19	07104682
Chlorophyll-a, C	orrecte	1.0	1.00		14.0	MG/CU.M.	10200H	10200H	07/03/19	07/08/19	07114690
Kjeldahl Nitroge	ц	0.190	0.200		1.03	MG/L	351.2	351.2	07/08/19	07/09/19	07104685
Nitrate as Nitro	gen	0.0380	0.0400		3.51	MG/L	NONE	GREEN	NA	07/09/19	07244731
Nitrite as Nitro	gen	0.0200	0.0200		0.029	MG/L	NONE	354.1	NA	07/03/19	07224723
Pheophytin-a		1.0	1.00		1.9	MG/CU.M.	10200H	10200H	07/03/19	07/08/19	07114690
Phosphorus		0.00800	0.0100		0.491	MG/L	365.2	365.2	07/18/19	01/10/10	07214718
Phosphorus, -orti	ho	0.00800	0.0100		0.112	MG/L	NONE	365.2	NA	07/03/19	07054673
Solids, Total Su	spended	6.67	6.67		101	MG/L	NONE	160.2	NA	07/03/19	07104688
Solids, Volatile	Suspen	6.67	6.67		11.3	MG/L	NONE	160.4	NA	07/03/19	07104689
Total Organic Ca	rbon	0.500	1.00		4.3	MG/L	NONE	415.1	NA	07/10/19	07184717

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

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(a) DOD and/or NELAC Accredited Analyte.

Sample 008485-07, Inorganic Analyses

Lab Report No:	008485						Щ	eport Date	: 07/30/2	019
Project Name: UPPE Project No:	R MISSISSIPPI	RIVER						Analysis ELAC Certi	: Inorgan. fied - IL1	ics 00308
ARDL No: 0084 Field ID: UMR- Received: 07/0	85-08 LA RM 283 2/2019	Samp] Samr Samr	ling Loc' pling Dat pling Tin	n: UPPE) .e: 07/0. .e: 0910	R MISSISSIPPI 2/2019	RIVER		Matrix Moisture	: WATER : NA	
Analyte	LOD	год	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Numb
Ammonia Nitrogen Chlorophyll-a, Corr Kjeldahl Nitrogen Nitrate as Nitrogen Nitrite as Nitrogen	ecte 1.0 0.0380 0.0380	0.0300 1.00 0.200 0.0400		0.0529 9.1 1.13 2.34 ND	MG/L MG/CU.M. MG/L MG/L	NONE 10200H 351.2 NONE NONE	350.1 10200H 351.2 GREEN 354.1	NA 07/03/19 07/08/19 NA	07/10/19 07/08/19 07/09/19 07/09/19	07104 07114 07104 07244

400 Aviation Drive; P.O. Box 1566

ARDL, INC.

Mt. Vernon, Illinois

62864

682 690 685 723 731 07/08/19 07114690 07/19/19 07214718 07/03/19 07054673 07/03/19 07104688 07/03/19 07104689 07/10/19 07184717 еr q 07/03/19 07/18/19 NA NA NA NA 10200H 365.2 365.2 160.2 160.4 415.1 10200H NONE NONE NONE 365.2 NONE MG/CU.M. MG/L MG/L MG/L MG/L MG/L 0.482 0.103 91.0 12.0 4.8 3.0 I 0.0100 0.0100 u.uzuu 1.00 10.0 10.0 1.00 U.UZUU 1.0 0.00800 0.00800 10.0 0.500 10.0 Solids, Total Suspended Solids, Volatile Suspen Total Organic Carbon UNTLEOUCH Phosphorus, -ortho Pheophytin-a Phosphorus רדדרע Am Ch Nji Nit

(a) DOD and/or NELAC Accredited Analyte.

Sample 008485-08, Inorganic Analyses

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

Lab Report No: 008485

UPPER MISSISSIPPI RIVER

Project Name: Project No:

Report Date: 07/30/2019

Analysis: Inorganics NELAC Certified - IL100308

ARDL No: 008485-0 Field ID: UMR-DP RU Received: 07/02/20	9 M 294 19	Sampl Samp Samp	ing Loc ling Da ling Ti	"n: UPPER te: 07/02 me: 0815	R MISSISSIPP. 2/2019	I RIVER		Matrix Moisture	: WATER : NA	
Analyte	LOD	LOQ	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Ammonia Nitrogen	0.0200	0.0300		DN	MG/L	NONE	350.1	NA	07/10/19 0	07104682
Chlorophyll-a, Correcte	1.0	1.00		11.8	MG/CU.M.	10200H	10200H	07/03/19	07/08/19 0	04114690
Kjeldahl Nitrogen	0.190	0.200		1.76	MG/L	351.2	351.2	07/08/19	07/09/19 0	07104685
Nitrate as Nitrogen	0.0760	0.0800		4.16	MG/L	NONE	GREEN	NA	07/09/19 0	07244732
Nitrite as Nitrogen	0.0200	0.0200		0.033	MG/L	NONE	354.1	NA	07/03/19 0	07224723
Pheophytin-a	1.0	1.00		6.6	MG/CU.M.	10200H	10200H	07/03/19	07/08/19 0	04114690
Phosphorus	0.00800	0.0100		0.586	MG/L	365.2	365.2	07/18/19	07/19/19 0	7214718
Phosphorus, -ortho	0.00800	0.0100		0.12	MG/L	NONE	365.2	NA	07/03/19 0	7054673
Solids, Total Suspended	9.09	9.09		151	MG/L	NONE	160.2	NA	07/03/19 0	07104688
Solids, Volatile Suspen	9.09	9.09		17.3	MG/L	NONE	160.4	NA	07/03/19 0	7104689
Total Organic Carbon	0.500	1.00		4.1	MG/L	NONE	415.1	NA	07/10/19 0	7184717

(a) DOD and/or NELAC Accredited Analyte.

Sample 008485-09, Inorganic Analyses

Lab Report No: 0084	185						щ	eport Date	: 07/30/20	119
Project Name: UPPER MIS Project No:	I IddISSISS	RIVER					Z	Analysis ELAC Certi	: Inorgani fied - IL10	1cs 00308
ARDL No: 008485-10 Field ID: SLH-3 Received: 07/02/201	0	Samp1 Samp Samp	ing Loc ling Da ling Ti	'n: UPPER te: 07/01 me: 1015	/2019	I RIVER		Matrix Moisture	: WATER : NA	
Analyte	LOD	ТОО	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Ammonia Nitrogen	0.0200	0.0300		QN	MG/L	NONE	350.1	NA	07/10/19 0	17104682
Chlorophyll-a, Correcte	1.0	1.00		6.7	MG/CU.M.	10200H	10200H	07/03/19	07/08/19 0	07114690
Kjeldahl Nitrogen	0.190	0.200		1.09	MG/L	351.2	351.2	07/08/19	07/09/19 0	7104685
Nitrate as Nitrogen	0.0190	0.0200		1.1	MG/L	NONE	GREEN	NA	07/09/19 0	07244730
Nitrite as Nitrogen	0.0200	0.0200		0.040	MG/L	NONE	354.1	NA	07/02/19 0	7224724
Pheophytin-a	1.0	1.00		DN	MG/CU.M.	10200H	10200H	07/03/19	07/08/19 0	7114690
Phosphorus	0.00800	0.0100		0.426	MG/L	365.2	365.2	07/18/19	07/19/19 0	7214718
Phosphorus, -ortho	0.00800	0.0100		0.0987	MG/L	NONE	365.2	NA	07/02/19 0	17054674
Solids, Total Suspended	6.67	6.67		76.7	MG/L	NONE	160.2	NA	07/03/19 0	7104688
Solids, Volatile Suspen	6.67	6.67		10.7	MG/L	NONE	160.4	NA	07/03/19 0	7104689
Total Organic Carbon	0.500	1.00		4.7	MG/L	NONE	415.1	NA	07/10/19 0	7184717

(a) DOD and/or NELAC Accredited Analyte.

Sample 008485-10, Inorganic Analyses

008485 Lab Report No:

07/30/2019 Report Date:

Project Name: UPPER MI: Project No:	SSISSIPPI	RIVER					N	Analysis ELAC Certi	: Inorgani fied - IL10	.cs 10308
ARDL No: 008485-1: Field ID: SLH-2 Received: 07/02/20:	1 1 9	Samp1 Samp Samp	ing Loc ling Da ling Ti	:'n: UPPE tte: 07/0 me: 0715	ER MISSISSIPPI 11/2019	RIVER		Matrix Moisture	: WATER : NA	
Analyte	LOD	LOQ	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Ammonia Nitrogen	0.0200	0.0300	Ŀ	0.0291	MG/L	NONE	350.1	NA	07/10/19 0	7104682
Chlorophyll-a, Correcte	1.0	1.00		8.3	MG/CU.M.	10200H	10200H	07/03/19	07/08/19 0	7114690
Kjeldahl Nitrogen	0.190	0.200		1.27	MG/L	351.2	351.2	07/08/19	07/09/19 0	7104685
Nitrate as Nitrogen	0.0190	0.0200		1.24	MG/L	NONE	GREEN	NA	07/09/19 0	7244730
Nitrite as Nitrogen	0.0200	0.0200		0.037	MG/L	NONE	354.1	NA	07/02/19 0	7224724
Pheophytin-a	1.0	1.00		DN	MG/CU.M.	10200H	10200H	07/03/19	07/08/19 0	7114690
Phosphorus	0.00800	0.0100		0.689	MG/L	365.2	365.2	07/18/19	07/19/19 0	7214718
Phosphorus, -ortho	0.00800	0.0100		0.102	MG/L	NONE	365.2	NA	07/02/19 0	7054674
Solids, Total Suspended	7.69	7.69		191	MG/L	NONE	160.2	NA	07/03/19 0	7104688
Solids, Volatile Suspen	7.69	7.69		13.9	MG/L	NONE	160.4	NA	07/03/19 0	7104689
Total Organic Carbon	0.500	1.00		4.4	MG/L	NONE	415.1	NA	07/10/19 0	7184717

(a) DOD and/or NELAC Accredited Analyte.

Sample 008485-11, Inorganic Analyses

	Report Date: 07/30/2019	Analysis: Inorganics NELAC Certified - IL100308
400 Aviation Drive; P.O. Box 1566 Mt. Vernon, Illinois 62864		
	Lab Report No: 008485	Project Name: UPPER MISSISSIPPI RIVER Project No:

ARDL, INC.

/2019	
01/30	
Date:	
leport	

ARDL No: 008485-12	2	Sampl	ing Loc	'n: UPPE	R MISSISSIPPI	RIVER		Matrix	: WATER	
Field ID: SLH-1		Samp	ling Da	te: 07/0	1/2019			Moisture	: NA	
Received: 07/02/201	19	Samp	iling Ti	.me: 0800						
Analyte	LOD	год	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Ammonia Nitrogen	0.0200	0.0300		ND	MG/L	NONE	350.1	NA	07/10/19 (07104682
Chlorophyll-a, Correcte	1.0	1.00		8.3	MG/CU.M.	10200H	10200H	07/03/19	07/08/19 (07114690
Kjeldahl Nitrogen	0.190	0.200		1.16	MG/L	351.2	351.2	07/08/19	07/09/19	07104685
Nitrate as Nitrogen	0.0190	0.0200		1.35	MG/L	NONE	GREEN	NA	07/09/19	07244730
Nitrite as Nitrogen	0.0200	0.0200		0.041	MG/L	NONE	354.1	NA	07/02/19 (07224724
Pheophytin-a	1.0	1.00		ND	MG/CU.M.	10200H	10200H	07/03/19	07/08/19 (07114690
Phosphorus	0.00800	0.0100		0.672	MG/L	365.2	365.2	07/18/19	07/19/19	07214718
Phosphorus, -ortho	0.00800	0.0100		0.113	MG/L	NONE	365.2	NA	07/02/19 (07054674
Solids, Total Suspended	5.88	5.88		182	MG/L	NONE	160.2	NA	07/03/19 (07104688
Solids, Volatile Suspen	5.88	5.88		14.1	MG/L	NONE	160.4	NA	07/03/19 (07104689
Total Organic Carbon	0.500	1.00		4.4	MG/L	NONE	415.1	NA	07/10/19	7184717

(a) DOD and/or NELAC Accredited Analyte.

Sample 008485-12, Inorganic Analyses

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

Lab Report No: 008485

UPPER MISSISSIPPI RIVER

Project Name: Project No:

07/30/2019 Report Date: NELAC Certified - IL100308

Analysis: Inorganics

ARDL No: 008485-3	13	Sampl	ing Loc	'n: UPPE	R MISSISSIPPI	I RIVER		Matrix	: WATER	
Field ID: SLH-15		Samp	ling Da	te: 07/0	1/2019			Moisture	: NA	
Received: 07/02/20	019	Samp	ling Ti	me: 0940						
Analyte	LOD	LOQ	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date N	Run umber
Ammonia Nitrogen	0.0200	0.0300		QN	MG/L	NONE	350.1	NA	07/10/19 07	104682
Chlorophyll-a, Correcte	e 1.0	1.00		14.1	MG/CU.M.	10200H	10200H	07/03/19	07/08/19 07	114690
Kjeldahl Nitrogen	0.190	0.200		2.21	MG/L	351.2	351.2	07/08/19	07/09/19 07	104685
Nitrate as Nitrogen	0.0380	0.0400		3.63	MG/L	NONE	GREEN	NA	70 01/00/10	244731
Nitrite as Nitrogen	0.0200	0.0200		0.051	MG/L	NONE	354.1	NA	07/02/19 07	224724
Pheophytin-a	1.0	1.00		3.4	MG/CU.M.	10200H	10200H	07/03/19	07/08/19 07	114690
Phosphorus	0.00800	0.0100		0.314	MG/L	365.2	365.2	07/18/19	07/19/19 07	214718
Phosphorus, -ortho	0.00800	0.0100		0.134	MG/L	NONE	365.2	NA	07/02/19 07	054674
Solids, Total Suspended	d 4.0	4.00		40.8	MG/L	NONE	160.2	NA	07/03/19 07	104688
Solids, Volatile Susper	n 4.0	4.00		5.6	MG/L	NONE	160.4	NA	07/03/19 07	104689
Total Organic Carbon	0.500	1.00		4.0	MG/L	NONE	415.1	NA	07/10/19 07	184717

(a) DOD and/or NELAC Accredited Analyte.

Sample 008485-13, Inorganic Analyses

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

Lab Report No: 008485

Report Date: 07/30/2019

Project Name: UPPER MISSISSIPPI RIVER

NELAC Certified - IL100308

			Blank		Ртер	Analysis	Prep	Analysis		QC Lab
Analyte	LOD	ТОQ	Result	Units	Method	Method	Date	Date I	Run	Number
Ammonia Nitrogen	0.020	0.030	DN	MG/L	NONE	350.1	NA	07/10/19 07:	104682	008485-01B1
Chlorophyll-a, Corre	1.0	1.0	DN	MG/CU.M.	10200H	10200H	07/03/19	07/08/19 07:	114690	008485-05B1
Kjeldahl Nitrogen	0.19	0.20	DN	MG/L	351.2	351.2	07/08/19	07/09/19 07:	104685	008485-01B1
Nitrate as Nitrogen	0.019	0.020	QN	MG/L	NONE	GREEN	NA	07/09/19 07:	244732	008486-01B1
Nitrate as Nitrogen	0.019	0.020	DN	MG/L	NONE	GREEN	NA	C1/09/19 07:	244731	008485-01B1
Nitrate as Nitrogen	0.019	0.020	DN	MG/L	NONE	GREEN	NA	C1/09/19 07	244730	008485-02B1
Nitrite as Nitrogen	0.020	0.020	QN	MG/L	NONE	354.1	NA	07/02/19 07:	224724	008485-01B1
Nitrite as Nitrogen	0.020	0.020	DN	MG/L	NONE	354.1	NA	07/03/19 073	224723	008486-02B1
Pheophytin-a	1.0	1.0	UN	MG/CU.M.	10200H	10200H	07/03/19	07/08/19 07	114690	008485-05B1
Phosphorus	0.008	0.010	QN	MG/L	365.2	365.2	07/18/19	07/19/19 07	214718	008485-01B1
Phosphorus, -ortho	0.008	0.010	QN	MG/L	NONE	365.2	NA	07/03/19 070	054673	008486-02B1
Phosphorus, -ortho	0.008	0.010	DN	MG/L	NONE	365.2	NA	07/02/19 070	054674	008485-01B1
Solids, Total Suspen	1.0	1.0	DN	MG/L	NONE	160.2	NA	07/03/19 07	104688	008485-02B1
Solids, Volatile Sus	1.0	1.0	QN	MG/L	NONE	160.4	NA	07/03/19 07:	104689	008485-02B1
Total Organic Carbon	0.50	1.0	ND	MG/L	NONE	415.1	NA	10 01/10//02	184717	008485-01B1

(a) DOD and/or NELAC Accredited Analyte Inorganic Method Blanks for 008485

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ARDL Report 8485 - Page 17 of 28

Project Name:UPPER MISSISSIPPI RIVERAnalyteLCS 1LCS 1LCS 2AnalyteLCS 1LCS 1LCS 2AnalyteResultLevel% RecResultAnalyte1.01.0104Mononia Nitrogen1.21.0118Gldahl Nitrogen0.991.099Gittate as Nitrogen0.991.099Mittite as Nitrogen0.991.099Mittite as Nitrogen0.991.099Nosphorus0.0950.1095Phosphorus, -ortho0.100.10104Cotal Organic Carbon8.810.088						
ICS 1 ICS 1 ICS 1 ICS 1 ICS 2 Amalyte Result Level % Rec Result monia Nitrogen 1.0 1.0 104 jeldahl Nitrogen 1.2 1.0 118 jeldahl Nitrogen 1.2 1.0 118 jeldahl Nitrogen 0.99 1.0 99 itrate as Nitrogen 0.97 1.0 99 itrate as Nitrogen 0.99 1.0 99 hosphorus 0.095 0.10 96 hosphorus, -ortho 0.10 0.10 95 hosphorus, -ortho 0.10 0.10 88 notal Organic Carbon 8.8 10.0 88					NELAC Cer	tified - IL100308
monia Nitrogen 1.0 1.0 104 jeldahl Nitrogen 1.2 1.0 118 ttrate as Nitrogen 0.99 1.0 99 ttrate as Nitrogen 0.99 1.0 99 ttrate as Nitrogen 0.99 1.0 99 ttrate as Nitrogen 0.97 1.0 97 ttrate as Nitrogen 0.99 1.0 99 ttrate as Nitrogen 0.99 1.0 97 ttrite as Nitrogen 0.99 1.0 99 otsphorus 0.099 1.0 99 osphorus, -ortho 0.095 0.10 95 otal Organic Carbon 8.8 10.0 88	LCS 2 Level	LCS 2 % Rec	% Rec Limits	Mean % Rec	Analytical Run	QC Lab Number
leidahl Nitrogen 1.2 1.0 118 trate as Nitrogen 0.99 1.0 99 trate as Nitrogen 0.97 1.0 98 trate as Nitrogen 0.97 1.0 97 trate as Nitrogen 0.97 1.0 97 trate as Nitrogen 0.99 1.0 97 trate as Nitrogen 0.99 1.0 99 trate as Nitrogen 0.99 0.10 99 trate as Nitrogen 0.095 0.10 96 tosphorus, -ortho 0.10 0.10 104 tosphorus, -ortho 8.8 10.0 88		-	80-120	1	07104682	008485-01C1
trate as Nitrogen 0.99 1.0 99 trate as Nitrogen 0.98 1.0 98 trate as Nitrogen 0.97 1.0 97 trate as Nitrogen 0.97 1.0 97 trate as Nitrogen 0.97 1.0 97 trite as Nitrogen 0.99 1.0 99 trite as Nitrogen 0.99 1.0 99 osphorus 0.095 0.10 95 osphorus, -ortho 0.10 0.10 95 tal Organic Carbon 8.8 10.0 88	1	1	80-120	1	07104685	008485-01C1
trate as Nitrogen 0.98 1.0 98 trate as Nitrogen 0.97 1.0 97 trite as Nitrogen 1.0 1.0 97 trite as Nitrogen 0.99 1.0 99 trite as Nitrogen 0.99 1.0 99 osphorus 0.095 0.10 95 osphorus, -ortho 0.010 0.10 95 osphorus, cortho 0.10 0.10 104 tal Organic Carbon 8.8 10.0 88	1	*** ***	80-120	ł	07244732	008486-01C1
trate as Nitrogen 0.97 1.0 97 trite as Nitrogen 1.0 1.0 102 trite as Nitrogen 0.99 1.0 99 trite as Nitrogen 0.99 1.0 99 osphorus 0.64 0.67 96 osphorus -ortho 0.095 0.10 95 osphorus -ortho 0.10 0.10 104 tal Organic Carbon 8.8 10.0 88	;	1	80-120	ł	07244731	008485-01C1
1.0 1.0 1.0 102 trite as Nitrogen 0.99 1.0 99 osphorus 0.64 0.67 96 osphorus, -ortho 0.095 0.10 95 osphorus, -ortho 0.10 0.10 95 osphorus, -ortho 0.10 0.10 104 osphorus, -ortho 0.10 0.10 88 osphorus, -ortho 8.8 10.0 88	1		80-120	ł	07244730	008485-02C1
trite as Nitrogen 0.99 1.0 99 osphorus 0.64 0.67 96 osphorus, -ortho 0.095 0.10 95 osphorus, -ortho 0.10 104 tal Organic Carbon 8.8 10.0 88	1	;	80-120	ł	07224724	008485-01C1
osphorus 0.64 0.67 96 osphorus, -ortho 0.095 0.10 95 osphorus, -ortho 0.10 0.10 104 tal Organic Carbon 8.8 10.0 88		1	80-120	1	07224723	008486-02C1
osphorus, -ortho 0.095 0.10 95 osphorus, -ortho 0.10 0.10 104 tal Organic Carbon 8.8 10.0 88	;	1	80-120	1	07214718	008485-01C1
osphorus, -ortho 0.10 0.10 104 tal Organic Carbon 8.8 10.0 88	1	1	80-120	ł	07054673	008486-02C1
tal Organic Carbon 8.8 10.0 88	1	4	80-120	ł	07054674	008485-01C1
		1	76-120	ł	07184717	008485-01C1

LABORATORY CONTROL SAMPLE REPORT

ARDL Report 8485 - Page 18 of 28

	62864
	H
	Vernon,
REPORT	Mt.
CATE	c 1566
DUPLI	. Box
IKE	Р.О
PIKE/SF	Drive;
MATRIX SI	Aviation
	400
	INC.
	ARDL,

Lab Report No: 008485

Report Date: 07/30/2019

UPPER MISSISSIPPI RIVER Project Name:

NELAC Certified - IL100308

Sample Analyte Matrix	monia Nitrogen WATE	eldahl Nitrogen WATE.	rate as Nitrogen WATE	rite as Nitrogen WATE	Phosphorus	sphorus, -ortho WATE	l Organic Carbon WATE
Sample Result	R ND	R 1.2	R 2.2	R 0.029	R 0.27	R 0.074	R 4.9
MS Result	2.2	1.8	3.1	1.0	1.1	0.18	9.2
MS Level	2.0	0.80	1.0	1.0	0.83	0.10	5.0
% Rec	108	76	93	102	66	104	86
MSD Result	2.2	1.9	3.2	1.1	1.1	0.18	9.1
MSD Level	2.0	0.80	1.0	1.0	0.83	0.10	5.0
MSD * Rec	110	16	66	103	100	101	84
% Rec Limits	75-125	75-125	75-125	75-125	75-125	75-125	76-120
RPD	2	7	7	-1	Ч	2	7
RPD Limit	20	20	20	20	20	20	20
Run	07104682	07104685	07244731	07224724	07214718	07054674	07184717
QC Lab Number	008485-01MS	008485-01MS	008485-01MS	008485-01MS	008485-01MS	008485-01MS	008485-01MS

Inorganic Matrix Spikes for 008485

(a) DOD and/or NELAC Accredited Analyte.

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

SAMPLE DUPLICATE REPORT DL, INC. 400 Aviation Drive; P.O. Box 1566 Mt. Vernon, IL 62864	38485 Report Date: 07/30/2019	PPER MISSISSIPPI RIVER NELAC Certified - 1L100308	Sample First Second Percent Mean Analytical QC Lab Conc'n Duplicate Duplicate Units Diff (Smp,D1,D2) Run Number	ced 16.3 15.4 MG/CU.M. 6 07114690 008485-05D1	5.3 5.5 MG/CU.M. 4 07114690 008485-U5D1	and 39.0 39.0 MG/L 0 07104689 008485-02D1
SAM NC. 400 Aviation 1		SSISSIPPI RIVER	mple First Secor nc'n Duplicate Duplica	6.3 15.4	5.3 5.5 LI 400 406	402 400
ARDL, IN	Lab Report No: 008485	Project Name: UPPER MI	Sa Analyte Co	hlorophyll-a, Corrected 1	Pheophytin-a	olids, Volatile Suspended 3

(a) DOD and/or NELAC Accredited Analyte Sample Duplicates for 008485

Sample Receipt Information

Including as appropriate:

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

ARDL Data Package 8485 - Inorganics

Authorized By: DSD-QAO

ARDL, Inc. P.O. Box 156 (618) 22

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

(618) 244-3235 Phone (618) 244-1149 Fax

CHAIN OF CUSTODY RECORD



8485
ARDL, Inc.	P.O. Box 1566, (618) 244	400 Aviat -3235 Pho	ion Dri	/e, Mt. (618)	Verno 244-1]	n, IL (49 Fa	2864						0	Ille	وراما	N OF C		S S S S S S S S S S S S S S S S S S S	<i>⊘</i> icor	Q
PROJECT Illinois River			ЕКЗ		2 N	5	37	1							Ŧ			PRI	SERVAT	NOE
SAMPLERS: (Signature)			NIATNO		N.	Port	ALL P	Q. N-cr	a									ICED	SPEC CHEMI ADDEI FINAL KNO	CEALS CALS AND PH IF
SAMPLE NUMBER DATE	TIME	GRAB COMP	NO. OF (AL SO.	4.1.*	10-0-	NEON	Shidoling		\sim	\sim			Ś	REN	IARKS OR LOCATIO	N			
п-2 7-1	150	×	X	X	$\frac{x}{x}$	X	X	X										×		
IL-6 7-1		X	X	×	X	X		X										×		
II-7 7-4	1736	X	X	×	X	X		X										X		
II-8 $ \langle g \rangle \rangle \rangle$		X	X	×	X	X		X										Х		
IL-9 · · · · ·	1900	X	X	×	X	X		X										X		
Mar al 1. Mil	Ser Contraction																			
1-2 SI H75	046	×		\succ	۲ ۲	X		X										X		
			:	2	•															
AR																				
PRelinquieted by: (Signature) Date	C IST	Receive	d by: (S	ignatur	(e)	R	MAR	KS/SPE	CIAL IN	ISTRU(CTION	ö								
Relinquished by: (Signature) Date	e Time	Receive	d by: (S	ignatur	(j)	⊊~ 	reserv	sd with	-12SO4											
Received for Laboratory by: Date O(Signature) Luley T	^c Time	Shippin	g Ticket	No.																
b PURCHASE ORDER NO:																				

23 of 28

	<u>COOLER RECEIPT</u>	REPC	ORT Ö	legina	l in S.	484 7/3	, 19
ARI	DL #: 8485 8486	Cool Num	er #	s in Shipm	ient: 1 h	5	
Pro	iect: IL RIVIA	Date	Received:	7/2/	18		-
		-110	(Di	TY			
А. 1	Did cooler some with a shipping slip (airbill etc.)2	-11_1	_(Signature)		VES	Ko	
1.		ľ				Č)
_	If YES, enter carrier name and airbill number here:	- 00			VEC	-	
2.	Were custody seals on outside of cooler?				YES	(MB)	N/A
	How many and where?,Seal Date:		,Seal Na	me:			
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?				Ý̧	NO	
5.	Were custody papers sealed in a plastic bag?		······		YES	0	
6.	Were custody papers filled out properly (ink, signed, etc.)?	•••••			ÉS	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	••••••	ES) NO	N/A
9.	Was a separate container provided for measuring temperature? YES	_ NO_	Observed	Cooler Temp	$\frac{\mathcal{O} \mathcal{D}}{\mathcal{O}}$).D	С
В.	LOG-IN PHASE: Date samples were logged-in: 7/3/19	(Signate	ure) <u>AA</u>	achru	www		
10.	Describe type of packing in cooler: Wet ice						3
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?				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?				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:]		Sample	Transfer		
			Fraction 41/		Fraction		
-		-	Area # /		Area #		
			Coold	1			
			By //	\sim	Ву		
-		-	On		On		
			7/2	118			
			Chain-of-C	ustody #	N/A	, 1	
(1	By: Signature) Date:				.,		

	COOLER RECEIPT	REP	<u>ORT</u>	aiegen	dle	\$4 - 19	84
AR	DL#: 848518486	Coc	oler #	·		. ,	
	Upper Miss Riven	Nur	nber of Co	olers in Shipr	ment: <u>Z)</u>	5	-
Pro	ject: <u>TLRIVIN</u>	Dat	e Receive	1: <u>-7 2 </u>	19		
A.	PRELIMINARY EXAMINATION PHASE: Date cooler was opened:) (Signature	NY	IY		
1.	Did cooler come with a shipping slip (airbill, etc.)?			AN7	12/17 YES	NO)
	If YES, enter carrier name and airbill number here:	_ (Comin	h	ł	U	
2.	Were custody seals on outside of cooler?		<u> </u>		YES	NO	N/A
	How many and where? Seal Date:		Se	al Name:		U	
3.	Were custody seals unbroken and intact at the date and time of arrival?		,00		YES	NO	MA
4.	Did vou screen samples for radioactivity using a Geiger Counter?				KES	NO	
5.	Were custody papers sealed in a plastic bag?				YES	ND	
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 to	p of this form			NO	N/A
9.	Was a separate container provided for measuring temperature? YES	NO_	<u> </u>	ved Cooler Tem	p. <u>0.4</u>	2	
В.	LOG-IN PHASE: Date samples were logged-in: 7-3-19	(Signa	ture <u>) / / /</u>	achter	ection factor_C	0+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?					NO	
14.	Did all sample labels agree with custody papers?	••••••			YES	NO	
15.	Were correct containers used for the tests indicated?	•••••				NO	
16.	Was pH correct on preserved water samples?				YES) NO	N/A
17.	Was a sufficient amount of sample sent for tests indicated?				VES	` NO	
18.	Were bubbles absent in VOA samples? If NO, list by sample #:			- 120 	YES	NO	N/A
19.	Was the ARDL project coordinator notified of any deficiencies?				YES	NO	(N/A)
	Comments and/or Corrective Action:		Fractica	Sample	Transfer		
			Fraction	211	Fraction		
		1	Area #		Area #		
-			By	A (1)	Bv		
				M			
			On 7/2	-/19	On		
			Chain-	of-Custody #	N/A	1	

Date:

(By: Signature)

	<u>COOLER RECEIPT F</u> <u>ARDL, INC.</u>	REPC	<u>)RT</u>	augu	ial in dec 7-3-1	, 84 9	186
ARI	DL#: <u>8485 (8486</u>	Cool	er#	-	-		
	Upper miss River	Num	ber of Cool	ers in Shipn	nent: <u>3</u> v	<u>75</u>	
Pro	ject: IL River	Date	Received:	-1/2/	19	V	
Α.	PRELIMINARY EXAMINATION PHASE: Date cooler was opened:	115	(Signature)	TY			
1.	Did cooler come with a shipping slip (airbill, etc.)?	. <u></u>	(olghataro)_		YES	NO	
	If XES, enter carrier name and airbill number here: $\int D I M$	1	(a) in al a			9	
2	Were custody seals on outside of cooler?		ONNIG	<u> </u>	VEQ	Rio	N1/A
2.							IN/A
_	How many and where?,Seal Date:,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?	•••••			(YÉS)	NO	N/A
8.	Was project identifiable from custody papers? If YES, enter project name at	the top	of this form			NO	N/A
9.	Was a separate container provided for measuring temperature? YES	_NO	Observe	d Cooler Temp 2 Corr	ection factor_6	C) <i>•0</i>	c
В.	LOG-IN PHASE: Date samples were logged-in: $7 - 3 - 19$	Signatu	ire) <u>AT (</u>	chur	ĸ		
10.	Describe type of packing in cooler: URT 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?				VES	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?					NO ל	
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:			Sample	Transfer		
			Fraction)	Fraction		
-			Area #	1	Area #		
			Cool	en			
			By	•	Ву		
-			On 1		On		
			7/2	118			
			Chain-of-	-Custodv #	N/K	1	

Date:

(By: Signature)

	COOLER RECEIPT I ARDL, INC.	REPC	DRT	aiegu	erial ii dle 7-3	e 8 - 19	486
AR	DL#: 848518484	Coo	ler #	-		_	
	Upper Miss River	Num	ber of Coolers	in Shipm	ent: $\frac{7}{2}$	<u>} </u>	
Pro	ject: <u>SL RIVM</u>	Date	Received:	7/2/1	19		
A.	PRELIMINARY EXAMINATION PHASE: Date cooler was opened:	2/19	(Signature)	Jγ			
1.	Did cooler come with a shipping slip (airbill, etc.)?	<u> </u>	(olghatalo)		YES	KO	
	If YES, enter carrier name and airbill number here:	211	Con in	er			
2.	Were custody seals on outside of cooler?	<u> </u>			YES (NO	 Ν/Δ
	How many and where?		Cool Nor				TM/ C
3	Nore custody coals unbroken and integt at the date and time of arrival?		,Seal Nam	e:	VER	NO	
з. Л	Did you screen samples for radioactivity using a Gaiger Counter?	•••••		••••••	VES	NO	MA
4. 5	Were custody papers sealed in a plastic bag?		••••••			NU NO	
э. 6	Were custody papers scaled in a plastic bag?		······		AEG	NO	N1/A
7	Were custody papers lined out property (link, signed, etc.) .		•••••••		VEQ	NO	
и. 8	Was project identifiable from custody papers? If YES, enter project name a	t the ton	of this form		VEQ	NO	
9.	Was a separate container provided for measuring temperature? YES			oler Temp	0.7	2	11/7
о. Б				Corre	ction factor_C	1.0	c
В.	LOG-IN PHASE: Date samples were logged-in:	Signati	ure) <u> </u>	encer	m		
10.	Describe type of packing in cooler:						
11.	Were all samples sealed in separate plastic bags?	•••••			YES	ŇO	, N/A
12.	Did all containers arrive unbroken and were labels in good condition?	•••••				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?	•••••	•••••	•••••		' NO	N/A
17.	Was a sufficient amount of sample sent for tests indicated?		•••••••	••••••	<u>C.YE</u> S	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	(1/A '
	Comments and/or Corrective Action:		Fraction -	Sample T	Fransfer		
			All				
			Area #		Area #		
		_	By	·····	Ву		
			M	>	-		
		2	on y/. h	0	On		
-			11211	/			
			Chain-of-Cu	stody #	N/#	1	
(1	By: Signature) Date:						

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	/ <u>COOLER RECEIPT F</u> / <u>ARDL, INC.</u>	REPO	DRT	arege	ical ca dle		9486
AR	DL#: 8485 8486	Coo Nun	ler #	ers in Shipn	nent: _5ა	15	-
Pro	iect EL Riven	Date	- Received	5/2/	 ۲۹	V	-
		, 115			<u>/</u>		
Α.	PRELIMINARY EXAMINATION PHASE: Date cooler was opened: // 4		<pre>\(Signature)</pre>			<u>(</u>)	
1.	Did cooler come with a shipping slip (airbill, etc.)?	Δ.	7	Ţ	YES	NO	
	If YES, enter carrier name and airbill number here:	91	mons	2017	a		
2.	Were custody seals on outside of cooler?				YES	NO	(NTA)
	How many and where?,Seal Date:,Seal Date:,		,Seal N	lame:			
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 (ink, signed, etc.)?					NO	N/A
7.	Were custody papers signed in appropriate place by ARDL personnel?	•••••			PES	NO	N/A
8.	Was project identifiable from custody papers? If YES, enter project name at	the top	o of this form			NO	N/A
9.	Was a separate container provided for measuring temperature? YES	_NO_		d Cooler Temp	$0. \frac{0.7}{100}$		C
В.	LOG-IN PHASE: Date samples were logged-in: 7 - 3 - 19	(Signat	ure <u>) Al</u>	ackie	cm		0
10.	Describe type of packing in cooler:		·				
11.	Were all samples sealed in separate plastic bags?				YES	NO	
12.	Did all containers arrive unbroken and were labels in good condition?				VES	NO NO	
13.	Were sample labels complete?					NO	
14.	Did all sample labels agree with custody papers?				YES	7 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	1
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		
			Area #	/	Area #		
			Cool	er			
			By Ar	0	Ву		
-			On /	1.	On		
			7/2	-118			
			Chain-of-	Custodv #	N/A		
(By: Signature) Date:	1		, , , ,			



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

www.ardlinc.com

Date: 7/31/19

Environmental | Analytical | Management | Safety

Customer Name: SLCOE

Project Name: Illinois River

Samples Received at ARDL: 7/2/19

Lab Name: ARDL, Inc.

ARDL Report No.: 8486

CASE NARRATIVE

<u>Customer</u> Sample No.	<u>Date</u> Collected	<u>Lab ID</u> Number	Analyses Requested
IL-2	7/1/19	8486-01	Inorganics(1)
IL-6	7/1/19	8486-02	Inorganics(1)
IL-7	7/1/19	8486-03	Inorganics(1)
IL-8	7/1/19	8486-04	Inorganics(1)
IL-9	7/1/19	8486-05	Inorganics(1)

(1) Including ammonia, chlorophyll/pheophytin, nitrite, nitrate, TKN, TOC, orthophosphate, total phosphorus, TSS, and TVSS.

The quality control data are summarized as follows:

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 TKN.

DUPLICATE

Duplicate analyses are reported as MS/MSD, except chlorophyll/pheophytin, TSS, and TVSS. RPD of the duplicate analyses met criteria, except pheophytin.

DATA REPORTING QUALIFIERS

The following data reporting qualifiers are used as required:

- ND Indicates parameter was analyzed for but not detected. The sample quantitation limit has been corrected for weight, dilution and/or percent moisture.
- 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.

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

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 8486 - Inorganics

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

Authorized By: DSD-QAO

Lab Report No: 0084	486						ц	keport Date	: 07/31/20	19
Project Name: ILLINOIS Project No:	RIVER						4	Analysis ELAC Certi	: Inorgani fied - IL10	cs 0308
ARDL No: 008486-01 Field ID: IL-2 Received: 07/02/201	61	Sampl Samp Samp	ing Loc ling Da ling Ti	"n: ILLI te: 07/0 me: 1500	NOIS RIVER 1/2019			Matrix Moisture	: WATER : NA	
Analyte	LOD	год	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Ammonia Nitrogen Chlorophyll-a, Correcte Kjeldahl Nitrogen Nitrate as Nitrogen Nitrite as Nitrogen Pheophytin-a Phosphorus Phosphorus, -ortho Solids, Total Suspended Solids, Volatile Suspen	0.0200 1.0 0.190 0.0760 0.0200 1.0 0.00800 0.00800 2.0 2.0	0.0300 1.00 0.200 0.0800 1.00 0.0200 2.00 2.00 2.00	ъ	ND 18.2 0.871 3.5 3.5 0.040 2.5 0.245 0.145 3.8 3.8 3.8	MG/L MG/CU.M. MG/CU.M. MG/L MG/L MG/L MG/L MG/L MG/L	NONE 10200H 351.2 NONE NONE 10200H 365.2 NONE NONE NONE	350.1 10200H 351.2 GREEN 354.1 10200H 365.2 365.2 365.2 160.2 160.2	NA 07/03/19 07/08/19 NA NA 07/03/19 07/18/19 NA NA NA	07/10/19 07/08/19 07/09/19 07/09/19 07/03/19 07/19/19 07/19/19 07/19/19 07/03/19 07/03/19 07/03/19	7104681 7114690 7104686 7244732 7244732 7114690 7214718 7054673 7104688 7104689

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

ARDL, INC.

(a) DOD and/or NELAC Accredited Analyte.

Sample 008486-01, Inorganic Analyses

I

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

> 008486 Lab Report No:

Report Date: 07/31/2019

Project Name: Project No:	SIONITI	RIVER						Z	Analysis ELAC Certi	:: Inorgan fied - IL1	lics .00308
ARDL No: Field ID:	008486-02 IL-6		Sampl Samp	ing Loo Ling Da	c'n: ILLI ate: 07/0	NOIS RIVER 11/2019			Matrix Moisture	C: WATER D: NA	
Received:	102/20//.0	a	Samp	Ling Ti	ime: 1655						
							Prep	Analysis	Prep	Analysis	Run
Analyt	Ð	LOD	ГОД	Flag	Result	Units	Method	Method	Date	Date	Number
Ammonia Nitroge	'n	0.0200	0.0300		0.857	MG/L	NONE	350.1	NA	07/10/19	07104681
Chlorophyll-a,	Correcte	1.0	1.00		12.5	MG/CU.M.	10200H	10200H	07/03/19	07/08/19	07114690
Kjeldahl Nitrog	len	0.190	0.200		0.847	MG/L	351.2	351.2	07/08/19	07/09/19	07104686
Nitrate as Nitr	ogen	0.0380	0.0400		3.62	MG/L	NONE	GREEN	NA	07/09/19	07244731
Nitrite as Nitr	rogen	0.0200	0.0200		0.033	MG/L	NONE	354.1	NA	07/03/19	07224723
Pheophytin-a		1.0	1.00		2.5	MG/CU.M.	10200H	10200H	07/03/19	07/08/19	07114690
Phosphorus		0.00800	0.0100		0.25	MG/L	365.2	365.2	07/18/19	07/19/19	07214718
Phosphorus, -or	tho	0.00800	0.0100		0.153	MG/L	NONE	365.2	NA	07/03/19	07054673
Solids, Total S	Juspended	2.22	2.22		23.8	MG/L	NONE	160.2	NA	07/03/19	07104688
Solids, Volatil	.e Suspen	2.22	2.22		3.11	MG/L	NONE	160.4	NA	07/03/19	07104689
Total Organic C	arbon	0.500	1.00		3.9	MG/L	NONE	415.1	NA	07/10/19	07184717

(a) DOD and/or NELAC Accredited Analyte.

Sample 008486-02, Inorganic Analyses

	Box 1566 62864	
ARDL, INC.	100 Aviation Drive; P.O. Mt. Vernon, Illinois	

Lab Report No: 008486

Report Date: 07/31/2019

Project Name: Project No:	SIONITI	RIVER						N	Analysis ELAC Certi	: Inorgan fied - IL1	ics 00308
ARDL No:	008486-03		Sampl	ing Loc	r'n: ILLIN	OIS RIVER			Matrix	: WATER	
Field ID: Received:	IL-7 07/02/201	6	Samp	ling Da ling Ti	ate: 07/01 Ime: 1730	/2019			Moisture	: NA	
							Prep	Analysis	Prep	Analysis	Run
Analyt	Ð	LOD	LOQ	Flag	Result	Units	Method	Method	Date	Date	Number
Ammonia Nitroge	n	0.0200	0.0300	Ŀ	0.0286	MG/L	NONE	350.1	NA	07/10/19	07104681
Chlorophyll-a,	Correcte	1.0	1.00		22.7	MG/CU.M.	10200H	10200H	07/03/19	07/08/19	07114690
Kjeldahl Nitrog	ten (0.190	0.200		1.08	MG/L	351.2	351.2	07/08/19	07/09/19	07104686
Nitrate as Nitr	rogen	0.0380	0.0400		3.57	MG/L	NONE	GREEN	NA	07/09/19	07244731
Nitrite as Nitr	rogen	0.0200	0.0200		0.032	MG/L	NONE	354.1	NA	07/03/19	07224723
Pheophytin-a		1.0	1.00		DN	MG/CU.M.	10200H	10200H	07/03/19	07/08/19	07114690
Phosphorus	1	0.00800	0.0100		0.254	MG/L	365.2	365.2	07/18/19	01/19/19	07214718
Phosphorus, -or	tho	0.00800	0.0100		0.148	MG/L	NONE	365.2	NA	07/03/19	07054673
Solids, Total S	Suspended	2.86	2.86		22.6	MG/L	NONE	160.2	NA	07/03/19	07104688
Solids, Volatil	e Suspen	2.86	2.86		4.57	MG/L	NONE	160.4	NA	07/03/19	07104689
Total Organic C	larbon	0.500	1.00		4.0	MG/L	NONE	415.1	NA	07/10/19	07184717

(a) DOD and/or NELAC Accredited Analyte.

Sample 008486-03, Inorganic Analyses

								l			
Lab Report N	0: 0084	86						ц	eport Date	: 07/31/2	610
Project Name: II Project No:	I SIONITI	RIVER						Ν	Analysis ELAC Certi	: Inorgan fied - IL1	iics 00308
ARDL No: 0(Field ID: I) Received: 0 ⁷	08486-04 L-8 7/02/2019	5	Sampl Samp Samp	ing Loc ling Da ling Ti	c'n: ILLI ate: 07/0 ime: 1830	NOIS RIVER 1/2019			Matrix Moisture	: WATER : NA	
Analyte		LOD	LOQ	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Ammonia Nitrogen		0.0200	0.0300		DN	MG/L	NONE	350.1	NA	07/10/19	07104681
Chlorophyll-a, Co	orrecte	1.0	1.00		20.4	MG/CU.M.	10200H	10200H	07/03/19	07/08/19	07114690
Kjeldahl Nitroger	c	0.190	0.200		0.509	MG/L	351.2	351.2	07/08/19	07/09/19	07104686
Nitrate as Nitro	gen	0.0380	0.0400		3.45	MG/L	NONE	GREEN	NA	07/09/19	07244731
Nitrite as Nitroc	gen	0.0200	0.0200		0.030	MG/L	NONE	354.1	NA	07/03/19	07224723
Pheophytin-a		1.0	1.00		2.8	MG/CU.M.	10200H	10200H	07/03/19	07/08/19	07114690
Phosphorus	0	0.00800	0.0100		0.237	MG/L	365.2	365.2	07/18/19	07/19/19	07214718

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

ARDL, INC.

07/03/19 07054673 07/03/19 07104688 07/03/19 07104689 07/10/19 07184717

NA NA NA NA

NONE NONE NONE NONE

365.2 160.2 160.4 415.1

MG/L MG/L MG/L

0.145

0.0100

0.00800 2.50 2.50 0.500

> Solids, Total Suspended Solids, Volatile Suspen Total Organic Carbon

Phosphorus, -ortho

16.5 3.75 4.1

2.50 2.50 1.00 (a) DOD and/or NELAC Accredited Analyte.

Sample 008486-04, Inorganic Analyses

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

> 008486 Lab Report No:

ILLINOIS RIVER

Project Name:

07/31/2019 Report Date: Analysis: Inorganics

I

1

Project No:							2	ELAC Certi	fied - IL1	00308
ARDL No: 008486-05	10	Sampl	Ling Loo	ILLI : 1'S	NOIS RIVER			Matrix	.: WATER	
FIELA LU: IL-9 Received: 07/02/201	61	samr samr	LING D	ate: 0//0 ime: 1900	ATUZ/T			Moisture	- NA	
						Prep	Analysis	Prep	Analysis	Run
Analyte	LOD	ТОŎ	Flag	Result	Units	Method	Method	Date	Date	Number
Ammonia Nitrogen	0.0200	0.0300	ъ	0.0269	MG/L	NONE	350.1	NA	07/10/19	07104681
Chlorophyll-a, Correcte	1.0	1.00	Ŀ	13.6	MG/CU.M.	10200H	10200H	07/03/19	07/08/19	07114690
Kjeldahl Nitrogen	0.190	0.200		0.912	MG/L	351.2	351.2	07/08/19	07/09/19	07104686
Nitrate as Nitrogen	0.0380	0.0400		3.63	MG/L	NONE	GREEN	NA	07/09/19	07244731
Nitrite as Nitrogen	0.0200	0.0200		0.036	MG/L	NONE	354.1	NA	07/03/19	07224723
Pheophytin-a	1.0	1.00		2.6	MG/CU.M.	10200H	10200H	07/03/19	07/08/19	07114690
Phosphorus	0.00800	0.0100		0.31	MG/L	365.2	365.2	07/18/19	07/19/19	07214718
Phosphorus, -ortho	0.00800	0.0100		0.225	MG/L	NONE	365.2	NA	07/03/19	07054673
Solids, Total Suspended	2.22	2.22		17.6	MG/L	NONE	160.2	NA	07/03/19	07104688
Solids, Volatile Suspen	2.22	2.22		3.56	MG/L	NONE	160.4	NA	07/03/19	07104689
Total Organic Carbon	0.500	1.00		4.0	MG/L	NONE	415.1	NA	07/10/19	07184717

(a) DOD and/or NELAC Accredited Analyte.

Sample 008486-05, Inorganic Analyses

Ч Page 1 of

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

Lab Report No: 008486

Report Date: 07/31/2019

62864

Project Name: ILLINOIS RIVER

NELAC Certified - IL100308

			Blank		Prep	Analysis	Prep	Analysis		QC Lab
Analyte	LOD	ГОQ	Result	Units	Method	Method	Date	Date	Run	Number
Ammonia Nitrogen	0.020	0.030	DN	MG/L	NONE	350.1	NA	70 01/10//0	7104681	008486-01B1
Chlorophyll-a, Corre	1.0	1.0	UN	MG/CU.M.	10200H	10200H	07/03/19	07/08/19 07	7114690	008485-05B1
Kjeldahl Nitrogen	0.19	0.20	ND	MG/L	351.2	351.2	07/08/19	70 01/00/10	7104686	008486-01B1
Nitrate as Nitrogen	0.019	0.020	ND	MG/L	NONE	GREEN	NA	07/09/19 07	7244732	008486-01B1
Nitrate as Nitrogen	0.019	0.020	DN	MG/L	NONE	GREEN	NA	07/09/19 07	7244731	008485-01B1
Nitrite as Nitrogen	0.020	0.020	DN	MG/L	NONE	354.1	NA	07/03/19 07	7224723	008486-02B1
Pheophytin-a	1.0	1.0	DN	MG/CU.M.	10200H	10200H	07/03/19	07/08/19 07	7114690	008485-05B1
Phosphorus	0.008	0.010	DN	MG/L	365.2	365.2	07/18/19	07/19/19 07	7214718	008485-01B1
Phosphorus, -ortho	0.008	0.010	DN	MG/L	NONE	365.2	NA	07/03/19 07	7054673	008486-02B1
Solids, Total Suspen	1.0	1.0	DN	MG/L	NONE	160.2	NA	07/03/19 07	7104688	008485-02B1
Solids, Volatile Sus	1.0	1.0	DN	MG/L	NONE	160.4	NA	07/03/19 07	7104689	008485-02B1
Total Organic Carbon	0.50	1.0	QN	MG/L	NONE	415.1	NA	07/10/19 07	7184717	008485-01B1

(a) DOD and/or NELAC Accredited Analyte Inorganic Method Blanks for 008486

ARDI	L, INC.	400 Av	LABORA riation	TORY C Drive	ONTROL ; P.O.	SAMPI Box 1	E REPC 566)RT Mt. Ve	rnon, IL	62864
Lab Report No: 008	486								Report Da	te: 07/31/2019
Project Name:	ILLINOIS	RIVER							NELAC Cer	tified - 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
Ammonia Nitrogen Kieldahl Nitrogen	1.1	1.0	117		1		80-120 80-120		07104686	008486-01C1 008486-01C1
Nitrate as Nitrogen	0.99	1.0	66	1	ł	ł	80-120	ł	07244732	008486-01C1
Nitrate as Nitrogen	0.98	1.0	86	1	ł	ł	80-120	ł	07244731	008485-01C1
Nitrite as Nitrogen	0.99	1.0	66		ł	1	80-120	ł	07224723	008486-02C1
Phosphorus	0.64	0.67	96	ł	1		80-120	ł	07214718	008485-01C1
Phosphorus, -ortho	0.095	0.10	95	ł	1	ł	80-120	!	07054673	008486-02C1
Total Organic Carbon	8.8	10.0	88		ł	ł	76-120	ł	07184717	008485-01C1
NOTE: Any values ta (a) DOD and/or NELA	bulated above m ⁱ C Accredited Ani	arked with alyte	an asteris	k are outs	ide of acc	eptable lí	mits.			

Inorganic LCS Results for 008486

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REPORJ	Mt.
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IKE/SE	Drive;
IX SP	tion
MATR	Avia
	400
	INC.
	ARDL,

Lab Report No: 008486

ILLINOIS RIVER

Project Name:

Report Date: 07/31/2019

NELAC Certified - IL100308

	Sample	Sample	SM	SM	SM	MSD	MSD	MSD	% Rec		RPD		QC Lab
Analyte	Matrix	Result	Result	Level	% Rec	Result	Level	% Rec	Limits	RPD	Limit	Run	Number
Ammonia Nitrogen	WATER	QN	2.2	2.0	110	2.2	2.0	109	75-125	-1	20	07104681	008486-01MS
Kjeldahl Nitrogen	WATER	0.87	1.9	0.80	127 *	1.7	0.80	66	75-125	13	20	07104686	008486-01MS
Nitrate as Nitrogen	WATER	3.5	4.4	1.0	94	4.3	1.0	ΓL	75-125	4	20	07244732	008486-01MS
Nitrite as Nitrogen	WATER	0.033	1.1	1.0	106	1.1	1.0	106	75-125	0	20	07224723	008486-02MS
Phosphorus	WATER	0.31	1.1	0.83	66	1.2	0.83	102	75-125	2	20	07214718	008486-05MS
Phosphorus, -ortho	WATER	0.15	0.26	0.10	104	0.27	0.10	113	75-125	4	20	07054673	008486-02MS

Inorganic Matrix Spikes for 008486

(a) DOD and/or NELAC Accredited Analyte.

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

364	07/31/2019	.ed - IL100308	QC Lab Number	008486-05D1 008486-05D1 008486-04D1 008486-04D1
on, IL 628	Report Date:	NELAC Certifi	Analytical Run	07114690 07104688 07104689 07104689
Mt. Vern			Mean (Smp,D1,D2)	
E REPORT Box 1566			Percent Diff	4 ^w ω Ο
DUPLICAT ve; P.O.			Units	MG/CU.M. MG/L MG/L
SAMPLE tion Driv			Second Duplicate	
400 Avia		~	First Duplicate	13.1 15.3
INC.	10	DIS RIVER	Sample Conc'n	13.0 19.0 19.0 19.0
ARDL,	Lab Report No: 00848	Project Name: ILLIN	Analyte	Chlorophyll-a, Corrected Pheophytin-a Solids, Total Suspended Solids, Volatile Suspend

* indicates that agreement between duplicates is greater than 20%. See Case Narrative for exceptions.
 (a) DOD and/or NELAC Accredited Analyte
 Sample Duplicates for 008486

ARDL Report 8486 - Page 11 of 18

Sample Receipt Information

Including as appropriate:

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

ARDL Data Package 8486 - Inorganics

Authorized By: DSD-QAO

CORD	ERVATION	SPECIFY CHEMICALS ADDED AND FINAL PH IF KNOWN																			
REC	PRES	ICED	-	×	X	X	X	X		X											
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DL, Inc	liver	S: (Signature)	PLE NUMBER				(1831)		w ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	2					d by: (Signature)	d by: (Signature)	In Laboratory by:	E ORDER NO:			
AR	PROJECT Illinois R	SAMPLER	SAMF	IL-2 .	1L-6	IL-7	IL-8	, 9-JI	1. AL	HTS				AR		Relinquishe	Skeceived fo	aburchasi	13 of <i>'</i>	18	

8485+ 8486

	COOLER RECEIPT I	REPORT					
	ARDL, INC.						
ARI	DL #: 8485 8486	Cooler # _	-		- / N	6	
	Upper Miss River +	Number of	Coolers	in Shipn	nent: 12	2	-
Pro	iect: IL Riven	Date Rece	eived:	7/2/	18		
A.	PRELIMINARY EXAMINATION PHASE: Date cooler was opened:	Sign	ature)	14			
1.	Did cooler come with a shipping slip (airbill, etc.)?				YES	NO)
	If YES, enter carrier name and airbill number here:	- Couns	ner				
2.	Were custody seals on outside of cooler?				YES	NO	N/A
	How many and where?,Seal Date:,Seal Date:,		_,Seal Name	e:			
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?				ÝĒ3	NO	-
5.	Were custody papers sealed in a plastic bag?				YES	NO	
6.	Were custody papers filled out properly (ink, signed, etc.)?			•••••	ÈS	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 f	form	•••••	ÉS	NO	N/A
9.	Was a separate container provided for measuring temperature? YES	_NOO	bserved Co	oler Temp Corre	ection factor	0.0	С
В.	LOG-IN PHASE: Date samples were logged-in: 7/3/19	(Signature)	Ala	Are	in		
10.	Describe type of packing in cooler: Wet 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?				YES	NO	
14.	Did all sample labels agree with custody papers?				VES	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?			•••••	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:	Fracti	S	ample	Fraction		
		11400	AU		Traction		
		Area	# 1,0	,	Area #		
-		Ву	00111		Ву		
			AD				
		On	7/2/	18	On		
		L					
		Cha	ain-of-Cus	stody #	N/A		
(E	By: Signature) Date:						

ARDL Report 8486 - Page 14 of 18

	ARDI INC	KEPORI	
	DUDS XYRG	-	
AR	UL#: 878518100	Number of Coolers in Shipment: 20 5	
Pro	pject: IL Rives	Date Received: 7/2/19	
^		119 TH TY	
A.	PRELIMINART EXAMINATION PHASE. Date cooler was opened.	AN TULA UTO	
1.	Did cooler come with a shipping slip (airbili, etc.)?	I a internet in the internet internet in the internet in the internet in the internet in the internet internet in the internet internet internet in the internet int	/
	If YES, enter carrier name and airbill number here:	Courter	
2.	Were custody seals on outside of cooler?	YES KO) N/A
	How many and where?,Seal Date:,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?	NO	
5.	Were custody papers sealed in a plastic bag?		
6.	Were custody papers filled out properly (ink, signed, etc.)?		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	N/A
9.	Was a separate container provided for measuring temperature? YES	NO Observed Cooler Temp. 0.4 C	C
B.	LOG-IN PHASE: Date samples were logged-in: 7-3-19	(Signature) / Lachum	
10.	Describe type of packing in cooler:		
11.	Were all samples sealed in separate plastic bags?) N/A
12.	Did all containers arrive unbroken and were labels in good condition?		
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?		
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	(N/A)
	Comments and/or Corrective Action:	Sample Transfer	
		Fraction Fraction	
\vdash		Area # / Area #	
		bool11	
		by MM by	
		On line On	
-		7/2//{	
		Chain-of-Custody # N/A	

Date:

(By: Signature)

	COOLER RECEIPT F	REPORT			
AR	DL #: <u>8485 8486</u> Upper Miss River	Cooler # Number of Coolers in Shipn	- nent: <u>3</u> 1	25	
Pro	ject: IL River	Date Received: 1/2/	19		
A.	PRELIMINARY EXAMINATION PHASE: Date cooler was opened:	(Signature) JY			
1.	Did cooler come with a shipping slip (airbill, etc.)?		YES	NO)
	If YES, enter carrier name and airbill number here:	Inizionen			
2	Were custody seals on outside of cooler?		YES	RO	N/A
2.		- 11I		110	N/A
	How many and where?,Seal Date:,Seal Date:,	,Seal Name:			0
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?		YE\$	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?			NO	N/A
8.	Was project identifiable from custody papers? If YES, enter project name at	the top of this form		NO	N/A
9.	Was a separate container provided for measuring temperature? YES	_NO Observed Cooler Temp	o. <u>0, y</u>		C
B.	LOG-IN PHASE: Date samples were logged-in: 7-3-19	(Signature) Slackum	×		
10.	Describe type of packing in cooler: uet ice				
11.	Were all samples sealed in separate plastic bags?		YES	NO	7 N/A
12.	Did all containers arrive unbroken and were labels in good condition?		KES	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?		ES'	NO	
16.	Was pH correct on preserved water samples?			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
Г	Comments and/or Corrective Action:	Sample	Fransfer		_
		Fraction	Fraction		
-		Area #	Area #		
		Crocken			
		Ву	Ву		
-		On	On	-	
		7/2/15			
		Chain of Custody #	NIA		

Date:

(By: Signature)

	COOLER RECEIPT RE	PORT
	ARDL, INC.	
ARI	DL #: 898518986	Cooler # 4 N ~
	upper Miss River	Number of Coolers in Shipment:
Pro	oject: <u>SL Rivn</u>	Date Received:
A.	PRELIMINARY EXAMINATION PHASE: Date cooler was opened:	(Signature) ゴア
1.	Did cooler come with a shipping slip (airbill, etc.)?	YES 10
	If YES, enter carrier name and airbill number here:	SI Courner
2.	Were custody seals on outside of cooler?	
	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?	NO
5.	Were custody papers sealed in a plastic bag?	YES 🔞
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 at the	e top of this form
9.	Was a separate container provided for measuring temperature? YESN	NO / Observed Cooler Temp. 0.7 c
В.	LOG-IN PHASE: Date samples were logged-in: 7-3-19 (Sig	gnature) LA Leichreim
10.	Describe type of packing in cooler: Let ice	
11.	Were all samples sealed in separate plastic bags?	
12.	Did all containers arrive unbroken and were labels in good condition?	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?	
16.	Was pH correct on preserved water samples?	
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 NA
19.	Was the ARDL project coordinator notified of any deficiencies?	YES NO NA
	Comments and/or Corrective Action:	Sample Transfer
		Fraction Fraction
-		Area # Area #
		Koler
		By By
		By By On On On
		By By On Market On 7/2/19
		$\frac{kole}{By} \qquad By \qquad By \qquad On \qquad O$

ARDL Report 8486 - Page 17 of 18

	COOLER RECEIPT I	REPORT			
	OUDE AJAL				
ARI	$DL #: \frac{39857878}{1000}$	Cooler #	55	15	
_	Vippen miss Rivers			~	
Pro	ect:LC /Z(Vm	Date Received:			
A.	PRELIMINARY EXAMINATION PHASE: Date cooler was opened:	2 15 (Signature)			
1.	Did cooler come with a shipping slip (airbill, etc.)?	1	YES	NO	
	If YES, enter carrier name and airbill number here:	DI Tronsport			
2.	Were custody seals on outside of cooler?	<i>,</i>	YES	NO	NA
	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	the top of this form	YES	NO	N/A
9.	Was a separate container provided for measuring temperature? YES	NO ()bserved Cooler Temp.	Cactor	+0	C:
В.	LOG-IN PHASE: Date samples were logged-in: 7 - 3-19	(Signature) Alackeer	<u></u>		
10.	Describe type of packing in cooler:				
11.	Were all samples sealed in separate plastic bags?			6	N/A و
12.	Did all containers arrive unbroken and were labels in good condition?		YES	NO	
13.	Did all containers arrive unbroken and were labels in good condition		YES	NO	
	Were sample labels complete?		YES YES YES	NO NO	
14.	Were sample labels complete? Did all sample labels agree with custody papers?		YES YES YES	NO NO NO	
14. 15.	Were sample labels complete? Did all sample labels agree with custody papers? Were correct containers used for the tests indicated?		YES YES YES YES	NO NO NO NO	
14. 15. 16.	Were sample labels complete? Did all sample labels agree with custody papers? Were correct containers used for the tests indicated? Was pH correct on preserved water samples?		YES YES YES YES YES	NO NO NO NO NO	N/A
14. 15. 16. 17.	Were sample labels complete? Did all sample labels agree with custody papers? Were correct containers used for the tests indicated? Was pH correct on preserved water samples? Was a sufficient amount of sample sent for tests indicated?		YES 	NO NO NO NO NO NO	N/A
14. 15. 16. 17. 18.	Were sample labels complete? Did all sample labels agree with custody papers? Were correct containers used for the tests indicated? Was pH correct on preserved water samples? Was a sufficient amount of sample sent for tests indicated? Were bubbles absent in VOA samples? If NO, list by sample #:		YES YES YES YES YES YES YES	NO NO NO NO NO NO NO	N/A
14. 15. 16. 17. 18. 19.	Were sample labels complete? Did all sample labels agree with custody papers? Were correct containers used for the tests indicated? Was pH correct on preserved water samples? Was a sufficient amount of sample sent for tests indicated? Were bubbles absent in VOA samples? If NO, list by sample #: Was the ARDL project coordinator notified of any deficiencies?		VES VES VES VES VES VES VES VES VES		N/A N/A
14. 15. 16. 17. 18. 19.	Were sample labels complete? Did all sample labels agree with custody papers? Were correct containers used for the tests indicated? Was pH correct on preserved water samples? Was a sufficient amount of sample sent for tests indicated? Were bubbles absent in VOA samples? If NO, list by sample #: Was the ARDL project coordinator notified of any deficiencies? Comments and/or Corrective Action:	Sample Trans	VES VES VES VES VES VES VES VES VES		
14. 15. 16. 17. 18. 19.	Were sample labels complete? Did all sample labels agree with custody papers? Were correct containers used for the tests indicated? Was pH correct on preserved water samples? Was a sufficient amount of sample sent for tests indicated? Were bubbles absent in VOA samples? If NO, list by sample #: Was the ARDL project coordinator notified of any deficiencies? Comments and/or Corrective Action:	Sample Trans Fraction Fract	YES YES YES YES YES YES YES YES YES		
14. 15. 16. 17. 18. 19.	Were sample labels complete? Did all sample labels agree with custody papers? Were correct containers used for the tests indicated? Was pH correct on preserved water samples? Was a sufficient amount of sample sent for tests indicated? Were bubbles absent in VOA samples? If NO, list by sample #: Was the ARDL project coordinator notified of any deficiencies? Comments and/or Corrective Action:	Sample Trans Fraction Fract Area Area	YES YES YES YES YES YES YES YES YES YES YES		N/A
14. 15. 16. 17. 18. 19.	Were sample labels complete? Did all sample labels agree with custody papers? Were correct containers used for the tests indicated? Was pH correct on preserved water samples? Was a sufficient amount of sample sent for tests indicated? Were bubbles absent in VOA samples? If NO, list by sample #: Was the ARDL project coordinator notified of any deficiencies? Comments and/or Corrective Action:	Sample Trans Fraction Fract Area Area Lowler Brack	YES YES YES YES YES YES YES YES YES YES YES YES YES		N/A
14. 15. 16. 17. 18. 19.	Were sample labels complete? Did all sample labels agree with custody papers? Were correct containers used for the tests indicated? Was pH correct on preserved water samples? Was a sufficient amount of sample sent for tests indicated? Were bubbles absent in VOA samples? If NO, list by sample #: Was the ARDL project coordinator notified of any deficiencies? Comments and/or Corrective Action:	Sample Trans Fraction Fract Area # Area Loole By By AW	YES YES YES YES YES YES YES YES YES YES YES		
14. 15. 16. 17. 18. 19.	Were sample labels complete? Did all sample labels agree with custody papers? Were correct containers used for the tests indicated? Was pH correct on preserved water samples? Was a sufficient amount of sample sent for tests indicated? Were bubbles absent in VOA samples? If NO, list by sample #: Was the ARDL project coordinator notified of any deficiencies? Comments and/or Corrective Action:	Sample Trans Fraction Fract Area Area By By On On	YES YES YES YES YES YES YES YES		

Chain-of-Custody # ___/A__

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

Date:

(By: Signature)



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

www.ardlinc.com

Lab Name: ARDL, Inc.

ARDL Report No.: 8489

Date: 8/20/19

Environmental | Analytical | Management | Safety

Customer Name: SLCOE

Project Name: Lower River

Samples Received at ARDL: 7/11/19

CASE NARRATIVE

<u>Customer</u>	Date	Lab ID	Angling - Demonsteri
Sample No.	Collected	Number	Analyses Requested
OPR-2 RM 44	7/11/19	8489-01	Inorganics(1)
OPR-3 RM 80	7/11/19	8489-02	Inorganics(1)
OPR-4 RM 110	7/11/19	8489-03	Inorganics(1)

(1) Including ammonia, chlorophyll/pheophytin, nitrite, nitrate, TKN, TOC, orthophosphate, total phosphorus, TSS, and TVSS.

The quality control data are summarized as follows:

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

The reported nitrate data was acquired via Method 300.0 eleven days beyond the normal 28 day holding period. Originally, nitrate data was collected via the Green method within holding times. Review of that data revealed inconsistencies from the instrument for some of the samples. Once noted, holding times had expired. ARDL analyzed the samples using the secondary method and got comparable data for the majority of the samples, and believes that the reported data are the most accurate available. These data have been flagged with an 'X'.

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

Duplicate analyses are reported as MS/MSD, except chlorophyll/pheophytin, TSS, and TVSS. RPD of the duplicate analyses met criteria, except pheophytin.

DATA REPORTING QUALIFIERS

The following data reporting qualifiers are used as required:

- ND Indicates parameter was analyzed for but not detected. The sample quantitation limit has been corrected for weight, dilution and/or percent moisture.
- X Indicates parameter was analyzed for outside of normally accepted holding times.

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

Project Name: Lower River

ARDL Report No.: 8489

CASE NARRATIVE (Continued)

 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.

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

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 8489 - Inorganics

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

Authorized By: DSD-QAO

ARDL Report 8489 - Page 3 of 13

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

> 008489 Lab Report No:

Project Name: LOWER RIVER

08/20/2019 Report Date: Analysis: Inorganics

Project No:								4	NELAC Certi	fied - IL1	00308
ARDL No: 00	8489-01		Sampl	ling Lo	c'n: LOWER	RIVER			Matrix	:: WATER	
Field ID: OF Received: 07	R-2 RM //11/201	44 19	Samp Samp	ling D	ate: 07/11 ime: 1045	1/2019			Moisture	: NA	
Analyte		TOD	ГОО	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Numbe <i>r</i>
(a) Nitrate-N		0.80	1.0	×	2.3	MG/L	NONE	300.0	NA	08/19/19	08204817
Ammonia Nitrogen		0.0200	0.0300		0.051	MG/L	NONE	350.1	NA	07/15/19	07164699
Chlorophyll-a, Co	rrecte	1.0	1.00		9.1	MG/CU.M.	10200H	10200H	07/12/19	07/15/19	07164701
Kjeldahl Nitrogen		0.190	0.200		0.756	MG/L	351.2	351.2	07/23/19	07/24/19	07284739
Nitrite as Nitrog	en	0.0200	0.0200		0.021	MG/L	NONE	354.1	NA	07/12/19	07314750
Pheophytin-a		1.0	1.00		3.6	MG/CU.M.	10200H	10200H	07/12/19	07/15/19	07164701
Phosphorus		0.00800	0.0100		0.461	MG/L	365.2	365.2	07/18/19	07/19/19	07214719
Phosphorus, -orth	0	0.00800	0.0100		0.134	MG/L	NONE	365.2	NA	07/12/19	07164696
Solids, Total Sus	pended	4.0	4.00		120	MG/L	NONE	160.2	NA	07/16/19	07174715
Solids, Volatile	Suspen	4.0	4.00		8.4	MG/L	NONE	160.4	NA	07/16/19	07174716
Total Organic Car	nod	0.500	1.00		3.8	MG/L	NONE	415.1	NA	07/23/19	07254733

(a) DOD and/or NELAC Accredited Analyte.

Sample 008489-01, Inorganic Analyses

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

> 008489 Lab Report No:

08/20/2019 Report Date:

Project Name: Project No:	LOWER RIV	ER						Z	Analysis ELAC Certi	:: Inorgar fied - IL1	iics 00308
ARDL No: Field ID: Received:	008489-02 OPR-3 RM 07/11/201	80 9	Samp1 Samp Samp	ling Loc ling Da ling Ti	c'n: LOWER ate: 07/11 ime: 1313	k RIVER /2019			Matrix Moisture	: WATER : NA	
Analy	ب ه	LOD	ΓΟŎ	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
(a) Nitrate-N		0.80	1.0	×	2.4	MG/L	NONE	300.0	NA	08/19/19	08204817
Ammonia Nitrog	en.	0.0200	0.0300		0.0392	MG/L	NONE	350.1	NA	07/15/19	07164699
Chlorophyll-a,	Correcte	1.0	1.00		9.1	MG/CU.M.	10200H	10200H	07/12/19	07/15/19	07164701
Kjeldahl Nitro	gen	0.190	0.200		0.894	MG/L	351.2	351.2	07/23/19	07/24/19	07284739
Nitrite as Nit	rogen	0.0200	0.0200		ND	MG/L	NONE	354.1	NA	07/12/19	07314750
Pheophytin-a	1	1.0	1.00		2.6	MG/CU.M.	10200H	10200H	07/12/19	07/15/19	07164701
Phosphorus		0.00800	0.0100		0.426	MG/L	365.2	365.2	07/18/19	07/19/19	07214719
Phosphorus, -o	rtho	0.00800	0.0100		0.142	MG/L	NONE	365.2	NA	07/12/19	07164696
Solids, Total	Suspended	6.67	6.67		104	MG/L	NONE	160.2	NA	07/16/19	07174715
Solids, Volati	le Suspen	6.67	6.67		8.0	MG/L	NONE	160.4	NA	07/16/19	07174716
Total Organic	Carbon	0.500	1.00		3.8	MG/L	NONE	415.1	NA	07/23/19	07254733

(a) DOD and/or NELAC Accredited Analyte.

Sample 008489-02, Inorganic Analyses

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

Lab Report No: 008489

Project Name: LOWER RIVER

Project No:

Report Date: 08/20/2019

Analysis: Inorganics NELAC Certified - IL100308

XDT, NO: 008489-03		[dmeS	ing Loc	"n. I.OWF.F	R R T VFR			Matrix	. WATER	
OPR-4 RM 07/11/201	110 9	Samp Samp	uling Da Ling Ta	te: 07/11 me: 1415	1/2019			Moisture	NA :	
t e	LOD	ГОД	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
	0.80	1.0	×	2.5	MG/L	NONE	300.0	NA	08/19/19	08204817
gen	0.0200	0.0300		0.0794	MG/L	NONE	350.1	NA	07/15/19	07164699
Correcte	1.0	1.00		10.6	MG/CU.M.	10200H	10200H	07/12/19	07/15/19	07164701
gen	0.190	0.200		0.825	MG/L	351.2	351.2	07/23/19	07/24/19	07284739
rogen	0.0200	0.0200		0.028	MG/L	NONE	354.1	NA	07/12/19	07314750
	1.0	1.00		3.2	MG/CU.M.	10200H	10200H	07/12/19	07/15/19	07164701
	0.00800	0.0100		0.439	MG/L	365.2	365.2	07/18/19	07/19/19	07214719
ortho	0.00800	0.0100		0.142	MG/L	NONE	365.2	NA	07/12/19	07164696
Suspended	6.67	6.67		125	MG/L	NONE	160.2	NA	07/16/19	07174715
ile Suspen	6.67	6.67		9.33	MG/L	NONE	160.4	NA	07/16/19	07174716
Carbon	0.500	1.00		3.9	MG/L	NONE	415.1	NA	07/23/19	07254733

(a) DOD and/or NELAC Accredited Analyte.

Sample 008489-03, Inorganic Analyses

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

Lab Report No: 008489

LOWER RIVER

Project Name:

Report Date: 08/20/2019

NELAC Certified - IL100308

			Blank		Prep	Analysis	Prep	Analysis		QC Lab	
Analyte	LOD	ТоQ	Result	Units	Method	Method	Date	Date	Run	Number	
(a) Nitrate-N	0.80	1.0	DN	MG/L	NONE	300.0	NA	08/19/19 0	8204817	008489-02B1	
Ammonia Nitrogen	0.020	0.030	ND	MG/L	NONE	350.1	NA	07/15/19 0	17164699	008488-13B1	
Chlorophyll-a, Corre	1.0	1.0	ND	MG/CU.M.	10200H	10200H	07/12/19	07/15/19 0	07164701	008489-02B1	
Kjeldahl Nitrogen	0.19	0.20	DN	MG/L	351.2	351.2	07/23/19	07/24/19 0	07284739	008489-01B1	
Nitrite as Nitrogen	0.020	0.020	DN	MG/L	NONE	354.1	NA	07/12/19 0	07314750	008489-01B1	
Pheophytin-a	1.0	1.0	ND	MG/CU.M.	10200H	10200H	07/12/19	07/15/19 0	7164701	008489-02B1	
Phosphorus	0.008	0.010	ND	MG/L	365.2	365.2	07/18/19	07/19/19 0	7214719	008489-02B1	
Phosphorus, -ortho	0.008	0.010	DN	MG/L	NONE	365.2	NA	07/12/19 0	17164696	008489-02B1	
Solids, Total Suspen	1.0	1.0	DN	MG/L	NONE	160.2	NA	07/16/19 0	7174715	008489-03B1	
Solids, Volatile Sus	1.0	1.0	ND	MG/L	NONE	160.4	NA	07/16/19 0	7174716	008489-03B1	
Total Organic Carbon	0.50	1.0	ND	MG/L	NONE	415.1	NA	07/23/19 0	17254733	008489-01B1	

(a) DOD and/or NELAC Accredited Analyte Inorganic Method Blanks for 008489

ARI	JL, INC.	400 Av	LABORA	TORY C Drive	ONTROL ; P.O.	SAMPI Box 1	E REP(566	DRT Mt.V∈	rnon, IL	62864
Lab Report No: 00	8489								Report Da	te: 08/20/2019
Project Name:	LOWER RIV	ER							NELAC Cer	tified - 1L100308
Analvte	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
		-	č							
a) Nicrace-N Dumonia Nitrocen	1.2T		1 0 0 0				001-08		01164699	008488-1301
Kieldahl Nitrogen	0.83						80-120	1	07284739	008489-01C1
Nitrite as Nitrogen	1.0	1.0	102	ł	i i	1	80-120	ł	07314750	008489-01C1
Phosphorus	0.67	0.67	100	1	ł	-	80-120		07214719	008489-02C1
Phosphorus, -ortho	0.10	0.10	101	ł	ł	ł	80-120	}	07164696	008489-02C1
Total Organic Carbon	8.7	10.0	87	ł	1		76-120	ł	07254733	008489-01C1
NOTE: Any values t (a) DOD and/or NET	abulated above maintend and	arked with	an asteris	sk are outs	ide of acc	eptable li	mits.			

Inorganic LCS Results for 008489

	62864
	ΗL
F .	Vernon,
REPORT	Mt.
CATE]	1566
UPLI	Box
IKE	Р.О.
SPIKE/SPIKE	Drive;
MATRIX SI	Aviation
	400
	INC.
	ARDL,

Lab Report No: 008489

LOWER RIVER

Project Name:

Report Date: 08/20/2019

NELAC Certified - IL100308

Analyte	Sample Matrix	Sample Result	MS Result	MS Level	MS & Rec	MSD Result	MSD Level	MSD % Rec	% Rec Limits	RPD	RPD Limit	Run	QC Lab Number
(a) Nitrate-N	WATER	2.4	9.5	8.0	89	9.6	8.0	89	75-125	-	20	08204817	008489-02MS
Ammonia Nitrogen	WATER	0.051	2.1	2.0	101	2.2	2.0	105	75-125	4	20	07164699	008489-01MS
Kjeldahl Nitrogen	WATER	0.76	1.4	0.80	83	1.6	0.80	107	75-125	13	20	07284739	008489-01MS
Nitrite as Nitrogen	WATER	0.021	0.99	1.0	97	0.99	1.0	97	75-125	1	20	07314750	008489-01MS
Phosphorus	WATER	0.43	1.2	0.83	66	1.2	0.83	98	75-125	0	20	07214719	008489-02MS
Phosphorus, -ortho	WATER	0.14	0.25	0.10	108	0.24	0.10	96	75-125	ß	20	07164696	008489-02MS
Total Organic Carbon	WATER	3.8	8.4	5.0	91	8.3	5.0	06	76-120	Ч	20	07254733	008489-01MS

Inorganic Matrix Spikes for 008489

(a) DOD and/or NELAC Accredited Analyte.

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

Page 1 of 1

ARDL Report 8489 - Page 9 of 13

			1						
364	08/20/2019	ed - IL100308	QC Lab	Number	008489-02D1	008489-02D1	008489-03D1	008489-03D1	008489-01D1
on, IL 628	Report Date:	NELAC Certifi	Analytical	Run	07164701	07164701	07174715	07174716	07254733
Mt. Vern			Mean	(Smp,D1,D2)			I I		
Box 1566			Percent	Diff	18	82*	1	L	2
ve; P.O.				Units	MG/CU.M.	MG/CU.M.	MG/L	MG/L	MG/L
ition Dri			Second	Duplicate		ł		1	
400 Avia			First	Duplicate	7.6	6.2	126	10.0	3.9
INC.	Q	RIVER	Sample	Conc'n	9.1	2.6	125	9.3	3.8
ARDL,	Lab Report No: 00848	Project Name: LOWER		Analyte	Chlorophyll-a, Corrected	Pheophytin-a	Solids, Total Suspended	Solids, Volatile Suspend	Total Organic Carbon

SAMPLE DUPLICATE REPORT

See Case Narrative for exceptions. * indicates that agreement between duplicates is greater than 20%. (a) DOD and/or NELAC Accredited Analyte Sample Duplicates for 008489

Sample Receipt Information

Including as appropriate:

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

ARDL Data Package 8489 - Inorganics

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

Authorized By: DSD-QAO

SPECIFY CHEMICALS ADDED AND FINAL PH IF KNOWN PRESERVATION CHAIN OF CUSTODY RECORD × ICED × × × REMARKS OR SAMPLE LOCATION arre hut C COUL REMARKS/SPECIAL INSTRUCTIONS: DEVELOPINO DEVISIONI VISINI *Preserved with H₂SO₄ X X × × P.O. Box 1566, 400 Aviation Drive, Mt. Vernon, IL 62864 (618) 244-1149 Fax × × × × × × × × CM N-EON SSAL × × × × Receiyed by (Signature) Received by: (Signature) × X × 122 × Shipping Ticket No. × × × × (618) 244-3235 Phone NO. OF CONTAINERS GRAB × × × × COWb 1045 CIIC Time 053 6161 Time 1845 TIME Time ALS 7/11/19 61/21 11/19 Date DATE 7 Date 7 11 ARDL, Inc. Rodgers, Grace Greeurg, Ber Clino Relinquished by: (Signature) Reynguished by (Signature) SAMPLE NUMBER SAMPLERS: (Signature) ONC **OPR-4 RM 110** OPR-5 RM 150 **OPR-3 RM 80 OPR-2** RM 44 Lower River lere PROJECT Report

6878
<u>coo</u>	LE	R	RE	С	E	P	Г	RE	P	<u>0</u>	R	T
		A	RE)L	., I	N	С.					

ARI	DL#: <u>8489</u> 00	Coole Num	er#_ <u>NoNe</u> ber of Coolers in Ship	_ ment: /		
Pro	ject: <u>Lower River</u>	Date	Received:7//	-19 le	цп	raj
A.	PRELIMINARY EXAMINATION PHASE: Date cooler was opened: 7-12-	-19	_(Signature)_ALCa	cheer	v v	
1.	Did cooler come with a shipping slip (airbill, etc.)?			YES	(NO)	>
	If YES, enter carrier name and airbill number here:		Car	rier	\bigcirc	
2.	Were custody seals on outside of cooler?			YES	NO	, N/A
	How many and where?		.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	\bigcirc
5.	Were custody papers sealed in a plastic bag?			YES	NO	
6.	Were custody papers filled out properly (ink, signed, etc.)?	Ma	I instealed or d	alid YES	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	e top	of this form	ÝES	NO	N/A
9.	Was a separate container provided for measuring temperature? YESN	۲ <u>۰</u> ۰۷	Observed Cooler Tem	пр. <u>0.5</u>	C	
В.	LOG-IN PHASE: Date samples were logged-in: 7-12-19 (Sid	qnatu	re) DLachre	rection factor_{	0+0	c
10.	Describe type of packing in cooler: Loraro, Coe		·			
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?				NO	
14.	Did all sample labels agree with custody papers?			ÝES,	NO	
15.	Were correct containers used for the tests indicated?				NO	
16.	Was pH correct on preserved water samples?) 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
<u> </u>	Comments and/or Corrective Action:		Sample	Transfer		
			Fraction	Fraction		
-			Area #	Area #		
			Walkin			
			Ву	Ву		
			On	On		
			7-12-19			

Chain-of-Custody # __//A

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

Date:

(By: Signature)



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

www.ardlinc.com

Lab Name: ARDL, Inc.

ARDL Report No.: 8515

Date: 9/24/19

Environmental | Analytical | Management | Safety

Customer Name: SLCOE

Project Name: Lower River

Samples Received at ARDL: 9/3/19

CASE NARRATIVE

	Customer	Date	Lab ID	N N
	Sample No.	Collected	Number	Analyses Requested
(OPR-2 RM 44	9/3/19	8515-01	Inorganics(1)
(OPR-3 RM 80	9/3/19	8515-02	Inorganics(1)
C	PR-4 RM 110	9/3/19	8515-03	Inorganics(1)
C	PR-5 RM 150	9/3/19	8515-04	Inorganics(1)
S	SLH-2 RM 177	9/3/19	8515-05	Inorganics(1)
S	SLH-1 RM 162	9/3/19	8515-06	Inorganics(1)
S	LH-15 RM 120	9/3/19	8515-07	Inorganics(1)

(1) Including ammonia, chlorophyll/pheophytin, nitrate, nitrite, TKN, TOC, orthophosphate, total phosphorus, TSS, and TVSS.

The quality control data are summarized as follows:

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

The samples for nitrate and nitrite were 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.

DUPLICATE

Duplicate analyses are reported as MS/MSD, except chlorophyll/pheophytin, TSS, and TVSS. RPD of the duplicate analyses met criteria, except chlorophyll-a and pheophytin-a.

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

Project Name: Lower River

ARDL Report No.: 8515

CASE NARRATIVE (Continued)

DATA REPORTING QUALIFIERS

The following data reporting qualifiers are used as required:

- ND Indicates parameter was analyzed for but not detected. The sample quantitation limit has been corrected for weight, dilution and/or percent moisture.
- 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.

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

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 8515 - Inorganic

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

Authorized By: DSD-QAO

ARDL Report 8515 - Page 3 of 18

Lab Report No: 008515

Project Name: LOWER RIVER

Project No:

Report Date: 09/24/2019

NELAC Certified - IL100308

Analysis: Inorganics

ARDI. NO. OC	08515-01		Camo	ing Loc	. D. LOWFL	2 RTV/FR			Matriv	· WATER	
Field ID: Of Received: 02	PR-2 RM 9/03/201	44 6	Samp Samp	ling Da Ling Ta	te: 09/05 me: 1038	3/2019			Moisture	NA :	
Analyte		LOD	LOQ	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Ammonia Nitrogen		0.0200	0.0300	Ŀ	0.0295	MG/L	NONE	350.1	NA	09/04/19	09054857
Chlorophyll-a, Co	orrecte	1.0	1.00		13.6	MG/CU.M.	10200H	10200H	09/04/19	09/09/19	09164886
Kjeldahl Nitroger	ц	0.190	0.200		0.697	MG/L	351.2	351.2	09/09/19	09/10/19	09124866
Nitrate as Nitrog	gen	0.800	1.00		1.04	MG/L	NONE	300.0	NA	09/04/19	09064859
Nitrite as Nitrog	gen	0.400	0.500		DN	MG/L	NONE	300.0	NA	09/04/19	09064858
Pheophytin-a		1.0	1.00		DN	MG/CU.M.	10200H	10200H	09/04/19	09/09/19	09164886
Phosphorus		0.00800	0.0100		0.51	MG/L	365.2	365.2	09/12/19	09/13/19	09174893
Phosphorus, -orth	ho	0.00800	0.0100		0.252	MG/L	NONE	365.2	NA	09/04/19	09124868
Solids, Total Sus	spended	10.0	10.0		199	MG/L	NONE	160.2	NA	09/09/19	09164884
Solids, Volatile	Suspen	10.0	10.0		15.0	MG/L	NONE	160.4	NA	09/09/10	09164885
Total Organic Car	rbon	0.500	1.00		4.1	MG/L	NONE	415.1	NA	09/17/10	09244911

(a) DOD and/or NELAC Accredited Analyte.

Sample 008515-01, Inorganic Analyses

Lab Report No: 008515

LOWER RIVER

Project Name:

Report Date: 09/24/2019

Analysis: Inorganics

Project No:							Z	TELAC Certi	fied - IL1	00308
ARDL No: 008515-02 Field ID: 0PR-3 RM Received: 09/03/201	2 80 19	Sampl Samp Samp	Ling Loo Ling Da Ling Ti	c'n: LOWEF ate: 09/03 ime: 0856	R RIVER 3/2019			Matrix Moisture	C: WATER S: NA	
Analyte	LOD	ΓΟŎ	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Ammonia Nitrogen	0.0200	0.0300		0.0413	MG/L	NONE	350.1	NA	09/04/19	09054857
Chlorophyll-a, Correcte	1.0	1.00		13.6	MG/CU.M.	10200H	10200H	09/04/19	09/09/19	09164886
Kjeldahl Nitrogen	0.190	0.200		0.631	MG/L	351.2	351.2	09/09/19	09/10/19	09124866
Nitrate as Nitrogen	0.800	1.00		1.05	MG/L	NONE	300.0	NA	09/04/19	09064859
Nitrite as Nitrogen	0.400	0.500		ND	MG/L	NONE	300.0	NA	09/04/19	09064858
Pheophytin-a	1.0	1.00		ND	MG/CU.M.	10200H	10200H	09/04/19	09/09/19	09164886
Phosphorus	0.00800	0.0100		0.544	MG/L	365.2	365.2	09/12/19	09/13/19	09174893
Phosphorus, -ortho	0.00800	0.0100		0.138	MG/L	NONE	365.2	NA	09/04/19	09124868
Solids, Total Suspended	10.0	10.0		216	MG/L	NONE	160.2	NA	09/09/19	09164884
Solids, Volatile Suspen	10.0	10.0		15.0	MG/L	NONE	160.4	NA	09/09/19	09164885
Total Organic Carbon	0.500	1.00		5.0	MG/L	NONE	415.1	NA	09/17/19	09244910

(a) DOD and/or NELAC Accredited Analyte.

Sample 008515-02, Inorganic Analyses

Lab Report No: 008515

Project Name: LOWER RIVER

Report Date: 09/24/2019

Analysis: Inorganics

Project No:							Z	TELAC Certi	fied - IL1	00308
ARDL No: 008515-03 Field ID: 0PR-4 RM Received: 09/03/201	3 110 19	Samp1 Samp Samp	ling Loc ling Da ling Ti	c'n: LOWEF ite: 09/03 .me: 1230	RIVER 3/2019			Matrix Moisture	:: WATER :: NA	
Analyte	LOD	LOQ	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Ammonia Nitrogen	0.0200	0.0300		0.0341	MG/L	NONE	350.1	NA	09/04/19	09054857
Chlorophyll-a, Correcte	1.0	1.00		15.9	MG/CU.M.	10200H	10200H	09/04/19	09/09/19	09164886
Kjeldahl Nitrogen	0.190	0.200		0.563	MG/L	351.2	351.2	09/09/19	09/10/19	09124866
Nitrate as Nitrogen	0.800	1.00		1.03	MG/L	NONE	300.0	NA	09/04/19	09064859
Nitrite as Nitrogen	0.400	0.500		UN .	MG/L	NONE	300.0	NA	09/04/19	09064858
Pheophytin-a	1.0	1.00		ND	MG/CU.M.	10200H	10200H	09/04/19	09/09/19	09164886
Phosphorus	0.00800	0.0100		0.51	MG/L	365.2	365.2	09/12/19	09/13/19	09174893
Phosphorus, -ortho	0.00800	0.0100		0.211	MG/L	NONE	365.2	NA	09/04/19	09124868
Solids, Total Suspended	10.0	10.0		217	MG/L	NONE	160.2	NA	09/09/19	09164884
Solids, Volatile Suspen	10.0	10.0		16.0	MG/L	NONE	160.4	NA	09/09/19	09164885
Total Organic Carbon	0.500	1.00		4.1	MG/L	NONE	415.1	NA	09/17/19	09244910

(a) DOD and/or NELAC Accredited Analyte.

Sample 008515-03, Inorganic Analyses

008515 Lab Report No:

Report Date: 09/24/2019

Project Name: Project No:	LOWER RIV	/ER						Z	Analysis ELAC Certi	: Inorgan fied - IL1	ics 00308
ARDL No:	008515-04		Sampl	ing Loc	"n: LOWER	RIVER			Matrix	.: WATER	
Field ID: Received:	OPR-5 RM 09/03/201	150 -9	Samp Samp	ling Da Ling Ti	te: 09/03 me: 1405	1/2019			Moisture	: NA	
Analy	بد	LOD	ΓΟΟ	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Ammonia Nitrog	en	0.0200	0.0300	Ŀ	0.0203	MG/L	NONE	350.1	NA	09/04/19 (09054857
Chlorophyll-a,	Correcte	1.0	1.00		11.3	MG/CU.M.	10200H	10200H	09/04/19	09/09/19 (09164886
Kjeldahl Nitro	gen	0.190	0.200		0.869	MG/L	351.2	351.2	09/09/19	09/10/19	09124866
Nitrate as Nit:	rogen	0.800	1.00		1.02	MG/L	NONE	300.0	NA	09/04/19 (9064859
Nitrite as Nit:	rogen	0.400	0.500		DN	MG/L	NONE	300.0	NA	09/04/19 (9064858
Pheophytin-a		1.0	1.00		4.5	MG/CU.M.	10200H	10200H	09/04/19	09/09/19 (09164886
Phosphorus		0.00800	0.0100		0.60	MG/L	365.2	365.2	09/12/19	09/13/19 (9174893
Phosphorus, -o	rtho	0.00800	0.0100		0.138	MG/L	NONE	365.2	NA	09/04/19 (9124868
Solids, Total :	Suspended	10.0	10.0		319	MG/L	NONE	160.2	NA	09/09/19 (9164884
Solids, Volati	le Suspen	10.0	10.0		26.0	MG/L	NONE	160.4	NA	09/09/19 (9164885
Total Organic (Carbon	0.500	1.00		4.1	MG/L	NONE	415.1	NA	09/17/19 (9244910

(a) DOD and/or NELAC Accredited Analyte.

Sample 008515-04, Inorganic Analyses

Page 1 of 1

Lab Report No: 008515

Report Date: 09/24/2019

Analyte	LOD	LOQ	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
			n							
Ammonia Nitrogen	0.0200	0.0300	Ь	0.0266	MG/L	NONE	350.1	NA	09/04/19 (9054857
Chlorophyll-a, Correcte	1.0	1.00		9.1	MG/CU.M.	10200H	10200H	09/04/19	09/09/19 (9164886
Kjeldahl Nitrogen	0.190	0.200		0.849	MG/L	351.2	351.2	09/09/19	09/10/10	9124866
Nitrate as Nitrogen	0.800	1.00		ND	MG/L	NONE	300.0	NA	09/04/19 (9064859
Nitrite as Nitrogen	0.400	0.500		ND	MG/L	NONE	300.0	NA	09/04/19 (9064858
Pheophytin-a	1.0	1.00		5.2	MG/CU.M.	10200H	10200H	09/04/19	09/09/19 (9164886
Phosphorus	0.00800	0.0100		0.687	MG/L	365.2	365.2	09/12/19	09/13/19 (9174893
Phosphorus, -ortho	0.00800	0.0100		0.333	MG/L	NONE	365.2	NA	09/04/19 (9124868
Solids, Total Suspended	10.0	10.0		377	MG/L	NONE	160.2	NA	09/09/19	9164884
Solids, Volatile Suspen	10.0	10.0		30.0	MG/L	NONE	160.4	NA	09/09/19	9164885
Total Organic Carbon	0.500	1.00		4.2	MG/L	NONE	415.1	NA	09/17/10	9244910

(a) DOD and/or NELAC Accredited Analyte.

Sample 008515-05, Inorganic Analyses

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

Lab Report No: 008515

LOWER RIVER

Project Name: Project No:

Report Date: 09/24/2019

Analysis: Inorganics NELAC Certified - IL100308

ARDL No: 008515-0(Field ID: SLH-1 RM Received: 09/03/201	6 162 19	Sampl Samp Samp	ing Loc ling Da ling Ti	"n: LOWER te: 09/03 me: 1530	k RIVER 1/2019			Matrix Moisture	: WATER : NA	
Analyte	LOD	год	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Ammonia Nitrogen	0.0200	0.0300		0.0646	MG/L	NONE	350.1	NA	09/04/19	09054857
Chlorophyll-a, Correcte	1.0	1.00		13.6	MG/CU.M.	10200H	10200H	09/04/19	09/09/19	09164886
Kjeldahl Nitrogen	0.190	0.200		0.754	MG/L	351.2	351.2	09/09/19	01/01/60	09124866
Nitrate as Nitrogen	0.800	1.00		1.05	MG/L	NONE	300.0	NA	09/04/19	09064859
Nitrite as Nitrogen	0.400	0.500		ND	MG/L	NONE	300.0	NA	09/04/19	09064858
Pheophytin-a	1.0	1.00		З. 9	MG/CU.M.	10200H	10200H	09/04/19	09/09/19	09164886
Phosphorus	0.00800	0.0100		0.575	MG/L	365.2	365.2	09/12/19	09/13/19	09174893
Phosphorus, -ortho	0.00800	0.0100		0.141	MG/L	NONE	365.2	NA	09/04/19	09124868
Solids, Total Suspended	10.0	10.0		311	MG/L	NONE	160.2	NA	09/09/19	09164884
Solids, Volatile Suspen	10.0	10.0		24.0	MG/L	NONE	160.4	NA	09/09/19	09164885
Total Organic Carbon	0.500	1.00		4.4	MG/L	NONE	415.1	NA	09/17/19	09244910

(a) DOD and/or NELAC Accredited Analyte.

Sample 008515-06, Inorganic Analyses

Lab Report No: 008515

LOWER RIVER

Project Name:

Report Date: 09/24/2019

Analysis: Inorganics

Project No:							Z	ELAC Certi	fied - ILl	00308
ARDL No: 008515-07	7	Sampl	ling Lo	c'n: LOWER	RIVER			Matrix	: WATER	
Field ID: SLH-15 RM Received: 09/03/201	м 120 19	Samr Samr	pling Da	ate: 09/03 ime: 1600	3/2019			Moisture	: NA	
						Prep	Analysis	Prep	Analysis	Run
Analyte	LOD	ТОО	Flag	Result	Units	Method	Method	Date	Date	Number
Ammonia Nitrogen	0.0200	0.0300		0.0386	MG/L	NONE	350.1	NA	09/04/19	09054857
Chlorophyll-a, Correcte	1.0	1.00	IJ	11.3	MG/CU.M.	10200H	10200H	09/04/19	09/09/19	09164886
Kjeldahl Nitrogen	0.190	0.200		0.877	MG/L	351.2	351.2	09/09/19	09/10/19	09124866
Nitrate as Nitrogen	0.800	1.00		DN	MG/L	NONE	300.0	NA	09/04/19	09064859
Nitrite as Nitrogen	0.400	0.500		UN	MG/L	NONE	300.0	NA	09/04/19	09064858
Pheophytin-a	1.0	1.00	Ŀ	1.4	MG/CU.M.	10200H	10200H	09/04/19	09/09/19	09164886
Phosphorus	0.00800	0.0100		0.67	MG/L	365.2	365.2	09/12/19	09/13/19	09174893
Phosphorus, -ortho	0.00800	0.0100		0.146	MG/L	NONE	365.2	NA	09/04/19	09124868
Solids, Total Suspended	10.0	10.0		381	MG/L	NONE	160.2	NA	09/09/19	09164884
Solids, Volatile Suspen	10.0	10.0		30.0	MG/L	NONE	160.4	NA	09/09/19	09164885
Total Organic Carbon	0.500	1.00		4.3	MG/L	NONE	415.1	NA	09/17/19	09244910

(a) DOD and/or NELAC Accredited Analyte.

Sample 008515-07, Inorganic Analyses

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

Lab Report No: 008515

LOWER RIVER

Project Name:

Report Date: 09/24/2019

62864

NELAC Certified - IL100308

			Blank		Prep	Analysis	Prep	Analysis		QC Lab
Analyte	LOD	ГОQ	Result	Units	Method	Method	Date	Date	Run	Number
Ammonia Nitrogen	0.020	0.030	DN	MG/L	NONE	350.1	NA	09/04/19 09	9054857	008515-01B1
Chlorophyll-a, Corre	1.0	1.0	ΟN	MG/CU.M.	10200H	10200H	09/04/19	09/09/19 0	9164886	008515-07B1
Kjeldahl Nitrogen	0.19	0.20	UN	MG/L	351.2	351.2	09/09/19	09/10/19 0	9124866	008515-01B1
Nitrate as Nitrogen	0.80	1.0	ND	MG/L	NONE	300.0	NA	09/04/19 05	9064859	008515-01B1
Nitrite as Nitrogen	0.40	0.50	QN	MG/L	NONE	300.0	NA	09/04/19 05	9064858	008515-01B1
Pheophytin-a	1.0	1.0	DN	MG/CU.M.	10200H	10200H	09/04/19	09/09/19 0	9164886	008515-07B1
Phosphorus	0.008	0.010	QN	MG/L	365.2	365.2	09/12/19	09/13/19 05	9174893	008515-01B1
Phosphorus, -ortho	0.008	0.010	DN	MG/L	NONE	365.2	NA	09/04/19 09	9124868	008515-04B1
Solids, Total Suspen	1.0	1.0	DN	MG/L	NONE	160.2	NA	09/09/19 05	9164884	008515-03B1
Solids, Volatile Sus	1.0	1.0	UN	MG/L	NONE	160.4	NA	09/09/19 05	9164885	008515-03B1
Total Organic Carbon	0.50	1.0	DN	MG/L	NONE	415.1	NA	09/17/19 05	9244910	008515-02B1
Total Organic Carbon	0.50	1.0	ND	MG/L	NONE	415.1	NA	09/17/19 09	9244911	008515-01B1

(a) DOD and/or NELAC Accredited Analyte Inorganic Method Blanks for 008515

ARDL	, INC.	400 A1	LABOR? riatior	ATORY C 1 Drive	CONTROL	SAMPI Box 1	LE REP(1566	DRT Mt.V€	ernon, IL	62864
Lab Report No: 0085	515								Report Da	te: 09/24/2019
Project Name:	LOWER RIVI	ER							NELAC Cer	tified - IL100308
										1-1 20
Analyte	LCS I Result	LEVEL	A Rec	LCS Z Result	Level	% Rec	% kec Limits	Rec &	Апатуцьсал Run	VC LAD
Ammonia Nitrogen	0.99	1.0	66			-	80-120	1	09054857	008515-01C1
Kjeldahl Nitrogen	0.93	1.0	93		ł	ł	80-120	1	09124866	008515-01C1
Nitrate as Nitrogen	12.8	14.0	91	8	ł	ł	80-120	ł	09064859	008515-01C1
Nitrite as Nitrogen	6.4	7.0	92		1	ł	80-120	ł	09064858	008515-01C1
Phosphorus	0.65	0.67	86	ł	ł	1	80-120	4	09174893	008515-01C1
Phosphorus, -ortho	0.092	0.10	92	}	1	ł	80-120	-	09124868	008515-04C1
Total Organic Carbon	0.0	10.0	06	1	-	ł	76-120		09244910	008515-02C1
Total Organic Carbon	8.9	10.0	89	-	1	1	76-120	1	09244911	008515-01C1
NOTE: Any values tab	ulated above ma	rked with	an asteris	sk are outs	ide of acc	sptable li	mits.			
(a) DOD and/or NELAC	Accredited Ana	lyte					1			

Inorganic LCS Results for 008515

	62864
	Π
	Vernon,
REPORT	Mt.
CATE	1566
UPLIC	Box
IKE DI	Р.О.
PIKE/SP	Drive;
MATRIX SI	Aviation
	400
	INC.
	ARDL,

Lab Report No: 008515

Report Date: 09/24/2019

Project Name: LOWER RIVER

NELAC Certified - IL100308

						1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 -							
	Sample	Sample	SM	SM	MS	MSD	MSD	MSD	% Rec		RPD		QC Lab
Analyte	Matrix	Result	Result	Level	% Rec	Result	Level	% Rec	Limits	RPD	Limit	Run	Number
Ammonia Nitrogen	WATER	J 0.030	2.1	2.0	104	2.1	2.0	103	75-125		20	09054857	008515-01MS
Kjeldahl Nitrogen	WATER	0.70	1.5	0.80	94	1.6	0.80	109	75-125	80	20	09124866	008515-01MS
Nitrate as Nitrogen	WATER	1.0	8.0	8.0	87	8.0	8.0	88	75-125	Ч	20	09064859	008515-01MS
Nitrite as Nitrogen	WATER	QN	4.0	4.0	100	4.1	4.0	101	75-125	7	20	09064858	008515-01MS
Phosphorus	WATER	0.51	1.3	0.83	101	1.3	0.83	66	75-125	Ч	20	09174893	008515-01MS
Phosphorus, -ortho	WATER	0.14	0.24	0.10	103	0.24	0.10	100	75-125	-1	20	09124868	008515-04MS
Total Organic Carbon	WATER	4.1	8.3	5.0	84	8.2	5.0	83	76-120	ы	20	09244911	008515-01MS

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

(a) DOD and/or NELAC Accredited Analyte.

Inorganic Matrix Spikes for 008515

		08		
364	09/24/2019	ed - IL1003	QC Lab Number	008515-07 008515-07 008515-03 008515-03
on, IL 628	Report Date:	NELAC Certifi	Analytical Run	09164886 09164886 09164884 09164885
Mt. Vern			Mean (Smp,D1,D2)	
TE REPORT Box 1566			Percent Diff	0 2 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8
DUPLICA ve; P.O.			Units	MG/CU.M. MG/L MG/L MG/L
SAMPLE tion Dri			Second Duplicate	
400 Avia			First Duplicate	9.1 229 16.0
INC.	10	RIVER	Sample Conc'n	11.3 1.4 217 16.0
ARDL,	Lab Report No: 00851	Project Name: LOWER	Analyte	Chlorophyll-a, Corrected Pheophytin-a Solids, Total Suspended Solids, Volatile Suspend

* indicates that agreement between duplicates is greater than 20%. See Case Narrative for exceptions. (a) DOD and/or NELAC Accredited Analyte Sample Duplicates for 008515

Sample Receipt Information

Including as appropriate:

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

ARDL Data Package 8515 - Inorganic

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

Authorized By: DSD-QAO

8515

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

9-3 1038 x X X X X X X X X X X X X X X X X X X		ENAL PH IF KNOWN KNOWN
	X	X
	X	X
	X	X
X X X X X X Sort Sort	x	X
	x	X
1-3 1530 x X X X X X X	x	X
q_3 1660 × X X X X X × 150	x	X
Date Time Redeived by. (Signature) REMARKS/SP	PECIAL INSTRUCTIONS:	
9 3 1 9 1 820 Received by: (Signature) *Preserved with	h H2SO4	
Date Time Shipping Ticket No.		
1/3/19 1820		

COOLER RECEIPT REPORT ARDL, INC.

ARI	DL#:	Cooler # 1 af Z			
	ρ	Number of Coolers in Shi	pment: <u> </u>		-
Pro	ject: Lower River	Date Received: $9-3$	-19		
A.	PRELIMINARY EXAMINATION PHASE: Date cooler was opened: 9-3	-19 (Signature) /	lackru	m	,
1.	Did cooler come with a shipping slip (airbill, etc.)?		YES	NO	
	If YES, enter carrier name and airbill number here:		Causie	N	
2.	Were custody seals on outside of cooler?		YES	NO.	N/A
	How many and where?	.Seal Name:			
3.	Were custody seals unbroken and intact at the date and time of arrival?		YES	NO	NA
4.	Did vou 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 (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 this form	ES	NO	N/A
9.	Was a separate container provided for measuring temperature? YES		mp. <u>0, 9</u>	2	
B	LOG-IN PHASE: Date samples were longed-in: 9-3-19 9-	1-19 Signature) Splach	orrection factor <u>(</u>	2:0	c
D.					
10.	Describe type of packing in cooler: <u>It as is Cele</u>			6	
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?		¥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?		ÆS	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:	Sampl	e Transfer		
		Fraction	Fraction		
		all			
		Area #	Area #		
-		By	Ву		
		dle			
		On 9-4-19	On		

Chain-of-Custody # ___/ A____

7

(By: Signature)

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

Date:

COOLER RECEIPT REPORT ARDL, INC.

AR	DL #:8515	Cooler # <u>2 af 2</u>		
		Number of Coolers in Shipment:		-
Proj	ect: Lower River	Date Received: 9-3-19		
A.	PRELIMINARY EXAMINATION PHASE: Date cooler was opened:	-3-19 (Signature) Allachre	m	
1.	Did cooler come with a shipping slip (airbill, etc.)?	YES	NO	2
	If YES, enter carrier name and airbill number here:	Caureer		
2.	Were custody seals on outside of cooler?	YES	NO	N/A
	How many and where?,Seal Da	te:,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 the top of this form	NO	N/A
9.	Was a separate container provided for measuring temperature? YES_	NO Observed Cooler Temp. 2, 7	C	0
В.	LOG-IN PHASE: Date samples were logged-in: 9-4-19	_(Signature)	0.0	
10.	Describe type of packing in cooler:			
11.	Were all samples sealed in separate plastic bags?		NO	C n∕a
12.	Did all containers arrive unbroken and were labels in good condition?	YES	NO S	
13.	Were sample labels complete?		" 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?	ÝES	NO 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:	Sample Transfer		
		Fraction Fraction		
		Area # Area #		
		Walkin		
		By By		
-		On On		
		9-4-19		

Chain-of-Custody # ___/

/

(By: Signature)

Date:

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

ARDL Report 8515 - Page 18 of 18



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

<u>www.ardlinc.com</u>

Environmental | Analytical | Management | Safety

Customer Name: SLCOE

Project Name: Illinois River

Samples Received at ARDL: 9/5/19

CASE NARRATIVE

Date: 10/1/19

PO Box 1566

Lab Name: ARDL, Inc.

ARDL Report No.: 8516

Customer	Date	Lab ID	
Sample No.	Collected	Number	Analyses Requested
IL-2	9/4/19	8516-01	Inorganics(1)
IL-6	9/4/19	8516-02	Inorganics(1)
IL-7	9/4/19	8516-03	Inorganics(1)
IL-8	9/4/19	8516-04	Inorganics(1)
IL-9	9/4/19	8516-05	Inorganics(1)

(1) Including ammonia, chlorophyll/pheophytin, nitrite, nitrate, TKN, TOC, orthophosphate, total phosphorus, TSS, and TVSS.

The quality control data are summarized as follows:

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

Nitrate and nitrite were 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.

DUPLICATE

Duplicate analyses are reported as MS/MSD, except chlorophyll/pheophytin, TOC, TSS, and TVSS. RPD of the duplicate analyses met criteria.

DATA REPORTING QUALIFIERS

The following data reporting qualifiers are used as required:

ND - Indicates parameter was analyzed for but not detected. The sample quantitation limit has been corrected for weight, dilution and/or percent moisture.

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

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

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 8516 - Inorganic

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

Authorized By: DSD-QAO

ARDL Report 8516 - Page 2 of 15

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

Lab Report No: 008516

ILLINOIS RIVER

Project Name: Project No:

Report Date: 10/01/2019

Analysis: Inorganics NELAC Certified - IL100308

ARDL No: 008516-0. Field ID: IL-2	1	Sampl Samp	ing Loc ling Da	'n: ILLIN te: 09/04	IOIS RIVER 1/2019			Matrix Moisture	: WATER : NA	
Received: 09/05/20:	19	Samp	ling Ti	me: 1137						
						Prep	Analysis	Prep	Analysis	Run
Analyte	LOD	ΓΟζ	Flag	Result	Units	Method	Method	Date	Date	Number
Ammonia Nitrogen	0.0200	0.0300		0.0652	MG/L	NONE	350.1	NA	09/09/19 0	9164887
Chlorophyll-a, Correcte	1.0	1.00		17.2	MG/CU.M.	10200H	10200H	09/05/19	09/12/19 0	9174898
Kjeldahl Nitrogen	0.190	0.200		0.882	MG/L	351.2	351.2	09/09/19	09/10/19 0	9124866
Nitrate as Nitrogen	0.800	1.00		1.67	MG/L	NONE	300.0	NA	09/05/19 0	9064861
Nitrite as Nitrogen	0.400	0.500		ND	MG/L	NONE	300.0	NA	09/05/19 0	9064860
Pheophytin-a	1.0	1.00		3.1	MG/CU.M.	10200H	10200H	09/05/19	09/12/19 0	9174898
Phosphorus	0.00800	0.0100		0.449	MG/L	365.2	365.2	09/30/19	09/30/19 1	0014928
Phosphorus, -ortho	0.00800	0.0100		0.302	MG/L	NONE	365.2	NA	09/05/19 0	9164888
Solids, Total Suspended	4.0	4.00		29.2	MG/L	NONE	160.2	NA	09/09/19 0	9164884
Solids, Volatile Suspen	4.0	4.00		4.4	MG/L	NONE	160.4	NA	09/09/190	9164885
Total Organic Carbon	0.500	1.00		4.0	MG/L	NONE	415.1	NA	09/17/19 0	9244910

(a) DOD and/or NELAC Accredited Analyte.

Sample 008516-01, Inorganic Analyses

Lab Report No: 0085	516						Щ	eport Date	: 10/01/20	19
Project Name: ILLINOIS Project No:	RIVER						N	Analysis ELAC Certi	: Inorgani fied - IL10	.cs 10308
ARDL No: 008516-02 Field ID: IL-6 Received: 09/05/201	2 19	Samp] Samr Samr	ling Loc Jling Da Jling Ti	"n: ILLIN te: 09/04 me: 1145	NOIS RIVER 1/2019			Matrix Moisture	: WATER : NA	
Analyte	LOD	ГОД	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Ammonia Nitrogen Chlorophyll-a, Correcte Kjeldahl Nitrogen Nitrate as Nitrogen Nitrite as Nitrogen Pheophytin-a Phosphorus Phosphorus, -ortho Solids, Total Suspended Solids, Volatile Suspen	0.0200 1.0 0.190 0.800 0.400 1.0 1.0 4.0 4.0	0.0300 1.00 0.200 1.00 0.500 1.00 0.500 1.00 4.00 4.00		0.0705 ND 1.18 1.74 ND 11.8 0.471 0.471 0.319 4.8 4.8	MG/L MG/CU.M. MG/CU.M. MG/L MG/L MG/L MG/L MG/L MG/L	NONE 10200H 351.2 NONE NONE 10200H 365.2 NONE NONE NONE	350.1 10200H 351.2 300.0 300.0 10200H 365.2 365.2 365.2 160.2 160.2	NA 09/05/19 09/09/19 NA NA 09/05/19 09/30/19 NA NA	09/09/19 0 09/12/19 0 09/12/19 0 09/05/19 0 09/12/19 0 09/30/19 1 09/30/19 0 09/09/19 0 09/09/19 0 09/09/19 0	9164887 9174898 9124866 9064861 9064860 9174898 9164888 9164888 9164888

(a) DOD and/or NELAC Accredited Analyte.

Sample 008516-02, Inorganic Analyses

Lab Report No: 008	8516						Ж	eport Date	: 10/01/2	019
Project Name: ILLINOIS Project No:	S RIVER							Analysis ELAC Certi	: Inorgan fied - ILl	ics 00308
ARDL No: 008516-(Field ID: IL-7 Received: 09/05/20	03	Samp] Samp Samr	ling Loc Ding Da	"n: ILLI ite: 09/0 me: 1103	NOIS RIVER 4/2019			Matrix Moisture	: WATER : NA	
			1 1 1 1	•						
						Prep	Analysis	Prep	Analysis	Run
Analyte	LOD	LOQ	Flag	Result	Units	Method	Method	Date	Date	Number
Ammonia Nitrogen	0.0200	0.0300		0.0777	MG/L	NONE	350.1	NA	09/09/19	09164887
Chlorophyll-a, Correcte	e 1.0	1.00		9.1	MG/CU.M.	10200H	10200H	09/05/19	09/12/19	09174898
Kjeldahl Nitrogen	0.190	0.200		0.753	MG/L	351.2	351.2	09/09/19	00/10/10	09124866
Nitrate as Nitrogen	0.800	1.00		1.76	MG/L	NONE	300.0	NA	09/05/19	09064861
Nitrite as Nitrogen	0.400	0.500		ND	MG/L	NONE	300.0	NA	09/05/19	09064860
Pheophytin-a	1.0	1.00		3.6	MG/CU.M.	10200H	10200H	09/05/19	09/12/19	09174898
Phosphorus	0.00800	0.0100		0.462	MG/L	365.2	365.2	09/30/19	09/30/19	10014928
Phosphorus, -ortho	0.00800	0.0100		0.34	MG/L	NONE	365.2	NA	09/05/19	09164888
Solids, Total Suspended	d 4.0	4.00		41.2	MG/L	NONE	160.2	NA	09/09/19	09164884
Solids, Volatile Susper	n 4.0	4.00		4.4	MG/L	NONE	160.4	NA	09/09/19	09164885
Total Organic Carbon	0.500	1.00		3.8	MG/L	NONE	415.1	NA	09/17/19	09244910

(a) DOD and/or NELAC Accredited Analyte.

Sample 008516-03, Inorganic Analyses

Lab Report No: 0085	516						ц	eport Date	: 10/01/20	19
Project Name: ILLINOIS Project No:	RIVER						Z	Analysis ELAC Certi	: Inorgani fied - IL10	.cs 0308
ARDL No: 008516-04 Field ID: IL-8 Received: 09/05/201	19	Sampl Samp Samp	ing Loc ling Da ling Ti	"n: ILLIN tte: 09/04 me: 0950	OIS RIVER /2019			Matrix Moisture	: WATER : NA	
Analyte	LOD	LOQ	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Ammonia Nitrogen	0.0200	0.0300		0.0811	MG/L	NONE	350.1	NA	09/09/19 0	9164887
Chlorophyll-a, Correcte	1.0	1.00		13.6	MG/CU.M.	10200H	10200H	09/05/19	09/12/19 0	9174898
Kjeldahl Nitrogen	0.190	0.200		0.996	MG/L	351.2	351.2	01/00/60	0 01/01/60	9124866
Nitrate as Nitrogen	0.800	1.00		1.75	MG/L	NONE	300.0	NA	09/05/19 0	9064861
Nitrite as Nitrogen	0.400	0.500		DN	MG/L	NONE	300.0	NA	09/05/19 0	9064860
Pheophytin-a	1.0	1.00		6.1	MG/CU.M.	10200H	10200H	09/05/19	09/12/19 0	9174898
Phosphorus	0.00800	0.0100		0.522	MG/L	365.2	365.2	09/30/19	09/30/19 1	0014928
Phosphorus, -ortho	0.00800	0.0100		0.302	MG/L	NONE	365.2	NA	09/05/19 0	9164888
Solids, Total Suspended	4.0	4.00		56.0	MG/L	NONE	160.2	NA	09/09/19 0	9164884
Solids, Volatile Suspen	4.0	4.00		5.6	MG/L	NONE	160.4	NA	09/09/19 0	9164885
Total Organic Carbon	0.500	1.00		3.9	MG/L	NONE	415.1	NA	09/17/19 0	9244910

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

ARDL, INC.

Mt. Vernon, Illinois

(a) DOD and/or NELAC Accredited Analyte.

Sample 008516-04, Inorganic Analyses

Page 1 of 1

	Box 1566	62864
ARDL, INC.	100 Aviation Drive; P.O.	Mt. Vernon, Illinois

Lab Report No: 008516

ILLINOIS RIVER

Project Name: Project No:

Report Date: 10/01/2019

Analysis: Inorganics NELAC Certified - IL100308

ARDL No: 008516-05 Field ID: IL-9 Received: 09/05/201	19	Sampl Samp Samp	ing Loc ling Da	"n: ILLIN te: 09/04 me: 0900	OIS RIVER /2019			Matrix Moisture	: WATER : NA	
Analyte	LOD	LOQ	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Ammonia Nitrogen	0.0200	0.0300		0.103	MG/L	NONE	350.1	NA	09/09/19 (09164887
Chlorophyll-a, Correcte	1.0	1.00		15.4	MG/CU.M.	10200H	10200H	09/02/19	09/12/19 (9174898
Kjeldahl Nitrogen	0.190	0.200		0.876	MG/L	351.2	351.2	09/09/19	09/10/19 (9124866
Nitrate as Nitrogen	0.800	1.00		1.66	MG/L	NONE	300.0	NA	09/05/19 (9064861
Nitrite as Nitrogen	0.400	0.500		ND	MG/L	NONE	300.0	NA	09/05/19 (9064860
Pheophytin-a	1.0	1.00		7.4	MG/CU.M.	10200H	10200H	09/02/19	09/12/19 (9174898
Phosphorus	0.00800	0.0100		0.599	MG/L	365.2	365.2	09/30/19	09/30/19	.0014928
Phosphorus, -ortho	0.00800	0.0100		0.364	MG/L	NONE	365.2	NA	09/05/19 (9164888
Solids, Total Suspended	4.0	4.00		72.4	MG/L	NONE	160.2	NA	09/09/19	9164884
Solids, Volatile Suspen	4.0	4.00		7.6	MG/L	NONE	160.4	NA	09/09/19 (9164885
Total Organic Carbon	0.500	1.00		3.9	MG/L	NONE	415.1	NA	09/17/10	9244911

(a) DOD and/or NELAC Accredited Analyte.

Sample 008516-05, Inorganic Analyses

BLANK SUMMARY REPORT

i

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

Lab Report No: 008516

Report Date: 10/01/2019

INOIS RIVER
Vame: ILL
Project N

NELAC Certified - IL100308

Analyte	LOD	год	Blank Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run	QC Lab Number
Ammonia Nitrogen	0.020	0.030	QN ;	MG/L	NONE	350.1	NA 0.0,00,00	01/00/00	09164887	008516-01B1
Chlorophyll-a, Corre Kjeldahl Nitrogen	1.0 0.19	1.0 0.20		MG/CU.M. MG/L	10200H 351.2	10200H 351.2	09/05/19 09/09/19	09/12/19	09124866	008515-01B1 008515-01B1
Nitrate as Nitrogen	0.80	1.0	DN	MG/L	NONE	300.0	NA	09/05/19	09064861	008516-01B1
Nitrite as Nitrogen	0.40	0.50	ND	MG/L	NONE	300.0	NA	09/05/19	09064860	008516-01B1
Pheophytin-a	1.0	1.0	ΠŊ	MG/CU.M.	10200H	10200H	09/05/19	09/12/19	09174898	008516-01B1
Phosphorus	0.008	0.010	ND	MG/L	365.2	365.2	09/30/19	09/30/19	10014928	008516-01B1
Phosphorus, -ortho	0.008	0.010	ND	MG/L	NONE	365.2	NA	09/05/19	09164888	008516-02B1
Solids, Total Suspen	1.0	1.0	ND	MG/L	NONE	160.2	NA	09/09/19	09164884	008515-03B1
Solids, Volatile Sus	1.0	1.0	ND	MG/L	NONE	160.4	NA	09/09/19	09164885	008515-03B1
Total Organic Carbon	0.50	1.0	ND	MG/L	NONE	415.1	NA	09/17/19	09244910	008515-02B1
Total Organic Carbon	0.50	1.0	ND	MG/L	NONE	415.1	NA	09/17/19	09244911	008515-01B1

(a) DOD and/or NELAC Accredited Analyte Inorganic Method Blanks for 008516

ARDL,	, INC.	400 Av	LABORA riation	LTORY C I Drive	ONTROL	Box 1	LE REPC)RT Mt.V∈	rnon, IL	62864
Lab Report No: 0085	16								Report Da	te: 10/01/2019
Project Name:	ILLINOIS	RIVER							NELAC Cer	tified - 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
Ammonia Nitrogen	1.0	1.0	100	1	1	1	80-120	1	09164887	008516-01C1
Kjeldahl Nitrogen	0.93	1.0	93	1	4	ł	80-120	ł	09124866	008515-01C1
Nitrate as Nitrogen	13.0	14.0	93	!	ł	!	80-120	!	09064861	008516-01C1
Nitrite as Nitrogen	6.5	7.0	92	1	1		80-120	ł	09064860	008516-01C1
Phosphorus	0.63	0.67	94	-		1	80-120		10014928	008516-01C1
Phosphorus, -ortho	0.099	0.10	66	:	ł	}	80-120	.1	09164888	008516-02C1
Total Organic Carbon	9.0	10.0	06	1	-	1	76-120		09244910	008515-02C1
Total Organic Carbon	8.9	10.0	89		***	. 1	76-120	ł	09244911	008515-01C1
NOTE: Any values tabu (a) DOD and/or NELAC	lated above m Accredited An	arked with alyte	an asteris	k are outs	ide of acc	eptable li	imits.			

Inorganic LCS Results for 008516

	ARDL,	INC.	MA 400 Av	TRIX S iation	PIKE/SP Drive;	P.O.	JPLICA Box 1	TE REP 566 M	ORT ft. Verr	, non) 11	52864	
Lab Report No): 00851	9								Repor	t Date	e: 10/0	11/2019
Project Name		SIONITTI	RIVER								NELAC	Certifi	ed - IL100308
Analyte	Sample Matrix	Sample Result	MS Result	MS Level	% MS Rec	MSD Result	MSD Level	MSD % Rec	% Rec Limits	RPD	RPD Limit	Run	QC Lab Number
Ammonia Nitrogen	WATER	0.065	2.1	2.0	103	2.1	2.0	102	75-125	н	20	09164887	008516-01MS
Kjeldahl Nitrogen	WATER	0.88	1.7	0.80	101	1.5	0.80	82	75-125	δ	20	09124866	008516-01MS
Nitrate as Nitrogen	WATER	1.7	8.8	8.0	89	8.8	8.0	89	75-125	Ч	20	09064861	008516-01MS
Nitrite as Nitrogen	WATER	UN	4.4	4.0	110	4.4	4.0	109	75-125	0	20	09064860	008516-01MS
Phosphorus	WATER	0.45	1.3	0.83	66	1.3	0.83	102	75-125	0	20	10014928	008516-01MS
Phosphorus, -ortho	WATER	0.32	0.43	0.10	114	0.43	0.10	111	75-125	1	20	09164888	008516-02MS

Inorganic Matrix Spikes for 008516

(a) DOD and/or NELAC Accredited Analyte.

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

AR	DL, INC.	400 Avi	SAMPLE ation Dri	DUPLICA Ve; P.O.	Box 1566	Mt. Veri	101, IL 628	864
Lab Report No: 0(8516						Report Date:	10/01/2019
Project Name: Il	LINOIS RIV.	ER					NELAC Certifi	ed - IL100308
Analyte	Sample Conc'n	First Duplicate	Second Duplicate	Units	Percent Diff (Mean Smp, D1, D2)	Analytical Run	QC Lab Number
Pheophytin-a Pheophytin-a Solids, Total Suspen Solids, Volatile Susp	and 29.2	10.2 29.6 4.4		MG/LU.M. MG/L MG/L	0 H O		09174898 09164884 09164885 09164885	008516-01D1 008516-01D1 008516-01D1

(a) DOD and/or NELAC Accredited Analyte Sample Duplicates for 008516

Sample Receipt Information

Including as appropriate:

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

ARDL Data Package 8516 - Inorganic

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

Authorized By: DSD-QAO

Drive, 1	(61
P.O. Box 1566, 400 Aviation]	(618) 244-3235 Phone
Two	
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DI	

Mt. Vernon, IL 62864



8516



COOLER RECEIPT REPORT ARDL, INC.

ARI	DL #:	Cooler # $1 of 2$			
		Number of Coolers in Shipm	nent:		-
Pro	ject: <u>Illinuis River</u>	Date Received: <u>9-5-</u>	-19		q
A.	PRELIMINARY EXAMINATION PHASE: Date cooler was opened: 9-5-	<u> 19 (Signature) / / / / / / / / / / / / / / / / / / /</u>	cheum		
1.	Did cooler come with a shipping slip (airbill, etc.)?		YES	NO)	
	If YES, enter carrier name and airbill number here:	Caure	er		
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?		YES	NO	
5.	Were custody papers sealed in a plastic bag?		YES	NO	
6.	Were custody papers filled out properly (ink, signed, etc.)?		ÝES	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		NO	N/A
9.	Was a separate container provided for measuring temperature? YES_ $ u$	NO Observed Cooler Temp	O.2.	2	C
B.	LOG-IN PHASE: Date samples were logged-in: 9-5-19 (s	Signature) <u>LH Cachre</u> u	m		
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?		KES	' 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?		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:	Sample T	ransfer		
		Fraction	Fraction		
		Area #	Area #		
		Wilkin	By		
		dle.	Dy		
		On On	On		
		9-3-14			
		Chain-of-Custody #	N/A		
(E	By: Signature) Date:	•			

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COOLER RECEIPT REPORT ARDL, INC.

ARI	DL #: <u>8516</u>	Cooler # <u>2</u> Number of Coole	of え ers in Shipment:?		
Pro	ject: <u>Illinois River</u>	Date Received:	9-5-19		¢
A.	PRELIMINARY EXAMINATION PHASE: Date cooler was opened: 9-5	-19 (Signature)	A Lacken	m	,
1.	Did cooler come with a shipping slip (airbill, etc.)?		YES	NO	>
	If YES, enter carrier name and airbill number here:		Cauer	ier	<u> </u>
2.	Were custody seals on outside of cooler?	·	YES	NO) N/A
	How many and where?,Seal Date:,Seal Date:,	,Seal N	lame:		
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?	·	VES	≥ NO	
5.	Were custody papers sealed in a plastic bag?		YES	NO	>
6.	Were custody papers filled out properly (ink, signed, etc.)?	mat initia	ed+ dated 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 top of this form	(ES) NO	N/A
9.	Was a separate container provided for measuring temperature? YES	NO Observed	d Cooler Temp. <u>0, 4</u>	с	
B.	LOG-IN PHASE: Date samples were logged-in: $9-5-19$ (Signature)	A Correction factor_ acktum	0:0	c
10	Describe type of packing in cooler: $\int \partial A d a = \int \partial A d a$	·			
11	Were all samples sealed in separate plastic hars?		YES	MO	 Γ Ν/Δ
12	Did all containers arrive unbroken and were labels in good condition?			') NO	
12.	Were sample labels complete?		VES) NO	
1J.	Pid all sample labels agree with custody papers?		VEC		
14.	Were correct containers used for the tests indicated?	·····	XEO	> NO	
10.	Was pli correct on presoned water samples?		ve		NI/A
10.	Was a sufficient amount of sample cost for tests indicated?		VEC		INIA
17.	Was a sufficient amount of sample sent to resus indicated f		VEO		ALIA
10.	Was the ARDI project coordinator notified of any deficiencies?		TEO	NO	
19.					
-	Comments and/or Corrective Action:	Fraction	Sample Transfer Fraction		
		all	2		

27

	······································	
(By: Signature)	Date:	

Sample Transfer			
Fraction	Fraction		
all			
Area #	Area #		
Walkin			
Ву	Ву		
dec			
On	On		
9-5-19			

Chain-of-Custody # _//A

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Environmental | Analytical | Management | Safety

Customer Name: SLCOE

Project Name: Upper Mississippi River

Samples Received at ARDL: 9/6/19 & 9/9/19

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

www.ardlinc.com

Date: 10/3/19

Lab Name: ARDL, Inc.

ARDL Report No.: 8518

Customer	Date	Lab ID	
<u>Sample No.</u>	Collected	<u>Number</u>	Analyses Requested
UMR-5 MILE 212.5	9/5/19	8518-01	Inorganics(1)
UMR-6 MILE 231	9/5/19	8518-02	Inorganics(1)
UMR-15	9/5/19	8518-03	Inorganics(1)
UMR-7 MILE 241	9/5/19	8518-04	Inorganics(1)
UMR-LM RM 251	9/5/19	8518-05	Inorganics(1)
UMR-9 MILE 273	9/5/19	8518-06	Inorganics(1)
UMR-LA RM 283	9/5/19	8518-07	Inorganics(1)
UMR-DP RM 294	9/5/19	8518-08	Inorganics(1)
UMR-1 CHAIN OF ROCKS CANAL	9/9/19	8518-09	Inorganics(1)
UMR-2 CONFLUENCE	9/9/19	8518-10	Inorganics(1)
UMR-3 MILE 200	9/9/19	8518-11	Inorganics(1)
SLH-3	9/9/19	8518-12	Inorganics(1)

CASE NARRATIVE

(1) Including ammonia, chlorophyll/pheophytin, nitrite, nitrate, TKN, TOC, orthophosphate, total phosphorus, TSS, and TVSS.

The quality control data are summarized as follows:

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

Nitrate and nitrite were 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 TKN.

DUPLICATE

Duplicate analyses are reported as MS/MSD, except chlorophyll/pheophytin, TSS, and TVSS. RPD of the duplicate analyses met criteria, except for pheophytin-a.

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

Project Name: Upper Mississippi River

ARDL Report No.: 8518

CASE NARRATIVE (Continued)

DATA REPORTING QUALIFIERS

The following data reporting qualifiers are used as required:

- ND Indicates parameter was analyzed for but not detected. The sample quantitation limit has been corrected for weight, dilution and/or percent moisture.
- 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.

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
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 8518 - Inorganic

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Authorized By: DSD-QAO

008518	MISSISSIPPI RIVER
No: (UPPER
Lab Report	roject Name: Project No:
	Lab Report No: 008518

ARDL, INC.

Report Date: 10/01/2019

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ect Name: UF oject No:	PER MI	IddISSISS	RIVER					Z	Analysis WELAC Certi	: Inorgan fied - IL1	ics 00308
DL No: 00 ld ID: UM eived: 09)8518-0: IR-5 MII 1/06/201	L LE 212.5 L9	Sampl Samp Samp	ing Lo ling D ling T	c'n: UPF ate: 09, ime: 16(PER MISSISSIPP (05/2019 00	I RIVER		Matrix Moisture	: WATER : NA	
Analyte		LOD	ΓΟÕ	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Nitrogen		0.0200	0.0300		0.0376	MG/L	NONE	350.1	NA	09/09/19	09124872
hyll-a, Co	rrecte	1.0	1.00		42.7	MG/CU.M.	10200H	10200H	09/06/19	09/16/19	09174899
I Nitrogen		0.190	0.200	Ŀ	0.842	MG/L	351.2	351.2	09/09/19	09/10/19	09124871
as Nitrog	ren	0.800	1.00		1.16	MG/L	NONE	300.0	NA	09/06/19	09124874
e as Nitrog	ren	0.400	0.500		ND	MG/L	NONE	300.0	NA	09/06/19	09124873
rtin-a		1.0	1.00		12.6	MG/CU.M.	10200H	10200H	09/06/19	09/16/19	09174899
sur		0.00800	0.0100		0.308	MG/L	365.2	365.2	09/30/19	09/30/19	10014928
orus, -orth	0	0.00800	0.0100		0.109	MG/L	NONE	365.2	NA	09/06/19	09124877
Total Sus	pended	4.0	4.00		34.8	MG/L	NONE	160.2	NA	09/09/19	09124869
Volatile	Suspen	4.0	4.00		6.4	MG/L	NONE	160.4	NA	09/09/19	09124870

(a) DOD and/or NELAC Accredited Analyte.

Sample 008518-01, Inorganic Analyses

Page 1 of 1

09/17/19 09244910

NA

415.1

NONE

MG/L

5.1

1.00

0.500

Total Organic Carbon

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

Report Date: 10/01/2019

Project Name: Project No:	UPPER MIS	I IddISSIS	RIVER					N	Analysis ELAC Certi	: Inorgan fied - IL1	ics 00308
ARDL No: Field ID: Received:	008518-02 UMR-6 MIL 09/06/201	臣 231 9	Sampl Samp Samp	ing Loc ling Da ling Ti	c'n: UPP1 ate: 09/(Lme: 150(ER MISSISSIPPI 05/2019 0	I RIVER		Matrix Moisture	: WATER : NA	
Analy	t e	LOD	год	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Ammonia Nitrog	en	0.0200	0.0300		0.125	MG/L	NONE	350.1	NA	09/09/19	09124872
Chlorophyll-a,	Correcte	1.0	1.00		69.9	MG/CU.M.	10200H	10200H	09/06/19	09/16/19	09174899
Kjeldahl Nitro	gen	0.190	0.200		0.705	MG/L	351.2	351.2	09/09/19	09/10/10	09124871
Nitrate as Nit	rogen	0.800	1.00		DN	MG/L	NONE	300.0	NA	09/06/19	09124874
Nitrite as Nit	rogen	0.400	0.500		DN	MG/L	NONE	300.0	NA	09/06/19	09124873
Pheophytin-a		1.0	1.00		14.6	MG/CU.M.	10200H	10200H	09/06/19	09/16/19	09174899
Phosphorus		0.00800	0.0100		0.295	MG/L	365.2	365.2	09/30/19	09/30/19	10014928
Phosphorus, -o	rtho	0.00800	0.0100		0.0446	MG/L	NONE	365.2	NA	09/06/19 (09124877
Solids, Total	Suspended	4.0	4.00		40.0	MG/L	NONE	160.2	NA	09/09/19 (09124869
Solids, Volati	le Suspen	4.0	4.00		8.4	MG/L	NONE	160.4	NA	09/09/19 (09124870
Total Organic	Carbon	0.500	1.00		4.3	MG/L	NONE	415.1	NA	09/17/19 (09244911

(a) DOD and/or NELAC Accredited Analyte.

Sample 008518-02, Inorganic Analyses

UPPER MISSISSIPPI RIVER

Project Name: Project No:

Report Date: 10/01/2019

Analysis: Inorganics NELAC Certified - IL100308

ARDL No: 008518-0	e	Sampl	ing Loc	c'n: UPPE	ER MISSISSIPPI	I RIVER		Matrix	: WATER	
Field ID: UMR-15		Samp	Jing Da	ate: 09/0	05/2019			Moisture	: NA	
Received: 09/06/20.	19	Samp	iling Ti	ime: 163(0					
Analyte	LOD	год	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Ammonia Nitrogen	0.0200	0.0300		0.0411	MG/L	NONE	350.1	NA	09/09/19 (9124872
Chlorophyll-a, Correcte	1.0	1.00		70.8	MG/CU.M.	10200H	10200H	09/06/19	09/16/19 (9174899
Kjeldahl Nitrogen	0.190	0.200		0.699	MG/L	351.2	351.2	09/09/19	0 61/01/60	9124871
Nitrate as Nitrogen	0.800	1.00		DN	MG/L	NONE	300.0	NA	09/06/19 (9124874
Nitrite as Nitrogen	0.400	0.500		ND	MG/L	NONE	300.0	NA	09/06/19 (9124873
Pheophytin-a	1.0	1.00	þ	20.1	MG/CU.M.	10200H	10200H	09/06/19	09/16/19 (9174899
Phosphorus	0.00800	0.0100		0.329	MG/L	365.2	365.2	09/30/19	09/30/19 1	0014928
Phosphorus, -ortho	0.00800	0.0100		0.0581	MG/L	NONE	365.2	NA	09/06/19 0	9124877
Solids, Total Suspended	4.0	4.00		43.6	MG/L	NONE	160.2	NA	09/09/19 0	9124869
Solids, Volatile Suspen	4.0	4.00		8.8	MG/L	NONE	160.4	NA	09/09/19 (9124870
Total Organic Carbon	0.500	1.00		5.5	MG/L	NONE	415.1	NA	09/11/19 0	9244910

(a) DOD and/or NELAC Accredited Analyte.

Sample 008518-03, Inorganic Analyses

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

Report Date: 10/01/2019

Project Name: UPPEF Project No:	R MISSIS	SSIPPI R	LVER					N	Analysis ELAC Certi	: Inorgani fied - IL1(ics 00308
ARDL No: 00851 Field ID: UMR-7 Received: 09/06	18-04 7 MILE 2 6/2019	241	Samp1 Samp Samp	ing Loo ling Da ling T	c'n: UPF ate: 09/ ime: 134	PER MISSISSIPP1 (05/2019 15	L RIVER		Matrix Moisture	:: WATER :: NA	
Analyte			LOQ	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	09/09/19 (09124872
Chlorophyll-a, Corre	ecte 1	1.0	1.00		69.9	MG/CU.M.	10200H	10200H	09/06/19	09/16/19 (09174899
Kjeldahl Nitrogen	.0	.190	0.200		0.744	MG/L	351.2	351.2	09/09/19	09/10/19 (09124871
Nitrate as Nitrogen	0.	.800	1.00		ΠN	MG/L	NONE	300.0	NA	09/06/19 (09124874
Nitrite as Nitrogen	0.	.400	0.500		QN	MG/L	NONE	300.0	NA	09/06/19 (09124873
Pheophytin-a		1.0	1.00		15.9	MG/CU.M.	10200H	10200H	09/06/19	09/16/19 (09174899
Phosphorus	0.0	00800	0.0100		0.261	MG/L	365.2	365.2	09/30/19	09/30/19	10014928
Phosphorus, -ortho	0.0	00800	0.0100		0.0446	+WG/T	NONE	365.2	NA	09/06/19 (09124877
Solids, Total Susper	nded 4	1.0	4.00		40.4	MG/L	NONE	160.2	NA	09/09/19 (09124869
Solids, Volatile Sus	spen 4	1.0	4.00		8.4	MG/L	NONE	160.4	NA	09/09/19 (09124870
Total Organic Carbon	л о.	.500	1.00		5.0	MG/L	NONE	415.1	NA	09/17/19 (0244910

(a) DOD and/or NELAC Accredited Analyte.

Sample 008518-04, Inorganic Analyses

08518 Report Date: 10/01/2019	MISSISSIPPI RIVER Analysis: Inorganics NELAC Certified - IL100308	-05 Sampling Loc'n: UPPER MISSISSIPPI RIVER MAtrix: WATER I RM 251 Sampling Date: 09/05/2019 2019 Sampling Time: 1245	Prep Analysis Prep Analysis Run LOD LOQ Flag Result Units Method Method Date Date Number	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
18	SISSIPPI RI	251 9	LOD	0.0200 1.0 0.190 0.800 0.400 1.0 0.00800 0.00800 4.0
Lab Report No: 0085	Project Name: UPPER MIS Project No:	ARDL No: 008518-05 Field ID: UMR-LM RN Received: 09/06/201	Analyte	Ammonia Nitrogen Chlorophyll-a, Correcte Kjeldahl Nitrogen Nitrate as Nitrogen Nitrite as Nitrogen Pheophytin-a Pheophytin-a Phosphorus Phosphorus, -ortho Solids, Total Suspended Solids, Volatile Suspen

(a) DOD and/or NELAC Accredited Analyte.

Sample 008518-05, Inorganic Analyses

Page 1 of 1

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

UPPER MISSISSIPPI RIVER

Project Name: Project No:

Report Date: 10/01/2019

Analysis: Inorganics NELAC Certified - IL100308

ARDL No: 0085	518-06		Sampl	ing Loc	c'n: UPPE	ER MISSISSIPP	I RIVER		Matrix	: WATER	
FIELA IU: UMR- Received: 09/C	-9 MILE 06/2019	513	samp Samp	iling Da	ate: 09/0 Lme: 0900	6102/cC			Moisture	: NA	
							Prep	Analysis	Prep	Analysis	Run
Analyte		LOD	ΓΟÕ	Flag	Result	Units	Method	Method	Date	Date	Number
Ammonia Nitrogen		0.0200	0.0300		0.0895	MG/L	NONE	350.1	NA	09/09/19 (9124872
Chlorophyll-a, Corr	recte	1.0	1.00		63.5	MG/CU.M.	10200H	10200H	09/06/19	09/16/19 (9174899
Kjeldahl Nitrogen		0.190	0.200		0.328	MG/L	351.2	351.2	09/09/19	09/10/60	9124871
Nitrate as Nitrogen		0.800	1.00		UN	MG/L	NONE	300.0	NA	09/06/19 (9124874
Nitrite as Nitrogen		0.400	0.500		UN	MG/L	NONE	300.0	NA	09/06/19 (9124873
Pheophytin-a		1.0	1.00		17.2	MG/CU.M.	10200H	10200H	09/06/19	09/16/19 (9174899
Phosphorus	0	.00800	0.0100		0.231	MG/L	365.2	365.2	09/30/19	09/30/19 1	.0014928
Phosphorus, -ortho	0	.00800	0.0100		0.050	MG/L	NONE	365.2	NA	09/06/19 (9124877
Solids, Total Suspe	ended	4.0	4.00		39.2	MG/L	NONE	160.2	NA	09/09/19 (9124869
Solids, Volatile Su	ıspen	4.0	4.00		8.4	MG/L	NONE	160.4	NA	09/09/19 (9124870
Total Organic Carbo) u	0.500	1.00		4.7	MG/L	NONE	415.1	NA	09/17/19 0	9244910

(a) DOD and/or NELAC Accredited Analyte.

Sample 008518-06, Inorganic Analyses

Lab Report	No: 0085	18						Щ	keport Date	: 10/01/2	019
Project Name: Project No:	UPPER MIS	IddISSIS	RIVER					Z	Analysis TELAC Certi	: Inorgan fied - IL1	ics 00308
ARDL No: Field ID: Received:	008518-07 UMR-LA RM 09/06/201	(283 9	Samp. Samr Samr	ling Loo Ding Do Ling T:	c'n: UPI ate: 09, ime: 09	PER MISSISSIPP. /05/2019 40	I RIVER		Matrix Moisture	: WATER : NA	
Analyt	Ð	LOD	LOQ	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Numbe
Ammonia Nitrogé Chlorophyll-a, Kieldahl Nitroo	en Correcte Ten	0.0200 1.0 0.190	0.0300 1.00		0.0879 67.2 0.58	MG/L MG/CU.M. MG/T.	NONE 10200H 351 2	350.1 10200H 351.2	NA 09/06/19 09/09/19	09/09/19 00/19 00/16/19 00/16/19 00/16/19 00/16/19 00/100/10000000000	091248 091748 091248

Analyte	LOD	TOQ	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Ammonia Nitrogen	0.0200	0.0300		0.0879	MG/L	NONE	350.1	NA	09/09/19 0	9124872
Chlorophyll-a, Correcte	1.0	1.00		67.2	MG/CU.M.	10200H	10200H	09/06/19	09/16/19 (9174899
<pre>Kjeldahl Nitrogen</pre>	0.190	0.200		0.58	MG/L	351.2	351.2	09/09/19	09/10/10	9124871
Vitrate as Nitrogen	0.800	1.00		DN	MG/L	NONE	300.0	NA	09/06/19 (9124874
Vitrite as Nitrogen	0.400	0.500		DN	MG/L	NONE	300.0	NA	09/06/19 (9124873
² heophytin-a	1.0	1.00		16.7	MG/CU.M.	10200H	10200H	09/06/19	09/16/19 (9174899
hosphorus	0.00800	0.0100		0.214	MG/L	365.2	365.2	09/30/19	09/30/19 1	.0014928
hosphorus, -ortho	0.00800	0.0100		0.0527	MG/L	NONE	365.2	NA	09/06/19 (9124877
Solids, Total Suspended	4.0	4.00		36.4	MG/L	NONE	160.2	NA	09/09/19 0	9124869
Solids, Volatile Suspen	4.0	4.00		8.4	MG/L	NONE	160.4	NA	09/09/19 (9124870
Cotal Organic Carbon	0.500	1.00		4.9	MG/L	NONE	415.1	NA	09/17/19 0	9244911

(a) DOD and/or NELAC Accredited Analyte.

Sample 008518-07, Inorganic Analyses

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

UPPER MISSISSIPPI RIVER

Project Name: Project No:

Report Date: 10/01/2019

Analysis: Inorganics NELAC Certified - IL100308

ARDL No: 008: Field ID: UMR-	518-08 -DP RM	294	Sampl Samp	ing Loc ling Da	c'n: UPPE ate: 09/0	ER MISSISSIFFI)5/2019	I RIVER		Matrix Moisture	: WATER : NA	
Recerved: U9/1	TN7/90	ת	samp	LI DUTTO	LMe: 103,						
Analyte		LOD	LOQ	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Ammonia Nitrogen		0.0200	0.0300		0.0768	MG/L	NONE	350.1	NA	09/09/19 0	9124872
Chlorophyll-a, Cori	recte	1.0	1.00		68.1	MG/CU.M.	10200H	10200H	09/06/19	09/16/19 0	9174899
Kjeldahl Nitrogen		0.190	0.200		0.816	MG/L	351.2	351.2	09/09/19	09/10/19 0	9124871
Nitrate as Nitroger	c	0.800	1.00		1.02	MG/L	NONE	300.0	NA	09/06/19 0	9124874
Nitrite as Nitroger	u	0.400	0.500		ND	MG/L	NONE	300.0	NA	09/06/19 0	9124873
Pheophytin-a		1.0	1.00		19.0	MG/CU.M.	10200H	10200H	09/06/19	09/16/19 0	9174899
Phosphorus	-	0.00800	0.0100		0.235	MG/L	365.2	365.2	09/30/19	09/30/19 1	.0014928
Phosphorus, -ortho	_	0.00800	0.0100		0.0849	MG/L	NONE	365.2	NA	09/06/19 0	9124877
Solids, Total Suspe	ended	4.0	4.00		41.6	MG/L	NONE	160.2	NA	09/09/19 0	9124869
Solids, Volatile Su	uspen	4.0	4.00		9.2	MG/L	NONE	160.4	NA	09/09/19 0	9124870
Total Organic Carbo	uo	0.500	1.00		5.0	MG/L	NONE	415.1	NA	09/17/19 0	9244911

(a) DOD and/or NELAC Accredited Analyte.

Sample 008518-08, Inorganic Analyses

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

Project Name: UPPER MISSISSIPPI RIVER

Project No:

Report Date: 10/01/2019

Analysis: Inorganics NELAC Certified - IL100308

ARDL No: Field ID: Received:	008518-09 UMR-1 CHA 09/09/201) NIN OF ROCI .9	Sampl KS CA Samp Samp	ing Loc ling Da ling Ti	c'n: UPPE ate: 09/0 ime: 0910	R MISSISSIPPJ 9/2019	I RIVER		Matrix Moisture	: WATER : NA	
Analy	لد e	LOD	ГОД	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Ammonia Nitrog	en	0.0200	0.0300		0.138	MG/L	NONE	350.1	NA	09/23/19	09244912
Chlorophyll-a,	Correcte	1.0	1.00		14.5	MG/CU.M.	10200H	10200H	01/01/60	09/16/19	09174900
Kjeldahl Nitro	gen	0.190	0.200		0.737	MG/L	351.2	351.2	09/23/19	09/24/19	10014929
Nitrate as Nit	rogen	0.800	1.00		1.15	MG/L	NONE	300.0	NA	09/10/19	09124876
Nitrite as Nit	rogen	0.400	0.500		DN	MG/L	NONE	300.0	NA	09/10/19	09124875
Pheophytin-a		1.0	1.00		1.4	MG/CU.M.	10200H	10200H	09/10/19	09/16/19	09174900
Phosphorus		0.00800	0.0100		0.291	MG/L	365.2	365.2	09/30/19	09/30/19	10014928
Phosphorus, -o.	rtho	0.00800	0.0100		0.124	MG/L	NONE	365.2	NA	09/10/19	09134879
Solids, Total	Suspended	4.0	4.00		27.2	MG/L	NONE	160.2	NA	09/10/19	09134880
Solids, Volati.	le Suspen	4.0	4.00		4.0	MG/L	NONE	160.4	NA	09/10/19	09134881
Total Organic (Carbon	0.500	1.00		4.4	MG/L	NONE	415.1	NA	09/17/10	09244911

(a) DOD and/or NELAC Accredited Analyte.

Sample 008518-09, Inorganic Analyses

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

Project Name: UPPER MISSISSIPPI RIVER

Report Date: 10/01/2019

Analysis: Inorganics NELAC Certified - IL100308

Project No:							Z	ELAC Certi	fied - IL1(0308
ARDL No: 008518-1	0	Sampl	ing Loc	'n: UPPEI	R MISSISSIPP	I RIVER		Matrix	: WATER	
Field ID: UMR-2 CO Received: 09/09/20	NFLUENCE	Samp Samp	ling Da ling Ti	tte: 09/0 me: 0930	9/2019			Moisture	. NA	
						Prep	Analysis	Prep	Analysis	Run
Analyte	LOD	LOQ	Flag	Result	Units	Method	Method	Date	Date	Number
Ammonia Nitrogen	0.0200	0.0300		0.0418	MG/L	NONE	350.1	NA	09/23/19 0	9244912
Chlorophyll-a, Correcte	1.0	1.00		12.1	MG/CU.M.	10200H	10200H	09/10/19	09/16/19 (9174900
Kjeldahl Nitrogen	0.190	0.200		0.868	MG/L	351.2	351.2	09/23/19	09/24/19 1	.0014929
Nitrate as Nitrogen	0.800	1.00		ND	MG/L	NONE	300.0	NA	09/10/19 (9124876
Nitrite as Nitrogen	0.400	0.500		ND	MG/L	NONE	300.0	NA	09/10/10	9124875
Pheophytin-a	1.0	1.00		2.7	MG/CU.M.	10200H	10200H	09/10/19	09/16/19 (9174900
Phosphorus	0.00800	0.0100		0.501	MG/L	365.2	365.2	09/30/19	09/30/19	.0014928
Phosphorus, -ortho	0.00800	0.0100		0.157	MG/L	NONE	365.2	NA	09/10/19 (9134879
Solids, Total Suspended	1 6.67	6.67		192	MG/L	NONE	160.2	NA	09/10/19 (9134880
Solids, Volatile Suspen	6.67	6.67		14.7	MG/L	NONE	160.4	NA	09/10/19 (9134881
Total Organic Carbon	0.500	1.00		4.8	MG/L	NONE	415.1	NA	09/17/19 (9244910

(a) DOD and/or NELAC Accredited Analyte.

Sample 008518-10, Inorganic Analyses

Lab Report No: 008518

Report Date: 10/01/2019

UPPER MISS 008518-11	ISSIPPI	RIVER Sampl.	ing Loc	n: UPPE	IR MISSISSIPI	L RIVER	2	Analysis NELAC Certi Matrix	s: Inorgan Ified - IL1 <: WATER	ics 00308
	200	Samp Samp	ling Da ling Ti	te: 09/(me: 1000	09/2019)			Moisture	: NA	
	LOD	ГОД	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
0	.0200	0.0300		0.108	MG/L	NONE	350.1	NA	09/23/19	09244912
	1.0	1.00		42.7	MG/CU.M.	10200H	10200H	09/10/19	09/16/19	09174900
0	.190	0.200		0.798	MG/L	351.2	351.2	09/23/19	09/24/19	10014929
0	.800	1.00		ND	MG/L	NONE	300.0	NA	09/10/19	09124876
0	.400	0.500		DN	MG/L	NONE	300.0	NA	09/10/19	09124875
	1.0	1.00		10.7	MG/CU.M.	10200H	10200H	09/10/19	09/16/19	09174900
_	00800	0.0100		0.209	MG/L	365.2	365.2	09/30/19	09/30/19	10014928
	00800	0.0100		0.0542	MG/L	NONE	365.2	NA	09/10/19	09134879
	4.0	4.00		31.2	MG/L	NONE	160.2	NA	09/10/19	09134880
	4.0	4.00		5.6	MG/L	NONE	160.4	NA	00/10/10	09134881
0	.500	1.00		4.9	MG/L	NONE	415.1	NA	09/17/10	09244910

(a) DOD and/or NELAC Accredited Analyte.

Sample 008518-11, Inorganic Analyses

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

UPPER MISSISSIPPI RIVER

Project Name: Project No:

Report Date: 10/01/2019

Analysis: Inorganics NELAC Certified - IL100308

ARDL No: 008518-1: Field ID: SLH-3	2	Samp] Samp	ing Loc	'n: UPPE1 te: 09/0	R MISSISSIPPI 9/2019	I RIVER		Matrix Moisture	: WATER : NA	
Received: 09/09/20	19	Samp	ling Ti	me: 0845						
Analyte	LOD	LOQ	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Ammonia Nitrogen	0.0200	0.0300		0.065	MG/L	NONE	350.1	NA	09/23/19	09244912
Chlorophyll-a, Correcte	1.0	1.00		28.7	MG/CU.M.	10200H	10200H	09/10/19	09/16/19	00174900
Kjeldahl Nitrogen	0.190	0.200		0.668	MG/L	351.2	351.2	09/23/19	09/24/19	10014929
Nitrate as Nitrogen	0.800	1.00		DN	MG/L	NONE	300.0	NA	09/10/19	09124876
Nitrite as Nitrogen	0.400	0.500		DN	MG/L	NONE	300.0	NA	09/10/19	09124875
Pheophytin-a	1.0	1.00		7.3	MG/CU.M.	10200H	10200H	09/10/19	09/16/19	09174900
Phosphorus	0.00800	0.0100		0.531	MG/L	365.2	365.2	09/30/19	09/30/19	10014928
Phosphorus, -ortho	0.00800	0.0100		0.116	MG/L	NONE	365.2	NA	09/10/19	09134879
Solids, Total Suspended	6.67	6.67		121	MG/L	NONE	160.2	NA	09/10/10	09134880
Solids, Volatile Suspen	6.67	6.67		9.33	MG/L	NONE	160.4	NA	09/10/10	09134881
Total Organic Carbon	0.500	1.00		4.4	MG/L	NONE	415.1	NA	09/11/10	09244910

(a) DOD and/or NELAC Accredited Analyte.

Sample 008518-12, Inorganic Analyses

BLANK SUMMARY REPORT 400 Aviation Drive; P.O. Box 1566 Mt. Vernon,		II
BLANK SUMMARY REPORT 400 Aviation Drive; P.O. Box 1566 Mt.		Vernon,
BLANK SUMMARY REPORT 400 Aviation Drive; P.O. Box 1566		Mt.
	BLANK SUMMARY REPORT	400 Aviation Drive; P.O. Box 1566

ARDL, INC.

Report Date: 10/01/2019

62864

Project Name: UPPER MISSISSIPPI RIVER

NELAC Certified - IL100308

											1
			Blank	8	Prep	Analysis	Prep	Analysis		QC Lab	
Analyte	LOD	ГОQ	Result	Units	Method	Method	Date	Date	Run	Number	
Ammonia Nitrogen	0.020	0.030	QN	MG/L	NONE	350.1	NA	09/09/19	09124872	008518-01B1	I I
Ammonia Nitrogen	0.020	0.030	QN	MG/L	NONE	350.1	NA	09/23/19	09244912	008518-09B1	
Chlorophyll-a, Corre	1.0	1.0	QN	MG/CU.M.	10200H	10200H	09/10/19	09/16/19	09174900	008518-09B1	
Chlorophyll-a, Corre	1.0	1.0	ND	MG/CU.M.	10200H	10200H	09/06/19	09/16/19	09174899	008518-03B1	
Kjeldahl Nitrogen	0.19	0.20	DN	MG/L	351.2	351.2	09/09/19	09/10/19	09124871	008518-01B1	
Kjeldahl Nitrogen	0.19	0.20	DN	MG/L	351.2	351.2	09/23/19	09/24/19	10014929	008518-09B1	
Nitrate as Nitrogen	0.80	1.0	QN	MG/L	NONE	300.0	NA	09/06/19	09124874	008518-02B1	
Nitrate as Nitrogen	0.80	1.0	ND	MG/L	NONE	300.0	NA	09/10/19	09124876	008518-09B1	
Nitrite as Nitrogen	0.40	0.50	UN	MG/L	NONE	300.0	NA	09/06/19	09124873	008518-02B1	
Nitrite as Nitrogen	0.40	0.50	ND	MG/L	NONE	300.0	NA	09/10/19	09124875	008518-09B1	
Pheophytin-a	1.0	1.0	ΟN	MG/CU.M.	10200H	10200H	09/10/19	09/16/19	09174900	008518-09B1	
Pheophytin-a	1.0	1.0	ΟN	MG/CU.M.	10200H	10200H	09/06/19	09/16/19	09174899	008518-03B1	
Phosphorus	0.008	0.010	ΟN	MG/L	365.2	365.2	09/30/19	09/30/19	10014928	008516-01B1	
Phosphorus, -ortho	0.008	0.010	ΟN	MG/L	NONE	365.2	NA	09/06/19	09124877	008518-03B1	
Phosphorus, -ortho	0.008	0.010	ND	MG/L	NONE	365.2	NA	09/10/19	09134879	008518-09B1	
Solids, Total Suspen	1.0	1.0	DN	MG/L	NONE	160.2	NA	09/09/19	09124869	008518-01B1	
Solids, Total Suspen	1.0	1.0	QN	MG/L	NONE	160.2	NA	09/10/19	09134880	008518-09B1	
Solids, Volatile Sus	1.0	1.0	QN	MG/L	NONE	160.4	NA	09/09/19	09124870	008518-01B1	
Solids, Volatile Sus	1.0	1.0	ND	MG/L	NONE	160.4	NA	09/10/19	09134881	008518-09B1	
Total Organic Carbon	0.50	1.0	ND	MG/L	NONE	415.1	NA	09/17/10	09244910	008515-02B1	
Total Organic Carbon	0.50	1.0	ND	MG/L	NONE	415.1	NA	09/17/19	09244911	008515-01B1	

(a) DOD and/or NELAC Accredited Analyte Inorganic Method Blanks for 008518

ARI	DL, INC.	400 Av	riation	Drive	DNTRUT	Box 1	LE REPC L566	DRT Mt. Ve	ernon, IL	62864
Lab Report No: 00	8518								Report Da	te: 10/01/2019
Project Name:	UPPER MIS	Iddissis	I RIVER						NELAC Cer	tified - IL100308
Analyte	LCS 1 Result	LCS 1 Level	LCS 1 % Rec	LCS 2 Result	LCS 2 Level	LCS 2 % Rec	<pre>% Rec Limits</pre>	Mean % Rec	Analytical Run	QC Lab Number
Ammonia Nitrogen	0.98	1.0	86		1	1	80-120	1	09244912	008518-09C1
Ammonia Nitrogen	ч	1.0	100	-	1	1 1	80-120	ļ	09124872	008518-01C1
Kjeldahl Nitrogen	0.84	1.0	84	1	ł	ł	80-120	1	10014929	008518-09C1
Kjeldahl Nitrogen	0.96	1.0	96	!	1	ł	80-120	1	09124871	008518-01C1
Nitrate as Nitrogen	13.2	14.0	94	1	ł	ł	80-120	;	09124876	008518-09C1
Nitrate as Nitrogen	13.1	14.0	93	ł	1	ł	80-120	ł	09124874	008518-02C1
Nitrite as Nitrogen	6.4	7.0	91	1	ł	1	80-120	1	09124875	008518-09C1
Nitrite as Nitrogen	6.4	7.0	92	1	ł	1	80-120	1	09124873	008518-02C1
Phosphorus	0.63	0.67	94	1	ł	ļ	80-120		10014928	008516-01C1
Phosphorus, -ortho	0.096	0.10	96	-	ł		80-120	ł	09124877	008518-03C1
Phosphorus, -ortho	0.11	0.10	106	ł	ł	ł	80-120	ł	09134879	008518-09C1
Total Organic Carbon	9.0	10.0	90	1	1	ł	76-120	ł	09244910	008515-02C1
Total Organic Carbon	8.9	10.0	89	ł	1	ł	76-120	ł	09244911	008515-01C1
NOTE: Any values t (a) DOD and/or NEL	abulated above ma AC Accredited Ana	rked with lyte .	an asteris)	k are outs	ide of acc	eptable li	imits.			
-		(

Page 1 of 1

Inorganic LCS Results for 008518

	62864
	H
-	Vernon,
REPOR!	Mt.
CATE	t 1566
DPLI	BOX
IKE I	Р.О.
IKE/SP]	Drive;
ATRIX SP	viation
Z	400 A
	INC.
	ARDL,

Report Date: 10/01/2019

: RIVER
PER MISSISSIPPI
Name: UPI
Project

NELAC Certified - IL100308

	Sample	Sample	WS	SM	SM	MSD	MSD	MSD	% Rec		RPD		QC Lab
Analyte	Matrix	Result	Result	Level	% Rec	Result	Level	% Rec	Limits	RPD	Limit	Run	Number
Ammonia Nitrogen	WATER	0.038	2.1	2.0	102	2.1	2.0	103	75-125	н	20	09124872	008518-01MS
Kjeldahl Nitrogen	WATER	0.84	1.4	0.80	71 *	1.6	0.80	16	75-125	11	20	09124871	008518-01MS
Nitrate as Nitrogen	WATER	ND	8.0	8.0	100	8.0	8.0	100	75-125	ч	20	09124874	008518-02MS
Nitrite as Nitrogen	WATER	DN	3.9	4.0	98	4.0	4.0	100	75-125	7	20	09124873	008518-02MS
Phosphorus	WATER	0.29	1.1	0.83	98	1.1	0.83	98	75-125	0	20	10014928	008518-09MS
Phosphorus, -ortho	WATER	0.058	0.16	0.10	106	0.16	0.10	103	75-125	2	20	09124877	008518-03MS

Inorganic Matrix Spikes for 008518

NOTE: Values tabulated above marked with an asterisk are explained in the associated narrative. (a) DOD and/or NELAC Accredited Analyte.

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

Report Date: 10/01/2019

UPPER MISSISSIPPI RIVER Project Name:

NELAC Certified - IL100308

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Analyte	Sample Conc'n	First Duplicate I	Second Duplicate	Units	Percent Diff	Mean (Smp,D1,D2)	Analytical Run	QC Lab Number	
Chlorophyll-a, Corrected	70.8	60.8		MG/CU.M.	15		09174899	008518-03D1	
Pheophytin-a	20.1	14.8	1	MG/CU.M.	30*		09174899	008518-03D1	
Solids, Total Suspended	34.8	36.8	1	MG/L	9	1	09124869	008518-01D1	
Solids, Volatile Suspend	6.4	7.2	1	MG/L	12		09124870	008518-01D1	

Page 1 of 1 * indicates that agreement between duplicates is greater than 20%. See Case Narrative for exceptions. (a) DOD and/or NELAC Accredited Analyte Sample Duplicates for 008518

ARDL Report 8518 - Page 19 of 25

Sample Receipt Information

Including as appropriate:

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

ARDL Data Package 8518 - Inorganic

Authorized By: DSD-QAO

P.O. Box 1566, 400 Aviatic	(618) 244-3235 Phon
Two	
IUDV	ANNUL,

on Drive, Mt. Vernon, IL 62864

(618) 244-1149 Fax Q

CHAIN OF CUSTODY RECORD

8158





COOLER RECEIPT REPORT ARDL, INC.

AR	DL #:	Cooler # <u>1 af 2</u>			
	4	Number of Coolers in Ship	oment: <u>2</u>		_
Pro	ject: Typer Messessippi Lucer	Date Received: <u>9-6</u>	-19		
A.	PRELIMINARY EXAMINATION PHASE: Date cooler was opened: 9-6-	-19 (Signature)	akian	<u>L.</u>	
1.	Did cooler come with a shipping slip (airbill, etc.)?		YES (NO	>
	If YES, enter carrier name and airbill number here:	Ca	wie		·····
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?		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?			NO	N/A
8.	Was project identifiable from custody papers? If YES, enter project name at t	he top of this form		NO	N/A
9.	Was a separate container provided for measuring temperature? YES		np. <u>1,3</u>) 	~
В.	LOG-IN PHASE: Date samples were logged-in: $9 - 4 - 19$ (S	Signature) <u>Alacki</u>	Letm		C
10.	Describe type of packing in cooler:				<u>.</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?		VES	° 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?		YES	NO	
16.	Was pH correct on preserved water samples?		KES	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:	Sample	Transfer		
		Fraction	Fraction		
		Area #	Area #		
		la la DA in	/ lica //		
		By	Ву		
ļ		de	<u> </u>		
		9 - 1 - 19	On		

1

Chain-of-Custody # __//A_

(By: Signature)

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

Date:

COOLE	<u>R RECE</u>	<u>EIPT RI</u>	EPORT
	ARDL,	INC.	

AR	DL#:	Cooler # <u>2af 2</u>			
		Number of Coolers in Ship	ment:2	·	
Pro	ect: <u>Upper Mussissipp</u> Review	Date Received: <u>9-1</u>	-19		f
A.	PRELIMINARY EXAMINATION PHASE: Date cooler was opened: 9-6	-19 (Signature)	Arcim	<u></u>	
1.	Did cooler come with a shipping slip (airbill, etc.)?		YES	NO	>
	If YES, enter carrier name and airbill number here:	/	ausee	ı L	
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?		YES	NO	
5.	Were custody papers sealed in a plastic bag?		YES	NO	>
6.	Were custody papers filled out properly (ink, signed, etc.)?		ES .) 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 a	t the top of this form	YES	NO	N/A
9.	Was a separate container provided for measuring temperature? YES	NOObserved Cooler Ten	np. <u>0,9</u>	0 220	C
В.	LOG-IN PHASE: Date samples were logged-in: 9-6-19	(Signature)	um		
10.	Describe type of packing in cooler:				
11.	Were all samples sealed in separate plastic bags?		YES	NO	D 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?		VES	NO	
15.	Were correct containers used for the tests indicated?		ÝES	NO	
16.	Was pH correct on preserved water samples?			^{>} NO	N/A
17.	Was a sufficient amount of sample sent for tests indicated?		YES	NO î	
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		
-		Area #	Area #		
		Walkin	By		
		dea	Ъу		
		On	On		
-		4-6-14			
		Chain-of-Custody #	NA		

1

(By: Signature)

Date:

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ARDL Report 8518 - Page 24 of 25

COOLER RECEIPT REPORT ARDL, INC.

ARE	DL #: 8518	Cooler # <u>None</u> Number of Coolers in Shipment:/_				
Proj	ect: <u>TApper Miss, River</u>	Date Received: <u>9-9-19</u>		f		
A.	PRELIMINARY EXAMINATION PHASE: Date cooler was opened:	-19 (Signature) Hachreen	2			
1.	Did cooler come with a shipping slip (airbill, etc.)?	YES	NO			
	If YES, enter carrier name and airbill number here:	Caurier				
2.	Were custody seals on outside of cooler?	YES	NO	N/A		
	How many and where?,Seal Date:					
З.	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?		NO	N/A		
8.	Was project identifiable from custody papers? If YES, enter project name at	t the top of this form	NO	N/A		
9.	Was a separate container provided for measuring temperature? YES	NO Observed Cooler Temp. $\frac{2.0}{2}$	0,0	С		
В.	LOG-IN PHASE: Date samples were logged-in: 9-9-19	(Signature) Dlachcum				
10.	Describe type of packing in cooler: <u>lance ice</u>					
11.	Were all samples sealed in separate plastic bags?		NO	N/A		
12.	Did all containers arrive unbroken and were labels in good condition?	YES	NO NO			
13.	Were sample labels complete?		NO			
14.	Did all sample labels agree with custody papers?		NO			
15.	5. Were correct containers used for the tests indicated?					
16.	6. Was pH correct on preserved water samples?					
17.	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	N/A,		
	Comments and/or Corrective Action:	Sample Transfer				
		Fraction Fraction				
-		Area # Area #				
		Wilkin By				
		dle_				
		On On On 9-9-19				
]		

17

Chain-of-Custody # _____

N/A

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

Date:

(By: Signature)



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

www.ardlinc.com

Environmental | Analytical | Management | Safety

Customer Name: SLCOE

Project Name: Upper Mississippi River

Samples Received at ARDL: 11/18/19

Date: 12/9/19

Lab Name: ARDL, Inc.

ARDL Report No.: 8573

CASE NARRATIVE

<u>Customer</u>	Date	Lab ID	
Sample No.	Collected	<u>Number</u>	Analyses Requested
UMR-5 MILE 212.5	11/18/19	8573-01	Inorganics(1)
UMR-6 MILE 231	11/18/19	8573-02	Inorganics(1)
UMR-15	11/18/19	8573-03	Inorganics(1)
UMR-7 MILE 241	11/18/19	8573-04	Inorganics(1)
UMR-LM RM 251	11/18/19	8573-05	Inorganics(1)
UMR-9 MILE 273	11/18/19	8573-06	Inorganics(1)
UMR-LA RM 283	11/18/19	8573-07	Inorganics(1)
UMR-DP RM 294	11/18/19	8573-08	Inorganics(1)

(1) Including ammonia, chlorophyll/pheophytin, nitrite, nitrate, TKN, TOC, orthophosphate, total phosphorus, TSS, and TVSS.

The quality control data are summarized as follows:

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

PREPARATION BLANK

Results of the preparation blanks were within acceptable limits, except 1 of 2 for TOC. The associated samples have been flagged appropriately with a 'B' qualifier.

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 2 of 2 for TKN. The parent sample has been flagged appropriately with a 'J' qualifier.

DUPLICATE

Duplicate analyses are reported as MS/MSD, except chlorophyll/pheophytin, TSS, and TVSS. RPD on all duplicate analyses were within control limits, with the exception of pheophytin. The parent sample has been flagged appropriately with a 'J' qualifier.

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

Project Name: Upper Mississippi River

ARDL Report No.: 8573

CASE NARRATIVE (Continued)

DATA REPORTING QUALIFIERS

The following data reporting qualifiers are used as required:

- ND Indicates parameter was analyzed for but not detected. The sample quantitation limit has been corrected for weight, dilution and/or percent moisture.
- 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.
- B This flag is used when the analyte is found in the blank as well as the sample. It indicates possible/probable blank contamination and warns the data user to take appropriate action.

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

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 8573 - Inorganic

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

Authorized By: DSD-QAO

ARDL Report 8573 - Page 3 of 19

008573 Lab Report No: UPPER MISSISSIPPI RIVER

Project Name: Project No:

Report Date: 12/09/2019

NELAC Certified - IL100308

Analysis: Inorganics

ARDL No: 008573-01 Fiold TD. TIMP 5 MIT	Г 2 2 2 2 2 2	Sampl	ing Loo	c'n: UPPER	MISSISSIPP:	I RIVER		Matrix Moisture	: WATER • NA	
Received: 11/18/201	C. 212 - 11 6]	Samp	Ling Ti	ime: 1546	0 + 0 7			11010	•	
						Бтер	Analysis	Prep	Analysis	Run
Analyte	LOD	ТОQ	Flag	Result	Units	Method	Method	Date	Date	Number
Ammonia Nitrogen	0.0200	0.0300		QN	MG/L	NONE	350.1	NA	11/20/19 1	1205054
Chlorophyll-a, Correcte	1.0	1.00		6.4	MG/CU.M.	10200H	10200H	11/19/19	12/03/19 1	2055074
Kjeldahl Nitrogen	0.19	0.20	þ	0.927	MG/L	351.2	351.2	12/03/19	12/04/19 1	2055077
Nitrate as Nitrogen	0.0380	0.0400		2.53	MG/L	NONE	GREEN	NA	11/22/19 1	2035070
Nitrite as Nitrogen	0.0200	0.0200		DN	MG/L	NONE	354.1	NA	11/19/19	.1265059
Pheophytin-a	1.0	1.00	Ċ	1.9	MG/CU.M.	10200H	10200H	11/19/19	12/03/19 1	2055074
Phosphorus	0.00800	0.0100		0.196	MG/L	365.2	365.2	12/02/19	12/04/19 1	.2055078
Phosphorus, -ortho	0.00800	0.0100		0.0632	MG/L	NONE	365.2	NA	11/19/19	1205052
Solids, Total Suspended	4.0	4.00		39.2	MG/L	NONE	160.2	NA	11/25/19 1	2035064
Solids, Volatile Suspen	4.0	4.00		4.0	MG/L	NONE	160.4	NA	11/25/19 1	.2035065
Total Organic Carbon	0.500	1.00	ш	6.5	MG/L	NONE	415.1	NA	12/02/19 1	2095081

1.00

0.500

Total Organic Carbon

(a) DOD and/or NELAC Accredited Analyte.

Sample 008573-01, Inorganic Analyses

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

> 008573 Lab Report No:

UPPER MISSISSIPPI RIVER

Project Name:

Report Date: 12/09/2019

Analysis: Inorganics

Project No:							Z	ELAC Certi	fied - IL10	0308
ARDL No: 008573-02 Field ID: UMR-6 MII Beceived: 11/18/201	2 LE 231	Sampl Samp Samp	ing Loo	c'n: UPPE ate: 11/1 ime: 1430	R MISSISSIPPJ 8/2019	I RIVER		Matrix Moisture	: WATER : NA	
	j	จ้านชาว								
						Prep	Analysis	Prep	Analysis	Run
Analyte	LOD	TOQ	Flag	Result	Units	Method	Method	Date	Date	Number
Ammonia Nitrogen	0.0200	0.0300		0.0452	MG/L	NONE	350.1	NA	11/20/19 1	1205054
Chlorophyll-a, Correcte	1.0	1.00		7.3	MG/CU.M.	10200H	10200H	11/19/19	12/03/19 1	2055074
Kjeldahl Nitrogen	0.190	0.200		0.878	MG/L	351.2	351.2	12/02/19	12/03/19 1	2055075
Nitrate as Nitrogen	0.0380	0.0400		2.54	MG/L	NONE	GREEN	NA	11/22/19 1	2035070
Nitrite as Nitrogen	0.0200	0.0200		QN	MG/L	NONE	354.1	NA	11/19/19	1265059
Pheophytin-a	1.0	1.00		1.6	MG/CU.M.	10200H	10200H	11/19/19	12/03/19 1	2055074
Phosphorus	0.00800	0.0100		0.204	MG/L	365.2	365.2	12/02/19	12/04/19 1	2055078
Phosphorus, -ortho	0.00800	0.0100		0.0738	MG/L	NONE	365.2	NA	11/19/19	1205052
Solids, Total Suspended	4.0	4.00		33.2	MG/L	NONE	160.2	NA	11/25/19 1	2035064
Solids, Volatile Suspen	4.0	4.00		4.4	MG/L	NONE	160.4	NA	11/25/19 1	2035065
Total Organic Carbon	0.500	1.00	щ	5.9	MG/L	NONE	415.1	NA	12/02/19 1	2095081

NA

415.1

NONE

MG/L

5.9

щ

1.00

0.500

Total Organic Carbon

(a) DOD and/or NELAC Accredited Analyte.

Sample 008573-02, Inorganic Analyses

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

> 008573 Lab Report No:

UPPER MISSISSIPPI RIVER

Project Name: Project No:

12/09/2019 Report Date: NELAC Certified - IL100308

Analysis: Inorganics

ARDL No: 008573-03 Field ID: UMR-15	m	Sampl Samp	ing Loc ling Da	'n: UPPEF te: 11/18	R MISSISSIPP. 3/2019	I RIVER		Matrix Moisture	: WATER : NA	
Received: 11/18/201	61	Samp	iling Ti	.me: 1215						
						Prep	Analysis	Prep	Analysis	Run
Analyte	LOD	ТОQ	Flag	Result	Units	Method	Method	Date	Date	Number
Ammonia Nitrogen	0.0200	0.0300		QN	MG/L	NONE	350.1	NA	11/20/19 1	1205054
Chlorophyll-a, Correcte	1.0	1.00		6.4	MG/CU.M.	10200H	10200H	11/19/19	12/03/19 1	2055074
Kjeldahl Nitrogen	0.190	0.200		0.919	MG/L	351.2	351.2	12/02/19	12/03/19 1	2055075
Nitrate as Nitrogen	0.0950	0.100		2.65	MG/L	NONE	GREEN	NA	11/22/19 1	2035070
Nitrite as Nitrogen	0.0200	0.0200		ND	MG/L	NONE	354.1	NA	11/19/19 1	1265059
Pheophytin-a	1.0	1.00		1.3	MG/CU.M.	10200H	10200H	11/19/19	12/03/19 1	2055074
Phosphorus	0.00800	0.0100		0.204	MG/L	365.2	365.2	12/02/19	12/04/19 1	2055078
Phosphorus, -ortho	0.00800	0.0100		0.0685	MG/L	NONE	365.2	NA	11/19/19 1	1205052
Solids, Total Suspended	4.0	4.00		35.6	MG/L	NONE	160.2	NA	11/25/19 1	2035064
Solids, Volatile Suspen	4.0	4.00		4.4	MG/L	NONE	160.4	NA	11/25/19 1	2035065
Total Organic Carbon	0.500	1.00	щ	5.8	MG/L	NONE	415.1	NA	12/02/19 1	2095081

(a) DOD and/or NELAC Accredited Analyte.

Sample 008573-03, Inorganic Analyses

Page 1 of 1

Lab Report No: 008573

UPPER MISSISSIPPI RIVER

Project Name:

Report Date: 12/09/2019

Inorganics

Analysis:

Project No:							N	ELAC Certi:	fied - IL1	00308
ARDL No: 008573-04 Field ID: UMR-7 MIL Received: 11/18/201	1 1E 241 .9	Sampl Samp Samp	ing Loc ling Da ling Ta	c'n: UPPE ate: 11/1 ime: 1340	R MISSISSIPPI 8/2019	L RIVER		Matrix Moisture	: WATER : NA	
Analyte	LOD	ГОЙ	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Ammonia Nitrogen	0.0200	0.0300		QN	MG/L	NONE	350.1	NA	11/20/19	11205054
Chlorophyll-a, Correcte	1.0	1.00		7.3	MG/CU.M.	10200H	10200H	11/19/19	12/03/19	12055074
Kjeldahl Nitrogen	0.190	0.200		0.872	MG/L	351.2	351.2	12/02/19	12/03/19	12055075
Nitrate as Nitrogen	0.0950	0.100		2.59	MG/L	NONE	GREEN	NA	11/22/19	12035070
Nitrite as Nitrogen	0.0200	0.0200		DN	MG/L	NONE	354.1	NA	11/19/19	11265059
Pheophytin-a	1.0	1.00		ND	MG/CU.M.	10200H	10200H	11/19/19	12/03/19	12055074
Phosphorus	0.00800	0.0100		0.196	MG/L	365.2	365.2	12/02/19	12/04/19	12055078
Phosphorus, -ortho	0.00800	0.0100		0.0658	MG/L	NONE	365.2	NA	11/19/19	11205052
Solids, Total Suspended	4.0	4.00		34.4	MG/L	NONE	160.2	NA	11/25/19	12035064
Solids, Volatile Suspen	4.0	4.00		4.0	MG/L	NONE	160.4	NA	11/25/19	12035065

(a) DOD and/or NELAC Accredited Analyte.

Sample 008573-04, Inorganic Analyses

Page 1 of 1

12/02/19 12095081

NA

415.1

NONE

MG/L

5.8

щ

1.00

0.500

Total Organic Carbon

Lab Report No: 008573

Report Date: 12/09/2019

Project Name: Project No:	UPPER MISSISSIPPI F	lver		Analysis: Inorganics NELAC Certified - IL100308
ARDL No:	008573-05	Sampling Loc'n:	UPPER MISSISSIPPI RIVER	Matrix: WATER
Field ID:	UMR-LM RM 251	Sampling Date:	11/18/2019	Moisture: NA
Received:	11/18/2019	Sampling Time:	1317	

	2	2	1 1 1 1 1 1 1 1 1 1 1 1	• • • • • • • • • • • • • • • • • • • •						
Analyte	LOD	гоб	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Ammonia Nitrogen	0.0200	0.0300		QN	MG/L	NONE	350.1	NA	11/20/19	1205054
Chlorophyll-a, Correcte	1.0	1.00		6.4	MG/CU.M.	10200H	10200H	11/19/19	12/03/19	L2055074
Kjeldahl Nitrogen	0.190	0.200		0.816	MG/L	351.2	351.2	12/02/19	12/03/19	L2055075
Nitrate as Nitrogen	0.0380	0.0400		2.56	MG/L	NONE	GREEN	NA	11/22/19	L2035070
Nitrite as Nitrogen	0.0200	0.0200		ND	MG/L	NONE	354.1	NA	11/19/19	L1265059
Pheophytin-a	1.0	1.00		1.9	MG/CU.M.	10200H	10200H	11/19/19	12/03/19	L2055074
Phosphorus	0.00800	0.0100		0.187	MG/L	365.2	365.2	12/02/19	12/04/19	L2055078
Phosphorus, -ortho	0.00800	0.0100		0.0658	MG/L	NONE	365.2	NA	11/19/19	L1205052
Solids, Total Suspended	4.0	4.00		30.4	MG/L	NONE	160.2	NA	11/25/19	L2035064
Solids, Volatile Suspen	4.0	4.00		4.0	MG/L	NONE	160.4	NA	11/25/19	12035065
Total Organic Carbon	0.500	1.00	ф	5.8	MG/L	NONE	415.1	NA	12/02/19	L2095081

(a) DOD and/or NELAC Accredited Analyte.

Sample 008573-05, Inorganic Analyses

Lab Report No: 008573

Report Date: 12/09/2019

ep Analysis Ru	Analysis Pre	Prep			
atrix: WATER sture: NA	M	UPPER MISSISSIPPI RIVER 11/18/2019 1151	Sampling Loc'n: Sampling Date: Sampling Time:	008573-06 UMR-9 MILE 273 11/18/2019	ARDL No: Field ID: Received:
lysis: Inorganics Certified - IL100308	Ana. NELAC		RIVER	UPPER MISSISSIPPI	Project Name: Project No:

Analyte	LOD	ГОД	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Ammonia Nitrogen	0.0200	0.0300		QN	MG/L	NONE	350.1	NA	11/20/19	11205054
Chlorophyll-a, Correcte	1.0	1.00		6.4	MG/CU.M.	10200Н	10200H	11/19/19	12/03/19	12055074
Kjeldahl Nitrogen	0.190	0.200		1.08	MG/L	351.2	351.2	12/02/19	12/03/19	12055075
Nitrate as Nitrogen	0.0380	0.0400		2.77	MG/L	NONE	GREEN	NA	11/22/19	12035070
Nitrite as Nitrogen	0.0200	0.0200		DN	MG/L	NONE	354.1	NA	11/19/19	11265059
Pheophytin-a	1.0	1.00		1.3	MG/CU.M.	10200H	10200H	11/19/19	12/03/19	12055074
Phosphorus	0.00800	0.0100		0.187	MG/L	365.2	365.2	12/02/19	12/04/19	12055078
Phosphorus, -ortho	0.00800	0.0100		0.0658	MG/L	NONE	365.2	NA	11/19/19	11205052
Solids, Total Suspended	4.0	4.00		36.0	MG/L	NONE	160.2	NA	11/25/19	L2035064
Solids, Volatile Suspen	4.0	4.00		4.0	MG/L	NONE	160.4	NA	11/25/19	12035065
Total Organic Carbon	0.500	1.00	، ط	5.9	MG/L	NONE	415.1	NA	12/02/19	12095081

(a) DOD and/or NELAC Accredited Analyte.

Sample 008573-06, Inorganic Analyses

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

> 008573 Lab Report No:

UPPER MISSISSIPPI RIVER

Project Name: Project No:

Report Date: 12/09/2019

NELAC Certified - IL100308 Analysis: Inorganics

ARDL No: 008573-07	7	Sampl	ing Loc	"n: UPPE	R MISSISSIPP.	I RIVER		Matrix	: WATER	
Field ID: UMR-LA RN Received: 11/18/201	M 283 19	Samp Samp	oling Da Vling Ti	te: 11/1 me: 1100	8/2019			Moisture	. NA	
Analyte	ΓΟD	ГОÕ	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Ammonia Nitrogen	0.0200	0.0300		QN	MG/L	NONE	350.1	NA	11/20/19 1	1205054
Chlorophyll-a, Correcte	1.0	1.00		6.4	MG/CU.M.	10200H	10200H	11/19/19	12/03/19 1	2055074
Kjeldahl Nitrogen	0.190	0.200		1.07	MG/L	351.2	351.2	12/02/19	12/03/19 1	2055075
Nitrate as Nitrogen	0.0380	0.0400		2.66	MG/L	NONE	GREEN	NA	11/22/19 1	2035070
Nitrite as Nitrogen	0.0200	0.0200		ND	MG/L	NONE	354.1	NA	11/19/19 1	1265059
Pheophytin-a	1.0	1.00		1.9	MG/CU.M.	10200H	10200H	11/19/19	12/03/19 1	2055074
Phosphorus	0.00800	0.0100		0.187	MG/L	365.2	365.2	12/02/19	12/04/19 1	2055078
Phosphorus, -ortho	0.00800	0.0100		0.0553	MG/L	NONE	365.2	NA	11/19/19 1	1205052
Solids, Total Suspended	4.0	4.00		36.4	MG/L	NONE	160.2	NA	11/25/19 1	2035064
Solids, Volatile Suspen	4.0	4.00		4.0	MG/L	NONE	160.4	NA	11/25/19 1	2035065
Total Organic Carbon	0.500	1.00		6.0	MG/L	NONE	415.1	NA	12/04/19 1	2095082

(a) DOD and/or NELAC Accredited Analyte.

Sample 008573-07, Inorganic Analyses

Page 1 of 1

Lab Report No: 008573

UPPER MISSISSIPPI RIVER

Project Name: Project No:

Report Date: 12/09/2019

NELAC Certified - IL100308

Analysis: Inorganics

	Run Number	11205054	12055074	12055075	12035070	11265059	12055074	12055078	11205052	12035064	12035065	12095082
WATER NA	Analysis Date	11/20/19	12/03/19	12/03/19	11/22/19	11/19/19	12/03/19	12/04/19	11/19/19	11/25/19	11/25/19	12/04/19
Matrix Moisture	Prep Date	NA	11/19/19	12/02/19	NA	NA	11/19/19	12/02/19	NA	NA	NA	NA
	Analysis Method	350.1	10200H	351.2	GREEN	354.1	10200H	365.2	365.2	160.2	160.4	415.1
L RIVER	Prep Method	NONE	10200H	351.2	NONE	NONE	10200H	365.2	NONE	NONE	NONE	NONE
R MISSISSIPPI 3/2019	Units	MG/L	MG/CU.M.	MG/L	MG/L	MG/L	MG/CU.M.	MG/L	MG/L	MG/L	MG/L	MG/L
'n: UPPE1 te: 11/1 me: 1000	Result	0.0437	6.4	0.816	2.6	ND	1.3	0.191	0.0553	36.0	4.0	5.4
ling Loc pling Da pling Ti	Flag											
Samp Sam Sam	ΓΟΟ	0.0300	1.00	0.200	0.0400	0.0200	1.00	0.0100	0.0100	4.00	4.00	1.00
294 9	LOD	0.0200	1.0	0.190	0.0380	0.0200	1.0	0.00800	0.00800	4.0	4.0	0.500
ARDL No: 008573-08 Field ID: UMR-DP RM Received: 11/18/201	Analyte	Ammonia Nitrogen	Chlorophyll-a, Correcte	Kjeldahl Nitrogen	Nitrate as Nitrogen	Nitrite as Nitrogen	Pheophytin-a	Phosphorus	Phosphorus, -ortho	Solids, Total Suspended	Solids, Volatile Suspen	Total Organic Carbon

(a) DOD and/or NELAC Accredited Analyte.

Sample 008573-08, Inorganic Analyses

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

Lab Report No: 008573

Report Date: 12/09/2019

Project Name: UPPER MISSISSIPPI RIVER

NELAC Certified - IL100308

			Blank		Prep	Analysis	Prep	Analysis		QC Lab
Analyte	LOD	τοΩ	Result	Units	Method	Method	Date	Date Ru	u	Number
Ammonia Nitrogen	0.020	0.030	QN	MG/L	NONE	350.1	NA	11/20/19 1120	05054	008573-01B1
Chlorophyll-a, Corre	1.0	1.0	ND	MG/CU.M.	10200H	10200H	11/19/19	12/03/19 1205	55074	008573-01B1
Kjeldahl Nitrogen	0.19	0.20	ND	MG/L	351.2	351.2	12/02/19	12/04/19 1205	55075	008574-01B1
Kjeldahl Nitrogen	0.19	0.20	QN	MG/L	351.2	351.2	12/03/19	12/04/19 1205	55077	008573-01B1
Nitrate as Nitrogen	0.019	0.020	DN	MG/L	NONE	GREEN	NA	11/22/19 1203	35070	008573-05B1
Nitrite as Nitrogen	0.020	0.020	ND	MG/L	NONE	354.1	NA	11/19/19 1126	55059	008573-01B1
Pheophytin-a	1.0	1.0	DN	MG/CU.M.	10200H	10200H	11/19/19	12/03/19 1205	55074	008573-01B1
Phosphorus	0.008	0.010	ND	MG/L	365.2	365.2	12/02/19	12/04/19 1205	55078	008573-04B1
Phosphorus, -ortho	0.008	0.010	DN	MG/L	NONE	365.2	NA	11/19/19 1120	05052	008573-03B1
Solids, Total Suspen	1.0	1.0	UN	MG/L	NONE	160.2	NA	11/25/19 1203	35064	008573-02B1
Solids, Volatile Sus	1.0	1.0	DN	MG/L	NONE	160.4	NA	11/25/19 1203	35065	008573-02B1
Total Organic Carbon	0.50	1.0	0.66	MG/L	NONE	415.1	NA	12/02/19 1209	95081	008573-01B1
Total Organic Carbon	0.50	1.0	DN	MG/L	NONE	415.1	NA	12/04/19 1209	95082	008574-01B1

(a) DOD and/or NELAC Accredited Analyte Inorganic Method Blanks for 008573

ARD	L, INC.	400 Av	LABORA 'iation	LTORY C I Drive	ONTROL	Box 1	LE REPO)RT Mt.V∈	rrnon, IL	62864
Lab Report No: 006	8573								Report Da	te: 12/09/2019
Project Name:	UPPER MIS	SISSIPP	I RIVER						NELAC Cer	tified - 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
Ammonia Nitrogen	0.93	1.0	93		1		80-120	-	11205054	008573-01C1
Kjeldahl Nitrogen	1.2	1.0	118	-	1		80-120	1	12055075	008574-01C1
Kjeldahl Nitrogen	0.84	1.0	84	ŀ		1	80-120	ł	12055077	008573-01C1
Nitrate as Nitrogen	0.98	1.0	86	ł	ł	l I	80-120	ł	12035070	008573-05C1
Nitrite as Nitrogen	0.99	1.0	66	ł		ł	80-120		11265059	008573-01C1
Phosphorus	0.66	0.67	86	ł	ł		80-120	ł	12055078	008573-04C1
Phosphorus, -ortho	0.10	0.10	103	-		1	80-120	1	11205052	008573-03C1
Total Organic Carbon	18.6	20.0	63	ł	ł	ł	76-120	1	12095081	008573-01C1
Total Organic Carbon	19.0	20.0	95			ł	76-120	!	12095082	008574-01C1
NOTE: Any values ti (a) DOD and/or NELI	abulated above m AC Accredited An	larked with alyte	an asteris	sk are outs	ide of acc	eptable li	mits.			

Inorganic LCS Results for 008573
	6286
	Ц
Ē	Vernon,
REPOR	Mt.
CATE	1566
DUPLI	. Box
IKE	Р.О.
IKE/SP	Drive;
MATRIX SE	Aviation
	400
	INC.
	ARDL,

Lab Report No: 008573

Report Date: 12/09/2019

4

NELAC Certified - IL100308 UPPER MISSISSIPPI RIVER Project Name:

	Sample	Sample	SM	WS	SM	MSD	MSD	MSD	% Rec		RPD		QC Lab
Analyte	Matrix	Result	Result	Level	% Rec	Result	Level	% Rec	Limits	DAR	Limit	Run	Number
Ammonia Nitrogen	WATER	QN	2.0	2.0	102	2.0	2.0	101	75-125		20	11205054	008573-01MS
Kjeldahl Nitrogen	WATER	0.93	2.6	0.80	209 *	1.5	0.80	68 *	75-125	56 *	20	12055077	008573-01MS
Nitrate as Nitrogen	WATER	2.6	3.5	1.0	92	3.5	1.0	92	75-125	0	20	12035070	008573-05MS
Nitrite as Nitrogen	WATER	DN	0.99	1.0	66	0.95	1.0	95	75-125	4	20	11265059	008573-01MS
Phosphorus	WATER	0.20	1.0	0.83	66	1.0	0.83	102	75-125	т	20	12055078	008573-04MS
Phosphorus, -ortho	WATER	0.069	0.17	0.10	106	0.17	0.10	106	75-125	0	20	11205052	008573-03MS
Total Organic Carbon	WATER	6.5	11.5	5.0	100	11.8	5.0	106	76-120	m	20	12095081	008573-01MS

Inorganic Matrix Spikes for 008573

(a) DOD and/or NELAC Accredited Analyte.

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

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

Lab Report No: 008573

Report Date: 12/09/2019

Project Name: UPPER MISSISSIPPI RIVER

NELAC Certified - IL100308

Analyte	Sample Conc'n	First Duplicate	Second Duplicate	Units	Percent Diff	Mean (Smp,D1,D2)	Analytical Run	QC Lab Number	
Chlorophyll-a, Corrected	6.4	5.4	1	MG/CU.M.	17		12055074	008573-01D1	
Pheophytin-a	1.9	3.4		MG/CU.M.	57*	1	12055074	008573-01D1	
Solids, Total Suspended	33.2	33.6	;	MG/L	Ч	!	12035064	008573-02D1	
Solids, Volatile Suspend	4.4	4.4		MG/L	0	ł	12035065	008573-02D1	

Page 1 of 1 See Case Narrative for exceptions. * indicates that agreement between duplicates is greater than 20%.(a) DOD and/or NELAC Accredited AnalyteSample Duplicates for 008573

Sample Receipt Information

Including as appropriate:

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

ARDL Data Package 8573 - Inorganic

Authorized By: DSD-QAO

RECORD	RESERVATION	SPECIFY CHEMICALS ADDED AND FINAL PH IF KNOWN																		
CHAIN OF CUSTODY F	ď	ICED	REMARKS OR SAMPLE LOCATION	X	X	X	X	X	X	X	X	X	X	X	X					
						·												CIAL INSTRUCTIONS:	H2SO4	
smon, IL 62864 4-1149 Fax		2 PO 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	10000000000000000000000000000000000000	XXX	X X X	- X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X			· REMARKS/SPE	*Preserved with	
Aviation Drive, Mt. Ve 35 Phone (618) 24	SXEI	CONTAIN	DIALE NO. OF	X X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X X	X X X	X X X	X X *		/	offined by Asignature	ceived by: (Signature)	upping Ticket No.
.O. Box 1566, 400 (618) 244-32		20100	COMP C	X		X	3/15 yb	7 1430	8 1215	5 1340	5 1317	21151	8 1100	5 1000	χ			17 Time Re	19 19 45	Time Sh
۲. ۲.	ver		DATE	X	\times	\times	51-11	5)-11	1-11	11-18	1-18	01-11	1-11	11-5	X			Date 11/18/	Date 11/19/	1/19/
ARDL, In	PROJECT Upper Mississippi Ri	SAMPLERS: (Signature)	SAMPLE NUMBER	UMR-1 Chain of Rocks Cana	UMR-2 Confluence	UMR-3 Mile 200	/ UMR-5 Mile 212.5	Z UMR-6 Mile 231	3 UMR-15	↓ UMR-7 Mile 241	5 UMR-LM RM 251	UMR-9 Mile 273	7 UMR- LA RM 283	7 UMR- DP RM 294	SLH-3	×49-19	RĐI	Relinquished by: (Signature)	Relinquished by: Signature)	Streeceived for Party by: (Signatory)

9573

LPURCHASE ORDER NO:

COOLER RECEIPT REPORT ARDL, INC.

ARI	DL#:	Coo Num	ler # <u>/ af Z</u> nber of Coolers in Shipr	_ ment:		- -
Pro	ject: Upper Missessigupi Raiev	Date	Received: <u>11-18</u>	-19		
A.	PRELIMINARY EXAMINATION PHASE: Date cooler was opened: 11-18	-19	_(Signature)	chrur	n	
1.	Did cooler come with a shipping slip (airbill, etc.)?			YES (NO)
	If YES, enter carrier name and airbill number here:		Ca	urier		
2.	Were custody seals on outside of cooler?			YES	NO	N/A
	How many and where?,Seal Date:,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	-19-19
6.	Were custody papers filled out properly (ink, signed, etc.)?	uli	mat included Ida	tid ges	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 this form	YES	NO	N/A
9.	Was a separate container provided for measuring temperature? YES	_NO	✓ Observed Cooler Tem	p. 0.3	2	0
В.	LOG-IN PHASE: Date samples were logged-in: //- /9 -/9	Signati	ure) Dlackie	im		C
10.	Describe type of packing in cooler:					
11.	Were all samples sealed in separate plastic bags?			YES	NO	Ž N/A
12.	Did all containers arrive unbroken and were labels in good condition?		·····	YES	NO	
13.	Were sample labels complete?			VES	NO	
14.	Did all sample labels agree with custody papers?			VES	NO	
15.	Were correct containers used for the tests indicated?			KES	NO	
16.	Was pH correct on preserved water samples?	•••••			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:		Sample	Transfer		
No	oTe; SAMPle UMR-DP RM294 Shows		Fraction	Fraction		
A	ample date as 11-8 on Caf C.		Area #	Area #		
	ogger wetter		Walkin			
			By	Ву		
-			On	On		
			11-19-19			
			Chain-of-Custodv #	N/A	á	
(E	By: Signature) dlc, Date: 11-19-19		· · · · · · · · · · · · · · · · · · ·	16		

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

COOLER RECEIPT REPORT ARDL, INC.

ARI	DL#: 8573	Cooler # 2 af 2
		Number of Coolers in Shipment:
Pro	ject: <u>Upper Misses</u> syrpi keines	Date Received:8-19
Α.	PRELIMINARY EXAMINATION PHASE: Date cooler was opened: 11-18	-19 (Signature) Alachrum
1.	Did cooler come with a shipping slip (airbill, etc.)?	
	If YES, enter carrier name and airbill number here:	Caurier
2.	Were custody seals on outside of cooler?	YES (NO) N/A
	How many and where?,Seal Date:,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?	
6.	Were custody papers filled out properly (ink, signed, etc.)?	Mot initialed / dated yes (NO N/A
7.	Were custody papers signed in appropriate place by ARDL personnel?	
8.	Was project identifiable from custody papers? If YES, enter project name at	the top of this form
9.	Was a separate container provided for measuring temperature? YES	NO_ \sim Observed Cooler Temp. $O, /$ C
В.	LOG-IN PHASE: Date samples were logged-in: 11-19-19 (Signature)
10.	Describe type of packing in cooler: <u>lease</u> ice	
11.	Were all samples sealed in separate plastic bags?	
12.	Did all containers arrive unbroken and were labels in good condition?	YES NO
13.	Were sample labels complete?	
14.	Did all sample labels agree with custody papers?	
15.	Were correct containers used for the tests indicated?	
16.	Was pH correct on preserved water samples?	
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 NA
19.	Was the ARDL project coordinator notified of any deficiencies?	YES N/A
	Comments and/or Corrective Action:	Sample Transfer
		Fraction Fraction
		Area # Area #
		Walkin
		Ву Ву
		alle.
		11-19-19

Chain-of-Custody # ___//A

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

Date:

(By: Signature)



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

www.ardlinc.com

Environmental | Analytical | Management | Safety

Customer Name: SLCOE

Project Name: Illinois River

Samples Received at ARDL: 11/19/19

Date: 12/12/19

Lab Name: ARDL, Inc.

ARDL Report No.: 8574

CASE NARRATIVE

Customer	Date	Lab ID	
Sample No.	Collected	<u>Number</u>	Analyses Requested
IL-2	11/19/19	8574-01	Inorganics(1)
IL-6	11/19/19	8574-02	Inorganics(1)
IL-7	11/19/19	8574-03	Inorganics(1)
IL-8	11/19/19	8574-04	Inorganics(1)
IL-9	11/19/19	8574-05	Inorganics(1)
UMR-1	11/19/19	8574-06	Inorganics(1)
UMR-3	11/19/19	8574-07	Inorganics(1)
UMR-2	11/19/19	8574-08	Inorganics(1)
SLH-3	11/19/19	8574-09	Inorganics(1)

(1) Including ammonia, chlorophyll/pheophytin, nitrite, nitrate, TKN, TOC, orthophosphate, total phosphorus, TSS, and TVSS.

The quality control data are summarized as follows:

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 TKN. The parent sample has been flagged appropriately with a 'J' qualifier.

DUPLICATE

Duplicate analyses are reported as MS/MSD, except chlorophyll/pheophytin, TSS, and TVSS. RPD of the duplicate analyses met criteria, except for TKN. The parent sample has been flagged appropriately with a 'J' qualifier.

Project Name: Illinois River

ARDL Report No.: 8574

CASE NARRATIVE (Continued)

DATA REPORTING QUALIFIERS

The following data reporting qualifiers are used as required:

- ND Indicates parameter was analyzed for but not detected. The sample quantitation limit has been corrected for weight, dilution and/or percent moisture.
- 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.

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

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 8574 - Inorganic

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

Authorized By: DSD-QAO

ARDL Report 8574 - Page 3 of 21

Lab Report No: 0085	574						ц	keport Date	: 12/12/2	019
)ject Name: ILLINOIS Project No:	RIVER						Z	Analysis IELAC Certi	fied - IL1	ics 00308
ARDL No: 008574-01 Field ID: IL-2 Received: 11/19/201	6	Samp] Samp Samp	ing Loc Ling Da Ling Ta	:'n: ILLIN ate: 11/19 ime: 1415	VOIS RIVER 9/2019			Matrix Moisture	: WATER : NA	
Analyte	ГОД	ΓΟÕ	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
monia Nitrogen	0.0200	0.0300		QN	MG/L	NONE	350.1	NA	11/20/19	11205053
lorophyll-a, Correcte	1.0	1.00		13.6	MG/CU.M.	10200H	10200H	11/20/19	12/06/19	12065079
eldahl Nitrogen	0.190	0.200	Ь	1.1	MG/L	351.2	351.2	12/02/19	12/04/19	12055075
trate as Nitrogen	0.0380	0.0400		2.94	MG/L	NONE	GREEN	NA	11/25/19	12035071
trite as Nitrogen	0.0200	0.0200		ДN	MG/L	NONE	354.1	NA	11/20/19	11265060
eophytin-a	1.0	1.00		1.6	MG/CU.M.	10200H	10200H	11/20/19	12/06/19	12065079
osphorus	0.00800	0.0100		0.346	MG/L	365.2	365.2	12/09/19	12/09/19	12105083
osphorus, -ortho	0.00800	0.0100		0.151	MG/L	NONE	365.2	NA	11/20/19	11215055
lids, Total Suspended	4.0	4.00		54.4	MG/L	NONE	160.2	NA	11/26/19	12035066
lids, Volatile Suspen	4.0	4.00		4.4	MG/L	NONE	160.4	NA	11/26/19	12035067
cal Organic Carbon	0.500	1.00		4.7	MG/L	NONE	415.1	NA	12/04/19	12095082

Box 1566 62864

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

(a) DOD and/or NELAC Accredited Analyte.

Sample 008574-01, Inorganic Analyses

Lab Report No: 008	3574						ц	eport Date	: 12/12/20	19
Project Name: ILLINOIS Project No:	S RIVER						Z	Analysis ELAC Certi	: Inorgani fied - IL10	cs 0308
ARDL No: 008574-0 Field ID: IL-6 Received: 11/19/20)2)19	Sampl Samp Samp	ing Loc' ling Date ling Time	n: ILLIN e: 11/19, e: 1215	DIS RIVER /2019			Matrix Moisture	: WATER : NA	
Analyte	LOD	LOQ	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Ammonia Nitrogen Chlorophyll-a, Correcte Kjeldahl Nitrogen Nitrate as Nitrogen Nitrite as Nitrogen Pheophytin-a Phosphorus Phosphorus, -ortho Solids, Total Suspended Solids, Volatile Suspen	0.0200 1.0 0.190 0.0380 0.0380 0.0380 0.0380 0.0380 0.00800 0.00800 0.00800	0.0300 1.00 0.200 0.0400 0.0200 1.00 1.00 4.00 4.00		0.0322 13.6 1.13 2.57 ND 2.9 0.372 0.166 71.6	MG/L MG/CU.M. MG/L MG/L MG/L MG/L MG/L MG/L	NONE 10200H 351.2 NONE NONE 10200H 365.2 NONE NONE NONE	350.1 10200H 351.2 GREEN 354.1 10200H 365.2 365.2 160.2 160.2	NA 11/20/19 NA NA NA 11/20/19 11/20/19 12/09/19 NA NA	11/20/19 12/06/19 12/06/19 11/25/19 11/20/19 12/06/19 12/00/19 11/20/19 11/26/19 11/26/19 11/26/19	1205053 2065079 2055075 2055071 1265060 2065079 2105083 1215055 2035066 2035066

(a) DOD and/or NELAC Accredited Analyte.

Sample 008574-02, Inorganic Analyses

Lab Report No: 008	574						μ,	keport Date	: 12/12/2019	
Project Name: ILLINOIS Project No:	RIVER						4	Analysis ELAC Certi	: Inorganics fied - IL100300	8
ARDL No: 008574-0. Field ID: IL-7 Received: 11/19/20.	3 19	Sampl Samp Samp	ing Loc ling Da ling Ti	'n: ILLIN te: 11/19 me: 1222	OIS RIVER //2019			Matrix Moisture	: WATER : NA	
Analyte	TOD	год	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Ru Date Numb	un ber
Ammonia Nitrogen Chlorophyll-a, Correcte Kjeldahl Nitrogen Nitrate as Nitrogen Nitrite as Nitrogen Pheophytin-a Phosphorus	0.0200 1.0 0.190 0.0380 0.0380 0.0380 0.0380 0.00800	0.0300 1.00 0.200 0.0400 1.00 1.00	ل	0.0274 14.5 0.967 2.57 ND 2.0 0.316	MG/CU.M. MG/CU.M. MG/L MG/L MG/CU.M. MG/L	NONE 10200H 351.2 NONE NONE 10200H 365.2	350.1 10200H 351.2 GREEN 354.1 10200H 365.2	NA 11/20/19 12/02/19 NA NA 11/20/19 12/09/19	11/20/19 11206 12/06/19 12069 12/04/19 12069 11/25/19 12059 11/20/19 11269 12/06/19 12069 12/09/19 12069	5053 5079 5075 5071 5060 5079 5083
Phosphorus, -ortho Solids, Total Suspended Solids, Volatile Suspen Total Organic Carbon	0.00800 4.0 0.500	0.0100 4.00 1.00		0.18 41.6 4.4 4.8	T/SM MG/L MG/L	NONE NONE NONE	365.2 160.2 160.4 415.1	NA NA NA NA	11/20/19 11219 11/26/19 12039 11/26/19 12039 12/04/19 12039	5055 5066 5067 5082

ARDL, INC. 400 Aviation Drive; P.O. Box 1566

(a) DOD and/or NELAC Accredited Analyte.

Sample 008574-03, Inorganic Analyses

		Ŧ	00 Avi Mt.	ation Dr: Vernon,	ive; P.O. Illinois	Box 156 62864	G			
Lab Report No: 0085	574						Ж	eport Date	: 12/12/20	019
Project Name: ILLINOIS Project No:	RIVER						N	Analysis ELAC Certi	: Inorgan fied - IL1	Lcs 00308
ARDL No: 008574-04 Field ID: IL-8 Received: 11/19/201	4 19	Sampl Samp Samp	ing Loc ling Da ling Ti	"n: ILLIN tte: 11/19 me: 1100	OIS RIVER /2019			Matrix Moisture	: WATER : NA	
						Prep	Analysis	Prep	Analysis	Run
Analyte	LOD	LOQ	Flag	Result	Units	Method	Method	Date	Date	Number
Ammonia Nitrogen	0.0200	0.0300		0.0365	MG/L	NONE	350.1	NA	11/20/19	1205053
Chlorophyll-a, Correcte	1.0	1.00		14.5	MG/CU.M.	10200H	10200H	11/20/19	12/06/19	2065079
Kjeldahl Nitrogen	0.190	0.200		0.784	MG/L	351.2	351.2	12/02/19	12/04/19	2055075
Nitrate as Nitrogen	0.0380	0.0400		2.6	MG/L	NONE	GREEN	NA	11/25/19	2035071
Nitrite as Nitrogen	0.0200	0.0200		DN	MG/L	NONE	354.1	NA	11/20/19	1265060
Pheophytin-a	1.0	1.00		ND	MG/CU.M.	10200H	10200H	11/20/19	12/06/19	2065079
Phosphorus	0.00800	0.0100		0.265	MG/L	365.2	365.2	12/09/19	12/09/19	2105083
Phosphorus, -ortho	0.00800	0.0100		0.148	MG/L	NONE	365.2	NA	11/20/19	1215055
Solids, Total Suspended	4.0	4.00		28.0	MG/L	NONE	160.2	NA	11/26/19	2035066
Solids, Volatile Suspen	4.0	4.00		DN	MG/L	NONE	160.4	NA	11/26/19 :	2035067
Total Organic Carbon	0.500	1.00		4.5	MG/L	NONE	415.1	NA	12/04/19	2095082

ARDL, INC.

(a) DOD and/or NELAC Accredited Analyte.

Sample 008574-04, Inorganic Analyses

Lab Report No: 0085	574						Ц	eport Date	: 12/12/20	119
Project Name: ILLINOIS Project No:	RIVER						N	Analysis ELAC Certi	: Inorgan fied - IL1	Lcs 00308
ARDL No: 008574-05 Field ID: IL-9 Received: 11/19/201	19	Samp1 Samp Samp	ing Loc ling Da ling Ti	'n: ILLIN te: 11/19 me: 0730	OIS RIVER /2019			Matrix Moisture	: WATER : NA	
Analyte	ГОД	год	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Ammonia Nitrogen Chlorophyll-a, Correcte Kjeldahl Nitrogen Nitrate as Nitrogen Nitrite as Nitrogen Pheophytin-a Phosphorus Phosphorus, -ortho Solids, Total Suspended Solids, Volatile Suspen Total Organic Carbon	0.0200 1.0 0.190 0.0380 0.0380 0.0380 0.0380 0.0380 0.0200 0.00800 0.00800 0.00800 0.00800	0.0300 1.00 0.200 0.0400 0.0200 1.00 0.0100 4.00 4.00 1.00	Ъ	0.0235 14.5 14.5 0.721 2.66 ND 2.6 0.256 0.219 0.219 26.4 ND	MG/L MG/CU.M. MG/L MG/L MG/L MG/L MG/L MG/L MG/L MG/L	NONE 10200H 351.2 NONE NONE 10200H 365.2 NONE NONE NONE NONE	350.1 10200H 351.2 GREEN 354.1 10200H 365.2 365.2 365.2 365.2 160.4 150.4	NA 11/20/19 12/02/19 NA NA 11/20/19 12/09/19 NA NA NA NA	$\begin{array}{c} 11/20/19\\ 12/06/19\\ 12/04/19\\ 11/25/19\\ 11/20/19\\ 12/06/19\\ 12/09/19\\ 11/20/19\\ 11/26/19\\ 11/26/19\\ 11/26/19\\ 11/26/19\\ 11/26/19\\ 12/04/19\end{array}$	<pre>[1205053 [2055079 [2055075 [2055079 [2065079 [2065079 [205083 [1215055 [2035066 [2035066 [2035067</pre>

(a) DOD and/or NELAC Accredited Analyte.

Sample 008574-05, Inorganic Analyses

Lab Report No: 008	574						μ,	teport Date	: 12/12/201	თ
Project Name: ILLINOIS Project No:	RIVER					2	2	Analysis ELAC Certi	: Inorganic fied - IL100	s 308
ARDL No: 008574-0(Field ID: UMR-1 Received: 11/19/201	6 19	Sampl Samp Samp	ing Loc ling Da ling Ti	'n: ILLIN te: 11/19 me: 1620	IOIS RIVER 1/2019			Matrix Moisture	: WATER : NA	
Analyte	LOD	год	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date N	Run umber
Ammonia Nitrogen Chlorophyll-a, Correcte Kjeldahl Nitrogen Nitrate as Nitrogen Nitrite as Nitrogen Pheophytin-a Phosphorus Phosphorus, -ortho Solids, Total Suspended Solids, Volatile Suspen Total Organic Carbon	0.0200 1.0 0.190 0.0380 0.0380 0.0380 0.0380 0.0380 0.0200 0.00800 0.00800 0.00800 0.500	0.0300 1.00 0.200 0.0400 0.0200 1.00 0.0100 4.00 4.00 1.00		0.0307 2.7 2.758 2.35 ND 2.4 0.239 0.116 0.116 25.2 ND 5.3	MG/L MG/CU.M. MG/CU.M. MG/L MG/L MG/L MG/L MG/L MG/L MG/L	NONE 10200H 351.2 NONE NONE 10200H 365.2 NONE NONE NONE NONE	350.1 350.1 10200H 351.2 GREEN 354.1 10200H 365.2 365.2 365.2 365.2 160.4 415.1	NA 11/20/19 12/02/19 NA NA 11/20/19 12/09/19 NA NA NA	11/20/19 11 12/06/19 12 12/04/19 12 11/25/19 12 11/20/19 11 12/06/19 12 12/09/19 12 11/20/19 11 11/26/19 12 11/26/19 12 11/26/19 12	205053 065079 055075 035071 265060 065079 105083 215083 215055 035066 035067 035067

(a) DOD and/or NELAC Accredited Analyte.

Sample 008574-06, Inorganic Analyses

Lab Report No: 0085	574						Ц	eport Date	: 12/12/20	19
Project Name: ILLINOIS Project No:	RIVER		2				Z	Analysis ELAC Certi	: Inorgani fied - IL10	cs 0308
ARDL No: 008574-0 Field ID: UMR-3 Received: 11/19/201	19	Sampl Samp Samp	ing Loc ling Da	'n: ILLIN te: 11/19 me: 1600	OIS RIVER 1/2019			Matrix Moisture	: WATER : NA	
Analyte	LOD	LOQ	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Ammonia Nitrogen Chlorophyll-a, Correcte Kjeldahl Nitrogen Nitrate as Nitrogen Nitrite as Nitrogen Pheophytin-a Phosphorus, -ortho Solids, Total Suspended Solids, Volatile Suspended	0.0200 1.0 0.190 0.0380 0.0380 0.0380 0.0380 0.0200 0.0200 0.0200 0.00800 0.00800 0.00800	0.0300 1.00 0.200 0.0400 0.0200 1.00 0.0100 14.3 14.3		0.14 15.9 1.88 2.47 ND 9.5 0.919 0.106 28.6 28.6	MG/L MG/CU.M. MG/CU.M. MG/L MG/L MG/L MG/L MG/L MG/L	NONE 10200H 351.2 NONE NONE 10200H 365.2 NONE NONE	350.1 10200H 351.2 GREEN 354.1 10200H 365.2 365.2 365.2 160.4 160.4	NA 11/20/19 12/02/19 NA 11/20/19 12/09/19 NA NA	11/20/19 12/06/19 12/06/19 11/25/19 11/20/19 12/06/19 12/09/19 11/20/19 11/20/19 11/26/19	1205053 2065079 2055079 2035071 1265060 2065079 2105083 1215055 2035066 2035067 203507 203507 203507 203507 203507 203507 203507 203507 203507 203507 203507 203507 203507 203507 203507 205507 205507 203507 203507 203507 203507 203507 205505 205505 205507 205507 205507 205507 205507 20550505 20550505 205505 20550505 205505 205505
Total Organic Carbon	0.500	1.00		5.6	MG/L	NONE	415.1	NA	12/04/19 1	2095082

(a) DOD and/or NELAC Accredited Analyte.

Sample 008574-07, Inorganic Analyses

2019	nics 100308		Run Number	11205053 12065079 12055075 12035071 12065079 12065079 12065079 12105083 1215055 12035066 12035066 12035066
: 12/12/:	: Inorga fied - IL	: WATER : NA	Analysis Date	11/20/19 12/06/19 12/04/19 11/22/19 11/20/19 12/06/19 12/09/19 11/20/19 11/26/19 11/26/19 11/26/19
eport Date	Analysis ELAC Certi	Matrix Moisture	Prep Date	NA 11/20/19 12/02/19 NA NA 11/20/19 12/09/19 NA NA NA NA
Щ	Z		Analysis Method	350.1 10200H 351.2 GREEN 354.1 10200H 365.2 365.2 365.2 160.2 160.4 415.1
			Prep Method	NONE 10200H 351.2 NONE NONE 10200H 365.2 NONE NONE NONE NONE
		NOIS RIVER 9/2019	Units	MG/L MG/CU.M. MG/CU.M. MG/L MG/L MG/L MG/L MG/L MG/L MG/L
		c'n: ILLI ate: 11/1 ime: 1700	Result	ND 2.7 0.971 0.972 ND ND 0.354 0.354 0.3111 102 6.0 4.3
		ling Loc Ipling Da Ting Ta	ъдад	
		Samp Sam Sam	ΓΟŎ	0.0300 1.00 0.200 0.0200 0.0200 1.00 4.00 4.00 1.00
574	RIVER	6	LOD	0.0200 1.0 0.190 0.0190 0.0200 0.0200 0.00800 0.00800 0.00800 0.00800 0.00800 0.00800
Lab Report No: 0085	Project Name: ILLINOIS Project No:	ARDL No: 008574-08 Field ID: UMR-2 Received: 11/19/201	Analyte	Ammonia Nitrogen Chlorophyll-a, Correcte Kjeldahl Nitrogen Nitrate as Nitrogen Nitrite as Nitrogen Pheophytin-a Phosphorus Phosphorus, -ortho Solids, Total Suspended Solids, Volatile Suspen Total Organic Carbon

ARDL, INC. 400 Aviation Drive; P.O. Box 1566

(a) DOD and/or NELAC Accredited Analyte.

Sample 008574-08, Inorganic Analyses

Page 1 of 1

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Lab Report No: 0085	574						ц	eport Date	: 12/12/20	119
Project Name: ILLINOIS Project No:	RIVER							Analysis ELAC Certi	: Inorgani fied - IL1(.cs 00308
ARDL No: 008574-09 Field ID: SLH-3 Received: 11/19/201	6 6	Sampl Samp Samp	ing Loc ling Da ling Ti	:'n: ILLIN ite: 11/19 me: 1635	IOIS RIVER 9/2019			Matrix Moisture	:: WATER :: NA	
Analyte	ГОД	LOQ	ъlag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Ammonia Nitrogen	0.0200	0.0300	ŗ	0.024	MG/L	NONE	350.1	NA	11/20/19	1205053
Chlorophyll-a, Correcte Kieldahl Nitrogen	1.0 0.190	1.00 0.200		9.1 0.89	MG/CU.M. MG/L	10200Н 351.2	10200Н 351.2	11/20/19 12/02/19	12/06/19 1 12/03/19 1	.2065079 .2055075
Nitrate as Nitrogen	0.0380	0.0400		2.51	MG/L	NONE	GREEN	NA	11/25/19]	2035071
Nitrite as Nitrogen	0.0200	0.0200		DN	MG/L	NONE	354.1	NA	11/20/19	.1265060
Pheophytin-a	1.0	1.00		2.4	MG/CU.M.	10200H	10200H	11/20/19	12/06/19 1	.2065079
Phosphorus	0.00800	0.0100		0.299	MG/L	365.2	365.2	12/09/19	12/09/19	2105083
Phosphorus, -ortho	0.00800	0.0100		0.10	MG/L	NONE	365.2	NA	11/20/19 1	.1215055
Solids, Total Suspended	4.0	4.00		66.4	MG/L	NONE	160.2	NA	11/26/19 1	.2035066
Solids, Volatile Suspen	4.0	4.00		5.2	MG/L	NONE	160.4	NA	11/26/19]	.2035067
Total Organic Carbon	0.500	1.00		5.0	MG/L	NONE	415.1	NA	12/04/19 1	2095082

(a) DOD and/or NELAC Accredited Analyte.

Sample 008574-09, Inorganic Analyses

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

Lab Report No: 008574

Report Date: 12/12/2019

62864

Project Name: ILLINOIS RIVER

NELAC Certified - IL100308

											1
			Blank		Prep	Analysis	Prep	Analysis		QC Lab	
Analyte	TOD	ГОQ	Result	Units	Method	Method	Date	Date	Run	Number	
Ammonia Nitrogen	0.020	0.030	DN	MG/L	NONE	350.1	NA	11/20/19	11205053	008574-01B1	1
Chlorophyll-a, Corre	1.0	1.0	QN	MG/CU.M.	10200H	10200H	11/20/19	12/06/19	12065079	008574-02B1	
Kjeldahl Nitrogen	0.19	0.20	QN	MG/L	351.2	351.2	12/02/19	12/04/19	12055075	008574-01B1	
Nitrate as Nitrogen	0.019	0.020	QN	MG/L	NONE	GREEN	NA	11/25/19	12035071	008574-04B1	
Nitrite as Nitrogen	0.020	0.020	QN	MG/L	NONE	354.1	NA	11/20/19	11265060	008574-02B1	
Pheophytin-a	1.0	1.0	QN	MG/CU.M.	10200Н	10200H	11/20/19	12/06/19	12065079	008574-02B1	
Phosphorus	0.008	0.010	ΠN	MG/L	365.2	365.2	12/09/19	12/09/19	12105083	008574-06B1	
Phosphorus, -ortho	0.008	0.010	QN	MG/L	NONE	365.2	NA	11/20/19	11215055	008574-03B1	
Solids, Total Suspen	1.0	1.0	QN	MG/L	NONE	160.2	NA	11/26/19	12035066	008574-01B1	
Solids, Volatile Sus	1.0	1.0	DN	MG/L	NONE	160.4	NA	11/26/19	12035067	008574-01B1	
Total Organic Carbon	0.50	1.0	QN	MG/L	NONE	415.1	NA	12/04/19	12095082	008574-01B1	

(a) DOD and/or NELAC Accredited Analyte Inorganic Method Blanks for 008574

ARD	L, INC.	400 A	LABOR? viatior	ATORY C 1 Drive	CONTROL	Box 1	LE REPC 1566)RT Mt.V∈	srnon, IL	62864
Lab Report No: 006	3574								Report Da	ite: 12/12/2019
Project Name:	ILLINOIS	RIVER							NELAC Cer	tified - 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
Ammonia Nitrogen	0.96	1.0	96	1	1		80-120		11205053	008574-01C1
Kjeldahl Nitrogen	1.2	1.0	118	ł	1	ł	80-120	ł	12055075	008574-01C1
Nitrate as Nitrogen	1.1	1.0	105	ł	ł	ł	80-120		12035071	008574-04C1
Nitrite as Nitrogen	0.93	1.0	63	ł	1	ł	80-120	1	11265060	008574-02C1
Phosphorus	0.64	0.67	95	-	1	!	80-120	}	12105083	008574-06C1
Phosphorus, -ortho	0.095	0.10	95	1	1	!	80-120	!	11215055	008574-03C1
Total Organic Carbon	19.0	20.0	95	*	ł	I I	76-120	1	12095082	008574-01C1
NOTE: Any values t. (a) DOD and/or NELL	abulated above 1 AC Accredited Ar	narked with nalyte	an asteri	sk are out:	side of acc	eptable 1:	imits.			
- - -	000 x y v + [.	N L J V								Page 1 of 1

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	Vernon,
REPORT	Mt.
CATE 1	1566
UPLI	BOX
IKE D	Р.О.
PIKE/SP	Drive;
MATRIX SI	Aviation
	400
	INC.
	ARDL,

Lab Report No: 008574

Report Date: 12/12/2019

ILLINOIS RIVER Project Name:

NELAC Certified - IL100308

	Sample	Sample	MS	WS	MS	MSD	MSD	MSD	% Rec		RPD		QC Lab
Analyte	Matrix	Result	Result	Level	% Rec	Result	Level	% Rec	Limits	RPD	Limit	Run	Number
Ammonia Nitrogen	WATER	QN	1.9	2.0	76	1.9	2.0	96	75-125	н	20	11205053	008574-01MS
Kjeldahl Nitrogen	WATER	1.1	2.0	0.80	116	1.4	0.80	41 *	75-125	35 *	20	12055075	008574-01MS
Nitrate as Nitrogen	WATER	2.6	3.5	1.0	95	3.5	1.0	06	75-125	1	20	12035071	008574-04MS
Nitrite as Nitrogen	WATER	QN	1.0	1.0	103	1.0	1.0	104	75-125	Ч	20	11265060	008574-02MS
Phosphorus	WATER	0.24	1.1	0.83	66	1.1	0.83	100	75-125	щ	20	12105083	008574-06MS
Phosphorus, -ortho	WATER	0.18	0.27	0.10	87	0.26	0.10	82	75-125	2	20	11215055	008574-03MS
Total Organic Carbon	WATER	4.7	9.3	5.0	92	9.4	5.0	94	76-120	н	20	12095082	008574-01MS
Total Organic Carbon	WATER	4.7	9.7	5.0	100	9.6	5.0	97	76-120	7	20	12095082	008574-02MS

Inorganic Matrix Spikes for 008574

(a) DOD and/or NELAC Accredited Analyte.

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

Page 1 of 1

ARDL Report 8574 - Page 15 of 21

	019	00308	ab er	-02D1 -02D1 -01D1 -01D1
864	12/12/2	ied - IL1	QC L Numb	008574 008574 008574 008574
10N, IL 62	Report Date:	NELAC Certif	Analytical Run	12065079 12065079 12035066 12035067
Mt. Vern			Mean (Smp,D1,D2)	
E REPORI Box 156(Percent Diff	0 0 0 F
DUPLICAT ve; P.O.			Units	MG/CU.M. MG/L MG/L MG/L
SAMPLE ation Dri			Second Duplicate	
400 Avi		ж.	First Duplicate	13.6 58.8 5.2 2.3 2.8
INC.	4	OIS RIVE.	Sample Conc'n	13.6 5.9.6 4.4 .4
ARDL,	Lab Report No: 00857	Project Name: ILLIN	Analyte	chlorophyll-a, Corrected Pheophytin-a Solids, Total Suspended Solids, Volatile Suspend

(a) DOD and/or NELAC Accredited Analyte Sample Duplicates for 008574

Sample Receipt Information

Including as appropriate:

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

ARDL Data Package 8574 - Inorganic

Authorized By: DSD-QAO

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 (618) 244-3235 Phone

CHAIN OF CUSTODY RECORD

8574

PROJECT Illinois River			542	CM		1														G	RESERV	ATION	
SAMPLERS: (Signature)				INIAINOO	23	FON	-d-1	bo bo	N-EHN IN					\sim	\sim					ICED	S E E F M	PECIFY EMICALS DED AND MAL PH IF CNOWN	
SAMPLE NUMBER	DATE	TIME	GBAB COMP	10.0N	11 55	11 .	500	SON .	NSN	dalouis							St	REM ² OI	RKS CATION	L			
/ IL-2	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1415	X	×	X	X	X	XX	X											X			
2 IL-6	11	1315	X	X	X	X	X	X	X											X			
3 IL-7	11	1222	X	×	X	X	X	X	X											X			
4 IL-8	11	lion	X	X	X	X	X	X	X											X			_
5 IL-9	11	730	X	X	X	X	X	X	X											X			
IL-15	11	1015	X	X	X	X	X	X	X						V	P:A	NOT	Rec	eve	X			_
								-	_														
Um2-1	11	1620																					
TUMR-3	11	1600					-																
2-UWN &	11	0021																		_	_		
9564-3	11	1635																			-		
			_					-	_											-	+		
C				-	(-	_	_						-					_	_		- ,
DRelinguished by: (Signature)	11/19	1717	Received	A by: (Signat	(III)	V	REM	ARKS/	SPEC	IAL II	NSTRI	JCTIO	SNG:									
Refinguished Dy: (Signature)	Date 11/19/19	Fime 1910	Received	d by: (Signet	arre)		*Prese	rved v	vith H	2504												
Received for Laboratory by:	Date /1/	Time	Shipping	g Ticke	st No.																		
por activity	120/19	0525					_																_

Purchase order No: Page 18 of 21

COOLER RECEIPT REPORT ARDL, INC.

ardl #: \$ 5.74	Cooler # af 3				
	Number of Coolers in Shipment:				
Project: <u>Illiniois River</u>	Date Received: <u>//-26-/9</u>				
A. PRELIMINARY EXAMINATION PHASE: Date cooler was opened: <u>11- 20</u>	6-19 (Signature) Jackscern				
1. Did cooler come with a shipping slip (airbill, etc.)?	YES NO				
If YES, enter carrier name and airbill number here:	Caurier				
2. Were custody seals on outside of cooler?					
How many and where?,Seal Date:,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?	VES NO				
5. Were custody papers sealed in a plastic bag?					
6. Were custody papers filled out properly (ink, signed, etc.)?	YES N/A				
7. Were custody papers signed in appropriate place by ARDL personnel?					
8. Was project identifiable from custody papers? If YES, enter project name at	the top of this form				
9. Was a separate container provided for measuring temperature? YES	NO \mathcal{V} Observed Cooler Temp. \mathcal{O} , \mathcal{U} C				
B. LOG-IN PHASE: Date samples were logged-in: 11-30-19	(Signature)				
10. Describe type of packing in cooler:					
11. Were all samples sealed in separate plastic bags?					
12. Did all containers arrive unbroken and were labels in good condition?					
13. Were sample labels complete?					
14. Did all sample labels agree with custody papers?					
15. Were correct containers used for the tests indicated?					
16. Was pH correct on preserved water samples?					
17. Was a sufficient amount of sample sent for tests indicated?	VES 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?	NO N/A				
Comments and/or Corrective Action:	Sample Transfer				
GNO ANALYS'S INdiCATEd FOR LAST 4	Fraction Fraction				
SAMPles. CONTAINERS INCIPATE THE	Area # Area #				
ON C of C. Will use these ANAlysis.	Walkin				
D All 10-19	By By				
HD. d NOT Recierce ANY SAMPLES FOR	On On				
IL-15,	11-20-19				
,	Chain-of-Custody # $\mathcal{N} \mathcal{A}$				
(By: Signature) \mathcal{A} Date: $1/-2/1-19$,,,,,				

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

COOLER RECEIPT REPORT ARDL, INC.

ARDL #: 8574	Cooler # 2 ad 2	
	Number of Coolers in Shipment:	-
Project: <u>Illinois River</u>	Date Received: <u>// - / 9 - / 9</u>	
A. PRELIMINARY EXAMINATION PHASE: Date cooler was opened: 11-19	2-19 (Signature) Dlacheum	
1. 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? 		N/A
How many and where?	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?	VES NO	
5 Were custody namers sealed in a plastic hard?	YES NO2	
Were custody papers scaled in a plastic bag Were custody papers filled out property (ink. signed, etc.)?	VES (NO)	Ν/Δ
 Were custody papers lined out property (link, signed, etc.): Were custody papers signed in appropriate place by APDL personnol2 	VES NO	
Were custody papers signed in appropriate place by ANDE personner Were custody papers signed in appropriate place by ANDE personner	the ten of this form	N/A
Was project identifiable from custody papers? If TES, enter project name at		11/74
9. Was a separate container provided for measuring temperature?	Correction factor 0.0	_c
B. LOG-IN PHASE: Date samples were logged-in: 11-20-19	(Signature) Adlachteen	
10. Describe type of packing in cooler: <u>lease</u> . iee		
11. Were all samples sealed in separate plastic bags?		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?		
15. Were correct containers used for the tests indicated?		
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?		N/A
Comments and/or Corrective Action:	Sample Transfer]
6 see Coales receipt 1 of 2.	Fraction Fraction	
Ill lag a gla have a full?	all Area #	
17 sec Could Recept 10 p =	10 m Lkin	
	By By	
	On On	
	11-20-19	
,	L	J
	Chain-of-Custody #// //	
(By: Signature) <i>cllc</i> Date: 11- 30-19		

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

Donna Cockrum

From:"Donna Cockrum" <dcockrum@ardlinc.com>To:"Dean Dickerson" <ddickerson@ardlinc.com>Sent:Wednesday, November 20, 2019 6:15 AMSubject:SLCOE 8574 - 11/19/19Received samples from Illinois River 11-19-19.

Last 4 sample numbers were hand written with no analysis indicated on C of C. Containers were the same for the previous 5 samples so I logged them in for the same tests.

Also, did not receive any samples for IL-15 as indicated on C of C.

All above noted on cooler receipt form.

Donna Cockrum Sample Receipt ARDL, Inc 618-244-3235x240

CONFIDENTIAL & PRIVILEGED TRANSMISSION

The message included with this e-mail and any attached document(s) contains information from ARDL, Inc. which may be confidential and/or privileged. This information is intended to be for the use of the addressee named on this transmittal sheet. If you are not the addressee, note that any disclosure, photocopying, distribution or use of the contents of this e-mail information is prohibited. If you have received this e-mail in error, please notify the sender above immediately so that arrangements can be made for the retrieval of the original document(s) at no cost to you.



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

www.ardlinc.com

Environmental | Analytical | Management | Safety

Customer Name: SLCOE

Project Name: Lower River

Samples Received at ARDL: 11/20/19

CASE NARRATIVE

<u>Customer</u> Sample No.	<u>Date</u> Collected	<u>Lab ID</u> Number	Analyses Requested
OPR-2 RM 44	11/20/19	8576-01	Inorganics(1)
OPR-3 RM 80	11/20/19	8576-02	Inorganics(1)
OPR-4 RM 110	11/20/19	8576-03	Inorganics(1)
OPR-5 RM 150	11/20/19	8576-04	Inorganics(1)
SLH-2 RM 177	11/20/19	8576-05	Inorganics(1)
SLH-1 RM 162	11/20/19	8576-06	Inorganics(1)
SLH-15 RM 120	11/20/19	8576-07	Inorganics(1)

(1) Including ammonia, chlorophyll/pheophytin, nitrate, nitrite, TKN, TOC, orthophosphate, total phosphorus, TSS, and TVSS.

The quality control data are summarized as follows:

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 2 of 2 for TKN. The parent sample has been flagged appropriately with a 'J' qualifier.

DUPLICATE

Duplicate analyses are reported as MS/MSD, except chlorophyll/pheophytin, TSS, and TVSS. RPD of the duplicate analyses met criteria.

Page 1 of 2

Date: 12/12/19

Lab Name: ARDL, Inc.

ARDL Report No.: 8576

Project Name: Lower River

ARDL Report No.: 8576

CASE NARRATIVE (Continued)

DATA REPORTING QUALIFIERS

The following data reporting qualifiers are used as required:

- ND Indicates parameter was analyzed for but not detected. The sample quantitation limit has been corrected for weight, dilution and/or percent moisture.
- 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.

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

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 8576 - Inorganic

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

Authorized By: DSD-QAO

Report Date: 12/12/2019	Analysis: Inorganics NELAC Certified - IL10030	n: LOWER RIVER Matrix: WATER e: 11/20/2019 Moisture: NA e: 1015	Prep Analysis Prep Analysis R Result Units Method Method Date Date Numl	ND MG/L NONE 350.1 NA 11/26/19 1226 4.5 MG/CU.M. 10200H 10200H 11/21/19 12/06/19 1206 0.524 MG/L 351.2 351.2 12/02/19 12/04/19 1206 1.65 MG/L 351.2 351.2 12/02/19 12/04/19 1205 1.65 MG/L NONE GREEN NA 11/25/19 1203 ND MG/L NONE 354.1 NA 11/21/19 1266 1.8 MG/L NONE 354.1 NA 11/21/19 1266 0.325 MG/L 10200H 10200H 10200H 11/21/19 1266 0.325 MG/L 365.2 365.2 NA 11/21/19 1206 0.0947 MG/L NONE 365.2 NA 11/21/19 1266 92.4 MG/L NONE 160.2 NA 11/27/19 1203
		ing Loc'i ing Date ing Time	Flag I	5
		Sampli Sampl Sampl	LOQ	0.0300 1.00 0.200 0.0200 1.00 0.0100 4.00
16	LR	14	LOD	0.0200 1.0 0.190 0.0190 0.0200 1.0 1.0 1.00800 1.00800 1.00800 1.0
Lab Report No: 00857	Project Name: LOWER RIVI Project No:	ARDL No: 008576-01 Field ID: 0PR-2 RM 4 Received: 11/20/2015	Analyte	Ammonia Nitrogen Chlorophyll-a, Correcte Kjeldahl Nitrogen Nitrate as Nitrogen Nitrite as Nitrogen Pheophytin-a Phosphorus, -ortho Solids, Total Suspended Solids, Volatile Suspen

(a) DOD and/or NELAC Accredited Analyte.

Sample 008576-01, Inorganic Analyses

Lab Report No: 0085	576						щ	eport Date	: 12/12/20	19
Project Name: LOWER RIV Project No:	VER						N	Analysis ELAC Certi	: Inorgani fied - IL10	cs 0308
ARDL No: 008576-02 Field ID: 0PR-3 RM Received: 11/20/201	2 80 19	Samp1 Samp Samp	Ling Loc ling Da ling Ti	"n: LOWER tte: 11/20 me: 1120	R RIVER 1/2019			Matrix Moisture	: WATER : NA	
Analyte	LOD	LOQ	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Ammonia Nitrogen Chlorophyll-a, Correcte Kjeldahl Nitrogen Nitrate as Nitrogen Nitrite as Nitrogen Pheophytin-a Phosphorus, -ortho Solids, Total Suspended Solids, Volatile Suspen Total Organic Carbon	0.0200 1.0 0.190 0.0190 0.0200 1.0 0.00800 0.00800 4.0 4.0	0.0300 1.00 0.200 0.0200 1.00 1.00 4.00 4.00		0.0378 6.4 6.214 1.67 1.67 1.67 1.67 1.67 0.207 0.307 0.307 0.0973 84.0	MG/L MG/CU.M. MG/CU.M. MG/L MG/L MG/L MG/L MG/L MG/L MG/L	NONE 10200H 351.2 NONE NONE 10200H 365.2 NONE NONE NONE	350.1 10200H 351.2 GREEN 354.1 10200H 365.2 365.2 365.2 160.2 160.4	NA 11/21/19 12/02/19 NA NA 11/21/19 12/09/19 NA NA NA NA	11/26/19 1 12/06/19 1 12/06/19 1 12/06/19 1 11/21/19 1 12/06/19 1 12/06/19 1 12/21/19 1 11/21/19 1 11/27/19 1 11/27/19 1	1265062 2065080 2055076 2035072 1265061 2065080 2105083 1265063 2035068 2035068
					1					

(a) DOD and/or NELAC Accredited Analyte.

Sample 008576-02, Inorganic Analyses

Lab Report No: 0085	576						щ	eport Date	: 12/12/20	119
Project Name: LOWER RIV Project No:	/ER						Z	Analysis ELAC Certi	: Inorgani fied - IL1(Lcs)0308
ARDL No: 008576-03 Field ID: 0PR-4 RM Received: 11/20/201	3 110 -9	Sampl Samp Samp	ing Loc Ling Da Ling Ti	"n: LOWER te: 11/20 me: 1340	k RIVER 1/2019			Matrix Moisture	: WATER : NA	
Analyte	LOD	ГОД	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Ammonia Nitrogen Chlorophyll-a, Correcte Kjeldahl Nitrogen Nitrate as Nitrogen Nitrite as Nitrogen Pheophytin-a Phosphorus, -ortho Solids, Total Suspended Solids, Volatile Suspen Total Organic Carbon	0.0200 1.0 0.190 0.0190 0.0200 1.0 0.00800 0.00800 4.0 4.0	0.0300 1.00 0.200 0.0200 0.0200 1.00 4.00 4.00 1.00	Ъ	0.0285 4.5 0.678 1.66 ND 1.8 0.312 0.312 0.312 88.4 6.4 5.2	MG/L MG/CU.M. MG/CU.M. MG/L MG/L MG/L MG/L MG/L MG/L	NONE 10200H 351.2 NONE NONE 10200H 365.2 NONE NONE NONE NONE	350.1 10200H 351.2 GREEN 354.1 10200H 365.2 365.2 365.2 160.2 160.4 150.4	NA 11/21/19 12/02/19 NA NA 11/21/19 12/09/19 NA NA NA NA	11/26/19 1 12/06/19 1 12/04/19 1 11/25/19 1 11/21/19 1 12/06/19 1 12/06/19 1 11/21/19 1 11/27/19 1 11/27/19 1 11/27/19 1	1265062 2055076 2055076 2035072 2065080 2105083 2105083 1265063 2035068 2035068 2035068

(a) DOD and/or NELAC Accredited Analyte.

Sample 008576-03, Inorganic Analyses

Lab Report No: 008	576						Ж	eport Date	: 12/12/20	019
Project Name: LOWER RI Project No:	VER						Z	Analysis ELAC Certi	: Inorgan fied - IL1	ics 00308
ARDL No: 008576-0 Field ID: OPR-5 RM Received: 11/20/20	14 I 150 119	Sampl Samp Samp	ing Loc ling Da ling Ta	.'n: LOWER ate: 11/20 .me: 1440	R RIVER 1/2019			Matrix Moisture	: WATER : NA	
Analyte	ГОД	гоб	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Ammonia Nitrogen	0.0200	0.0300		DN	MG/L	NONE	350.1	NA	11/26/19	11265062
Chlorophyll-a, Correcte	1.0	1.00		6.4	MG/CU.M.	10200H	10200H	11/21/19	12/06/19	L2065080
Kjeldahl Nitrogen	0.190	0.200		0.852	MG/L	351.2 MONE	351.2 CDEEN	12/02/19 MN	12/04/19	L2055076
Nitrite as Nitrogen Nitrite as Nitrogen	0.0200	0.0200		L o 4 ND	MG/L	NONE	GREEN 354.1	NA	11/21/19	L1265061
Pheophytin-a	1.0	1.00		ND	MG/CU.M.	10200H	10200H	11/21/19	12/06/19	12065080
Phosphorus	0.00800	0.0100		0.316	MG/L	365.2	365.2	12/09/19	12/09/19	12105083
Phosphorus, -ortho	0.00800	0.0100		0.0973	MG/L	NONE	365.2	NA	11/21/19	11265063
Solids, Total Suspended	1.0	4.00		78.0	MG/L	NONE	160.2	NA	11/27/19	L2035068
Solids, Volatile Suspen	4.0	4.00		6.4	MG/L	NONE	160.4	NA	11/27/19	L2035069
Total Organic Carbon	0.500	1.00		4.6	MG/L	NONE	415.1	NA	12/04/19	L2095082

(a) DOD and/or NELAC Accredited Analyte.

Sample 008576-04, Inorganic Analyses

Lab Report No: 008	576						ц	eport Date	: 12/12/2	019
Project Name: LOWER RIV Project No:	VER							Analysis ELAC Certi	: Inorgan fied - IL1	ics 00308
ARDL No: 008576-05 Field ID: SLH-2 RM	5 177 10	Sampl Samp	ing Loc ling Da	te: 11/20	k RIVER 1/2019			Matrix Moisture	: WATER : NA	
VECETVED: TT/20/	۲ ۲	Jurpo	rt butt							
Analyte	LOD	LOO	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
٩		t)							
Ammonia Nitrogen	0.0200	0.0300		DN	MG/L	NONE	350.1	NA	11/26/19	11265062
Chlorophyll-a, Correcte	1.0	1.00		4.5	MG/CU.M.	10200H	10200H	11/21/19	12/06/19	12065080
Kjeldahl Nitrogen	0.190	0.200		0.586	MG/L	351.2	351.2	12/02/19	12/04/19	12055076
Nitrate as Nitrogen	0.0190	0.0200		1.32	MG/L	NONE	GREEN	NA	11/25/19	12035072
Nitrite as Nitrogen	0.0200	0.0200		QN	MG/L	NONE	354.1	NA	11/21/19	11265061
Pheophytin-a	1.0	1.00		DN	MG/CU.M.	10200H	10200Н	11/21/19	12/06/19	12065080
Phosphorus	0.00800	0.0100		0.423	MG/L	365.2	365.2	12/09/19	12/09/19	12105083
Phosphorus, -ortho	0.00800	0.0100		0.108	MG/L	NONE	365.2	NA	11/21/19	11265063
Solids, Total Suspended	4.0	4.00		84.0	MG/L	NONE	160.2	NA	11/27/19	12035068
Solids, Volatile Suspen	4.0	4.00		6.4	MG/L	NONE	160.4	NA	11/27/19	12035069
Total Organic Carbon	0.500	1.00		5.4	MG/L	NONE	415.1	NA	12/04/19	12095082

Page 1 of 1

(a) DOD and/or NELAC Accredited Analyte.

Sample 008576-05, Inorganic Analyses

Lab Report No: 008!	576						Υ. Υ	eport Date	: 12/12/20	119
Project Name: LOWER RIV Project No:	VER							Analysis ELAC Certi	: Inorgan fied - IL1(Lcs)0308
ARDL No: 008576-00 Field ID: SLH-1 RM Received: 11/20/201	6 162 19	Sampl Samp Samp	ing Loc ling Da ling Ti	c'n: LOWEF ate: 11/20 Lme: 1345	R RIVER 0/2019			Matrix Moisture	: WATER : NA	
Analyte	гор	год	Flag	Result	Units	Prep Method	Analysis Method	Prep Date	Analysis Date	Run Number
Ammonia Nitrogen	0.0200	0.0300	Ŀ	0.0282	MG/L	NONE	350.1	NA	11/26/19 1	1265062
Chlorophyll-a, Correcte	1.0	1.00		4.5	MG/CU.M.	10200H	10200H	11/21/19	12/06/19]	2065080
Kjeldahl Nitrogen	0.190	0.200		0.538	MG/L	351.2	351.2	12/02/19	12/04/19]	2055076
Nitrate as Nitrogen	0.0380	0.0400		1.78	MG/L	NONE	GREEN	NA	11/25/19]	2035072
Nitrite as Nitrogen	0.0200	0.0200		ND	MG/L	NONE	354.1	NA	11/21/19]	.1265061
Pheophytin-a	1.0	1.00		2.5	MG/CU.M.	10200H	10200H	11/21/19	12/06/19]	2065080
Phosphorus	0.00800	0.0100		0.295	MG/L	365.2	365.2	12/09/19	12/09/19	2105083
Phosphorus, -ortho	0.00800	0.0100		0.0973	MG/L	NONE	365.2	NA	11/21/19]	.1265063
Solids, Total Suspended	4.0	4.00		72.8	MG/L	NONE	160.2	NA	11/27/19	2035068
Solids, Volatile Suspen	4.0	4.00		6.0	MG/L	NONE	160.4	NA	11/27/19	.2035069
Total Organic Carbon	0.500	1.00		4.7	MG/L	NONE	415.1	NA	12/04/19 1	2095082

(a) DOD and/or NELAC Accredited Analyte.

Sample 008576-06, Inorganic Analyses
	Box 1566	62864	
ARDL, INC.	400 Aviation Drive; P.O.	Mt. Vernon, Illinois	

Lab Report No: 008576

Project Name: LOWER RIVER

Report Date: 12/12/2019

Analysis: Inorganics NELAC Certified - IL100308

Project No:								Z	TELAC Certi	fied - IL10	0308
ARDL No: Field ID:	008576-07 SLH-15 RM	120	Samp] Samp	ling Lo	c'n: LOWEF ate: 11/20	R RIVER)/2019			Matrix Moisture	: WATER : NA	
Received:	11/20/201	6	Samr	ling T	ime: 1330						
							Prep	Analysis	Ргер	Analysis	Run
Analyt	Ð	LOD	LOQ	Flag	Result	Units	Method	Method	Date	Date	Number
Ammonia Nitroge	ue ue	0.0200	0.0300		ND	MG/L	NONE	350.1	NA	11/26/19 1	1265062
Chlorophyll-a,	Correcte	1.0	1.00		4.5	MG/CU.M.	10200H	10200H	11/21/19	12/06/19 1	.2065080
Kjeldahl Nitrog	jen	0.190	0.200		0.318	MG/L	351.2	351.2	12/02/19	12/04/19 1	2055076
Nitrate as Nitr	rogen	0.0190	0.0200		1.64	MG/L	NONE	GREEN	NA	11/25/19 1	2035072
Nitrite as Nitr	rogen	0.0200	0.0200		DN	MG/L	NONE	354.1	NA	11/21/19 1	1265061
Pheophytin-a		1.0	1.00		1.8	MG/CU.M.	10200H	10200H	11/21/19	12/06/19 1	.2065080
Phosphorus		0.00800	0.0100		0.282	MG/L	365.2	365.2	12/09/19	12/09/19 1	.2105083
Phosphorus, -or	tho	0.00800	0.0100		0.0947	MG/L	NONE	365.2	NA	11/21/19 1	.1265063
Solids, Total S	Suspended	4.0	4.00		75.6	MG/L	NONE	160.2	NA	11/27/19 1	.2035068
Solids, Volatil	le Suspen	4.0	4.00		6.0	MG/L	NONE	160.4	NA	11/27/19 1	.2035069
Total Organic C	Carbon	0.500	1.00		4.7	MG/L	NONE	415.1	NA	12/04/19 1	2095082

(a) DOD and/or NELAC Accredited Analyte.

Sample 008576-07, Inorganic Analyses

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

Lab Report No: 008576

Report Date: 12/12/2019

62864

RIVER
LOWER
Name:
Project

NELAC Certified - IL100308

			Blank		Prep	Analysis	Prep	Analysis		QC Lab
Analyte	LOD	ТОÕ	Result	Units	Method	Method	Date	Date	Run	Number
Ammonia Nitrogen	0.020	0.030	QN	MG/L	NONE	350.1	NA	11/26/19 11	265062	008576-01B1
Chlorophyll-a, Corre	1.0	1.0	QN	MG/CU.M.	10200H	10200H	11/21/19	12/06/19 12	065080	008576-05B1
Kjeldahl Nitrogen	0.19	0.20	QN	MG/L	351.2	351.2	12/02/19	12/04/19 12	055076	008576-01B1
Nitrate as Nitrogen	0.019	0.020	QN	MG/L	NONE	GREEN	NA	11/25/19 12	035072	008576-06B1
Nitrite as Nitrogen	0.020	0.020	DN	MG/L	NONE	354.1	NA	11/21/19 11	265061	008576-04B1
Pheophytin-a	1.0	1.0	QN	MG/CU.M.	10200H	10200H	11/21/19	12/06/19 12	065080	008576-05B1
Phosphorus	0.008	0.010	DN	MG/L	365.2	365.2	12/09/19	12/09/19 12	105083	008574-06B1
Phosphorus, -ortho	0.008	0.010	ND	MG/L	NONE	365.2	NA	11/21/19 11	265063	008576-02B1
Solids, Total Suspen	1.0	1.0	DN	MG/L	NONE	160.2	NA	11/27/19 12	035068	008576-03B1
Solids, Volatile Sus	1.0	1.0	ND	MG/L	NONE	160.4	NA	11/27/19 12	035069	008576-03B1
Total Organic Carbon	0.50	1.0	ND	MG/L	NONE	415.1	NA	12/04/19 12	095082	008574-01B1

(a) DOD and/or NELAC Accredited Analyte Inorganic Method Blanks for 008576

ARDI	, INC.	400 Av	LABORA iation	TORY C Drive	ONTROL ; P.O.	Box 1	LE REP(1566	DRT Mt. V€	rnon, IL	62864
Lab Report No: 008	576								Report Da	te: 12/12/2019
Project Name:	LOWER RIVI	R							NELAC Cer	tified - 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
Ammonia Nitrogen	0.93	1.0	93	1	1		80-120		11265062	008576-01C1
Kjeldahl Nitrogen	0.96	1.0	96	ł	1	1	80-120	ł	12055076	008576-01C1
Nitrate as Nitrogen	1.0	1.0	103	-		ł	80-120	ł	12035072	008576-06C1
Nitrite as Nitrogen	0.92	1.0	92	1	ł	ł	80-120	ł	11265061	008576-04C1
Phosphorus	0.64	0.67	95	1	1	ł	80-120	ł	12105083	008574-06C1
Phosphorus, -ortho	0.097	0.10	97	ł	ł		80-120		11265063	008576-02C1
Total Organic Carbon	19.0	20.0	95	ł	-	ł	76-120		12095082	008574-01C1
NOTE: Any values tak (a) DOD and/or NELAC	bulated above ma Accredited Ana	ırked with Ilyte	an asteris	k are outs	ide of acc	eptable li	imits.			

Inorganic LCS Results for 008576

	62864
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F .	Vernon,
REPORT	Mt.
ICATE	x 1566
DUPL	. Bo
IKE	Р.О
PIKE/SP	Drive;
MATRIX SE	Aviation
	400
	INC.
	ARDL,

Lab Report No: 008576

Report Date: 12/12/2019

LOWER RIVER Project Name:

NELAC Certified - IL100308

Analyte	Sample Matrix	Sample Result	MS Result	MS Level	MS % Rec	MSD Result	MSD Level	MSD % Rec	% Rec Limits	RPD	RPD Limit	Run	QC Lab Number
Ammonia Nitrogen	WATER	QN	2.0	2.0	101	2.0	2.0	98	75-125	ю	20	11265062	008576-01MS
Kjeldahl Nitrogen	WATER	0.52	1.9	0.80	171 *	1.6	0.80	137 *	75-125	15	20	12055076	008576-01MS
Nitrate as Nitrogen	WATER	1.8	2.7	1.0	91	2.7	1.0	88	75-125	ы	20	12035072	008576-06MS
Nitrite as Nitrogen	WATER	QN	1.0	1.0	100	1.0	1.0	102	75-125	7	20	11265061	008576-04MS
Phosphorus	WATER	0.32	1.1	0.83	98	1.1	0.83	98	75-125	0	20	12105083	008576-04MS
Phosphorus, -ortho	WATER	0.097	0.20	0.10	98	0.20	0.10	104	75-125	ю	20	11265063	008576-02MS

Inorganic Matrix Spikes for 008576

(a) DOD and/or NELAC Accredited Analyte.

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

Page 1 of 1

ARDL Report 8576 - Page 13 of 18

	19	0308	дч	05D1 03D1 03D1 03D1
364	12/12/20	ed - 1110	QC La Numbe	008576- 008576- 008576- 008576-
on, IL 628	Report Date:	NELAC Certifi	Analytical Run	12065080 12065080 12035068 12035069
Mt. Vern			Mean (Smp,D1,D2)	
E REPORT Box 1566			Percent Diff	o y n o
DUPLICAT ve; P.O.			Units	MG/CU.M. MG/L MG/L MG/L
SAMPLE Ition Dri			Second Duplicate	
400 Avia			First Duplicate	4 8 • 6 6 •
INC.	9	RIVER	Sample Conc'n	4.5 88.0 6.4 7.5
ARDL,	Lab Report No: 00857	Project Name: LOWER	Analyte	Chlorophyll-a, Corrected Pheophytin-a Solids, Total Suspended Solids, Volatile Suspend

(a) DOD and/or NELAC Accredited Analyte Sample Duplicates for 008576

Sample Receipt Information

Including as appropriate:

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

ARDL Data Package 8576 - Inorganic

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

Authorized By: DSD-QAO

ARDL, Inc	P.O.	. Box 1566, (618) 244	400 Av -3235 F	iation]	Drive, 1 (61	Mt. V 8) 24	ernon, 4-114	IL 62 9 Fax	864					-		CH	AIN O	F CU	ر کر STOD	Υ RE	CORE	0
PROJECT Lower River				SXE																PRE	SERVATI	NO
SAMPLERS: (Signature) T. Se her ker	(Sree	دلك		CONTAIN	- 0,	CON'SS	N	1000-	NEHN	15					\sim					ICED	SPECIB CHEMIC ADDED J FINAL P KNOW	AND AND N
SAMPLE NUMBER	DATE	TIME	GKAB COMP	NO. OF	U SSI		3010	Sol -	d dN	NISA	daon	\sim				R	EMARK OR LE LOC	CS -				
/ OPR-2 RM 44	1-25-19	1015	X		XX	X	X	X	-	X			-							×		
2 OPR-3 RM 80	11-2015	02/1	x		XX	X	X	X		X										X		
3 OPR-4 RM 110		OKE !	x		XX	X	Х	X		X										Х		
4 OPR-5 RM 150		1440	X		XX	XX	Х	X		X										X		
5 SLH-2 RM 177		1700	х		XX	X	Х	X		X										X		
LH-1 RM 162		1345	x		XX	X	Х	X	×	X										X		
7 SLH-15 RM 120		1330	х		XX	X	Х	X		X										Х		
							1															
A			1		0	1	1														3	
DRelinquished by: (Signature)	Date 11/20/19	Time 17/1	Recei	ved by	Sign	S.	4	REM	ARKS	//SPE(IAL I	NSTR	UCTI	SNO:								
DReinfugished by (Senature)	1. Pate	Time 1846	Receiv	ved by:	(Signi	ature)		*Pres	served	with F	l2SO4											
Received for Laboratory by: 6(Signature) 62 A A a Milling	11/21/19	Time 0525	Shipp	ing Tic	ket No																	
A A A A A A A A A A A A A A A A A A A				8]

Purchase order No: bage 16 of 18

9226

COOLER RECEIPT REPORT ARDL, INC.

ARI	DL#: <u>8576</u>	Cool	er#_ <u>/ 0 / 2</u>	,			
		Num	ber of Coolers in S	Shipmen	it:		-
Pro	ject: Lower River	Date	Received: _//-	20-1	9		
A.	PRELIMINARY EXAMINATION PHASE: Date cooler was opened: //- ZC	0-19	_(Signature)	Lac	Ares	n	
1.	Did cooler come with a shipping slip (airbill, etc.)?				YES	NO)	
	If YES, enter carrier name and airbill number here:			Car	erier	>	
2.	Were custody seals on outside of cooler?				YES	NO	N/A
	How many and where?		.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 (ink, signed, etc.)?				YES	NO	N/A
7.	Were custody papers signed in appropriate place by ARDL personnel?				ŒS	NO	N/A
8.	Was project identifiable from custody papers? If YES, enter project name at	the top	of this form		ÝES	NO	N/A
9.	Was a separate container provided for measuring temperature? YES	_NO	Cobserved Cooler	Temp.	0.2		
В.	LOG-IN PHASE: Date samples were logged-in: 11-21-19	Signatu	re) At Cac	Correctic	on factor <u>0</u> WC	. U	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?				YES	NO	
15.	Were correct containers used for the tests indicated?	•••••			¥ES`	NO	
16.	Was pH correct on preserved water samples?				YES	NO י	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:		Sam	ple Tra	nsfer		
			Fraction	Fra	action		
			Area #	Are	ea #		
			Walkin				
			Dy Alo.	^{by}			
			On 11-21-19	On			
	,	l		l	n1 1]
			Chain-of-Custod	y#	IY A	<u>.</u>	<u> </u>
L(E	By: Signature) Date:						

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COOLER RECEIPT REPORT ARDL, INC.

ARI	DL #: <u>8576</u>	Coc	pler # $2 a f$	2 4		
		Nur	nber of Coolers in S	Shipment:		-
Pro	ject: Lower River	Dat	e Received: <u>// -</u>	20-19		
A.	PRELIMINARY EXAMINATION PHASE: Date cooler was opened: // -	10-1	9 (Signature)	Lachru.	m	
1.	Did cooler come with a shipping slip (airbill, etc.)?			YES	NO	ł
	If YES, enter carrier name and airbill number here:			Causier		
2.	Were custody seals on outside of cooler?			YES	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?			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?			ÝES	NO	N/A
8.	Was project identifiable from custody papers? If YES, enter project name at	the top	o of this form		NO	N/A
9.	Was a separate container provided for measuring temperature? YES	_ NO_	Observed Cooler	Temp. <u>0,9</u>	C A	0
В.	LOG-IN PHASE: Date samples were logged-in: 11-21-19	(Signat	ure <u>) A. Cer</u>	chilim actor 0		C
10.	Describe type of packing in cooler:		r			
11.	Were all samples sealed in separate plastic bags?			YES	NQ	> 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?				NO	
15.	Were correct containers used for the tests indicated?	•••••			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:		Sam	ple Transfer		
			Fraction	Fraction		
			Area #	Area #		
			Walkin			
			Ву	Ву		
			On	On		
			11-21-19			
	-		Chain-of-Custod	v# ///	1 .	

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Date:

(By: Signature)