

Enclosure 5 to LC-2018-0075  
Site Investigation Report  
(540 pages)

November 8, 2018

Mr. Tim Zeichert  
Hydrogeologist, Remediation & Redevelopment Program  
Wisconsin Department of Natural Resources  
P.O. Box 7921  
Madison, WI 53707-7921

Subject: Site Investigation Report  
LaCrosse Boiling Water Reactor  
4601 State Highway 35, Genoa WI  
DNR BRRTS Activity #02-62-581112  
DNR FID #663020930

Dear Mr. Zeichert:

In accordance with your letter dated March 30, 2018, enclosed please find the Site Investigation Report that summarizes activities completed as part of the Site Investigation Work Plan to address the tritium detected in site groundwater. This Report builds on the previous characterization efforts that have been completed in support of the ongoing site decommissioning process.

We have also enclosed payment as proscribed in NR 749 Wisconsin Administrative Code so that we may receive your written comments on our proposed scope of work.

We look forward to your continued support, and as always, if you have any questions or wish to discuss our proposed approach, do not hesitate to call me at 860-462-9707 or our consultant, Nadia Glucksberg at 207-482-4623.

Sincerely yours,  
LaCrosseSolutions, LLC



Gerard van Noordennen  
Vice President Regulatory Affairs

cc: Joseph Nowak, EnergySolutions  
Bob Busch, Wisconsin Department of Public Health (electronic copy)  
Rhex Edwards, Nuclear Regulatory Commission, Region III (electronic copy)  
Marlayna Vaaler, Nuclear Regulatory Commission, Headquarters (electronic copy)  
Nadia Glucksberg, PG, Haley & Aldrich, Inc. (electronic copy)



**Notice:** Use this form to request a written response (on agency letterhead) from the Department of Natural Resources (DNR) regarding technical assistance, a post-closure change to a site, a specialized agreement or liability clarification for Property with known or suspected environmental contamination. A fee will be required as is authorized by s. 292.55, Wis. Stats., and NR 749, Wis. Adm. Code., unless noted in the instructions below. Personal information collected will be used for administrative purposes and may be provided to requesters to the extent required by Wisconsin's Open Records law [ss. 19.31 - 19.39, Wis. Stats.].

### Definitions

**"Property"** refers to the subject Property that is perceived to have been or has been impacted by the discharge of hazardous substances.

**"Liability Clarification"** refers to a written determination by the Department provided in response to a request made on this form. The response clarifies whether a person is or may become liable for the environmental contamination of a Property, as provided in s. 292.55, Wis. Stats.

**"Technical Assistance"** refers to the Department's assistance or comments on the planning and implementation of an environmental investigation or environmental cleanup on a Property in response to a request made on this form as provided in s. 292.55, Wis. Stats.

**"Post-closure modification"** refers to changes to Property boundaries and/or continuing obligations for Properties or sites that received closure letters for which continuing obligations have been applied or where contamination remains. Many, but not all, of these sites are included on the GIS Registry layer of RR Sites Map to provide public notice of residual contamination and continuing obligations.

### Select the Correct Form

This form should be used to request the following from the DNR:

- Technical Assistance
- Liability Clarification
- Post-Closure Modifications
- Specialized Agreements (tax cancellation, negotiated agreements, etc.)

Do **not** use this form if one of the following applies:

- Request for an **off-site liability exemption or clarification** for Property that has been or is perceived to be contaminated by one or more hazardous substances that originated on another Property containing the source of the contamination. Use DNR's Off-Site Liability Exemption and Liability Clarification Application Form 4400-201.
- Submittal of an Environmental Assessment for the **Lender Liability Exemption**, s 292.21, Wis. Stats., **if no response or review by DNR is requested**. Use the Lender Liability Exemption Environmental Assessment Tracking Form 4400-196.
- Request for an **exemption to develop on a historic fill site** or licensed landfill. Use DNR's Form 4400-226 or 4400-226A.
- **Request for closure** for Property where the investigation and cleanup actions are completed. Use DNR's Case Closure - GIS Registry Form 4400-202.

All forms, publications and additional information are available on the internet at: [dnr.wi.gov/topic/Brownfields/Pubs.html](http://dnr.wi.gov/topic/Brownfields/Pubs.html).

### Instructions

1. Complete sections 1, 2, 6 and 7 for all requests. Be sure to provide adequate and complete information.
2. Select the type of assistance requested: Section 3 for technical assistance or post-closure modifications, Section 4 for a written determination or clarification of environmental liabilities; or Section 5 for a specialized agreement.
3. Include the fee payment that is listed in Section 3, 4, or 5, unless you are a "Voluntary Party" enrolled in the Voluntary Party Liability Exemption Program and the questions in Section 2 direct otherwise. Information on to whom and where to send the fee is found in Section 8 of this form.
4. Send the completed request, supporting materials and the fee to the appropriate DNR regional office where the Property is located. See the map on the last page of this form. A paper copy of the signed form and all reports and supporting materials shall be sent with an electronic copy of the form and supporting materials on a compact disk. For electronic document submittal requirements see: <http://dnr.wi.gov/files/PDF/pubs/rrr/RR690.pdf>

The time required for DNR's determination varies depending on the complexity of the site, and the clarity and completeness of the request and supporting documentation.

## Technical Assistance, Environmental Liability Clarification or Post-Closure Modification Request

Form 4400-237 (R 9/15)

Page 2 of 8

### Section 1. Contact and Recipient Information

#### Requester Information

This is the person requesting technical assistance or a post-closure modification review, that his or her liability be clarified or a specialized agreement and is identified as the requester in Section 7. DNR will address its response letter to this person.

Last Name Nowak	First Joe	MI	Organization/ Business Name LaCrosse Solutions
Mailing Address S4601 State Highway 35			City Genoa
			State WI
			ZIP Code 54632-8846
Phone # (include area code) (608) 689-4210	Fax # (include area code)	Email janowak@energysolutions.com	

The requester listed above: (select all that apply)

- Is currently the owner
  Is considering selling the Property  
 Is renting or leasing the Property
  Is considering acquiring the Property  
 Is a lender with a mortgagee interest in the Property  
 Other. Explain the status of the Property with respect to the applicant:

#### Contact Information (to be contacted with questions about this request)

Select if same as requester

Contact Last Name van Noordennen	First Gerard	MI	Organization/ Business Name Energy Solutions
Mailing Address S4601 State Highway 35			City Genoa
			State WI
			ZIP Code 54632-8846
Phone # (include area code) (860) 462-9707	Fax # (include area code)	Email gpvan Noordennen@energysolutions.com	

#### Environmental Consultant (if applicable)

Contact Last Name Glucksberg	First Nadia	MI	Organization/ Business Name Haley & Aldrich
Mailing Address 75 Washington Avenue, Suite 1A			City Portland
			State ME
			ZIP Code 04101
Phone # (include area code) (207) 482-4623	Fax # (include area code)	Email naglucksberg@haleyaldrich.com	

#### Property Owner (if different from requester)

Contact Last Name Peters	First Lane	MI	Organization/ Business Name Dairyland Power Cooperative
Mailing Address S4651 State Highway 35			City Genoa
			State WI
			ZIP Code 54632
Phone # (include area code) (608) 689-4316	Fax # (include area code)	Email lane.peters@dairylandpower.com	

## Technical Assistance, Environmental Liability Clarification or Post-Closure Modification Request

Form 4400-237 (R 9/15)

Page 3 of 8

### Section 2. Property Information

Property Name <b>La Crosse Boiling Water Reactor Facility</b>		FID No. (if known) <b>663020930</b>	
BRRTS No. (if known) <b>02-63-581112</b>		Parcel Identification Number <b>Parcel/Lot 8 (Government Lot 3, Section 32, T13N, R7W)</b>	
Street Address <b>S4601 State Highway 35</b>		City <b>Genoa</b>	State   ZIP Code <b>WI   54632-8846</b>
County <b>Vernon</b>	Municipality where the Property is located <input type="radio"/> City <input checked="" type="radio"/> Town <input type="radio"/> Village of Genoa	Property is composed of: <input checked="" type="radio"/> Single tax parcel <input type="radio"/> Multiple tax parcels	Property Size Acres <b>3</b>

1. Is a response needed by a specific date? (e.g., Property closing date) Note: Most requests are completed within 60 days. Please plan accordingly.

No  Yes

Date requested by: \_\_\_\_\_

Reason: \_\_\_\_\_

2. Is the "Requester" enrolled as a Voluntary Party in the Voluntary Party Liability Exemption (VPLE) program?

No. Include the fee that is required for your request in Section 3, 4 or 5.

Yes. Do not include a separate fee. This request will be billed separately through the VPLE Program.

Fill out the information in Section 3, 4 or 5 which corresponds with the type of request:

**Section 3. Technical Assistance or Post-Closure Modifications;**

**Section 4. Liability Clarification; or Section 5. Specialized Agreement.**

### Section 3. Request for Technical Assistance or Post-Closure Modification

Select the type of technical assistance requested: [Numbers in brackets are for WI DNR Use]

- No Further Action Letter (NFA) (Immediate Actions) - NR 708.09, [183] - Include a fee of \$350. Use for a written response to an immediate action after a discharge of a hazardous substance occurs. Generally, these are for a one-time spill event.
- Review of Site Investigation Work Plan - NR 716.09, [135] - Include a fee of \$700.
- Review of Site Investigation Report - NR 716.15, [137] - Include a fee of \$1050.
- Approval of a Site-Specific Soil Cleanup Standard - NR 720.10 or 12, [67] - Include a fee of \$1050.
- Review of a Remedial Action Options Report - NR 722.13, [143] - Include a fee of \$1050.
- Review of a Remedial Action Design Report - NR 724.09, [148] - Include a fee of \$1050.
- Review of a Remedial Action Documentation Report - NR 724.15, [152] - Include a fee of \$350
- Review of a Long-term Monitoring Plan - NR 724.17, [25] - Include a fee of \$425.
- Review of an Operation and Maintenance Plan - NR 724.13, [192] - Include a fee of \$425.

Other Technical Assistance - s. 292.55, Wis. Stats. [97] (For request to build on an abandoned landfill use Form 4400-226)

- Schedule a Technical Assistance Meeting - Include a fee of \$700.
- Hazardous Waste Determination - Include a fee of \$700.
- Other Technical Assistance - Include a fee of \$700. Explain your request in an attachment.

Post-Closure Modifications - NR 727, [181]

- Post-Closure Modifications: Modification to Property boundaries and/or continuing obligations of a closed site or Property; sites may be on the GIS Registry. This also includes removal of a site or Property from the GIS Registry. Include a fee of \$1050, and:
  - Include a fee of \$300 for sites with residual soil contamination; and
  - Include a fee of \$350 for sites with residual groundwater contamination, monitoring wells or for vapor intrusion continuing obligations.

Attach a description of the changes you are proposing, and documentation as to why the changes are needed (if the change to a Property, site or continuing obligation will result in revised maps, maintenance plans or photographs, those documents may be submitted later in the approval process, on a case-by-case basis).

Technical Assistance, Environmental Liability  
Clarification or Post-Closure Modification Request

Form 4400-237 (R 9/15)

Page 4 of 8

Skip Sections 4 and 5 if the technical assistance you are requesting is listed above and complete Sections 6 and 7 of this form.

**Section 4. Request for Liability Clarification**

Select the type of liability clarification requested. Use the available space given or attach information, explanations, or specific questions that you need answered in DNR's reply. Complete Sections 6 and 7 of this form. [Numbers in brackets are for DNR Use]

"Lender" liability exemption clarification - s. 292.21, Wis. Stats. [686]

❖ Include a fee of \$700.

Provide the following documentation:

- (1) ownership status of the real Property, and/or the personal Property and fixtures;
- (2) an environmental assessment, in accordance with s. 292.21, Wis. Stats.;
- (3) the date the environmental assessment was conducted by the lender;
- (4) the date of the Property acquisition; for foreclosure actions, include a copy of the signed and dated court order confirming the sheriff's sale.
- (5) documentation showing how the Property was acquired and the steps followed under the appropriate state statutes.
- (6) a copy of the Property deed with the correct legal description; and,
- (7) the Lender Liability Exemption Environmental Assessment Tracking Form (Form 4400-196).
- (8) If no sampling was done, please provide reasoning as to why it was not conducted. Include this either in the accompanying environmental assessment or as an attachment to this form, and cite language in s. 292.21(1)(c)2., h.-i., Wis. Stats.:
  - h. The collection and analysis of representative samples of soil or other materials in the ground that are suspected of being contaminated based on observations made during a visual inspection of the real Property or based on aerial photographs, or other information available to the lender, including stained or discolored soil or other materials in the ground and including soil or materials in the ground in areas with dead or distressed vegetation. The collection and analysis shall identify contaminants in the soil or other materials in the ground and shall quantify concentrations.
  - i. The collection and analysis of representative samples of unknown wastes or potentially hazardous substances found on the real Property and the determination of concentrations of hazardous waste and hazardous substances found in tanks, drums or other containers or in piles or lagoons on the real Property.

"Representative" liability exemption clarification (e.g. trustees, receivers, etc.) - s. 292.21, Wis. Stats. [686]

❖ Include a fee of \$700.

Provide the following documentation:

- (1) ownership status of the Property;
- (2) the date of Property acquisition by the representative;
- (3) the means by which the Property was acquired;
- (4) documentation that the representative has no beneficial interest in any entity that owns, possesses, or controls the Property;
- (5) documentation that the representative has not caused any discharge of a hazardous substance on the Property; and
- (6) a copy of the Property deed with the correct legal description.

Clarification of local governmental unit (LGU) liability exemption at sites with: (select all that apply)

- hazardous substances spills - s. 292.11(9)(e), Wis. Stats. [649];
- Perceived environmental contamination - [649];
- hazardous waste - s. 292.24 (2), Wis. Stats. [649]; and/or
- solid waste - s. 292.23 (2), Wis. Stats. [649].

❖ Include a fee of \$700, a summary of the environmental liability clarification being requested, and the following:

- (1) clear supporting documentation showing the acquisition method used, and the steps followed under the appropriate state statute(s).
- (2) current and proposed ownership status of the Property;
- (3) date and means by which the Property was acquired by the LGU, where applicable;
- (4) a map and the ¼, ¼ section location of the Property;
- (5) summary of current uses of the Property;
- (6) intended or potential use(s) of the Property;
- (7) descriptions of other investigations that have taken place on the Property; and
- (8) (for solid waste clarifications) a summary of the license history of the facility.

Technical Assistance, Environmental Liability  
Clarification or Post-Closure Modification Request

Form 4400-237 (R 9/15)

Page 5 of 8

**Section 4. Request for Liability Clarification (cont.)**

Lease liability clarification - s. 292.55, Wis. Stats. [646]

❖ Include a fee of \$700 for a single Property, or \$1400 for multiple Properties and the information listed below:

- (1) a copy of the proposed lease;
- (2) the name of the current owner of the Property and the person who will lease the Property;
- (3) a description of the lease holder's association with any persons who have possession, control, or caused a discharge of a hazardous substance on the Property;
- (4) map(s) showing the Property location and any suspected or known sources of contamination detected on the Property;
- (5) a description of the intended use of the Property by the lease holder, with reference to the maps to indicate which areas will be used. Explain how the use will not interfere with any future investigation or cleanup at the Property; and
- (6) all reports or investigations (e.g. Phase I and Phase II Environmental Assessments and/or Site Investigation Reports conducted under s. NR 716, Wis. Adm. Code) that identify areas of the Property where a discharge has occurred.

General or other environmental liability clarification - s. 292.55, Wis. Stats. [682] - Explain your request below.

❖ Include a fee of \$700 and an adequate summary of relevant environmental work to date.

No Action Required (NAR) - NR 716.05, [682]

❖ Include a fee of \$700.

Use where an environmental discharge has or has not occurred, and applicant wants a DNR determination that no further assessment or clean-up work is required. Usually this is requested after a Phase I and Phase II environmental assessment has been conducted; the assessment reports should be submitted with this form. This is not a closure letter.

Clarify the liability associated with a "closed" Property - s. 292.55, Wis. Stats. [682]

❖ Include a fee of \$700.

- Include a copy of any closure documents if a state agency other than DNR approved the closure.

Use this space or attach additional sheets to provide necessary information, explanations or specific questions to be answered by the DNR.

Technical Assistance, Environmental Liability  
Clarification or Post-Closure Modification Request

Form 4400-237 (R 9/15)

Page 6 of 8

**Section 5. Request for a Specialized Agreement**

Select the type of agreement needed. Include the appropriate draft agreements and supporting materials. Complete Sections 6 and 7 of this form. More information and model draft agreements are available at: [dnr.wi.gov/topic/Brownfields/lgu.html#tabx4](http://dnr.wi.gov/topic/Brownfields/lgu.html#tabx4).

Tax cancellation agreement - s. 75.105(2)(d), Wis. Stats. [654]

❖ Include a fee of \$700, and the information listed below:

- (1) Phase I and II Environmental Site Assessment Reports,
- (2) a copy of the Property deed with the correct legal description; and,
- (3) a draft 75.105 agreement based on the DNR's model ([dnr.wi.gov/topic/brownfields/documents/mod75-105agrmt.pdf](http://dnr.wi.gov/topic/brownfields/documents/mod75-105agrmt.pdf)).

Agreement for assignment of tax foreclosure judgement - s. 75.106, Wis. Stats. [666]

❖ Include a fee of \$700, and the information listed below:

- (1) Phase I and II Environmental Site Assessment Reports,
- (2) a copy of the Property deed with the correct legal description; and,
- (3) a draft 75.105 agreement based on the DNR's model ([dnr.wi.gov/topic/brownfields/documents/mod75-106agrmt.pdf](http://dnr.wi.gov/topic/brownfields/documents/mod75-106agrmt.pdf)).

Negotiated agreement - Enforceable contract for non-emergency remediation - s. 292.11(7)(d) and (e), Wis. Stats. [630]

❖ Include a fee of \$1400, and the information listed below:

- (1) a draft schedule for remediation; and,
- (2) the name, mailing address, phone and email for each party to the agreement.

**Section 6. Other Information Submitted**

Identify all materials that are included with this request.

Include one copy of any document from any state agency files that you want the Department to review as part of this request. The person submitting this request is responsible for contacting other state agencies to obtain appropriate reports or information.

Phase I Environmental Site Assessment Report - Date: \_\_\_\_\_

Phase II Environmental Site Assessment Report - Date: \_\_\_\_\_

Legal Description of Property (required for all liability requests and specialized agreements)

Map of the Property (required for all liability requests and specialized agreements)

Analytical results of the following sampled media: Select all that apply and include date of collection.

Groundwater     Soil     Sediment     Other medium - Describe: \_\_\_\_\_

Date of Collection: \_\_\_\_\_

A copy of the closure letter and submittal materials

Draft tax cancellation agreement

Draft agreement for assignment of tax foreclosure judgment

Other report(s) or information - Describe: \_\_\_\_\_

For Property with newly identified discharges of hazardous substances only: Has a notification of a discharge of a hazardous substance been sent to the DNR as required by s. NR 706.05(1)(b), Wis. Adm. Code?

Yes - Date (if known): \_\_\_\_\_

No

Note: The Notification for Hazardous Substance Discharge (non-emergency) form is available at: [dnr.wi.gov/files/PDF/forms/4400/4400-225.pdf](http://dnr.wi.gov/files/PDF/forms/4400/4400-225.pdf).



Technical Assistance, Environmental Liability  
Clarification or Post-Closure Modification Request

Form 4400-237 (R 9/15)

Page 7 of 8

Section 7. Certification by the Person who completed this form

I am the person submitting this request (requester)

I prepared this request for: Joe Nowak

Requester Name

I certify that I am familiar with the information submitted on this request, and that the information on and included with this request is true, accurate and complete to the best of my knowledge. I also certify I have the legal authority and the applicant's permission to make this request.

Signature

Date Signed

SENIOR ASSOCIATE

11/7/18  
207 482 4623

Title

Telephone Number (include area code)

# Technical Assistance, Environmental Liability Clarification or Post-Closure Modification Request

Form 4400-237 (R 9/15)

Page 8 of 8

## Section 8. DNR Contacts and Addresses for Request Submittals

Send or deliver one paper copy and one electronic copy on a compact disk of the completed request, supporting materials, and fee to the region where the property is located to the address below. Contact a [DNR regional brownfields specialist](#) with any questions about this form or a specific situation involving a contaminated property. For electronic document submittal requirements see: <http://dnr.wi.gov/files/PDF/pubs/rr/RR690.pdf>.

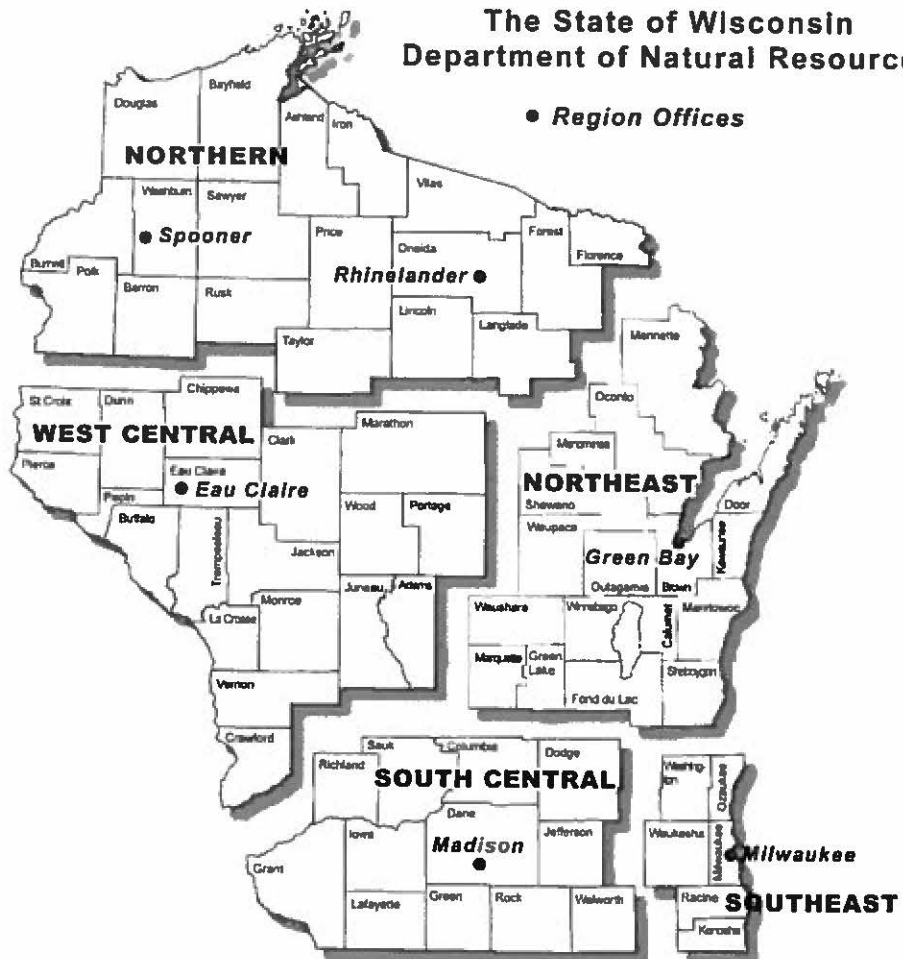
**DNR NORTHERN REGION**  
Attn: RR Program Assistant  
Department of Natural Resources  
223 E Steinfest Rd Antigo, WI 54409

**DNR NORTHEAST REGION**  
Attn: RR Program Assistant  
Department of Natural Resources  
2984 Shawano Avenue  
Green Bay WI 54313

**DNR SOUTH CENTRAL REGION**  
Attn: RR Program Assistant  
Department of Natural Resources  
3911 Fish Hatchery Road  
Fitchburg WI 53711

**DNR SOUTHEAST REGION**  
Attn: RR Program Assistant  
Department of Natural Resources  
2300 North Martin Luther King Drive  
Milwaukee WI 53212

**DNR WEST CENTRAL REGION**  
Attn: RR Program Assistant  
Department of Natural Resources  
1300 Clairemont Ave.  
Eau Claire WI 54702



*Note: These are the Remediation and Redevelopment Program's designated regions. Other DNR program regional boundaries may be different.*

DNR Use Only			
Date Received	Date Assigned	BRRTS Activity Code	BRRTS No. (if used)
DNR Reviewer		Comments	
Fee Enclosed? <input type="radio"/> Yes <input type="radio"/> No	Fee Amount \$	Date Additional Information Requested	Date Requested for DNR Response Letter
Date Approved	Final Determination		



**DRAFT**  
**SITE INVESTIGATION REPORT**  
**LA CROSSE BOILING WATER REACTOR**  
**GENOA, WISCONSIN**

DNR BRRTS ACTIVITY #02-63-581112  
DNR FID #663020930

by Haley & Aldrich, Inc.  
Portland, Maine

for *LaCrosseSolutions*  
Genoa, Wisconsin

File No. 128924-004  
November 2018



## Executive Summary

Haley & Aldrich, Inc. (Haley & Aldrich) has prepared this Site Investigation Report (Report) on behalf of LaCrosseSolutions to assess tritium concentrations detected in groundwater at the La Crosse Boiling Water Reactor (LACBWR).

This Site Investigation was conducted in response to the Wisconsin Department of Natural Resources (DNR) letter dated 30 March 2018 which required the LACBWR Site to enter into the Wisconsin DNR Program under the Bureau for Remediation and Redevelopment Tracking System (BRRTS) as Activity #02-63-581112 (see Appendix A). The site investigation activities were initiated upon approval by DNR on 28 June 2018 and were conducted in accordance with the DNR-approved Site Investigation Work Plan dated May 2018.

Based on the investigation activities completed onsite and assessment of data collected, it has been confirmed that tritium is no longer being released to the groundwater. Tritium has only been detected at two monitoring wells (MW-202AR [and previously MW-202A] and MW-203A), and concentrations have continued to decrease and are well below the maximum contaminant level (MCL) of 20,000 picocuries per liter (pCi/L) in both locations (with most recent samples collected in September showing 1,040 pCi/L at MW-202AR and 616 pCi/L at MW-203A). Based on these results and the corresponding modeling information, tritium has not impacted drinking water onsite, nor has it impacted waters offsite (namely the Mississippi River). With the release promptly addressed and stopped, no further impacts to the environment are anticipated.

Due to the decreasing tritium concentrations and results being well below the MCL, vapor intrusion does not pose a risk to human health onsite. Also, with concentrations never exceeding the MCL at the furthest downgradient well (MW-202AR), there are no unacceptable risks to the surface waters of the Mississippi River or ecological receptors.

No remedial activities are warranted. No further action is necessary.

# Table of Contents

	Page
<b>Executive Summary</b>	<b>i</b>
<b>List of Tables</b>	<b>iv</b>
<b>List of Figures</b>	<b>iv</b>
<b>1. Introduction</b>	<b>1</b>
1.1 SITE LOCATION AND DESCRIPTION	1
1.2 PURPOSE	1
1.3 APPLICABLE CODES, STANDARDS, AND GUIDELINES	1
1.4 REPORT ORGANIZATION	2
<b>2. Site Background</b>	<b>3</b>
2.1 SITE HISTORY	3
2.2 CURRENT SITE CONDITIONS	3
2.3 PHYSICAL SETTING	4
2.3.1 Topography	4
2.3.2 Geology	4
2.3.3 Hydrology	5
2.3.4 Surface Water	6
2.4 SUMMARY OF PREVIOUS GROUNDWATER INVESTIGATIONS	6
2.4.1 Groundwater Monitoring during D&D activities starting in 2013	6
<b>3. Completed Investigation Activities</b>	<b>8</b>
3.1 REPLACEMENT WELL INSTALLATION	8
3.2 GROUNDWATER SAMPLE COLLECTION	8
3.2.1 Sampling Method	8
3.2.2 Equipment Calibrations and Decontamination	9
3.2.3 Laboratory Analytical Methods and Detection Limits	9
3.2.4 Quality Control and Data Validation	9
3.3 DYE TRACER STUDY	10
3.3.1 Purpose	10
3.3.2 Permitting	10
3.3.3 Work Plan Implementation	10
3.4 GROUNDWATER MODELING	11
<b>4. Findings</b>	<b>12</b>
4.1 GROUNDWATER ANALYTICAL RESULTS	12
4.2 DYE STUDY RESULTS	12
4.3 GROUNDWATER MODELING RESULTS	13
<b>5. Environmental Impacts</b>	<b>14</b>

## Table of Contents

	Page
<b>6. Conclusions and Recommendations</b>	<b>15</b>
6.1 CONCLUSIONS	15
6.2 RECOMMENDATIONS	15
<b>References</b>	<b>16</b>

## List of Acronyms and Abbreviations

### Tables

### Figures

**Appendix A** - Pertinent Correspondence

**Appendix B** - Field Data Records

**Appendix C** - Analytical Laboratory Data

**Appendix D** - Communications Plan

**Appendix E** - Dye Application and Work Plan

**Appendix F** - Dye Laboratory Data

**Appendix G** - Groundwater Modeling Details

## List of Tables

<b>Table No.</b>	<b>Title</b>
1	Summary of Groundwater Elevations and Gradients
2	Summary of Groundwater Quality Data, 2014-2018
3	Summary of Field Parameters, 2015-2018
4	Notes for Analytical Data
5	Summary of Dye Results

## List of Figures

<b>Figure No.</b>	<b>Title</b>
1	Site Locus
2	Current Site Conditions
3	Monitoring Well Locations
4	Shallow Groundwater Contours: December 2017
5	Deeper Groundwater Contours: December 2017
6	Shallow Groundwater Contours: June 2018
7	Deep Groundwater Contours: June 2018
8	Predicted Groundwater Flow Pathway
9	Tritium and Dye Fate and Transport Model

## List of Acronyms and Abbreviations

AEC	Atomic Energy Commission
bgs	below ground surface
BRRTS	Bureau for Remediation and Redevelopment Tracking System
cm/sec	centimeters per second
D&D	Decontamination and Decommissioning
DOE	Department of Energy
DPC	Dairyland Power Cooperative
DNR	Department of Natural Resources
DQO	data quality objective
ft/day	feet per day
ft/ft	feet per foot
GEL	General Engineering Laboratories
Haley & Aldrich	Haley & Aldrich, Inc.
ISFSI	Independent Spent Fuel Storage Installation
LACBWR	La Crosse Boiling Water Reactor
LTP	License Termination Plan
MDL	minimum detection limit
MSL	mean sea level
MWe	megawatt electrical
NELAP	National Environmental Laboratory Accreditation Program
NRC	Nuclear Regulatory Commission
OUL	Ozark Underground Laboratory
PCB	polychlorinated biphenyl
ppb	parts per billion
QA/QC	Quality Assurance/Quality Control
Report	Site Investigation Report
RCA	Radiologically Controlled Area
RPGPA	Reactor Plant, Generator Plant Access
RWT	Rhodamine WT
SOP	standard operating procedure
ug/L	micrograms per liter
USEPA	United States Environmental Protection Agency
VOC	volatile organic compound

# 1. Introduction

Haley & Aldrich, Inc. (Haley & Aldrich) has prepared this Site Investigation Report (Report) on behalf of LaCrosseSolutions to assess tritium concentrations detected in groundwater at the La Crosse Boiling Water Reactor (LACBWR).

This Site Investigation was conducted in response to the Wisconsin Department of Natural Resources (DNR) letter dated 30 March 2018 which required the LACBWR Site to enter into the Wisconsin DNR Program under the Bureau for Remediation and Redevelopment Tracking System (BRRTS) as Activity #02-63-581112 (included in Appendix A). The site investigation activities were initiated upon approval by DNR in July 2018 and were conducted in accordance with the DNR-approved Site Investigation Work Plan dated May 2018.

## 1.1 SITE LOCATION AND DESCRIPTION

The site is located at 4601 State Highway 35, Genoa, in Vernon County, Wisconsin (43° 13' 35" north and 91° 13' 53" west) as shown on Figure 1. Surrounding lands are predominantly used for agriculture (dairy) and forestry (DPC, 1972). LACBWR is bordered to the west by the Mississippi River, to the north by the former Genoa-1 coal-fired plant (currently a vacant lot), to the east by State Highway 35 and to the south by the Genoa-3 coal-fired plant. The railroad also crosses through the eastern portion of the parcel, east of the plant structures.

LACBWR was built in 1967 as part of a federal project to demonstrate the viability of nuclear power. It contained a small 50 megawatt electrical (MWe) nuclear generating plant that utilized a 165 MWe boiling water reactor that was owned and operated by the Dairyland Power Cooperative (DPC). In 1987, after 19 years of operation, the plant was shut down and was placed in SAFSTOR (1991). In 2007, the reactor pressure vessel was removed and shipped to the Barnwell Waste Management Facility in South Carolina. The site is currently undergoing Decontamination and Decommissioning (D&D) with the goal of NRC license termination of the former plant area. Site features and boundaries are shown on Figure 2.

## 1.2 PURPOSE

In accordance with Section 292.11 of the Wisconsin Statutes and Chapter NR 716 of the Wisconsin Administrative Code, this Report has been developed to summarize the investigation of the tritium contamination detected in the groundwater, including further characterizing groundwater flow regimes and the hydraulic communication with the Mississippi River. Prior to the release reported on 14 March 2018, no impacts to site groundwater quality were observed in the monitoring well network which was established and monitored during D&D activities starting in 2013 as discussed in Section 2.4.

## 1.3 APPLICABLE CODES, STANDARDS, AND GUIDELINES

The Nuclear Regulatory Commission (NRC) is the primary stakeholder for license termination. However, the DNR and United States Environmental Protection Agency (USEPA) regulations apply to site groundwater, soil, and surface waters. All site investigation activities have been conducted in accordance with all local, state, and federal rules, laws, and regulations, including but not limited to:

- Section 292.11 Wisconsin Statutes;

- Wisconsin Administrative Code chapters NR 700 through NR 754;
- Wisconsin Administrative Code chapter NR 140; and
- Nuclear Regulatory Commission.

#### **1.4 REPORT ORGANIZATION**

The remainder of this Report presents the following:

Section 2 – Site Background

Section 3 – Completed Investigation Activities

Section 4 – Environmental Impacts

Section 5 – Conclusions



## 2. Site Background

### 2.1 SITE HISTORY

LACBWR is a 50 MWe nuclear power plant that is owned and was operated by DPC of La Crosse, Wisconsin. The plant is located on the east bank of the Mississippi River in Vernon County, Wisconsin, approximately one mile south of the village of Genoa, Wisconsin and approximately 19 miles south of the city of La Crosse, Wisconsin. The plant was one of a series of demonstration plants funded in part by the United States Atomic Energy Commission (AEC). The Allis-Chalmers Company was the original licensee. The AEC later sold the plant to DPC and provided DPC with a provisional operating license. LACBWR achieved initial criticality on 11 July 1967 and began commercial power generation on 1 November 1969. The plant operated for 19 years until it was shut down permanently on 30 April 1987.

The NRC approved the Decommissioning Plan on 7 August 1991. DPC conducted D&D activities until the middle of 2014, when it was decided to return the facility to SAFSTOR until additional resources could be obtained to complete the decommissioning effort. In June 2016, DPC transferred the possession-only license to *LaCrosseSolutions* for the purpose of completing the decommissioning effort.

Several structures, including the reactor vessel and internals, were removed from the site prior to the start of this investigation. The spent fuel is all stored on the Independent Spent Fuel Storage Installation (ISFSI) pad.

### 2.2 CURRENT SITE CONDITIONS

The LACBWR facility is in the process of decommissioning, and as of October 2018, only the following buildings remain:

- Administrative Building;
- G1 Crib House;
- G3 Crib House;
- LACBWR Crib House;
- Administrative Building;
- Transmission Sub-station Switch House;
- Barge Wash Break Room;
- Back-up Control Center; and
- Security Station.

All other structures have been removed to three feet below grade. *LaCrosseSolutions* is in the process of removing the last pieces of the liner from the Reactor Building. Only the structural concrete three feet below grade is scheduled to remain in place.

The last structure is scheduled to be removed from the Site by December 2018, consistent with the request to transfer the Site's NRC license back to DPC.

## 2.3 PHYSICAL SETTING

The LACBWR site location was first developed by hydraulic dredging and relocating sands from the adjacent river to fill in the low-lying areas to extend the shoreline such that the reactor and supporting structures could be constructed. This section provides an overview of the physical setting of the area, with a focus on the plant itself and specifically how the physical setting impacts groundwater flow directions and hydrogeological properties.

### 2.3.1 Topography

The site is located within the Mississippi River Valley, where the valley is cut into highly dissected uplands. From La Crosse to Prairie du Chien, Wisconsin, the valley width varies between 2.5 to 4.5 miles and the valley walls rise sharply to heights of 500 to 600 feet above the river level.

Initially, the site consisted of marshes and low-lying wetlands. The current property was then built up through the deposition of hydraulically dredged sands from the river. During the sand placement and site preparation (prior to construction), the area was graded to a relatively flat ground surface. The resulting grade for the LACBWR site is generally flat with grade level at approximately 639 feet above mean sea level (MSL) from the access road along the eastern boundary of the site to the riprap along the river shore (Figure 2).

The site is situated between two valleys that cut in to the bluffs located east of Highway 35 (Figure 1). The first valley drains to an area north of the site, toward Genoa, and the second valley drains to an area south of the site. These two valleys limit the drainage area that may contribute stormwater runoff from upgradient sources. Furthermore, drainage upgradient of the site is channeled along the highway and railroad into a recharge swale. A small amount of other drainage from the railroad right-of-way and nearby hills is channeled to the river via three underground culverts. These culverts cross the property discharging to the Mississippi River (DPC, 1972).

### 2.3.2 Geology

LACBWR is located on the east bank of the Mississippi River in the Wisconsin Driftless section of the Central Lowland Physiographic Province. It sits on the southwest flank of the Wisconsin Dome and the western flank of the Wisconsin Arch. The sedimentary strata or bedrock in this region dips less than 20 feet per mile to the southwest (Dames & Moore, 1973).

Much of the regional and site geology has been studied and is well documented. During construction and then during support of seismic studies, soil borings were completed within the LACBWR footprint and the shallow geology is very well understood.

Generally, the local geology is described as approximately 15 feet of hydraulic fill overlying 100 to 130 feet of glacial outwash and fluvial deposits on the east flood plain of the Mississippi River Valley. These unconsolidated deposits are underlain by flat lying sandstone and shales of the Dreshbach Group (Upper Cambrian). The Dreshbach Group is then underlain by dense Precambrian crystalline rocks encountered at approximately 650 feet bgs (Dames & Moore, 1973). At the subject site, the bedrock surface is encountered at an elevation of approximately 509 feet above MSL near the Reactor Building and slopes to approximately 501 feet above MSL near the river shoreline.

Numerous geotechnical subsurface explorations have been conducted on site. Below is a summary of site-specific soil conditions encountered.

- 0 to 20 feet below ground surface (bgs). Hydraulic Fill – Fill sands are encountered from approximately 0 to 20 feet bgs and described as light brown to brown, fine to medium sands with occasional fine gravel.
- 20 to 30 feet bgs. Brown to grey, fine to medium sands underlie the fill, with an average thickness of 7 to 28 feet.
- 30 to 100 feet bgs. Brown, fine to medium sands that also have zones of coarse sand and fine gravel below the finer sands.
- 100 to 115 feet bgs. Brown fine to medium sand and fine to medium gravels.
- 115 to 135 feet bgs. Brown fine to medium sand with trace silt, occasional zones of gravel.

These data were used to better understand site hydrogeology, specifically how the shallow unconsolidated deposits that underlie LACBWR govern groundwater flow, as well as the fate and transport of potential radionuclides in both the vadose zone and in the aquifers below.

### 2.3.3 Hydrology

Regionally, groundwater flows from the bluff towards the Mississippi River. Closer to the river, it is likely that the groundwater flow direction turns ‘downstream’ as groundwater discharges to the surface water. Groundwater elevation data from site monitoring wells agree with the regional groundwater flow, and show seasonal variation on upward and downward gradients that are influenced by the river stage.

Groundwater beneath the site is first encountered at depths ranging from approximately 15 to 25 feet bgs and the water table aquifer is in strong hydraulic communication with the adjacent Mississippi River. Groundwater in the shallow deposits and fill material flows towards the west and discharges into the Mississippi River. The deeper groundwater flows west but may be influenced by the river and may turn and flow parallel to the river. Site monitoring well locations are shown on Figure 3 and groundwater elevation contours and the predicted groundwater flow pathway are shown on Figures 4 through 8.

Groundwater flow through the site is generally towards the river but impacted locally by the deeper structures (i.e., the containment structure shell) as well as the deep pilings that support the structures. During plant construction, and more specifically the installation of the support pilings, the soil was compacted, reducing the effective porosity and permeability of the soils. This reduction in permeability likely decreased the hydraulic conductivity of the aquifer within the footprint of the buildings. The resulting impact to groundwater flow is that groundwater within the compacted soils will flow at a slower velocity.

Based on the soil classification of fine to medium sands (SM and SP) and silts (ML) for the shallow soils, expected hydraulic conductivities for the shallow aquifer range from 10-5 centimeters per second (cm/sec) (or 10-1 feet per day [ft/day]) to 10-1 cm/sec (or 100 ft/day). The average shallow aquifer

hydraulic conductivity is approximately 313 feet per day and the average deep aquifer hydraulic conductivity is approximately 429 feet per day.

The horizontal gradient of the water table ranges from 0.004 to 0.005 feet per foot (ft/ft) in the shallow aquifer and 0.001 to 0.002 ft/ft in the deeper aquifer. Vertical groundwater gradients also vary and are impacted by the river stage. Generally, there is an upward gradient, as expected, during the low river stages with a downward gradient during times of extremely high water. Vertical gradients are small and range from 0.117 ft/ft in the downward direction to 0.028 ft/ft in the upward direction as shown in Table 1.

Groundwater velocity is directly related to the gradients or difference in hydraulic head across the site. Groundwater velocity in the shallow water bearing zone ranges from 0.13 to 1.67 ft/day and 0.25 to 0.69 ft/day in the deep zone (Haley & Aldrich, 2016).

### **2.3.4 Surface Water**

LACBWR is located along the Mississippi River with the discharge located at the head of Thief Slough, a side channel of the Mississippi River that is separated from the main channel by Island 126. The Mississippi River Valley floor is primarily comprised of marsh lands, with islands between river channels and extensions of low lying flood plain cut by ponds, sloughs and meandering stream channels. The main channel of the river varies greatly in width both above and below the site. A series of dams are operated by the United States Army Corps of Engineers for navigational purposes. Above Dam No. 8 (about ¾ mile north of the site) the river is nearly 4 miles wide. Below the dam and closer to the site, the river is 1,500 to 2,000 feet wide (DPC, 1972). The published flood stages for the Mississippi River at the site are:

- 50-year flood state is at 635'2" above MSL
- 100-year flood stage is 637'2" above MSL
- 500-year flood stage is at 640' above MSL

Therefore, the 100-year flood is within two feet of the plant grade (639 feet above MSL).

## **2.4 SUMMARY OF PREVIOUS GROUNDWATER INVESTIGATIONS**

Several phases of environmental assessments and investigations have been conducted on-site since 2013. This section provides a brief summary of the work performed and significant findings related to the tritium release reported in March 2018.

### **2.4.1 Groundwater Monitoring during D&D activities starting in 2013**

#### *2.4.1.1 Info on D&D activities starting in 2013*

Several rounds of groundwater samples have been collected from site monitoring wells. This includes two rounds of groundwater samples collected in 2014; and quarterly samples collected in 2015. Samples were collected from monitoring wells MW-201A/B, MW-202A/B, MW-203A/B, MW-204A/B, MWB11R, and MWB11AR (Figure 3).

Groundwater samples were collected using USEPA's Low Stress/Low Flow Sampling Methods (USEPA 2010). The process is described with more detail in Section 3.2.1 (Groundwater Sampling Method).

Groundwater samples have been submitted to General Engineering Laboratories (GEL) (Charleston, South Carolina), Eberline Analytical Services (Oak Ridge, Tennessee), Chemical Services Laboratory (La Crosse, Wisconsin), and Northern Lake Service (Crandon, Wisconsin) for one or more of the following analyses:

- Radionuclides by alpha and gamma spectroscopy;
- Volatile organic compounds (VOCs) by USEPA SW-846 Method 8260C;
- Inorganic constituents, or metals by USEPA SW-846 Methods 9056, 6010B, and/or 7010B; and
- Polychlorinated biphenyls (PCBs) by USEPA SW-846 Method 8082.

Samples were also collected in domestic Wells 3, 4, and 7 (in June 2014, radionuclides only) and domestic well number 5 (in June and September 2014 and quarterly in 2015 with full suite analyzed). Domestic well locations are shown on Figure 3.

In December 2016 and May 2017 additional groundwater samples were collected from monitoring wells MW-200A/B, MW-201A/B, MW-202A/B, MW-203A/B, MW-204A/B, B11R, B11AR, and domestic Well Number 5.

A detailed discussion of the analytical results for groundwater sampling associated with the above sampling events can be found in the Site Investigation Work Plan (Haley & Aldrich, 2018) and the semi-annual groundwater monitoring reports (Haley & Aldrich, 2014-2017).

#### *2.4.1.2 December 2017 Sampling Event and Tritium Release*

In December 2017, groundwater samples were collected from monitoring wells MW-200A/B, MW-201A, MW-202A/B, MW-203A/B, MW-204A/B, B11R, B11AR, and domestic Well Number 5. (Note: MW-201B was damaged during the demolition of the Turbine Building and was not sampled in December 2017).

As required to support the license termination plan (LTP), radionuclide monitoring included the analysis of constituents: Cesium-137, Strontium-90, Cobalt-60, Nickel-63, and tritium. Results and the uncertainty values of these constituents from groundwater samples collected in December 2017 are included in Table 2. With the exception of one location, no constituents were detected, and some reported values were negative. In many of the measurements, the laboratory reported accuracy includes zero.

Tritium was detected at MW-203A at a concentration of 13,000 picocuries per liter (pCi/L). Tritium had not been detected at this location during the previous two sampling rounds and had last been detected at a concentration of 104 pCi/L in November 2015. While this reported value is below the USEPA MCL of 20,000 pCi/L, it warranted further investigation. Completed investigation activities are detailed in Section 3.

Concentrations observed in all other groundwater samples collected from the monitoring and domestic wells were non-detect. Analytical data is included in Table 2.

### 3. Completed Investigation Activities

#### 3.1 REPLACEMENT WELL INSTALLATION

During decommissioning activities at the site, two monitoring wells, MW-201B and MW-202A, were damaged by heavy equipment. Subsequently, these wells were abandoned and reinstalled within 5 feet of the original well locations. Monitoring well MW-202A was replaced on 19 March 2018 with monitoring well MW-202AR; monitoring well MW-201B was replaced on 13 April 2018 with monitoring well MW-201BR. Both newly installed wells were installed to replicate the original well design. Replacement well locations are shown on Figure 3.

#### 3.2 GROUNDWATER SAMPLE COLLECTION

Groundwater samples were collected from groundwater monitoring wells on-site during February 2018, April 2018, and the second week of each month from June 2018 through September 2018. Select wells were sampled during limited sampling events in February 2018 and April 2018 to assist with further delineation of the tritium in groundwater. During monthly sampling events, samples were collected from monitoring wells MW-200A/B, MW-201A/BR, MW-202AR/B, MW-203A/B, MW-204A/B, B11R, B11AR, domestic Well Number 3 (WUWN: AK185), domestic Well Number 5 (AK187), and domestic Well Number 7 (WQ177). Monitoring well locations are shown on Figure 3.

The Site Investigation Work Plan (Haley & Aldrich, 2018) discusses the additional monitoring of wells MW-201A, MW-201BR, MW-202AR, MW-202B, MW-203A, and MW-203B; however, all wells were sampled monthly to assist with further delineation of any other constituents.

##### 3.2.1 Sampling Method

Groundwater samples were collected using the USEPA's Low Stress/Low Flow Sampling Methods (USEPA 2010) and LaCrosseSolutions Procedure No. LC-RP-PR-057 with field parameter measurements for the following:

- pH;
- Oxidation reduction potential;
- Temperature;
- Conductivity;
- Dissolved oxygen; and
- Turbidity.

As part of this collection method, groundwater is purged at a rate not to depress the water table. Samples are then collected for laboratory analysis once the field parameters have stabilized to within applicable criteria. Field parameter data for the six additional sampling events are presented in Table 3. The field data records for each of the sampling events are presented in Appendix B.

Purge water from all wells is containerized in a 55-gallon drum that remains within the Radiologically Controlled Area (RCA) and is disposed of in accordance with the site's radiation protection program.

### 3.2.2 Equipment Calibrations and Decontamination

Daily calibrations are completed for the equipment used for water quality parameters (Horiba U-52 Multiparameter Meter) and turbidity (Hach 2100Q Handheld Turbidity Meter). Calibration measurements are recorded in the project specific field books completed by field staff.

Since all necessary sampling equipment used for sample collected is dedicated to each individual monitoring well, decontamination of sampling equipment is not required for this scope of work.

### 3.2.3 Laboratory Analytical Methods and Detection Limits

Groundwater samples for this investigation were submitted to GEL for the following radionuclide analyses:

- Cobalt-60, Cesium-137, Europium-152, and Europium-154 by gamma spectroscopy;
- Nickel-63 and tritium by liquid scintillation; and
- Strontium-90 by gas flow proportional counting.

Uncertainty values of these constituents from groundwater samples during site investigation are included in Table 2. Related minimum detection limits (MDLs) can be found within the laboratory Certificate of Analysis Reports located in the laboratory reports included in Appendix C.

### 3.2.4 Quality Control and Data Validation

All samples were collected in accordance with site procedures as well as the Site Investigation Work Plan (Haley & Aldrich, 2018). Samples for this investigation were submitted to GEL for analysis. GEL has a current National Environmental Laboratory Accreditation Program (NELAP) and Wisconsin required certifications. The laboratory's QA program includes provisions for replicate, method blank, matrix spike, tracer yield, internal standards, and surrogate measurements.

Laboratory analytical reports were reviewed to determine data usability in accordance with guidance provided by the USEPA. The following QA/QC criteria from the analysis of the project samples were evaluated as applicable:

- Sample Preservation and Holding Time Compliance
- Method Sample Analysis
- Blank Sample Analysis
- Laboratory Control Samples
- Field and Laboratory Duplicates
- Target Analyte Identification
- Use of Laboratory Data Qualifiers

### 3.3 DYE TRACER STUDY

#### 3.3.1 Purpose

The purpose of this study was to confirm if the Reactor Plant, Generator Plant Access (RPGPA) sump was the source for tritium detected in monitoring wells MW-202A and MW-203A. The data was also used to calibrate the groundwater model with respect to the groundwater velocity, as well as the potential flux of tritium towards the Mississippi River.

#### 3.3.2 Permitting

A brief workplan dated May 2018 was provided to Wisconsin DNR, with the necessary information to approve the dye introduction.

Prior to completing the introduction of the dye, LaCrosseSolutions obtained a Temporary Exemption approval under NR 140 from DNR dated 28 June 2018 for the injection of a remedial material into groundwater under NR 140.28 (1) (d), Wisconsin Administrative Code (WAC). Up to one pound of Rhodamine WT (RWT) dye was approved for introduction into the existing excavation along the west side of the reactor building where the sump was previously located. Rationale for the use of RWT is discussed in Section 3.3.3.1. Additional requirements associated with the approval to introduce the RWT were provided from DNR by letter dated 28 June 2018 (See Appendix A). Per Item 9 of this approval letter, LaCrosseSolutions was to provide a communications plan to Dairyland Power Corporation (DPC). A copy of the communications plan is provided in Appendix D. LaCrosseSolutions has also agreed to provide potable water to DPC employees until such time that DNR approves the termination of this study per Item 7 of the approval letter.

A copy of the application and dye study work plan is provided in Appendix E.

#### 3.3.3 Work Plan Implementation

##### 3.3.3.1 Background Evaluation

To first establish that there were no background dyes present, carbon packets were placed in three of the wells onsite on 8 March 2018; MW-202B, MW-203A, and MW-203B. The carbon packets contain granular activated carbon placed in a cloth bag. The carbon packets were removed on 16 March 2018 after being submerged for seven days, dried to remove potential residual tritium, and submitted to Ozark Underground Laboratory (OUL) to evaluate background conditions and support dye selection.

Laboratory analyses were conducted for four commonly used dyes: Fluorescein, Eosine, RWT, and Sulforhodamine B. Initial analysis did not detect background concentrations of dye in wells MW-202B and MW-203B; however, Fluorescein was detected at MW-203A at a concentration of 0.964 parts per billion (ppb). With the detection of Fluorescein in MW-203A, RWT was recommended as the preferred dye to utilize for the dye tracer test, as no background concentrations of RWT were detected in the wells. Analytical results are included in Appendix F.



### 3.3.3.2 Dye Introduction

One pound of RWT dye was introduced to the sump on 12 July 2018 at 13:04. Approximately two feet of water was present within the sump at the time of dye introduction, and the dye was flushed with approximately 230 gallons of non-chlorinated water.

### 3.3.3.3 Sampling

To monitor the distance and direction(s) the dye traveled in the subsurface, charcoal packets were installed within monitoring wells MW-201A, MW-202AR, MW-202B, MW-203A, MW-203B, MW-204A, and MW-204B. A charcoal packet was also installed in the river downgradient of the sump to monitor dye migration to the Mississippi River. The charcoal packets were collected and replaced every week for five weeks after the dye introduction to monitor dye distribution. After five weeks, the packet collection and removal process was changed to a monthly collection schedule. Upon removal, the packets were dried and submitted to OUL for analysis.

During the duration of the dye test and completed on the same schedule as dye packet collection, water samples were also collected from the three domestic Wells: 3 (AK185), 5 (AK187), and 7 (WQ177) to verify that the dye was not impacting the drinking water wells onsite.

## 3.4 GROUNDWATER MODELING

To address what the theoretical or estimated maximum concentration of tritium in groundwater could be, a numerical groundwater flow model was constructed to determine and verify groundwater flow pathways and velocities to better assess the potential release volume and concentration. The model was developed using site hydraulic conductivity estimates, geology interpreted from boring logs, pumping rates in production wells (assumed based on usage), water levels observed in monitoring wells, and calibrated with the results of the tracer test. The details of the numerical model, input parameters and assumptions for the model are provided in Appendix G.

The model was calibrated to estimate the magnitude and arrival time of tracer in the downgradient wells with a release area of roughly 15 ft x 15 ft, with 20,000 ug/L of tracer, using the assumed hydraulic conductivities and boundary conditions. The outputs were then used to estimate the total volume/concentration of tritium first introduced to the aquifer via the RPGPA sump. Results of the groundwater model are discussed below in Section 4.3.

## 4. Findings

### 4.1 GROUNDWATER ANALYTICAL RESULTS

After the initial detection of tritium at MW-203A during the December 2017 sampling event, additional samples were collected from MW-201A, MW-202A and MW-203A in February 2018 to further evaluate results from the December 2017 event. Tritium was detected below the detection limit in MW-201A and below the MCL in MW-202A (13,200 pCi/L), however; it exceeded the MCL in MW-203A at 24,200 pCi/L. The presence of tritium to MW-202A indicated that the tritium in groundwater was migrating along the expected groundwater horizontal flow gradient.

A subsequent limited sampling event of monitoring wells MW-202AR, MW-202B, MW-203A, and MW-203B was completed in April 2018. Tritium was not detected at MW-202B or MW-203B. Tritium was detected in concentrations below the MCL in MW-202AR (702 pCi/L) and MW-203A (12,100 pCi/L). The decrease in the tritium results between the February and April sampling events indicated that the tritium was no longer being released into the groundwater.

Monthly sampling completed from June 2018 through September 2018 confirmed that tritium was no longer being released into the groundwater. Additionally, no tritium has been detected in any of the domestic wells onsite, nor has it been detected in any of the deeper monitoring wells. MW-202AR and MW-203A are the only wells that have had detectable tritium concentrations following the release event. Tritium concentrations at MW-203A have decreased from 11,900 pCi/L in June to 616 pCi/L in September. Values at MW-202AR have remained stable during this time, with a maximum concentration well below the MCL at 1,100 pCi/L.

No other radionuclides have been detected at any domestic or monitoring well onsite. A summary of radiological groundwater analytical results are provided in Table 2

### 4.2 DYE STUDY RESULTS

RWT was only detected at one location during weekly pack retrieval, MW-203A, with a maximum concentration of 529 ppb (75.57 ppb/day) occurring during the third week of the test and a minimum concentration of 12.3 ppb (1.76 ppb/day) occurring during the fifth week of the test. No detections of RWT have been observed in any of the other monitoring wells or drinking water wells onsite.

During monthly pack retrievals, RWT has only been detected at MW-203A with a maximum concentration of 543 ppb (20.88 ppb/day). No detections of RWT have been observed in any of the other monitoring wells or supply water wells onsite.

The results of the dye tracer test confirmed the conceptual site model regarding the groundwater flow velocity and direction, which further suggest that the sump was the source of the tritium release into groundwater. Laboratory analytical results are summarized in Table 5 and included in Appendix F.

The dye tracer results were also used to calibrate the groundwater model to be able to estimate flux and groundwater velocity and are discussed in Section 4.3.

### 4.3 GROUNDWATER MODELING RESULTS

The groundwater model is only able to estimate possible release concentration and volumes, due to inherent non-uniqueness in modeling and some uncertainty in the timing and amount (i.e. volume and concentration) of the initial release. Because we do not know the exact duration of the release of condensate/impacted ice/snow melt to the ground, nor the volume of storm water runoff that migrated to the RPGPA sump area, based on conservative estimates, the model predicted that approximately 46,000 gallons of 60,000 pCi/L impacted groundwater could have resulted in concentrations observed in the monitoring wells. This volume would include storm water collection over approximately two months (including snow melt). Once in the RPGPA sump area, the tritium was in hydraulic communication with the shallow aquifer and the plume migrated towards the river.

All of the tritium (and dye) impacted groundwater migrated towards the river; production wells showed no signs of drawing the impacted groundwater downwards into deeper units, which is consistent with groundwater sampling. The impacted groundwater traveled to the downgradient wells with a velocity consistent with estimates from the dye tracer test and hydraulic gradients/conductivities on the order of 3 ft/day. Based on the model and field data, we believe that the leading edge of the plume has passed MW-203A as dye data are now stable and anticipated to begin decreasing as the plume migrates past.

## 5. Environmental Impacts

Based on the investigations completed to date, from before decommissioning activities began to the current state of demolition, groundwater at the site is characterized and well understood. This first detection of tritium in groundwater occurred during the December 2017 sampling event. The source was identified as storm water/ice melt runoff from underneath the ventilation exhaust area from the reactor building which moved along a soil erosion channel to the RPGPA Sump area. The reactor building ventilation exhaust contained tritium in gaseous form which combined readily with the storm water/ice melt run off located below and in the immediate area of its release points which were directed towards the ground. This exhaust system for the reactor building was brought on line for day to day operation on November 20, 2017. Following the tritium detections in groundwater, the reactor building exhaust ventilation system exhaust points were directed up in the air rather than towards the ground to minimize any additional tritium being released to the storm water/ice melt water in the exhaust ventilation area. Additionally, a catch containment was established in the reactor building ventilation exhaust area to collect and control any movement of storm water/ice melt in that area and the soil erosion channel pathway was isolated and controlled. The exhaust system discharge point adjustments and the related containment controls were finished on March 15, 2018.

The tritium then migrated via storm water (and snow melt) to the RPGPA Sump area where it was in hydraulic communication with the shallow aquifer. Monitoring wells MW-203A and MW-203B were initially installed to monitor groundwater quality down gradient from the Turbine Building floor drains (and the RPGPA Sump). In accordance with the Site Conceptual Model, it is where tritium was first detected.

To be able to confirm that the RPGPA sump was the source area, a dye study was then completed to mimic the tritium release, using RWT. The results would then be used to both calibrate the groundwater numerical model and estimate the initial volume/concentration of tritium and further evaluate the potential environmental impacts of this release.

Because there are three supply wells on site, and two currently being used by DPC, the DNR approved the use of RWT to further investigate groundwater conditions, with a limit of 0.1 ppb RWT in the supply wells based on Wisconsin Department of Health Services guidance provided in a letter dated 29 May 2018 (provided in Appendix A).

As predicted by the model and confirmed by sampling, RWT was only detected in groundwater monitor well MW-203A. No dyes were detected in any of the deeper groundwater monitoring wells or in the supply wells.

The concentrations of tritium are below the EPA MCLs and with the elimination of the source, the concentration will continue to decrease with time. No additional evaluations are warranted as there is no risk for vapor intrusion to current or future structures. Furthermore, in accordance with the Department of Energy (DOE) standard on evaluating radiological doses to biota (DOE, 2002), because the levels of tritium in groundwater are below the drinking water standards (EPA MCLs) an ecological risk assessment is not warranted; based on the graded approach, since there are no unacceptable risks to humans, there are no unacceptable risks to ecological receptors from the tritium in groundwater.

There are no significant environmental impacts that resulted from the release of tritium to groundwater at the LACBWR site.

## **6. Conclusions and Recommendations**

### **6.1 CONCLUSIONS**

Based on the investigation activities completed onsite and assessment of data collected, it has been confirmed that tritium is no longer being released to the groundwater. Tritium has only been detected at two monitoring wells (MW-202AR [formerly MW-202A] and MW-203A), and concentrations have continued to decrease and are well below the MCL of 20,000 pCi/L in both locations (with most recent samples collected in September showing 1,040 pCi/L at MW-202AR and 616 pCi/L at MW-203A). Based on these results and the corresponding modeling information, tritium has not impacted drinking water onsite, nor has it impacted waters offsite (i.e. the Mississippi River). With the release promptly addressed and stopped, no further impacts to the environment are anticipated.

Due to the decreasing tritium concentrations and current results being well below the MCLs at all locations, vapor intrusion does not pose a risk to human health onsite and was therefore not evaluated. Furthermore, there are not any unacceptable risks to ecological receptors. Under the DOE standard (DOE, 2002), if the environmental levels are protective of human health, then they are protective of ecological receptors and no additional investigations or evaluations are necessary.

### **6.2 RECOMMENDATIONS**

Due to tritium still being detected onsite at monitoring wells MW-202AR and MW-203A, monthly sampling will continue onsite through the end of the year, then will return to semi-annual sampling to satisfy the LTP requirements. No remedial activities are warranted. No further action is needed.

## References

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4. Haley & Aldrich, Inc. 2018. Site Investigation Work Plan, La Crosse Boiling Water Reactor, *LaCrosseSolutions*, Genoa, WI, May 2018.
5. Haley & Aldrich, Inc. 2016. Hydrogeological Investigation Report, La Crosse Boiling Water Reactor, Dairyland Power Cooperative. Revised 24 February 2016.
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## **TABLES**

**TABLE 1**  
**SUMMARY OF GROUNDWATER ELEVATIONS AND GRADIENTS**  
**LA CROSSE BOILING WATER REACTOR (LACBWR)**  
**GENOA, WISCONSIN**

Well ID	Date	Groundwater Elevation, Feet MSL	Head Difference (feet)	Vertical Gradient <sup>1,2</sup> (feet/feet)	Direction
MW-200A	11/13/2012	620.70			
MW-200B		620.65	0.05	0.002	Downward
MW-200A	12/11/2012	620.73			
MW-200B		621.58	-0.85	-0.028	Upward
MW-200A	6/26/2013	629.39			
MW-200B		629.32	0.07	0.002	Downward
MW-200A	6/27/2013	629.45			
MW-200B		629.32	0.13	0.004	Downward
MW-200A	11/5/2013	621.50			
MW-200B		621.74	-0.24	-0.008	Upward
MW-200A	6/23/2015	624.97			
MW-200B		624.44	0.53	0.018	Downward
MW-200A	11/11/2015	622.59			
MW-200B		622.43	0.16	0.005	Downward
MW-200A	12/8/2016	625.57			
MW-200B		626.10	-0.53	-0.018	Upward
MW-200A	5/22/2017	628.51			
MW-200B		629.26	-0.75	-0.025	Upward
MW-200A	12/6/2017	622.95			
MW-200B		622.73	0.22	0.007	Downward
MW-200A	6/5/2018	625.70			
MW-200B		625.46	0.24	0.008	Downward
MW-200A	7/11/2018	629.05			
MW-200B		628.79	0.26	0.009	Downward
MW-200A	8/14/2018	623.55			
MW-200B		622.78	0.77	0.026	Downward
MW-200A	9/10/2018	626.29			
MW-200B		626.69	-0.40	-0.013	Downward
MW-201A	11/13/2012	620.71			
MW-201B		620.64	0.07	0.002	Downward
MW-201A	12/11/2012	620.72			
MW-201B		620.59	0.13	0.004	Downward
MW-201A	6/26/2013	629.41			
MW-201B		629.33	0.08	0.003	Downward
MW-201A	6/27/2013	627.39			
MW-201B		627.42	-0.03	-0.001	Upward
MW-201A	11/5/2013	621.52			
MW-201B		621.06	0.46	0.015	Downward
MW-201A	6/23/2015	624.89			
MW-201B		624.46	0.43	0.014	Downward
MW-201A	11/11/2015	622.65			
MW-201B		622.45	0.20	0.007	Downward
MW-201A	12/8/2016	625.77			
MW-201B		626.10	-0.33	-0.011	Upward
MW-201A	5/23/2017	629.23			
MW-201B		629.71	-0.48	-0.016	Upward
MW-201A	12/6/2017	622.95			
MW-201B		NM	NA	NA	--
MW-201A	2/1/2018	622.21			
MW-201B		NM	NA	NA	--
MW-201A	6/6/2018	625.71			
MW-201BR		625.04	0.67	0.022	Downward
MW-201A	7/11/2018	629.15			
MW-201BR		628.54	0.61	0.020	Downward
MW-201A	8/15/2018	623.48			
MW-201BR		622.49	0.99	0.033	Downward
MW-201A	9/11/2018	626.58			
MW-201BR		626.50	0.08	0.003	Downward



**TABLE 1**  
**SUMMARY OF GROUNDWATER ELEVATIONS AND GRADIENTS**  
**LA CROSSE BOILING WATER REACTOR (LACBWR)**  
**GENOA, WISCONSIN**

Well ID	Date	Groundwater Elevation, Feet MSL	Head Difference (feet)	Vertical Gradient <sup>1,2</sup> (feet/feet)	Direction
MW-202A	11/13/2012	620.51			
MW-202B		620.51	0.00	0.000	--
MW-202A	12/11/2012	620.57			
MW-202B		620.54	0.03	0.001	Downward
MW-202A	6/26/2013	629.26			
MW-202B		629.26	0.00	0.000	--
MW-202A	6/27/2013	626.98			
MW-202B		626.85	0.13	0.004	Downward
MW-202A	11/5/2013	621.06			
MW-202B		620.97	0.09	0.003	Downward
MW-202A	6/23/2015	624.38			
MW-202B		624.40	-0.02	-0.001	Upward
MW-202A	11/11/2015	622.41			
MW-202B		622.41	0.00	0.000	--
MW-202A	12/7/2016	625.99			
MW-202B		625.99	0.00	0.000	--
MW-202A	5/23/2017	629.54			
MW-202B		629.53	0.01	0.000	--
MW-202A	12/7/2017	622.55			
MW-202B		622.58	-0.03	-0.001	Upward
MW-202A	2/1/2018	621.71			
MW-202B		NM	NA	NA	--
MW-202AR	4/4/2018	625.82			
MW-202B		NM	NA	NA	--
MW-202AR	6/5/2018	626.09			
MW-202B		625.39	0.70	0.023	Downward
MW-202AR	7/10/2018	629.66			
MW-202B		628.96	0.70	0.023	Downward
MW-202AR	8/15/2018	623.40			
MW-202B		622.67	0.73	0.024	Downward
MW-202AR	9/11/2018	627.38			
MW-202B		626.70	0.68	0.023	Downward
MW-203A	11/13/2012	620.47			
MW-203B		620.65	-0.18	-0.006	Upward
MW-203A	12/11/2012	620.53			
MW-203B		620.68	-0.15	-0.005	Upward
MW-203A	6/26/2013	629.62			
MW-203B		629.44	0.18	0.006	Downward
MW-203A	6/27/2013	627.27			
MW-203B		627.11	0.16	0.005	Downward
MW-203A	11/5/2013	621.47			
MW-203B		621.16	0.31	0.010	Downward
MW-203A	6/23/2015	624.78			
MW-203B		624.56	0.22	0.007	Downward
MW-203A	11/11/2015	622.75			
MW-203B		622.53	0.22	0.007	Downward
MW-203A	12/7/2016	625.90			
MW-203B		626.09	-0.19	-0.006	Upward
MW-203A	5/23/2017	629.13			
MW-203B		629.66	-0.53	-0.018	Upward
MW-203A	12/7/2017	622.86			
MW-203B		622.68	0.18	0.006	Downward
MW-203A	2/1/2018	622.32			
MW-203B		NM	NA	NA	--
MW-203A	4/4/2018	624.84			
MW-203B		625.19	-0.35	-0.012	Upward
MW-203A	6/6/2018	625.64			
MW-203B		625.25	0.39	0.013	Downward
MW-203A	7/11/2018	629.16			
MW-203B		628.86	0.30	0.010	Downward
MW-203A	8/15/2018	623.20			
MW-203B		622.94	0.26	0.009	Downward
MW-203A	9/11/2018	626.87			
MW-203B		626.84	0.03	0.001	Downward

**TABLE 1**  
**SUMMARY OF GROUNDWATER ELEVATIONS AND GRADIENTS**  
**LA CROSSE BOILING WATER REACTOR (LACBWR)**  
**GENOA, WISCONSIN**

Well ID	Date	Groundwater Elevation, Feet MSL	Head Difference (feet)	Vertical Gradient <sup>1,2</sup> (feet/feet)	Direction
MW-204A	11/13/2012	620.83	0.07	0.002	Downward
MW-204B		620.76			
MW-204A	12/11/2012	620.89	0.05	0.002	Downward
MW-204B		620.84			
MW-204A	6/26/2013	629.83	0.17	0.006	Downward
MW-204B		629.66			
MW-204A	6/27/2013	629.73	0.12	0.004	Downward
MW-204B		629.61			
MW-204A	11/5/2013	621.48	0.17	0.006	Downward
MW-204B		621.31			
MW-204A	6/23/2015	624.86	0.13	0.004	Downward
MW-204B		624.73			
MW-204A	11/11/2015	622.74	0.08	0.003	Downward
MW-204B		622.66			
MW-204A	12/7/2016	626.19	-0.04	-0.001	Upward
MW-204B		626.23			
MW-204A	5/22/2017	629.06	-0.17	-0.006	Upward
MW-204B		629.23			
MW-204A	12/6/2017	623.09	0.08	0.003	Downward
MW-204B		623.01			
MW-204A	6/7/2018	625.68	0.17	0.006	Downward
MW-204B		625.51			
MW-204A	7/12/2018	629.12	0.21	0.007	Downward
MW-204B		628.91			
MW-204A	8/14/2018	623.38	0.22	0.007	Downward
MW-204B		623.16			
MW-204A	9/12/2018	627.00	0.17	0.006	Downward
MW-204B		626.83			
MW-B11R	6/23/2015	627.35	2.40	0.080	Downward
MW-B11AR		624.95			
MW-B11R	11/11/2015	623.76	0.85	0.028	Downward
MW-B11AR		622.91			
MW-B11R	12/6/2016	627.28	0.90	0.030	Downward
MW-B11AR		626.38			
MW-B11R	5/22/2017	630.05	0.71	0.024	Downward
MW-B11AR		629.34			
MW-B11R	12/5/2017	625.21	1.99	0.066	Downward
MW-B11AR		623.22			
MW-B11R	6/4/2018	628.87	2.82	0.094	Downward
MW-B11AR		626.05			
MW-B11R	7/10/2018	630.82	1.28	0.043	Downward
MW-B11AR		629.54			
MW-B11R	8/14/2018	626.90	3.51	0.117	Downward
MW-B11AR		623.39			
MW-B11R	9/10/2018	628.71	1.34	0.045	Downward
MW-B11AR		627.37			

## Notes:

<sup>1</sup>Shallow wells (denoted with an "A") were installed from 15 to 25 feet bgs.

<sup>2</sup>Deeper wells (denoted with a "B") were installed from 45 to 55 feet bgs.

Distance between the shallow and deeper screens is 30 feet.

Survey conducted by Lampman & Associates of De Soto, Wisconsin on 20 November 2012.

bgs = below ground surface

NM = Not Measured

NA = Not Available

TOC = Top of Casing, referencing PVC casing above ground surface

MSL = Mean Sea Level

-- = no directional gradient observed

Well elevations approximate - awaiting survey information

**TABLE 2**  
**SUMMARY OF GROUNDWATER QUALITY DATA, 2014-2018**  
**LA CROSSE BOILING WATER REACTOR (LACBWR)**  
**GENOA, WISCONSIN**

Location Sample ID Sample Date	3 MW-DW3-06182014 06/18/2014	3 Well-3-071018 7/10/2018	3 Well-3-081518 8/15/2018	3 Well-3-091018 9/10/2018	4 MW-DW4-06182014 06/18/2014	5 MW-DW5-06182014 06/18/2014	5 MW-DW5-09242014 09/24/2014	5 DW-5-03252015 03/25/2015	5 DW-5-11122015 11/12/2015	5 Well 5-120716 12/07/2016
<b>Radiological (pCi/L)</b>										
Americium-241	0.0538 ± 0.0898	-	-	-	0.0341 ± 0.09	0.00464 ± 0.0846	0.128 ± 0.156	-	-	-
Carbon-14	2.79 ± 8.74	-	-	-	0 ± 8.89	-3.97 ± 8.76	-0.944 ± 7.34	-	-	-
Cesium-137	-0.597 ± 2.03	2.65 U ± 3.38	1.12 U ± 3.78	3.86 U ± 7.02	-0.346 ± 1.49	-0.745 ± 2.06	3.96 ± 2.45	2.17 ± 2.8	-0.568 ± 3.01	0.249 U ± 2.32
Cobalt-60	1.02 ± 1.98	-1.85 U ± 3.41	4.12 U ± 3.42	4.15 U ± 5.37	0.394 ± 2.17	2.49 ± 2.11	2.17 ± 3.17	2.37 ± 3.52	0.377 ± 2.15	0.0409 U ± 1.50
Europium-152	9.48 ± 12.9	4.70 U ± 10.5	-3.83 U ± 10.3	8.81 U ± 10.8	2.34 ± 7.76	-7.42 ± 11.2	2.48 ± 20.5	4.59 ± 12.6	1.51 ± 17.9	-
Europium-154	-5.23 ± 4.13	-3.56 U ± 10.7	7.27 U ± 12.8	0.876 U ± 9.33	3.15 ± 5.06	1.34 ± 6.02	-3.3 ± 7.97	-3.36 ± 10.1	-0.26 ± 7.18	-
Europium-155	-2.67 ± 4.38	-	-	-	1.46 ± 4.67	-0.154 ± 4.42	2.68 ± 4.49	0.902 ± 7.84	0.438 ± 6.76	-
Gross Alpha Analytes	0.126 ± 1.01	-	-	-	-0.132 ± 0.862	4.43 ± 1.71	0.847 ± 0.725	-1.06 ± 1.15	0.947 ± 1.82	-
Gross Beta Analytes	1.48 ± 1.57	-	-	-	3.13 ± 1.65	1.92 ± 2.15	2.95 ± 1.74	2.09 ± 1.64	-1.05 ± 2.42	-
Iron-55	-20 ± 70	-	-	-	-31.1 ± 78.2	-26.6 ± 80.2	9.39 ± 77.7	-	-	-
Nickel-59	18.3 ± 62.2	-	-	-	39.6 ± 76.9	-47.4 ± 87.9	3.12 ± 59.9	-	-	-
Nickel-63	-1.77 ± 3.82	12.8 U ± 20.0	-9.41 U ± 24.6	8.01 U ± 21.7	-6.13 ± 3.62	-7.4 ± 3.62	2.79 ± 2.89	-	-	16.4 U ± 25.4
Niobium-94	0.44 ± 2.13	-	-	-	0.143 ± 1.98	-1.25 ± 1.68	-0.945 ± 2.04	1.86 ± 2.14	-0.374 ± 2.1	-
Plutonium-238	0.0282 ± 0.279	-	-	-	-0.0476 ± 0.172	-0.0221 ± 0.154	0.0171 ± 0.0713	-	-	-
Plutonium-239/240	-0.096 ± 0.201	-	-	-	0.0336 ± 0.172	0.0313 ± 0.16	0.0928 ± 0.12	-	-	-
Plutonium-241	3.51 ± 17.4	-	-	-	2.7 ± 20.1	-8.39 ± 17.6	3.17 ± 9.31	-	-	-
Strontium-90	0.609 ± 0.686	-0.0243 U ± 0.634	-0.0845 U ± 0.959	1.42 U ± 1.22	0.0898 ± 0.658	0.0898 ± 0.595	-0.0174 ± 0.657	-0.0369 ± 0.658	-0.579 ± 0.906	0.870 U ± 0.829
Technetium-99	-8.27 ± 3.48	-	-	-	-7.37 ± 3.52	-8.26 ± 3.48	-1.54 ± 3.14	-	-	-
Tritium	104 ± 137	-99 U ± 267	-347 U ± 265	245 U ± 317	159 ± 140	194 ± 141	34.2 ± 139	-52.6 ± 143	-104 ± 146	-96.7 U ± 133

Please see Notes on Table 4

**TABLE 2**  
**SUMMARY OF GROUNDWATER QUALITY DATA, 2014-2018**  
**LA CROSSE BOILING WATER REACTOR (LACBWR)**  
**GENOA, WISCONSIN**

Location Sample ID Sample Date	5 Well-5-052217 05/22/2017	5 Well-5-120717 12/07/2017	5 Well-5-060618 6/6/2018	5 Well-5-071018 7/10/2018	5 Well-5-081518 8/15/2018	5 Well-5-091118 9/11/2018	7 MW-DW7-06182014 06/18/2014	7 Well-7-060618 6/6/2018	7 Well-7-071018 7/10/2018	7 Well-7-081518 8/15/2018
<b>Radiological (pCi/L)</b>										
Americium-241	-	-	-	-	-	-	-0.0109 ± 0.0766	-	-	-
Carbon-14	-	-	-	-	-	-	-5.08 ± 9.8	-	-	-
Cesium-137	-0.132 U ± 2.08	-1.03 U ± 4.12	-1.02 U ± 2.84	1.00 U ± 3.04	-3.26 U ± 2.98	-0.56 U ± 3.12	-1.83 ± 2.24	-0.149 U ± 4.00	0.607 U ± 3.29	0.787 U ± 4.09
Cobalt-60	-1.12 U ± 2.41	0.457 U ± 4.65	0.189 U ± 3.88	0.954 U ± 2.20	2.45 U ± 3.99	0.489 U ± 2.62	-2.41 ± 3.24	1.57 U ± 4.26	1.09U ± 2.68	0.585 U ± 3.02
Europium-152	-	-	-4.54 U ± 10.6	1.70 U ± 7.70	5.32 U ± 8.88	0.201 U ± 7.98	-5.5 ± 21.1	-1.03 U ± 11.2	0.291 U ± 9.09	9.63 U ± 11.5
Europium-154	-	-	3.98 U ± 9.77	-2.29 U ± 9.91	1.08 U ± 18.7	-11.9 U ± 12.5	-4.73 ± 5.45	6.22 U ± 17.7	0.821 U ± 9.17	-9.0 U ± 10.1
Europium-155	-	-	-	-	-	-	-0.174 ± 4.33	-	-	-
Gross Alpha Analytes	-	-	-	-	-	-	-0.378 ± 0.909	-	-	-
Gross Beta Analytes	-	-	-	-	-	-	0 ± 1.38	-	-	-
Iron-55	-	-	-	-	-	-	-38.5 ± 82.3	-	-	-
Nickel-59	-	-	-	-	-	-	26 ± 65.9	-	-	-
Nickel-63	18.6 U ± 19.7	-14.5 U ± 18.1	-9.21 U ± 21.9	2.58 U ± 19.6	3.08 U ± 22.1	15.1 U ± 36.8	-4.38 ± 3.83	-5.36 U ± 22.8	23.4 U ± 20.2	0.0239 U ± 20.9
Niobium-94	-	-	-	-	-	-	0.748 ± 2.35	-	-	-
Plutonium-238	-	-	-	-	-	-	0.0822 ± 0.168	-	-	-
Plutonium-239/240	-	-	-	-	-	-	0.406 ± 0.331	-	-	-
Plutonium-241	-	-	-	-	-	-	2.62 ± 13	-	-	-
Strontium-90	0.370 U ± 0.696	-0.25 U ± 0.443	0.970 U ± 0.959	-0.335 U ± 0.698	0.691 U ± 1.06	0.00966 U ± 0.768	0.0177 ± 0.725	-0.205 U ± 0.653	0.903 U ± 0.908	0.184 U ± 0.860
Technetium-99	-	-	-	-	-	-	-9.35 ± 3.53	-	-	-
Tritium	-8.03 U ± 237	-127 U ± 330	-166 U ± 226	1.44 U ± 276	-97.8 U ± 285	-62.9 U ± 181	123 ± 139	124 U ± 245	-49.3 U ± 271	10.2 U ± 289

Please see Notes on Table 4

**TABLE 2**  
**SUMMARY OF GROUNDWATER QUALITY DATA, 2014-2018**  
**LA CROSSE BOILING WATER REACTOR (LACBWR)**  
**GENOA, WISCONSIN**

Location Sample ID Sample Date	7 Well-7-091118 9/11/2018	B11AR MW-B11AR-06182014 06/18/2014	B11AR MW-B11AR-09242014 09/24/2014	B11AR MW-B11AR-03252015 03/25/2015	B11AR MW-B11AR-11122015 11/12/2015	B11AR B11AR-120616 12/06/2016	B11AR B11AR-052217 05/22/2017	B11AR B11AR-D-052217 05/22/2017	B11AR B11AR-120517 12/05/2017	B11AR B11AR-D-120517 12/05/2017
<b>Radiological (pCi/L)</b>										
Americium-241	-	0.0837 ± 0.107	-0.0168 ± 0.0514	-	-	-	-	-	-	-
Carbon-14	-	6.83 ± 9.84	0 ± 7.01	-	-	-	-	-	-	-
Cesium-137	3.49 U ± 3.98	1.83 ± 3.8	0.972 ± 2.18	-0.186 ± 2.71	2.38 ± 2.93	-0.727 U ± 1.95	-0.421 U ± 1.98	1.08 U ± 2.19	8 U ± 10.5	-0.274 U ± 4.93
Cobalt-60	-3.02 U ± 3.24	-1.93 ± 3.73	1.22 ± 1.98	2.58 ± 2.21	6.3 ± 3.29	-1.72 U ± 2.18	-0.214 U ± 2.30	0.690 U ± 2.19	-1.94 U ± 6.37	-1 U ± 5.26
Europium-152	1.65 U ± 9.34	1.47 ± 21.7	6.41 ± 13.9	-4.68 ± 15.7	-29.8 ± 36.3	-	-	-	-	-
Europium-154	3.66 U ± 10.6	-2.61 ± 9.62	1.1 ± 5.62	4.5 ± 7.25	-0.762 ± 4.12	-	-	-	-	-
Europium-155	-	-4.46 ± 5.54	1.69 ± 4.49	-5.89 ± 7.09	1.69 ± 7.93	-	-	-	-	-
Gross Alpha Analytes	-	0.733 ± 1.6	0.207 ± 1.86	0.221 ± 1.56	-0.239 ± 2.61	-	-	-	-	-
Gross Beta Analytes	-	-0.269 ± 2.36	0.303 ± 1.97	-1.43 ± 3.06	-0.0949 ± 3.01	-	-	-	-	-
Iron-55	-	-37.5 ± 74.2	-34.8 ± 77.2	-	-	-	-	-	-	-
Nickel-59	-	2.52 ± 54.9	-8.49 ± 60.6	-	-	-	-	-	-	-
Nickel-63	8.65 U ± 20.5	0 ± 3.62	-0.413 ± 2.92	-	-	-12.5 U ± 23.2	5.53 U ± 16.6	21.4 U ± 22.1	-6.1 U ± 17.1	-5.69 U ± 17.5
Niobium-94	-	1.52 ± 3.07	-0.129 ± 1.82	0.985 ± 2.13	-1.22 ± 3.25	-	-	-	-	-
Plutonium-238	-	0.0409 ± 0.118	-0.0055 ± 0.0643	-	-	-	-	-	-	-
Plutonium-239/240	-	-0.0339 ± 0.122	-0.0109 ± 0.0652	-	-	-	-	-	-	-
Plutonium-241	-	0.837 ± 12.4	-2.29 ± 8.27	-	-	-	-	-	-	-
Strontium-90	0.454 U ± 0.685	0.611 ± 0.633	1.32 ± 0.735	3.52 ± 0.924	1.4 ± 0.678	0.248 U ± 0.609	1.02 U ± 1.01	1.44 U ± 1.01	-0.784 U ± 0.396	0.0335 U ± 0.561
Technetium-99	-	-8.46 ± 3.48	-1.56 ± 3.18	-	-	-	-	-	-	-
Tritium	-45.5 U ± 189	161 ± 142	34.3 ± 139	-69.4 ± 141	-86.3 ± 146	-367 U ± 316	-93.5 U ± 229	-51 U ± 224	-243 U ± 322	-85.9 U ± 337

Please see Notes on Table 4

**TABLE 2**  
**SUMMARY OF GROUNDWATER QUALITY DATA, 2014-2018**  
**LA CROSSE BOILING WATER REACTOR (LACBWR)**  
**GENOA, WISCONSIN**

Location Sample ID Sample Date	B11AR B11AR-060418 6/4/2018	B11AR B11AR-071018 7/10/2018	B11AR B11AR-081418 8/14/2018	B11AR B11AR-091018 9/10/2018	B11R MW-B11R-06182014 06/18/2014	B11R MW-B11R-09242014 09/24/2014	B11R MW-B11R-03252015 03/25/2015	B11R MW-B11R-11122015 11/12/2015	B11R B11R-120616 12/06/2016	B11R B11R-052217 05/22/2017
<b>Radiological (pCi/L)</b>										
Americium-241	-	-	-	-	0.0122 ± 0.0626	0.0368 ± 0.108	-	-	-	-
Carbon-14	-	-	-	-	9.06 ± 9.66	-2.7 ± 6.97	-	-	-	-
Cesium-137	0.702 U ± 3.25	-4.69 U ± 4.38	0.0977 U ± 3.00	-0.389 U ± 3.98	1.24 ± 2.12	-0.724 ± 2.06	-2.2 ± 2.54	-0.562 ± 2.79	R	0.0792 U ± 2.81
Cobalt-60	-0.767 U ± 2.71	-3.02 U ± 3.76	0.568 U ± 3.52	-1.52 U ± 3.90	0.876 ± 1.87	1.32 ± 2.08	1.04 ± 2.7	1.34 ± 2.06	0.436 U ± 2.00	-0.347 U ± 2.05
Europium-152	0.210 U ± 9.42	8.76 U ± 10.6	0.253 U ± 8.28	-0.069 U ± 9.74	-0.993 ± 13.4	3 ± 10.3	10.5 ± 16.9	-6.36 ± 14.7	-	-
Europium-154	3.81 U ± 9.47	2.90 U ± 14.9	11.2 U ± 11.7	-1.69 U ± 14.8	1.63 ± 5.5	-3.92 ± 5.31	-0.782 ± 5.42	1.97 ± 6.45	-	-
Europium-155	-	-	-	-	1.59 ± 4.53	1.94 ± 4.61	2.39 ± 6.91	-6.62 ± 7.29	-	-
Gross Alpha Analytes	-	-	-	-	0 ± 1.66	3.08 ± 1.94	-1.11 ± 2.1	-0.267 ± 3.1	-	-
Gross Beta Analytes	-	-	-	-	3.59 ± 3.02	14.4 ± 4.05	4.68 ± 2.8	2.26 ± 3.61	-	-
Iron-55	-	-	-	-	-31.8 ± 81.3	-30.9 ± 71	-	-	-	-
Nickel-59	-	-	-	-	-4.16 ± 55.6	16.3 ± 66.8	-	-	-	-
Nickel-63	-1.61 U ± 22.4	2.80 U ± 20.4	-5.34 U ± 21.1	10.5 U ± 20.6	-3.56 ± 4.1	2.47 ± 2.98	-	-	3.05 U ± 24.3	12.8 U ± 17.4
Niobium-94	-	-	-	-	-0.699 ± 1.83	-1.39 ± 1.64	-0.556 ± 2.32	-0.284 ± 2.3	-	-
Plutonium-238	-	-	-	-	0 ± 0.12	0.0368 ± 0.102	-	-	-	-
Plutonium-239/240	-	-	-	-	-0.0254 ± 0.092	0 ± 0.102	-	-	-	-
Plutonium-241	-	-	-	-	-5.72 ± 9.32	-3.68 ± 8.84	-	-	-	-
Strontium-90	0.389 U ± 1.05	-0.0161 U ± 0.520	1.00 U ± 1.14	0.254 U ± 0.813	0.733 ± 0.673	1.63 ± 0.642	0.974 ± 0.682	2.46 ± 0.777	-0.702 U ± 0.482	0.993 U ± 0.918
Technetium-99	-	-	-	-	-5.52 ± 3.48	-0.399 ± 3.27	-	-	-	-
Tritium	309 U ± 261	-238 U ± 257	32.9 U ± 291	75.1 U ± 206	245 ± 141	0 ± 140	-191 ± 139	-105 ± 147	-322 U ± 318	-69.3 U ± 229

Please see Notes on Table 4

**TABLE 2**  
**SUMMARY OF GROUNDWATER QUALITY DATA, 2014-2018**  
**LA CROSSE BOILING WATER REACTOR (LACBWR)**  
**GENOA, WISCONSIN**

Location Sample ID Sample Date	B11R B11R-120517 12/05/2017	B11R B11R-060418 6/4/2018	B11R B11R-071018 7/10/2018	B11R B11R-081418 8/14/2018	B11R B11R-091018 9/10/2018	B2 MW-B2-06182014 06/18/2014	B3 MW-B3-06182014 06/18/2014	MW-200A MW-200A-06172014 06/17/2014	MW-200A MW-200A-09242014 09/24/2014	MW-200A MW-200A-03242015 03/24/2015
<b>Radiological (pCi/L)</b>										
Americium-241	-	-	-	-	-	0.00398 ± 0.0725	0.0228 ± 0.066	0.172 ± 0.179	0.11 ± 0.133	-
Carbon-14	-	-	-	-	-	1.93 ± 10	-2.04 ± 10.5	9.25 ± 7.33	-0.455 ± 7.09	-
Cesium-137	1.81 U ± 4.06	1.68 U ± 3.07	2.50 U ± 3.73	0.211 U ± 3.10	-2.06 U ± 3.92	1.36 ± 2.02	2.13 ± 2.22	0.176 ± 2.05	1.71 ± 2.73	1.13 ± 3.08
Cobalt-60	-2.31 U ± 5.16	0.199 U ± 4.17	-0.979 U ± 5.62	1.62 U ± 2.97	1.80 U ± 4.44	-1.38 ± 1.86	-1.13 ± 1.77	1 ± 2.02	3.55 ± 2.86	4.15 ± 3.8
Europium-152	-	-0.331 U ± 7.30	-6.29 U ± 9.45	2.03 U ± 8.22	-9.32 U ± 9.22	0.106 ± 12	14.2 ± 13.1	9.7 ± 14.8	-2.38 ± 21.9	-3.51 ± 18.4
Europium-154	-	-2.21 U ± 8.75	-1.7 U ± 11.6	-2.76 U ± 9.24	-1.5 U ± 9.72	2.35 ± 4.86	1.69 ± 5.46	0.576 ± 5	-0.657 ± 7.96	11 ± 8.14
Europium-155	-	-	-	-	-	-1.6 ± 4.72	-3.16 ± 4.36	-3.62 ± 4.33	-0.816 ± 3.91	2.13 ± 7.82
Gross Alpha Analytes	-	-	-	-	-	-2.12 ± 3.23	0.645 ± 1.83	4.04 ± 1.91	0.241 ± 1.7	1.05 ± 1.82
Gross Beta Analytes	-	-	-	-	-	11.2 ± 4.99	4.14 ± 3.33	8.65 ± 3.88	2.4 ± 3.16	5.27 ± 5.09
Iron-55	-	-	-	-	-	-9.2 ± 72.9	-43.9 ± 85.6	19.3 ± 74.6	-33.4 ± 73.4	-
Nickel-59	-	-	-	-	-	-7.12 ± 57.7	31.4 ± 76.5	-21.8 ± 68	7.84 ± 66.7	-
Nickel-63	-4.5 U ± 17.6	-5.48 U ± 22.3	7.01 U ± 18.8	9.57 U ± 22.4	-2.07 U ± 20.7	-7.94 ± 3.63	1.49 ± 3.83	-1.97 ± 2.86	3.61 ± 2.93	-
Niobium-94	-	-	-	-	-	1.76 ± 1.62	0.664 ± 1.87	1.08 ± 1.75	-1.42 ± 2.63	1.94 ± 3.18
Plutonium-238	-	-	-	-	-	0.0539 ± 0.142	0.0829 ± 0.138	-0.0138 ± 0.0818	0.0264 ± 0.0635	-
Plutonium-239/240	-	-	-	-	-	0.034 ± 0.0985	0.145 ± 0.192	0.0267 ± 0.0819	0.0583 ± 0.0894	-
Plutonium-241	-	-	-	-	-	0 ± 11.8	-0.739 ± 10.9	0 ± 7.96	-2.22 ± 8.04	-
Strontium-90	-0.313 U ± 0.572	0.166 U ± 0.628	0.0515 U ± 0.825	-1.21 U ± 0.903	-0.858 U ± 0.615	0.652 ± 0.69	0.612 ± 0.671	0.986 ± 0.723	2.17 ± 0.748	0.522 ± 0.644
Technetium-99	-	-	-	-	-	-7.41 ± 3.44	-8.09 ± 3.41	3.54 ± 3.15	-1.57 ± 3.2	-
Tritium	-89.2 U ± 331	49.4 U ± 237	-191 U ± 255	-200 U ± 277	-19.6 U ± 192	159 ± 141	193 ± 140	52.3 ± 140	68.6 ± 140	-155 ± 139

Please see Notes on Table 4

**TABLE 2**  
**SUMMARY OF GROUNDWATER QUALITY DATA, 2014-2018**  
**LA CROSSE BOILING WATER REACTOR (LACBWR)**  
**GENOA, WISCONSIN**

Location Sample ID Sample Date	MW-200A MW-200A-11112015 11/11/2015	MW-200A MW-200A-120816 12/08/2016	MW-200A MW-200A-052217 05/22/2017	MW-200A MW-200A-120617 12/06/2017	MW-200A MW-200A-060518 6/5/2018	MW-200A MW-200A-071118 7/11/2018	MW-200A MW-200A-081418 8/14/2018	MW-200A MW-200A-091018 9/10/2018	MW-200A MW-200A-D-091018 9/10/2018	MW-200B MW-200B-06172014 06/17/2014
<b>Radiological (pCi/L)</b>										
Americium-241	-	-	-	-	-	-	-	-	-	0.37 ± 0.232
Carbon-14	-	-	-	-	-	-	-	-	-	4.84 ± 7.48
Cesium-137	3.93 ± 4.18	1.29 U ± 1.98	-1.68 U ± 2.61	0.559 U ± 5.19	1.54 U ± 3.16	0.456 U ± 3.51	-1.84 U ± 3.59	2.61 U ± 3.31	-0.517 U ± 3.27	-0.364 ± 2.2
Cobalt-60	-0.653 ± 4.12	1.11 U ± 1.89	0.176 U ± 1.98	-1.24 U ± 4.48	3.17 U ± 3.01	-0.315 U ± 3.05	0.454 U ± 3.54	1.34 U ± 3.01	-0.94 U ± 4.23	-1.26 ± 3.1
Europium-152	4.84 ± 28.7	-	-	-	-2.27 U ± 8.07	0.631 U ± 8.97	-3.59 U ± 8.85	-6.15 U ± 8.94	1.23 U ± 8.30	-11.5 ± 17.1
Europium-154	-0.816 ± 7.7	-	-	-	0.326 U ± 10.4	4.10 U ± 10.4	2.81 U ± 9.91	5.38 U ± 9.98	5.07 U ± 8.13	0.559 ± 7.46
Europium-155	-8.19 ± 7.63	-	-	-	-	-	-	-	-	-3.44 ± 4.39
Gross Alpha Analytes	0.322 ± 2.89	-	-	-	-	-	-	-	-	-0.226 ± 2.12
Gross Beta Analytes	0.964 ± 4.44	-	-	-	-	-	-	-	-	-1.79 ± 3.42
Iron-55	-	-	-	-	-	-	-	-	-	-41.6 ± 78.4
Nickel-59	-	-	-	-	-	-	-	-	-	33.1 ± 75.2
Nickel-63	-	0.294 U ± 23.1	-2.58 U ± 16.5	0.184 U ± 18.3	-9.23 U ± 21.8	0.0695 U ± 21.7	-4.15 U ± 21.4	-0.71 U ± 20.1	14.0 U ± 20.9	-4.68 ± 3.36
Niobium-94	0.59 ± 4.27	-	-	-	-	-	-	-	-	0.847 ± 2.48
Plutonium-238	-	-	-	-	-	-	-	-	-	0.015 ± 0.0628
Plutonium-239/240	-	-	-	-	-	-	-	-	-	-0.0156 ± 0.0628
Plutonium-241	-	-	-	-	-	-	-	-	-	4.49 ± 6.55
Strontium-90	2.4 ± 0.919	-1.8 U ± 0.916	-0.567 U ± 0.981	1.31 U ± 0.935	0.101 U ± 0.780	0.197 U ± 0.837	1.31 U ± 1.11	-0.417 U ± 0.690	0.229 U ± 0.712	0.998 ± 0.758
Technetium-99	-	-	-	-	-	-	-	-	-	5.08 ± 3.18
Tritium	-17.2 ± 147	-469 U ± 326	-174 U ± 221	244 U ± 355	-21.4 U ± 240	-226 U ± 247	-212 U ± 274	-19.1 U ± 191	73.7 U ± 208	123 ± 144

Please see Notes on Table 4



**TABLE 2**  
**SUMMARY OF GROUNDWATER QUALITY DATA, 2014-2018**  
**LA CROSSE BOILING WATER REACTOR (LACBWR)**  
**GENOA, WISCONSIN**

Location Sample ID Sample Date	MW-200B MW-200B-09242014 09/24/2014	MW-200B MW-200B-03242015 03/24/2015	MW-200B MW-200B-D-03242015 03/24/2015	MW-200B MW-200B-11112015 11/11/2015	MW-200B MW-200B-120816 12/08/2016	MW-200B MW-200B-052217 05/22/2017	MW-200B MW-200B-120617 12/06/2017	MW-200B MW-200B-060518 6/5/2018	MW-200B MW-200B-071118 7/11/2018	MW-200B MW-200B-081418 8/14/2018
<b>Radiological (pCi/L)</b>										
Americium-241	0.229 ± 0.249	-	-	-	-	-	-	-	-	-
Carbon-14	-4.98 ± 6.99	-	-	-	-	-	-	-	-	-
Cesium-137	1.94 ± 2.8	2.34 ± 2.44	0.725 ± 2.43	1.49 ± 2.35	0.608 U ± 1.55	-0.176 U ± 2.10	-2.36 U ± 3.41	-481 U ± 3.34	-0.606 U ± 4.10	1.55 U ± 3.83
Cobalt-60	0.619 ± 2.47	0.676 ± 2.4	0.388 ± 1.84	-0.506 ± 2.35	0.114 U ± 1.80	0.257 U ± 2.56	3.19 U ± 3.2	1.58 U ± 3.52	-1.86 U ± 4.03	2.18 U ± 3.20
Europium-152	-13.4 ± 19.1	3.81 ± 13.9	-2.24 ± 17.4	15.1 ± 14	-	-	-	2.04 U ± 8.21	10.3 U ± 10.6	-1.37 U ± 9.77
Europium-154	-1.53 ± 7.96	2.98 ± 6.58	0.376 ± 7.28	0.619 ± 6.92	-	-	-	-1.27 U ± 10.0	-5.49 U ± 10.8	-3.54 U ± 8.58
Europium-155	-1.64 ± 4.2	-2.74 ± 6.91	1.33 ± 6.85	2.79 ± 6.37	-	-	-	-	-	-
Gross Alpha Analytes	2.01 ± 1.87	0.958 ± 0.995	1.51 ± 1.19	1.06 ± 3.46	-	-	-	-	-	-
Gross Beta Analytes	9.1 ± 3.35	2.17 ± 1.6	1.66 ± 2.51	5.1 ± 4.36	-	-	-	-	-	-
Iron-55	-45.5 ± 75.9	-	-	-	-	-	-	-	-	-
Nickel-59	23.7 ± 70.8	-	-	-	-	-	-	-	-	-
Nickel-63	-0.787 ± 2.77	-	-	-	11.2 U ± 24.6	0.622 U ± 19.2	-3.58 U ± 17.2	-5.96 U ± 21.4	-5.43 U ± 19.1	3.09 U ± 21.3
Niobium-94	-0.268 ± 2.69	1.22 ± 2.58	0.332 ± 1.97	1.1 ± 2.34	-	-	-	-	-	-
Plutonium-238	-0.00649 ± 0.076	-	-	-	-	-	-	-	-	-
Plutonium-239/240	0 ± 0.105	-	-	-	-	-	-	-	-	-
Plutonium-241	8.49 ± 10.4	-	-	-	-	-	-	-	-	-
Strontium-90	1.54 ± 0.731	2.14 ± 0.813	3.68 ± 1	0.829 ± 0.896	0.531 U ± 0.485	1.44 U ± 1.14	0.548 U ± 0.849	0.129 U ± 0.909	-0.751 U ± 0.831	0.677 U ± 1.06
Technetium-99	-1.53 ± 3.13	-	-	-	-	-	-	-	-	-
Tritium	51.7 ± 140	-121 ± 141	-104 ± 142	-52 ± 147	-107 U ± 357	38.5 U ± 233	128 U ± 346	-10.8 U ± 236	-214 U ± 250	-77.6 U ± 284

Please see Notes on Table 4

**TABLE 2**  
**SUMMARY OF GROUNDWATER QUALITY DATA, 2014-2018**  
**LA CROSSE BOILING WATER REACTOR (LACBWR)**  
**GENOA, WISCONSIN**

Location Sample ID Sample Date	MW-200B MW-200B-091018 9/10/2018	MW-201A MW-201A-06172014 06/17/2014	MW-201A MW-201A-D-06172014 06/17/2014	MW-201A MW-201A-09242014 09/24/2014	MW-201A MW-201A-03252015 03/25/2015	MW-201A MW-201A-11112015 11/11/2015	MW-201A MW-201A-120816 12/08/2016	MW-201A MW-201A-052317 05/23/2017	MW-201A MW-201A-120617 12/06/2017
<b>Radiological (pCi/L)</b>									
Americium-241	-	0.0945 ± 0.123	0.03 ± 0.0792	0.14 ± 0.14	-	-	-	-	-
Carbon-14	-	4.83 ± 7.47	0 ± 7.06	2.69 ± 7.06	-	-	-	-	-
Cesium-137	0.519 U ± 3.63	0.309 ± 1.84	-1.13 ± 2.25	-1.09 ± 2.07	0.346 ± 3.79	0.388 ± 2.38	-0.629 U ± 2.60	-2.08 U ± 2.95	2.45 U ± 4.14
Cobalt-60	-2.32 U ± 2.70	-0.0604 ± 1.68	1.42 ± 1.99	-0.0723 ± 1.85	3.58 ± 3.2	0.258 ± 2.38	3.57 U ± 3.10	-2.05 U ± 3.15	2.8 U ± 4.44
Europium-152	9.35 U ± 9.79	4.15 ± 11.1	1.41 ± 18.4	4.79 ± 13.2	10 ± 20.5	-10.4 ± 11.3	-	-	-
Europium-154	4.31 U ± 8.74	-2.39 ± 4.89	1.15 ± 7.85	-3.08 ± 6.44	4.57 ± 7.38	-2.9 ± 7.7	-	-	-
Europium-155	-	-2.92 ± 4.61	1.75 ± 4.34	-1.47 ± 4.43	0.338 ± 7.79	0.845 ± 6.8	-	-	-
Gross Alpha Analytes	-	0.383 ± 1.59	0.636 ± 2.16	1.18 ± 2.31	0.873 ± 2.48	3.26 ± 2.55	-	-	-
Gross Beta Analytes	-	7.25 ± 3.54	6.75 ± 3.17	7.36 ± 3.27	2.37 ± 3.78	3.4 ± 4.95	-	-	-
Iron-55	-	-32 ± 73.4	0.717 ± 67.6	-21.8 ± 77	-	-	-	-	-
Nickel-59	-	-16.7 ± 60.4	16.4 ± 61.7	-19.8 ± 63.9	-	-	-	-	-
Nickel-63	3.18 U ± 21.0	1.81 ± 2.72	-1.8 ± 2.62	4.99 ± 2.96	-	-	9.55 U ± 24.4	14.3 U ± 19.0	0.537 U ± 18
Niobium-94	-	0.373 ± 2.03	0.348 ± 2.4	0.655 ± 1.92	0.0628 ± 3.24	1.15 ± 2.17	-	-	-
Plutonium-238	-	0.0532 ± 0.115	-0.0739 ± 0.0898	-0.0358 ± 0.0887	-	-	-	-	-
Plutonium-239/240	-	-0.00685 ± 0.0802	-0.00671 ± 0.0785	0 ± 0.117	-	-	-	-	-
Plutonium-241	-	-0.485 ± 6.95	0 ± 8.85	-0.691 ± 10	-	-	-	-	-
Strontium-90	0.940 U ± 0.957	0.0686 ± 0.708	1.53 ± 0.748	0.92 ± 0.716	0.866 ± 0.662	1.24 ± 0.705	0.301 U ± 0.615	1.47 U ± 1.03	0.343 U ± 0.599
Technetium-99	-	3.91 ± 3.15	6.95 ± 3.3	-0.794 ± 3.24	-	-	-	-	-
Tritium	81.2 U ± 197	70.2 ± 142	87 ± 141	86.6 ± 141	52 ± 144	-17.3 ± 147	-375 U ± 331	-115 U ± 225	-192 U ± 322

Please see Notes on Table 4

**TABLE 2**  
**SUMMARY OF GROUNDWATER QUALITY DATA, 2014-2018**  
**LA CROSSE BOILING WATER REACTOR (LACBWR)**  
**GENOA, WISCONSIN**

Location Sample ID Sample Date	MW-201A MW-201A-020118 2/1/2018	MW-201A MW-201A-060618 6/6/2018	MW-201A MW-201A-071118 7/11/2018	MW-201A MW-201A-081518 8/15/2018	MW-201A MW-201A-091118 9/11/2018	MW-201B MW-201B-06172014 06/17/2014	MW-201B MW-201B-09242014 09/24/2014	MW-201B MW-201B-03252015 03/25/2015	MW-201B MW-201B-11112015 11/11/2015	MW-201B MW-201B-120816 12/08/2016
<b>Radiological (pCi/L)</b>										
Americium-241	-	-	-	-	-	0.00398 ± 0.0726	0.028 ± 0.0777	-	-	-
Carbon-14	-	-	-	-	-	4.51 ± 6.97	0.927 ± 7.25	-	-	-
Cesium-137	-2.17 U ± 2.85	1.03 U ± 3.55	-0.943 U ± 3.09	1.77 U ± 3.27	2.76 U ± 2.87	-0.62 ± 2.07	1.84 ± 2.12	2.18 ± 2.63	0.067 ± 2.77	2.40 U ± 2.65
Cobalt-60	1.23 U ± 2.64	0.219 U ± 3.45	-1.46 U ± 3.31	-0.572 U ± 3.80	-0.983 U ± 3.41	1.72 ± 1.83	0.95 ± 1.94	1.46 ± 2.11	0.977 ± 2.3	1.08 U ± 2.13
Europium-152	-	-2.18 U ± 7.87	3.43 U ± 9.43	3.64 U ± 10.1	-2.42 U ± 7.83	11.2 ± 12.4	2.52 ± 10.4	-8.2 ± 15.1	12.7 ± 15.4	-
Europium-154	-	0.877 U ± 9.31	-2.71 U ± 8.01	2.79 U ± 9.80	2.67 U ± 7.94	-2.43 ± 5.38	1.93 ± 5.49	-0.9 ± 7.37	-4.44 ± 6.84	-
Europium-155	-	-	-	-	-	-2.6 ± 4.38	4.12 ± 4.66	0.169 ± 6.35	0.269 ± 6.65	-
Gross Alpha Analytes	-	-	-	-	-	-1.03 ± 2.67	1.42 ± 1.33	2.25 ± 1.76	0 ± 2.93	-
Gross Beta Analytes	-	-	-	-	-	-1.03 ± 3.17	3.67 ± 2.74	2.77 ± 2.63	-0.121 ± 4.14	-
Iron-55	-	-	-	-	-	15.7 ± 72.3	27.6 ± 78.9	-	-	-
Nickel-59	-	-	-	-	-	-71.1 ± 123	30.8 ± 74.3	-	-	-
Nickel-63	-	-16.9 U ± 22.0	0.389 U ± 19.5	-8.59 U ± 21.7	5.17 U ± 20.6	-1.91 ± 2.78	2.15 ± 2.82	-	-	10.3 U ± 24.5
Niobium-94	-	-	-	-	-	1.79 ± 1.87	0.643 ± 1.48	0.208 ± 2.23	1.32 ± 2.17	-
Plutonium-238	-	-	-	-	-	-0.0501 ± 0.11	0.0854 ± 0.128	-	-	-
Plutonium-239/240	-	-	-	-	-	0.0236 ± 0.0986	0.141 ± 0.146	-	-	-
Plutonium-241	-	-	-	-	-	-1.41 ± 10.1	-0.584 ± 8.48	-	-	-
Strontium-90	-0.0488 U ± 0.516	0.110 U ± 0.874	0.0963 U ± 0.871	1.44 U ± 1.08	0.432 U ± 0.715	1.01 ± 0.716	0.541 ± 0.708	1.27 ± 0.735	0.875 ± 0.732	-0.208 U ± 0.474
Technetium-99	-	-	-	-	-	1.17 ± 3.06	-1.94 ± 3.16	-	-	-
Tritium	264 U ± 255	245 U ± 255	132 U ± 287	24.4 U ± 292	326 U ± 265	105 ± 142	-34.1 ± 137	17.2 ± 142	34 ± 146	-123 U ± 307

Please see Notes on Table 4

**TABLE 2**  
**SUMMARY OF GROUNDWATER QUALITY DATA, 2014-2018**  
**LA CROSSE BOILING WATER REACTOR (LACBWR)**  
**GENOA, WISCONSIN**

Location Sample ID Sample Date	MW-201B MW-201B-052317 05/23/2017	MW-201BR MW-201B-060618 6/6/2018	MW-201BR MW-201BR-071118 7/11/2018	MW-201BR MW-201BR-081518 8/15/2018	MW-201BR MW-201BR-091118 9/11/2018	MW-202A MW-202A-06172014 06/17/2014	MW-202A MW-202A-09232014 09/23/2014	MW-202A MW-202A-03242015 03/24/2015	MW-202A MW-202A-11112015 11/11/2015	MW-202A MW-202A-120716 12/07/2016
<b>Radiological (pCi/L)</b>										
Americium-241	-	-	-	-	-	0.116 ± 0.118	0.0662 ± 0.126	-	-	-
Carbon-14	-	-	-	-	-	0 ± 7.09	4.94 ± 7.14	-	-	-
Cesium-137	1.31 U ± 2.11	2.03 U ± 3.51	-2.16 U ± 4.17	-0.478 U ± 3.02	3.27 U ± 4.03	-0.463 ± 2.12	-0.433 ± 2.18	1.68 ± 3	2.1 ± 3.24	-1.33 U ± 2.62
Cobalt-60	0.927 U ± 2.36	-1.66 U ± 5.09	-0.30 U ± 4.13	-0.398 U ± 2.54	2.13 U ± 2.93	-0.891 ± 1.66	0.972 ± 1.6	3.46 ± 3.23	0.236 ± 3.4	2.01 U ± 2.65
Europium-152	-	-6.07 U ± 11.7	-5.76 U ± 10.6	0.119 U ± 7.42	-1.78 U ± 7.58	4.1 ± 11	9.4 ± 12.6	3.66 ± 22.4	0 ± 7.83	-
Europium-154	-	-0.503 U ± 10.4	-9.3 U ± 16.7	0.338 U ± 8.03	-20.1 U ± 11.8	-1.11 ± 5.46	-0.367 ± 5.23	-8.38 ± 12.1	-0.635 ± 4.36	-
Europium-155	-	-	-	-	-	-1.58 ± 4.39	-2.08 ± 4.54	-1.96 ± 8.13	-1.31 ± 7.86	-
Gross Alpha Analytes	-	-	-	-	-	1.05 ± 1.29	1.03 ± 0.574	0.106 ± 0.86	0.475 ± 1.72	-
Gross Beta Analytes	-	-	-	-	-	4.33 ± 2.12	0.486 ± 1.56	1.47 ± 1.77	2.51 ± 2.74	-
Iron-55	-	-	-	-	-	-3.26 ± 74.7	-54.3 ± 81	-	-	-
Nickel-59	-	-	-	-	-	24.8 ± 68.3	-11.7 ± 65.4	-	-	-
Nickel-63	-3.85 U ± 18.9	-1.69 U ± 22.3	-6.0 U ± 18.7	-3.9 U ± 22.4	7.70 U ± 20.1	-1.93 ± 2.81	0.824 ± 2.94	-	-	-4.11 U ± 21.5
Niobium-94	-	-	-	-	-	-0.355 ± 1.63	-0.0647 ± 1.96	-0.125 ± 2.64	0.926 ± 2.8	-
Plutonium-238	-	-	-	-	-	-0.00846 ± 0.0956	0.0113 ± 0.0731	-	-	-
Plutonium-239/240	-	-	-	-	-	-0.0226 ± 0.091	0.0586 ± 0.0998	-	-	-
Plutonium-241	-	-	-	-	-	2.19 ± 10.5	0 ± 9.65	-	-	-
Strontium-90	1.06 U ± 0.834	-0.105 U ± 0.885	0.369 U ± 0.996	0.730 U ± 1.04	-0.91 U ± 0.609	1.12 ± 0.755	1.71 ± 0.741	0.0945 ± 0.741	1.21 ± 0.81	0.236 U ± 0.626
Technetium-99	-	-	-	-	-	0.388 ± 3.02	0.797 ± 3.29	-	-	-
Tritium	106 U ± 235	176 U ± 250	-186 U ± 261	-151 U ± 271	28.4 U ± 201	335 ± 149	-51.7 ± 138	498 ± 153	174 ± 152	-182 U ± 350

Please see Notes on Table 4

**TABLE 2**  
**SUMMARY OF GROUNDWATER QUALITY DATA, 2014-2018**  
**LA CROSSE BOILING WATER REACTOR (LACBWR)**  
**GENOA, WISCONSIN**

Location Sample ID Sample Date	MW-202A MW-202A-D-120716 12/07/2016	MW-202A MW-202A-052317 05/23/2017	MW-202A MW-202A-120717 12/07/2017	MW-202A MW-202A-020118 2/1/2018	MW-202AR MW-202AR-040418 4/4/2018	MW-202AR MW-202A-060518 6/5/2018	MW-202AR MW-202AR-071018 7/10/2018	MW-202AR MW-202AR-081518 8/15/2018	MW-202AR MW-202AR-091118 9/11/2018	MW-202B MW-202B-06172014 06/17/2014
<b>Radiological (pCi/L)</b>										
Americium-241	-	-	-	-	-	-	-	-	-	0.0391 ± 0.0652
Carbon-14	-	-	-	-	-	-	-	-	-	4.7 ± 7.27
Cesium-137	-0.0139 U ± 1.97	0.143 U ± 1.96	-0.896 U ± 5.42	0.167 U ± 2.62	0.0594 U ± 2.66	0.328 U ± 3.97	-3.12 U ± 4.06	-0.0899 U ± 3.23	-0.0297 U ± 3.98	2.86 ± 2.36
Cobalt-60	-2.49 U ± 2.64	-0.0306 U ± 2.45	-2.38 U ± 4.99	0.345 U ± 2.79	0.123 U ± 2.74	2.85 U ± 4.57	0.0719 U ± 4.01	5.04 U ± 3.91	1.42 U ± 3.34	1.02 ± 2.89
Europium-152	-	-	-	-	1.21 U ± 6.90	10.8 U ± 9.59	0.598 U ± 10.4	-6.29 U ± 7.85	-3.91 U ± 7.95	10.8 ± 17.9
Europium-154	-	-	-	-	0.446 U ± 7.50	13.6 U ± 9.97	-18.7 U ± 19.5	-1.99 U ± 9.72	-0.293 U ± 7.24	-1.18 ± 2.55
Europium-155	-	-	-	-	-	-	-	-	-	-3.48 ± 4.19
Gross Alpha Analytes	-	-	-	-	-	-	-	-	-	0.406 ± 1.49
Gross Beta Analytes	-	-	-	-	-	-	-	-	-	1.48 ± 2.84
Iron-55	-	-	-	-	-	-	-	-	-	-45.4 ± 77.9
Nickel-59	-	-	-	-	-	-	-	-	-	-10.4 ± 65.4
Nickel-63	0.983 U ± 22.2	17.0 U ± 18.4	2.46 U ± 18.1	-	11.7 U ± 20.2	3.58 U ± 22.9	14.2 U ± 20.6	20.4 U ± 22.8	15.0 U ± 20.0	-3.73 ± 2.68
Niobium-94	-	-	-	-	-	-	-	-	-	0.104 ± 1.99
Plutonium-238	-	-	-	-	-	-	-	-	-	0.148 ± 0.179
Plutonium-239/240	-	-	-	-	-	-	-	-	-	-0.0453 ± 0.0729
Plutonium-241	-	-	-	-	-	-	-	-	-	2.72 ± 7.87
Strontium-90	0.430 U ± 0.825	0.576 U ± 0.818	-0.359 U ± 0.512	0.590 U ± 0.758	0.304 U ± 0.928	-0.172 U ± 0.803	1.36 U ± 0.947	1.49 U ± 1.12	0.000448 U ± 0.784	0.604 ± 0.701
Technetium-99	-	-	-	-	-	-	-	-	-	2.72 ± 2.89
Tritium	-192 U ± 317	113 U ± 239	-11.3 U ± 338	13200 ± 785	702 ± 283	1100 ± 305	281 U ± 294	937 ± 356	1040 ± 374	105 ± 143

Please see Notes on Table 4

**TABLE 2**  
**SUMMARY OF GROUNDWATER QUALITY DATA, 2014-2018**  
**LA CROSSE BOILING WATER REACTOR (LACBWR)**  
**GENOA, WISCONSIN**

Location Sample ID Sample Date	MW-202B MW-202B-09232014 09/23/2014	MW-202B MW-202B-03242015 03/24/2015	MW-202B MW-202B-11112015 11/11/2015	MW-202B MW-202B-120716 12/07/2016	MW-202B MW-202B-05232017 05/23/2017	MW-202B MW-202B-120717 12/07/2017	MW-202B MW-202B-040318 4/3/2018	MW-202B MW-202B-060518 6/5/2018	MW-202B MW-202B-D-060518 6/5/2018	MW-202B MW-202B-071018 7/10/2018
<b>Radiological (pCi/L)</b>										
Americium-241	0.0947 ± 0.121	-	-	-	-	-	-	-	-	-
Carbon-14	-2.71 ± 7.02	-	-	-	-	-	-	-	-	-
Cesium-137	2.3 ± 2.61	-0.704 ± 2.64	4.26 ± 4.28	-1.88 U ± 2.71	-0.914 U ± 2.38	-1.72 U ± 5.69	0.913 U ± 3.39	0.756 U ± 3.72	1.25 U ± 3.67	0.731 U ± 3.33
Cobalt-60	1.17 ± 2.98	0.862 ± 2.46	1.33 ± 4.06	-2.07 U ± 3.19	2.17 U ± 1.73	-3.67 U ± 4.29	2.07 U ± 3.18	-0.909 U ± 3.59	-1.5 U ± 3.62	3.41 U ± 3.57
Europium-152	6.51 ± 17.3	-7.32 ± 14.4	4.37 ± 21.8	-	-	-	-10.3 U ± 10.0	-3.01 U ± 12.7	1.04 U ± 9.61	0.281 U ± 9.01
Europium-154	4.18 ± 8.87	1.09 ± 5.78	-10.5 ± 14.2	-	-	-	1.48 U ± 10.1	-5.6 U ± 12.5	10.2 U ± 13.7	12.0 U ± 9.52
Europium-155	-0.841 ± 4.47	4.96 ± 6.54	-2.16 ± 7.53	-	-	-	-	-	-	-
Gross Alpha Analytes	-0.209 ± 1.59	0.553 ± 1.4	1.46 ± 2.04	-	-	-	-	-	-	-
Gross Beta Analytes	2.3 ± 2.77	1.4 ± 2.57	4.79 ± 4.47	-	-	-	-	-	-	-
Iron-55	33.6 ± 76.7	-	-	-	-	-	-	-	-	-
Nickel-59	-44.6 ± 87.3	-	-	-	-	-	-	-	-	-
Nickel-63	-0.829 ± 2.92	-	-	2.79 U ± 23.1	16.5 U ± 19.0	-0.455 U ± 17.5	-6.87 U ± 18.4	-6.9 U ± 22.1	-4.7 U ± 22.7	0.561 U ± 19.4
Niobium-94	-1.02 ± 2.07	-0.556 ± 2.45	-0.253 ± 3.95	-	-	-	-	-	-	-
Plutonium-238	0.0363 ± 0.0909	-	-	-	-	-	-	-	-	-
Plutonium-239/240	0.0524 ± 0.0892	-	-	-	-	-	-	-	-	-
Plutonium-241	-1.75 ± 8.48	-	-	-	-	-	-	-	-	-
Strontium-90	1.57 ± 0.748	1.04 ± 0.732	1.54 ± 0.792	0.145 U ± 0.687	1.30 U ± 1.17	0.39 U ± 0.606	-0.418 U ± 0.541	-0.796 U ± 0.656	0.843 U ± 0.918	-0.0289 U ± 0.741
Technetium-99	-0.194 ± 3.19	-	-	-	-	-	-	-	-	-
Tritium	103 ± 141	-52 ± 141	0 ± 147	-197 U ± 349	54.5 U ± 236	-193 U ± 320	113 U ± 239	-11.2 U ± 231	-220 U ± 217	-170 U ± 257

Please see Notes on Table 4

**TABLE 2**  
**SUMMARY OF GROUNDWATER QUALITY DATA, 2014-2018**  
**LA CROSSE BOILING WATER REACTOR (LACBWR)**  
**GENOA, WISCONSIN**

Location Sample ID Sample Date	MW-202B MW-202B-081518 8/15/2018	MW-202B MW-202B-091118 9/11/2018	MW-203A MW-203A-06172014 06/17/2014	MW-203A MW-203A-09232014 09/23/2014	MW-203A MW-203A-03242015 03/24/2015	MW-203A MW-203A-11112015 11/11/2015	MW-203A MW-203A-120716 12/07/2016	MW-203A MW-203A-052317 05/23/2017	MW-203A MW-203A-120717 12/07/2017	MW-203A MW-203A-020118 2/1/2018
<b>Radiological (pCi/L)</b>										
Americium-241	-	-	0.0293 ± 0.085	0.25 ± 0.304	-	-	-	-	-	-
Carbon-14	-	-	4.54 ± 7.02	-3.95 ± 7.64	-	-	-	-	-	-
Cesium-137	0.257 U ± 4.08	0.799 U ± 3.04	1.48 ± 1.67	1.55 ± 2.53	3.68 ± 3.45	-2.32 ± 2.54	-0.403 U ± 2.93	-0.355 U ± 1.89	1.08 U ± 4.46	-0.94 U ± 3.22
Cobalt-60	2.41 U ± 4.03	2.40 U ± 2.04	0.0348 ± 1.98	3.66 ± 2.85	2.59 ± 3.43	0.467 ± 2.42	1.34 U ± 2.20	-0.0464 U ± 1.81	0.389 U ± 5.62	0.947 U ± 2.58
Europium-152	-0.816 U ± 8.71	-2.25 U ± 8.17	-0.958 ± 9.46	4.06 ± 21.1	23.6 ± 24.9	-0.672 ± 14.2	-	-	-	-
Europium-154	-5.41 U ± 13.9	-1.34 U ± 8.82	1.93 ± 6.1	-3.32 ± 9.28	-0.997 ± 10.5	2.94 ± 5.41	-	-	-	-
Europium-155	-	-	-4.9 ± 4.39	-0.0953 ± 4.4	5.47 ± 6.26	3.09 ± 5.19	-	-	-	-
Gross Alpha Analytes	-	-	1.74 ± 1.05	1.36 ± 1.04	1.39 ± 0.803	0.819 ± 1.6	-	-	-	-
Gross Beta Analytes	-	-	2.26 ± 1.74	1.51 ± 1.56	3.87 ± 1.89	1.26 ± 3.21	-	-	-	-
Iron-55	-	-	-49.5 ± 75.1	-49.4 ± 79.5	-	-	-	-	-	-
Nickel-59	-	-	-27.1 ± 69.2	53 ± 90.8	-	-	-	-	-	-
Nickel-63	6.63 U ± 22.1	10.4 U ± 19.4	-3.69 ± 2.65	1.61 ± 2.9	-	-	1.09 U ± 25.2	16.0 U ± 20.2	7.03 U ± 17.8	-
Niobium-94	-	-	1.58 ± 1.66	0.0853 ± 2.05	0.0209 ± 3.33	1.67 ± 2.05	-	-	-	-
Plutonium-238	-	-	-0.0567 ± 0.0747	0.0708 ± 0.106	-	-	-	-	-	-
Plutonium-239/240	-	-	-0.0226 ± 0.0691	0.0915 ± 0.12	-	-	-	-	-	-
Plutonium-241	-	-	4.06 ± 8.43	0.504 ± 7.33	-	-	-	-	-	-
Strontium-90	0.593 U ± 0.985	0.697 U ± 0.789	1.17 ± 0.708	1.52 ± 0.782	0.177 ± 0.665	1.37 ± 1.3	1.01 U ± 0.834	-0.44 U ± 1.03	-0.517 U ± 0.526	-0.269 U ± 0.454
Technetium-99	-	-	4.36 ± 3.2	-1.23 ± 3.37	-	-	-	-	-	-
Tritium	-290 U ± 272	163 U ± 230	279 ± 146	-34.3 ± 138	-34.7 ± 142	104 ± 150	-303 U ± 340	-6.35 U ± 227	13000 ± 874	24200 ± 1040

Please see Notes on Table 4

**TABLE 2  
SUMMARY OF GROUNDWATER QUALITY DATA, 2014-2018  
LA CROSSE BOILING WATER REACTOR (LACBWR)  
GENOA, WISCONSIN**

Location Sample ID Sample Date	MW-203A MW-203A-040418 4/4/2018	MW-203A MW-203A-060618 6/6/2018	MW-203A MW-203A-071118 7/11/2018	MW-203A MW-203A-081518 8/15/2018	MW-203A MW-203A-091118 9/11/2018	MW-203B MW-203B-06172014 06/17/2014	MW-203B MW-203B-09232014 09/23/2014	MW-203B MW-203B-D-09232014 09/23/2014	MW-203B MW-203B-03242015 03/24/2015
<b>Radiological (pCi/L)</b>									
Americium-241	-	-	-	-	-	0.0763 ± 0.0979	0.102 ± 0.124	-0.00498 ± 0.0564	-
Carbon-14	-	-	-	-	-	4.54 ± 7.03	0.489 ± 7.64	-2.74 ± 7.09	-
Cesium-137	0.951 U ± 3.47	3.15 U ± 4.96	0.0155 U ± 3.57	0.608 U ± 2.81	1.55 U ± 2.82	1.38 ± 2.57	0.683 ± 1.92	0.335 ± 2.92	-1.65 ± 2.64
Cobalt-60	0.866 U ± 4.82	3.27 U ± 5.77	1.61 U ± 4.15	-2.12 U ± 3.17	-8.83 U ± 4.83	-0.955 ± 2.82	1.99 ± 1.84	1.21 ± 2.65	-0.949 ± 2.48
Europium-152	-2.01 U ± 7.97	8.19 U ± 9.80	8.64 U ± 11.2	-0.722 U ± 8.09	-2.67 U ± 7.92	4.98 ± 21.5	-1.15 ± 12.3	-4.86 ± 18.4	9.69 ± 12
Europium-154	-2.24 U ± 7.87	-6.08 U ± 10.7	-1.73 U ± 9.59	-6.58 U ± 8.84	-9.55 U ± 8.30	-3.69 ± 7.71	-0.231 ± 5.18	-1.53 ± 7.34	0 ± 7.55
Europium-155	-	-	-	-	-	4.04 ± 4.44	-0.365 ± 3.81	-4 ± 4.13	6.5 ± 6.46
Gross Alpha Analytes	-	-	-	-	-	-0.228 ± 2.14	-0.668 ± 2	0.785 ± 1.54	1.09 ± 1.02
Gross Beta Analytes	-	-	-	-	-	5.53 ± 2.99	1 ± 3.02	2.4 ± 2.63	1 ± 2.22
Iron-55	-	-	-	-	-	-49.5 ± 73.2	43.2 ± 74.5	28.4 ± 80.2	-
Nickel-59	-	-	-	-	-	-4.66 ± 56.1	-43.4 ± 90.8	2.7 ± 61	-
Nickel-63	15.2 U ± 20.4	6.28 U ± 21.5	1.20 U ± 18.6	5.29 U ± 21.0	-5.21 U ± 19.9	-3.8 ± 2.73	-1.77 ± 3.1	-3.1 ± 2.86	-
Niobium-94	-	-	-	-	-	1.5 ± 2.33	2.16 ± 1.92	0.565 ± 2.32	0.806 ± 1.57
Plutonium-238	-	-	-	-	-	-0.0586 ± 0.128	0.0812 ± 0.113	-0.0264 ± 0.106	-
Plutonium-239/240	-	-	-	-	-	-0.0394 ± 0.125	0.0596 ± 0.0915	-0.00882 ± 0.103	-
Plutonium-241	-	-	-	-	-	10.2 ± 13.6	-3.71 ± 8.92	-6.33 ± 13	-
Strontium-90	-0.30 U ± 0.935	0.579 U ± 1.05	-0.143 U ± 0.890	0.277 U ± 1.02	-0.104 U ± 0.515	0.822 ± 0.671	1.91 ± 0.765	1.93 ± 0.734	1.12 ± 0.682
Technetium-99	-	-	-	-	-	4.16 ± 3.19	-3.32 ± 3.16	-1.37 ± 3.21	-
Tritium	12100 ± 722	11900 ± 713	2360 ± 410	315 U ± 288	616 ± 347	278 ± 145	121 ± 142	68.7 ± 140	-139 ± 140

Please see Notes on Table 4



**TABLE 2**  
**SUMMARY OF GROUNDWATER QUALITY DATA, 2014-2018**  
**LA CROSSE BOILING WATER REACTOR (LACBWR)**  
**GENOA, WISCONSIN**

Location Sample ID Sample Date	MW-203B MW-203B-11112015 11/11/2015	MW-203B MW-203B-D-11112015 11/11/2015	MW-203B MW-203B-120716 12/07/2016	MW-203B MW-203B-052317 05/23/2017	MW-203B MW-203B-120717 12/07/2017	MW-203B MW-203B-040418 4/4/2018	MW-203B MW-203B-060718 6/7/2018	MW-203B MW-203B-071118 7/11/2018	MW-203B MW-203B-081518 8/15/2018	MW-203B MW-203B-091118 9/11/2018
<b>Radiological (pCi/L)</b>										
Americium-241	-	-	-	-	-	-	-	-	-	-
Carbon-14	-	-	-	-	-	-	-	-	-	-
Cesium-137	-0.0708 ± 2.71	2.83 ± 2.59	-2.13 U ± 3.72	-0.161 U ± 2.80	-0.562 U ± 3.3	0.447 U ± 2.66	0.322 U ± 3.25	-1.49 U ± 3.36	0.250 U ± 4.67	1.05 U ± 4.36
Cobalt-60	0.613 ± 2.56	2.15 ± 2.31	2.40 U ± 2.63	-2.19 U ± 2.64	-1.54 U ± 4.27	2.36 U ± 2.85	0.618 U ± 2.92	1.24 U ± 3.43	0.562 U ± 3.42	-2.29 U ± 4.06
Europium-152	-3.14 ± 16.9	-10.8 ± 18.3	-	-	-	0.294 U ± 7.31	0.478 U ± 9.67	0.0125 U ± 9.58	0.00 U ± 16.5	-3.67 U ± 8.87
Europium-154	-2.96 ± 4.19	-1.28 ± 6.61	-	-	-	7.39 U ± 6.82	2.28 U ± 9.18	1.46 U ± 7.80	-1.02 U ± 8.30	-6.8 U ± 12.8
Europium-155	2.79 ± 6.32	1.5 ± 6.23	-	-	-	-	-	-	-	-
Gross Alpha Analytes	3.32 ± 2.68	-1.41 ± 2.42	-	-	-	-	-	-	-	-
Gross Beta Analytes	3.04 ± 4.83	-0.386 ± 4.16	-	-	-	-	-	-	-	-
Iron-55	-	-	-	-	-	-	-	-	-	-
Nickel-59	-	-	-	-	-	-	-	-	-	-
Nickel-63	-	-	11.7 U ± 25.7	5.62 U ± 17.2	-5.67 U ± 17.4	6.25 U ± 18.0	-3.13 U ± 21.4	-3.72 U ± 18.6	-16 U ± 21.0	21.7 U ± 21.9
Niobium-94	1.51 ± 2.28	-0.947 ± 2.32	-	-	-	-	-	-	-	-
Plutonium-238	-	-	-	-	-	-	-	-	-	-
Plutonium-239/240	-	-	-	-	-	-	-	-	-	-
Plutonium-241	-	-	-	-	-	-	-	-	-	-
Strontium-90	0.737 ± 0.781	1.21 ± 0.823	0.210 U ± 0.593	0.287 U ± 0.796	-0.256 U ± 0.538	-0.00534 U ± 0.995	0.894 U ± 1.01	1.23 U ± 0.893	0.777 U ± 1.05	0.819 U ± 0.755
Technetium-99	-	-	-	-	-	-	-	-	-	-
Tritium	-153 ± 143	-120 ± 145	-297 U ± 335	101 U ± 241	13.1 U ± 338	226 U ± 246	-43.8 U ± 231	-167 U ± 260	206 U ± 306	324 U ± 261

Please see Notes on Table 4

**TABLE 2**  
**SUMMARY OF GROUNDWATER QUALITY DATA, 2014-2018**  
**LA CROSSE BOILING WATER REACTOR (LACBWR)**  
**GENOA, WISCONSIN**

Location Sample ID Sample Date	MW-204A MW-204A-06172014 06/17/2014	MW-204A MW-204A-09232014 09/23/2014	MW-204A MW-204A-03242015 03/24/2015	MW-204A MW-204A-11112015 11/11/2015	MW-204A MW-204A-120716 12/07/2016	MW-204A MW-204A-052217 05/22/2017	MW-204A MW-204A-120617 12/06/2017	MW-204A MW-204A-060718 6/7/2018	MW-204A MW-204A-071218 7/12/2018
<b>Radiological (pCi/L)</b>									
Americium-241	0.155 ± 0.149, 0.0362 ± 0.0955	0.105 ± 0.115	-	-	-	-	-	-	-
Carbon-14	4.65 ± 7.19	0.473 ± 7.39	-	-	-	-	-	-	-
Cesium-137	-0.303 ± 2.02	-1.14 ± 2.49	-0.633 ± 4.54	4.4 ± 5.41	-3.09 U ± 3.17	-2.7 U ± 3.51	1.72 U ± 5.24	-3.19 U ± 4.13	0.811 U ± 3.66
Cobalt-60	0.19 ± 3.23	-0.377 ± 2.42	0.23 ± 4.16	2.52 ± 3.46	0.909 U ± 2.68	-0.666 U ± 3.02	-0.771 U ± 5.63	0.114 U ± 4.63	-4.57 U ± 5.31
Europium-152	2.11 ± 18.3	-19.2 ± 18.2	19.1 ± 23.6	0 ± 12.2	-	-	-	-5.77 U ± 10.7	17.2 U ± 10.3
Europium-154	2.36 ± 8.67	-4.94 ± 8.1	-8.09 ± 12.2	-1.27 ± 12.8	-	-	-	6.04 U ± 13.6	-8.19 U ± 9.62
Europium-155	-0.433 ± 4.28	-2.02 ± 4.49	-2 ± 5.32	1.39 ± 8.05	-	-	-	-	-
Gross Alpha Analytes	0.758 ± 1.96	0.599 ± 1.66	0.978 ± 1.5	1.97 ± 2.62	-	-	-	-	-
Gross Beta Analytes	2.68 ± 2.98	5.28 ± 2.21	10.9 ± 3.06	11.1 ± 4.57	-	-	-	-	-
Iron-55	-40.3 ± 79.2	34.5 ± 75.3	-	-	-	-	-	-	-
Nickel-59	-6.22 ± 59.1	-31.2 ± 74.8	-	-	-	-	-	-	-
Nickel-63	0 ± 2.75	-0.183 ± 2.6	-	-	11.3 U ± 23.6	11.6 U ± 20.3	-7.5 U ± 17.8	17.4 U ± 22.9	0.183 U ± 18.4
Niobium-94	0.225 ± 1	0.118 ± 2.46	-0.241 ± 3.76	1.52 ± 2.09	-	-	-	-	-
Plutonium-238	-0.0512 ± 0.115	-0.000645 ± 0.0685	-	-	-	-	-	-	-
Plutonium-239/240	-0.0248 ± 0.0757	-0.00548 ± 0.0641	-	-	-	-	-	-	-
Plutonium-241	4.07 ± 8.44	-3.97 ± 8.17	-	-	-	-	-	-	-
Strontium-90	2 ± 0.675	1.94 ± 0.734	4.52 ± 1.07	0.76 ± 0.703	0.428 U ± 0.958	0.463 U ± 1.18	0.38 U ± 0.595	0.723 U ± 0.944	0.330 U ± 0.738
Technetium-99	6.95 ± 3.3	-1.95 ± 3.18	-	-	-	-	-	-	-
Tritium	105 ± 143	68.7 ± 140	-52 ± 141	17.2 ± 147	-206 U ± 340	22.4 U ± 236	211 U ± 356	329 U ± 260	-28.2 U ± 267

Please see Notes on Table 4

**TABLE 2**  
**SUMMARY OF GROUNDWATER QUALITY DATA, 2014-2018**  
**LA CROSSE BOILING WATER REACTOR (LACBWR)**  
**GENOA, WISCONSIN**

Location	MW-204A	MW-204A	MW-204A	MW-204A	MW-204B	MW-204B	MW-204B	MW-204B	MW-204B
Sample ID	MW-204A-D-071218	MW-204A-081418	MW-204A-D-081418	MW-204A-091218	MW-204B-06172014	MW-204B-09232014	MW-204B-03242015	MW-204B-11112015	MW-204B-120716
Sample Date	7/12/2018	8/14/2018	8/14/2018	9/12/2018	06/17/2014	09/23/2014	03/24/2015	11/11/2015	12/07/2016
<b>Radiological (pCi/L)</b>									
Americium-241	-	-	-	-	0.0824 ± 0.146	0.268 ± 0.351	-	-	-
Carbon-14	-	-	-	-	12.9 ± 10.2, 4.61 ± 7.13	0.946 ± 7.39	-	-	-
Cesium-137	-4.34 U ± 3.91	0.232 U ± 2.31	0.430 U ± 2.99	1.27 U ± 3.11	1.92 ± 2.24, 2.46 ± 2.15	1.24 ± 2.09	1.87 ± 3.73	-4.15 ± 3.09	-0.257 U ± 2.60
Cobalt-60	2.08 U ± 4.46	-1.28 U ± 2.26	1.03 U ± 3.07	-0.936 U ± 3.55	-0.231 ± 1.83, 0.665 ± 1.8	2.05 ± 2.11	2.63 ± 3.78	-0.162 ± 2.53	-0.0975 U ± 2.11
Europium-152	1.96 U ± 9.96	0.752 U ± 7.00	-5.5 U ± 8.86	1.55 U ± 7.74	7.67 ± 11.1, 4.91 ± 10.4	2.23 ± 12.8	7.43 ± 28.1	8.74 ± 10.9	-
Europium-154	3.77 U ± 13.1	2.08 U ± 6.82	7.52 U ± 9.29	-3.41 U ± 9.13	0.605 ± 6.39, -3.23 ± 5.89	2.36 ± 5.6	-0.428 ± 11.8	-1.76 ± 6.92	-
Europium-155	-	-	-	-	1.66 ± 4.52, -0.45 ± 4.2	0.945 ± 4.76	-1.87 ± 7.28	3.68 ± 6.73	-
Gross Alpha Analytes	-	-	-	-	1.26 ± 2.15, 1.92 ± 3.21	3.52 ± 2.03	-0.537 ± 2.88	3.65 ± 3.4	-
Gross Beta Analytes	-	-	-	-	0.256 ± 4.48, 1.25 ± 4.09	0 ± 3.39	1.8 ± 3.64	15 ± 6.28	-
Iron-55	-	-	-	-	8.68 ± 68.2, -3.98 ± 78.7	-92.5 ± 89.8	-	-	-
Nickel-59	-	-	-	-	-24.7 ± 71.8, -22 ± 65.7	-18.6 ± 67	-	-	-
Nickel-63	-1.27 U ± 19.8	-11.2 U ± 21.1	-0.57 U ± 20.4	32.2 U ± 21.8	-1.97 ± 2.86, -1.95 ± 2.84	0.393 ± 2.79	-	-	-2.04 U ± 24.6
Niobium-94	-	-	-	-	1.28 ± 1.65, -0.511 ± 0.624	-1.88 ± 1.76	0.0185 ± 1.66	2.3 ± 2.03	-
Plutonium-238	-	-	-	-	-0.00928 ± 0.108, 0.0143 ± 0.0929	-0.0326 ± 0.0806	-	-	-
Plutonium-239/240	-	-	-	-	0.0627 ± 0.157, -0.0381 ± 0.0942	0.0701 ± 0.107	-	-	-
Plutonium-241	-	-	-	-	-1.89 ± 9.01, 6.16 ± 9.99	-6.46 ± 10.3	-	-	-
Strontium-90	0.105 U ± 1.06	0.436 U ± 1.02	-0.0389 U ± 1.02	-0.166 U ± 0.521	0.61 ± 0.637, 0.355 ± 0.681	1.26 ± 0.741	0.654 ± 0.728	1.25 ± 0.745	0.719 U ± 0.652
Technetium-99	-	-	-	-	6.3 ± 3.25, 4.96 ± 3.22	0.389 ± 3.2	-	-	-
Tritium	-227 U ± 258	59.6 U ± 296	248 U ± 313	-45.6 U ± 189	34.9 ± 140, 139 ± 142	-120 ± 136	-120 ± 140	-17.3 ± 147	-453 U ± 327

Please see Notes on Table 4

**TABLE 2**  
**SUMMARY OF GROUNDWATER QUALITY DATA, 2014-2018**  
**LA CROSSE BOILING WATER REACTOR (LACBWR)**  
**GENOA, WISCONSIN**

Location Sample ID Sample Date	MW-204B MW-204B-052217 05/22/2017	MW-204B MW-204B-120617 12/06/2017	MW-204B MW-204B-060718 6/7/2018	MW-204B MW-204B-071218 7/12/2018	MW-204B MW-204B-081418 8/14/2018	MW-204B MW-204B-091218 9/12/2018
<b>Radiological (pCi/L)</b>						
Americium-241	-	-	-	-	-	-
Carbon-14	-	-	-	-	-	-
Cesium-137	-0.721 U ± 2.41	0.793 U ± 3.77	-1.76 U ± 2.93	-3.08 U ± 3.81	-2.66 U ± 3.37	-1.57 U ± 3.63
Cobalt-60	-0.0548 U ± 1.95	1.96 U ± 4.73	0.179 U ± 3.23	-0.131 U ± 4.73	-0.463 U ± 3.43	0.464 U ± 2.73
Europium-152	-	-	0.934 U ± 9.69	-4.88 U ± 9.68	-4.67 U ± 7.19	2.10 U ± 8.74
Europium-154	-	-	8.92 U ± 10.8	0.515 U ± 9.27	-2.43 U ± 7.80	3.23 U ± 13.1
Europium-155	-	-	-	-	-	-
Gross Alpha Analytes	-	-	-	-	-	-
Gross Beta Analytes	-	-	-	-	-	-
Iron-55	-	-	-	-	-	-
Nickel-59	-	-	-	-	-	-
Nickel-63	6.34 U ± 17.3	4.95 U ± 16.1	-9.86 U ± 21.7	4.23 U ± 19.8	-3.82 U ± 20.2	2.55 U ± 19.6
Niobium-94	-	-	-	-	-	-
Plutonium-238	-	-	-	-	-	-
Plutonium-239/240	-	-	-	-	-	-
Plutonium-241	-	-	-	-	-	-
Strontium-90	1.00 U ± 0.908	0.937 U ± 0.801	-1.11 U ± 0.763	-0.487 U ± 0.950	1.16 U ± 1.10	0.0301 U ± 0.490
Technetium-99	-	-	-	-	-	-
Tritium	-124 U ± 228	-179 U ± 325	83.4 U ± 241	-238 U ± 243	-76.4 U ± 285	-7.34 U ± 180

Please see Notes on Table 4

**TABLE 3**  
**FIELD PARAMETERS, 2015-2018**  
**LA CROSSE BOILING WATER REACTOR (LACBWR)**  
**GENOA, WISCONSIN**

Location	3	3	3	5	5	5	5	5	5	5
Sample ID	Well-3-071018	Well-3-081518	Well-3-091018	DW-5-03252015	DW-5-06242015	DW-5-09022015	DW-5-11122015	Well 5-120716	Well-5-052217	Well-5-120717
Sample Date	7/10/2018	8/15/2018	9/10/2018	03/25/2015	06/24/2015	09/02/2015	11/12/2015	12/07/2016	05/22/2017	12/07/2017
<b>Field Parameters</b>										
Temperature (Deg C)	17.74	18.33	21.47	5.48	12.4	12.4	12	9.88	14.92	10.72
Dissolved Oxygen, Field (mg/L)	2.83	4.52	3.23	7.13	8.7	8.1	7.7	6.45	7.1	8.32
Conductivity, Field (µS/cm)	450	432	431	550	622	666	671	568	465	592
ORP, Field (mv)	-74	-60	146	304	292	286	230	202	139	104
Turbidity, Field (NTU)	4.05	4.33	13.9	134.6	0	0	0	43.6	3.3	1.17
pH, Field (pH units)	8.24	7.48	8.02	7.23	7.17	7.12	7.28	8.02	7.51	7.71

**ABBREVIATIONS AND NOTES:**  
 - Only collected field parameters are shown in this table.  
 C: Celsius  
 mg/L: milligrams per liter  
 µS/cm: microSiemens per centimeter  
 mV: millivolts  
 NTU: Nephelometric Turbidity Unit

**TABLE 3**  
**FIELD PARAMETERS, 2015-2018**  
**LA CROSSE BOILING WATER REACTOR (LACBWR)**  
**GENOA, WISCONSIN**

Location Sample ID Sample Date	5 Well-5-060618 6/6/2018	5 Well-5-071018 7/10/2018	5 Well-5-081518 8/15/2018	5 Well-5-091118 9/11/2018	7 Well-7-060618 6/6/2018	7 Well-7-071018 7/10/2018	7 Well-7-081518 8/15/2018	7 Well-7-091118 9/11/2018	B11AR MW-B11AR-03252015 03/25/2015	B11AR MW-B11AR-06242015 06/24/2015
<b>Field Parameters</b>										
Temperature (Deg C)	14.06	14.5	14.06	16.72	12.88	15.73	14.35	14.15	10.3	14.5
Dissolved Oxygen, Field (mg/L)	6.31	7.93	11.84	10.45	6.67	7.29	14.32	11.08	3.5	3.5
Conductivity, Field (µS/cm)	607	618	680	550	564	490	525	523	1014	986
ORP, Field (mv)	126	136	220	125	61	115	168	152	290	350
Turbidity, Field (NTU)	7.24	2.75	1.69	1.1	2.52	12.9	2.5	6.62	0	1.5
pH, Field (pH units)	7.64	8.17	7.69	7.29	7.99	8.23	7.67	7.65	7.37	7.15

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 mV: millivolts  
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**TABLE 3**  
**FIELD PARAMETERS, 2015-2018**  
**LA CROSSE BOILING WATER REACTOR (LACBWR)**  
**GENOA, WISCONSIN**

Location Sample ID Sample Date	B11AR MW-B11AR-09022015 09/02/2015	B11AR MW-B11AR-11122015 11/12/2015	B11AR B11AR-120616 12/06/2016	B11AR B11AR-052217 05/22/2017	B11AR B11AR-D-052217 05/22/2017	B11AR B11AR-120517 12/05/2017	B11AR B11AR-D-120517 12/05/2017	B11AR B11AR-060418 6/4/2018	B11AR B11AR-071018 7/10/2018
<b>Field Parameters</b>									
Temperature (Deg C)	14.3	14.3	7.01	12.58	12.58	10.45	10.45	18.05	14.55
Dissolved Oxygen, Field (mg/L)	2.7	2.7	1.65	2.6	2.6	4.51	4.51	3.2	0
Conductivity, Field (µS/cm)	950	950	0	1010	1010	1000	1000	903	546
ORP, Field (mv)	289	289	178	192	192	192	192	92	306
Turbidity, Field (NTU)	0	0	1.9	0.35	0.35	1.06	1.06	0.41	0.2
pH, Field (pH units)	7.37	7.37	7.26	7.26	7.26	6.88	6.88	7.68	7.47

**ABBREVIATIONS AND NOTES:**

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C: Celsius

mg/L: milligrams per liter

µS/cm: microSiemens per centimeter

mV: millivolts

NTU: Nephelometric Turbidity Unit

**TABLE 3**  
**FIELD PARAMETERS, 2015-2018**  
**LA CROSSE BOILING WATER REACTOR (LACBWR)**  
**GENOA, WISCONSIN**

Location Sample ID Sample Date	B11AR B11AR-081418 8/14/2018	B11AR B11AR-091018 9/10/2018	B11R MW-B11R-03252015 03/25/2015	B11R MW-B11R-06242015 06/24/2015	B11R MW-B11R-09022015 09/02/2015	B11R MW-B11R-11122015 11/12/2015	B11R B11R-120616 12/06/2016	B11R B11R-052217 05/22/2017	B11R B11R-120517 12/05/2017
<b>Field Parameters</b>									
Temperature (Deg C)	17.12	16.71	9.7	13.5	16.1	12.9	10.7	12.64	10.08
Dissolved Oxygen, Field (mg/L)	3.38	6.51	0.64	0.2	0.15	0	0	3.3	1.57
Conductivity, Field (µS/cm)	905	888	1095	1085	1132	1120	985	829	1100
ORP, Field (mv)	128	232	131	153	75	90	-65	-86	-65
Turbidity, Field (NTU)	0.56	0.39	10	16.4	8	3.3	16.1	49	8
pH, Field (pH units)	6.21	7.55	6.33	6.3	6.42	6.62	7.5	6.45	6.85

**ABBREVIATIONS AND NOTES:**  
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 mg/L: milligrams per liter  
 µS/cm: microSiemens per centimeter  
 mV: millivolts  
 NTU: Nephelometric Turbidity Unit



**TABLE 3**  
**FIELD PARAMETERS, 2015-2018**  
**LA CROSSE BOILING WATER REACTOR (LACBWR)**  
**GENOA, WISCONSIN**

Location Sample ID Sample Date	B11R B11R-060418 6/4/2018	B11R B11R-071018 7/10/2018	B11R B11R-081418 8/14/2018	B11R B11R-091018 9/10/2018	MW-200A MW-200A-03242015 03/24/2015	MW-200A MW-200A-06242015 06/24/2015	MW-200A MW-200A-09022015 09/02/2015	MW-200A MW-200A-11112015 11/11/2015	MW-200A MW-200A-120816 12/08/2016
<b>Field Parameters</b>									
Temperature (Deg C)	17.1	17.23	17.61	16.1	8.93	13.8	16.4	14.4	10.8
Dissolved Oxygen, Field (mg/L)	0.18	1.3	0.69	0.21	0.26	0	0.4	0.5	0
Conductivity, Field (µS/cm)	1050	1120	1060	1080	1742	1018	614	1175	1270
ORP, Field (mv)	-77	-64	-35	-65	83	279	251	153	-124
Turbidity, Field (NTU)	9.22	5.65	9.91	7.9	10.1	13.6	2.9	8.3	8.7
pH, Field (pH units)	7.03	7.36	6.54	7.6	6.54	6.85	7.09	6.85	7.94

**ABBREVIATIONS AND NOTES:**  
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 mg/L: milligrams per liter  
 µS/cm: microSiemens per centimeter  
 mV: millivolts  
 NTU: Nephelometric Turbidity Unit

**TABLE 3**  
**FIELD PARAMETERS, 2015-2018**  
**LA CROSSE BOILING WATER REACTOR (LACBWR)**  
**GENOA, WISCONSIN**

Location Sample ID Sample Date	MW-200A MW-200A-052217 05/22/2017	MW-200A MW-200A-120617 12/06/2017	MW-200A MW-200A-060518 6/5/2018	MW-200A MW-200A-071118 7/11/2018	MW-200A MW-200A-081418 8/14/2018	MW-200A MW-200A-091018 9/10/2018	MW-200B MW-200B-03242015 03/24/2015	MW-200B MW-200B-D-03242015 03/24/2015	MW-200B MW-200B-06242015 06/24/2015
<b>Field Parameters</b>									
Temperature (Deg C)	14.03	9.23	14.68	17.62	19.65	17.41	10.4	10.4	13.1
Dissolved Oxygen, Field (mg/L)	1.6	2.4	0.85	1.27	3.46	0.44	0	0	0.45
Conductivity, Field (µS/cm)	1400	1900	1070	1350	16.7	1340	830	830	845
ORP, Field (mv)	-142	-122	-34	-71	164	-177	119	119	94
Turbidity, Field (NTU)	4.69	2.42	4.68	8.03	3.57	2.93	0.3	0.3	5.6
pH, Field (pH units)	7.05	6.98	7.2	7.42	7	8.28	7.37	7.37	6.98

**ABBREVIATIONS AND NOTES:**  
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 C: Celsius  
 mg/L: milligrams per liter  
 µS/cm: microSiemens per centimeter  
 mV: millivolts  
 NTU: Nephelometric Turbidity Unit

**TABLE 3**  
**FIELD PARAMETERS, 2015-2018**  
**LA CROSSE BOILING WATER REACTOR (LACBWR)**  
**GENOA, WISCONSIN**

Location Sample ID Sample Date	MW-200B MW-200B-09022015 09/02/2015	MW-200B MW-200B-11112015 11/11/2015	MW-200B MW-200B-120816 12/08/2016	MW-200B MW-200B-052217 05/22/2017	MW-200B MW-200B-120617 12/06/2017	MW-200B MW-200B-060518 6/5/2018	MW-200B MW-200B-071118 7/11/2018	MW-200B MW-200B-081418 8/14/2018	MW-200B MW-200B-091018 9/10/2018
<b>Field Parameters</b>									
Temperature (Deg C)	14.5	12.4	9.99	13.15	8.29	16	14.25	16.02	16.01
Dissolved Oxygen, Field (mg/L)	0.5	0	0	2.09	2.39	0.37	0	1.75	5.05
Conductivity, Field (µS/cm)	846	92	915	652	912	1020	643	1030	960
ORP, Field (mv)	93	92	-101	-75	-39	-114	-92	-111	-110
Turbidity, Field (NTU)	1.1	92	8.7	8.9	5.9	4.81	3.18	4.89	2.08
pH, Field (pH units)	7.01	7.23	7.3	6.46	6.77	7.59	7.08	6.34	7.63

**ABBREVIATIONS AND NOTES:**  
 - Only collected field parameters are shown in this table.  
 C: Celsius  
 mg/L: milligrams per liter  
 µS/cm: microSiemens per centimeter  
 mV: millivolts  
 NTU: Nephelometric Turbidity Unit

**TABLE 3**  
**FIELD PARAMETERS, 2015-2018**  
**LA CROSSE BOILING WATER REACTOR (LACBWR)**  
**GENOA, WISCONSIN**

Location Sample ID Sample Date	MW-201A MW-201A-03252015 03/25/2015	MW-201A MW-201A-06232015 06/23/2015	MW-201A MW-201A-09012015 09/01/2015	MW-201A MW-201A-11112015 11/11/2015	MW-201A MW-201A-120816 12/08/2016	MW-201A MW-201A-052317 05/23/2017	MW-201A MW-201A-120617 12/06/2017	MW-201A MW-201A-020118 2/1/2018	MW-201A MW-201A-060618 6/6/2018
<b>Field Parameters</b>									
Temperature (Deg C)	8.5	13.4	15.65	13.8	2.96	12.16	9.39	4.29	11.84
Dissolved Oxygen, Field (mg/L)	0.51	0.46	2.3	0.11	0	1.29	3.52	6.24	0.21
Conductivity, Field (µS/cm)	1356	1270	1228	1297	688	1040	642	1090	870
ORP, Field (mv)	170	276	237	35	-66	-176	77	-7	-98
Turbidity, Field (NTU)	5.7	3.5	0	3.5	20	5.48	6.98	10	15.5
pH, Field (pH units)	6.5	6.69	6.99	6.95	7.2	7.21	7.16	7.34	7.42

**ABBREVIATIONS AND NOTES:**  
 - Only collected field parameters are shown in this table.  
 C: Celsius  
 mg/L: milligrams per liter  
 µS/cm: microSiemens per centimeter  
 mV: millivolts  
 NTU: Nephelometric Turbidity Unit

**TABLE 3**  
**FIELD PARAMETERS, 2015-2018**  
**LA CROSSE BOILING WATER REACTOR (LACBWR)**  
**GENOA, WISCONSIN**

Location Sample ID Sample Date	MW-201A MW-201A-071118 7/11/2018	MW-201A MW-201A-081518 8/15/2018	MW-201A MW-201A-091118 9/11/2018	MW-201B MW-201B-03252015 03/25/2015	MW-201B MW-201B-06232015 06/23/2015	MW-201B MW-201B-09012015 09/01/2015	MW-201B MW-201B-11112015 11/11/2015	MW-201B MW-201B-120816 12/08/2016	MW-201B MW-201B-052317 05/23/2017
<b>Field Parameters</b>									
Temperature (Deg C)	16.88	15.11	13.33	10.6	14	15.6	12.7	2.96	12.89
Dissolved Oxygen, Field (mg/L)	0	3.55	1.03	0	0	0.3	0	0	2.65
Conductivity, Field (µS/cm)	593	1830	1320	907	896	866	868	1070	772
ORP, Field (mv)	-116	80	-81	126	115	111	132	-58	-91
Turbidity, Field (NTU)	17	8.65	18.4	2.5	0	2.8	0	18.7	20.8
pH, Field (pH units)	6.91	5.44	6.69	7.15	6.76	6.77	7.04	6.84	6.76

**ABBREVIATIONS AND NOTES:**

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C: Celsius

mg/L: milligrams per liter

µS/cm: microSiemens per centimeter

mV: millivolts

NTU: Nephelometric Turbidity Unit

**TABLE 3**  
**FIELD PARAMETERS, 2015-2018**  
**LA CROSSE BOILING WATER REACTOR (LACBWR)**  
**GENOA, WISCONSIN**

Location Sample ID Sample Date	MW-201BR MW-201B-060618 6/6/2018	MW-201BR MW-201BR-071118 7/11/2018	MW-201BR MW-201BR-081518 8/15/2018	MW-201BR MW-201BR-091118 9/11/2018	MW-202A MW-202A-03242015 03/24/2015	MW-202A MW-202A-06232015 06/23/2015	MW-202A MW-202A-09012015 09/01/2015	MW-202A MW-202A-D-09012015 09/01/2015
<b>Field Parameters</b>								
Temperature (Deg C)	13.26	24.24	14.7	13.85	10.1	14.7	17.3	17.3
Dissolved Oxygen, Field (mg/L)	0.02	0.81	0.67	0	0	1.3	4	4
Conductivity, Field (µS/cm)	942	780	980	928	615	681	333	333
ORP, Field (mv)	-114	-124	-120	-168	370	262	299	299
Turbidity, Field (NTU)	3.4	4.47	2.04	3.61	0	2.1	1.1	1.1
pH, Field (pH units)	7.26	7.53	6.69	7.53	7.26	7.05	7.17	7.17

**ABBREVIATIONS AND NOTES:**

- Only collected field parameters are shown in this table.

C: Celsius

mg/L: milligrams per liter

µS/cm: microSiemens per centimeter

mV: millivolts

NTU: Nephelometric Turbidity Unit

**TABLE 3**  
**FIELD PARAMETERS, 2015-2018**  
**LA CROSSE BOILING WATER REACTOR (LACBWR)**  
**GENOA, WISCONSIN**

Location Sample ID Sample Date	MW-202A MW-202A-11112015 11/11/2015	MW-202A MW-202A-120716 12/07/2016	MW-202A MW-202A-D-120716 12/07/2016	MW-202A MW-202A-052317 05/23/2017	MW-202A MW-202A-120717 12/07/2017	MW-202A MW-202A-020118 2/1/2018	MW-202AR MW-202AR-040418 4/4/2018	MW-202AR MW-200A-060518 6/5/2018	MW-202AR MW-202AR-071018 7/10/2018
<b>Field Parameters</b>									
Temperature (Deg C)	15.6	11.73	11.73	12.03	4.86	6.31	7.72	16.48	18.1
Dissolved Oxygen, Field (mg/L)	1	0	0	1.43	5.45	1	4.09	0.14	0
Conductivity, Field (µS/cm)	439	287	287	622	715	646	742	842	442
ORP, Field (mv)	266	9	9	159	88	82	-52	33	83
Turbidity, Field (NTU)	0	4.1	4.1	1.2	5.34	3.75	30.4	9.4	20.8
pH, Field (pH units)	7.14	8.24	8.24	7.07	6.84	7.52	7.55	7.57	7.35

**ABBREVIATIONS AND NOTES:**

- Only collected field parameters are shown in this table.

C: Celsius

mg/L: milligrams per liter

µS/cm: microSiemens per centimeter

mV: millivolts

NTU: Nephelometric Turbidity Unit

**TABLE 3**  
**FIELD PARAMETERS, 2015-2018**  
**LA CROSSE BOILING WATER REACTOR (LACBWR)**  
**GENOA, WISCONSIN**

Location Sample ID Sample Date	MW-202AR MW-202AR-081518 8/15/2018	MW-202AR MW-202AR-091118 9/11/2018	MW-202B MW-202B-03242015 03/24/2015	MW-202B MW-202B-06232015 06/23/2015	MW-202B MW-202B-09012015 09/01/2015	MW-202B MW-202B-11112015 11/11/2015	MW-202B MW-202B-120716 12/07/2016	MW-202B MW-202B-052317 05/23/2017	MW-202B MW-202B-120717 12/07/2017
<b>Field Parameters</b>									
Temperature (Deg C)	16.38	15.89	11.15	15.8	16.7	13.5	10.23	13.99	4.49
Dissolved Oxygen, Field (mg/L)	4.88	3.35	0.51	0.26	0	0.2	0	2.73	3.89
Conductivity, Field (µS/cm)	893	1320	975	936	906	907	1000	809	968
ORP, Field (mv)	185	-30	103	91	79	88	-116	-131	-46
Turbidity, Field (NTU)	8.23	7.35	4.9	19	1.4	2.4	7.3	5.07	15.7
pH, Field (pH units)	7.08	8	6.81	6.96	7.26	7.02	7.34	6.97	6.82

**ABBREVIATIONS AND NOTES:**  
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 C: Celsius  
 mg/L: milligrams per liter  
 µS/cm: microSiemens per centimeter  
 mV: millivolts  
 NTU: Nephelometric Turbidity Unit



**TABLE 3**  
**FIELD PARAMETERS, 2015-2018**  
**LA CROSSE BOILING WATER REACTOR (LACBWR)**  
**GENOA, WISCONSIN**

Location Sample ID Sample Date	MW-202B MW-202B-040318 4/3/2018	MW-202B MW-202B-060518 6/5/2018	MW-202B MW-202B-071018 7/10/2018	MW-202B MW-202B-081518 8/15/2018	MW-202B MW-202B-091118 9/11/2018	MW-203A MW-203A-03242015 03/24/2015	MW-203A MW-203A-06232015 06/23/2015	MW-203A MW-203A-09012015 09/01/2015	MW-203A MW-203A-11112015 11/11/2015
<b>Field Parameters</b>									
Temperature (Deg C)	7.72	15.47	16.64	15.63	18.86	10.6	15	16.6	14.7
Dissolved Oxygen, Field (mg/L)	4.25	0.55	0	1.32	4.28	0.36	2	0	0.6
Conductivity, Field (µS/cm)	1050	1080	747	1040	899	567	567	589	556
ORP, Field (mv)	-59	-112	-84	-131	-122	128	160	96	146
Turbidity, Field (NTU)	24.3	1.08	2.1	4.01	1.48	9.8	1.1	1.2	2.5
pH, Field (pH units)	7.05	7.31	7.27	5.82	6.91	6.55	6.65	7.07	6.78

**ABBREVIATIONS AND NOTES:**

- Only collected field parameters are shown in this table.

C: Celsius

mg/L: milligrams per liter

µS/cm: microSiemens per centimeter

mV: millivolts

NTU: Nephelometric Turbidity Unit

**TABLE 3**  
**FIELD PARAMETERS, 2015-2018**  
**LA CROSSE BOILING WATER REACTOR (LACBWR)**  
**GENOA, WISCONSIN**

Location Sample ID Sample Date	MW-203A MW-203A-120716 12/07/2016	MW-203A MW-203A-052317 05/23/2017	MW-203A MW-203A-120717 12/07/2017	MW-203A MW-203A-020118 2/1/2018	MW-203A MW-203A-040418 4/4/2018	MW-203A MW-203A-060618 6/6/2018	MW-203A MW-203A-071118 7/11/2018	MW-203A MW-203A-081518 8/15/2018	MW-203A MW-203A-091118 9/11/2018
<b>Field Parameters</b>									
Temperature (Deg C)	9.03	13.48	8.02	6.49	5.46	15.85	17.28	19.33	23.89
Dissolved Oxygen, Field (mg/L)	0	1.75	1.25	8.7	4.96	2.2	0	1.58	1
Conductivity, Field (µS/cm)	914	514	873	925	1000	527	216	305	164
ORP, Field (mv)	-121	-142	-104	-72	-52	-104	-50	23	-103
Turbidity, Field (NTU)	6.9	2.6	4.96	7.7	38.8	8.69	13.8	6.93	12.9
pH, Field (pH units)	7.92	7.04	7.16	7.28	6.81	7.55	7.1	6.05	6.94

**ABBREVIATIONS AND NOTES:**

- Only collected field parameters are shown in this table.

C: Celsius

mg/L: milligrams per liter

µS/cm: microSiemens per centimeter

mV: millivolts

NTU: Nephelometric Turbidity Unit

**TABLE 3**  
**FIELD PARAMETERS, 2015-2018**  
**LA CROSSE BOILING WATER REACTOR (LACBWR)**  
**GENOA, WISCONSIN**

Location Sample ID Sample Date	MW-203B MW-203B-03242015 03/24/2015	MW-203B MW-203B-06232015 06/23/2015	MW-203B MW-203B-D-06232015 06/23/2015	MW-203B MW-203B-09012015 09/01/2015	MW-203B MW-203B-11112015 11/11/2015	MW-203B MW-203B-D-11112015 11/11/2015	MW-203B MW-203B-120716 12/07/2016	MW-203B MW-203B-052317 05/23/2017
<b>Field Parameters</b>								
Temperature (Deg C)	12.5	14.8	14.8	15	13.1	13.1	8.87	13.15
Dissolved Oxygen, Field (mg/L)	0	0	0	0.2	0	0	0	2.76
Conductivity, Field (µS/cm)	681	609	609	840	861	861	765	497
ORP, Field (mv)	80	47	47	58	68	68	-112	-147
Turbidity, Field (NTU)	0.4	0	0	0.3	2.1	2.1	8	7.1
pH, Field (pH units)	7.5	7.5	7.5	7.28	7.39	7.39	7.37	7.24

**ABBREVIATIONS AND NOTES:**

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mg/L: milligrams per liter

µS/cm: microSiemens per centimeter

mV: millivolts

NTU: Nephelometric Turbidity Unit

**TABLE 3**  
**FIELD PARAMETERS, 2015-2018**  
**LA CROSSE BOILING WATER REACTOR (LACBWR)**  
**GENOA, WISCONSIN**

Location Sample ID Sample Date	MW-203B MW-203B-120717 12/07/2017	MW-203B MW-203B-040418 4/4/2018	MW-203B MW-203B-060718 6/7/2018	MW-203B MW-203B-071118 7/11/2018	MW-203B MW-203B-081518 8/15/2018	MW-203B MW-203B-091118 9/11/2018	MW-204A MW-204A-03242015 03/24/2015	MW-204A MW-204A-06232015 06/23/2015	MW-204A MW-204A-08312015 08/31/2015
<b>Field Parameters</b>									
Temperature (Deg C)	4.49	7.81	14.01	21.17	24.81	23.37	7.11	13.3	18.5
Dissolved Oxygen, Field (mg/L)	4.36	4.91	0.88	2.21	0.36	0	0.21	2.4	1.8
Conductivity, Field (µS/cm)	765	850	813	789	634	787	730	6300	709
ORP, Field (mv)	-49	-72	-163	-155	-170	-227	322	360	363
Turbidity, Field (NTU)	4.99	6.1	2.13	2.62	8.27	4.2	4.7	0	0.4
pH, Field (pH units)	7.09	7.63	7.84	8.1	7.29	8.45	7.1	7.26	7.15

**ABBREVIATIONS AND NOTES:**

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mV: millivolts

NTU: Nephelometric Turbidity Unit

**TABLE 3**  
**FIELD PARAMETERS, 2015-2018**  
**LA CROSSE BOILING WATER REACTOR (LACBWR)**  
**GENOA, WISCONSIN**

Location Sample ID Sample Date	MW-204A MW-204A-11112015 11/11/2015	MW-204A MW-204A-120716 12/07/2016	MW-204A MW-204A-052217 05/22/2017	MW-204A MW-204A-120617 12/06/2017	MW-204A MW-204A-060718 6/7/2018	MW-204A MW-204A-071218 7/12/2018	MW-204A MW-204A-081418 8/14/2018	MW-204A MW-204A-D-081418 8/14/2018	MW-204A MW-204A-091218 9/12/2018
<b>Field Parameters</b>									
Temperature (Deg C)	15.7	8.85	12.84	9.47	14.25	16.91	16.36	16.36	17.88
Dissolved Oxygen, Field (mg/L)	0	0	2.15	3.55	2.6	0	4.45	4.45	0.92
Conductivity, Field (µS/cm)	731	727	544	826	961	530	1470	1470	812
ORP, Field (mv)	397	56	119	258	93	259	111	111	121
Turbidity, Field (NTU)	0	4.2	1.15	4.71	3.34	1.21	0.81	0.81	3.39
pH, Field (pH units)	7.07	7.34	6.63	6.65	7.56	7.28	6.21	6.21	6.94

**ABBREVIATIONS AND NOTES:**  
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 mg/L: milligrams per liter  
 µS/cm: microSiemens per centimeter  
 mV: millivolts  
 NTU: Nephelometric Turbidity Unit

**TABLE 3**  
**FIELD PARAMETERS, 2015-2018**  
**LA CROSSE BOILING WATER REACTOR (LACBWR)**  
**GENOA, WISCONSIN**

Location Sample ID Sample Date	MW-204B MW-204B-03242015 03/24/2015	MW-204B MW-204B-06232015 06/23/2015	MW-204B MW-204B-08312015 08/31/2015	MW-204B MW-204B-11112015 11/11/2015	MW-204B MW-204B-120716 12/07/2016	MW-204B MW-204B-052217 05/22/2017	MW-204B MW-204B-120617 12/06/2017	MW-204B MW-204B-060718 6/7/2018	MW-204B MW-204B-071218 7/12/2018
<b>Field Parameters</b>									
Temperature (Deg C)	9.39	13.3	15.9	12.7	8.35	15.86	9.4	14.15	15.57
Dissolved Oxygen, Field (mg/L)	0	0.35	0.3	0.2	0	2.79	3.17	0.78	1.69
Conductivity, Field (µS/cm)	1205	1159	1402	1267	1310	1260	1250	1150	1190
ORP, Field (mv)	350	298	323	304	63	122	108	69	108
Turbidity, Field (NTU)	1.2	0	0.5	1.1	0.8	2.56	7.07	4.19	1.4
pH, Field (pH units)	7.25	6.96	6.86	6.87	8.15	7.2	7.24	7.42	7.59

**ABBREVIATIONS AND NOTES:**  
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 C: Celsius  
 mg/L: milligrams per liter  
 µS/cm: microSiemens per centimeter  
 mV: millivolts  
 NTU: Nephelometric Turbidity Unit

**TABLE 3**  
**FIELD PARAMETERS, 2015-2018**  
**LA CROSSE BOILING WATER REACTOR (LACBWR)**  
**GENOA, WISCONSIN**

Location	MW-204B	MW-204B
Sample ID	MW-204B-081418	MW-204B-091218
Sample Date	8/14/2018	9/12/2018
<b>Field Parameters</b>		
Temperature (Deg C)	16.15	16.89
Dissolved Oxygen, Field (mg/L)	0.58	0
Conductivity, Field (µS/cm)	1200	1110
ORP, Field (mv)	107	31
Turbidity, Field (NTU)	3.97	1.8
pH, Field (pH units)	7.08	7.63

**ABBREVIATIONS AND NOTES:**

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C: Celsius

mg/L: milligrams per liter

µS/cm: microSiemens per centimeter

mV: millivolts

NTU: Nephelometric Turbidity Unit

**TABLE 4**  
**NOTES FOR ANALYTICAL DATA**  
**LA CROSSE BOILING WATER REACTOR (LACBWR)**  
**GENOA, WISCONSIN**

**Notes:**

- 1 Regulatory criteria from NR 140.10, Subchapter II
  - R Result is rejected
  - pCi/L picoCuries per liter
  - U Not detected, number is the laboratory reporting limit
- Shaded cells indicate duplicate analyses performed.



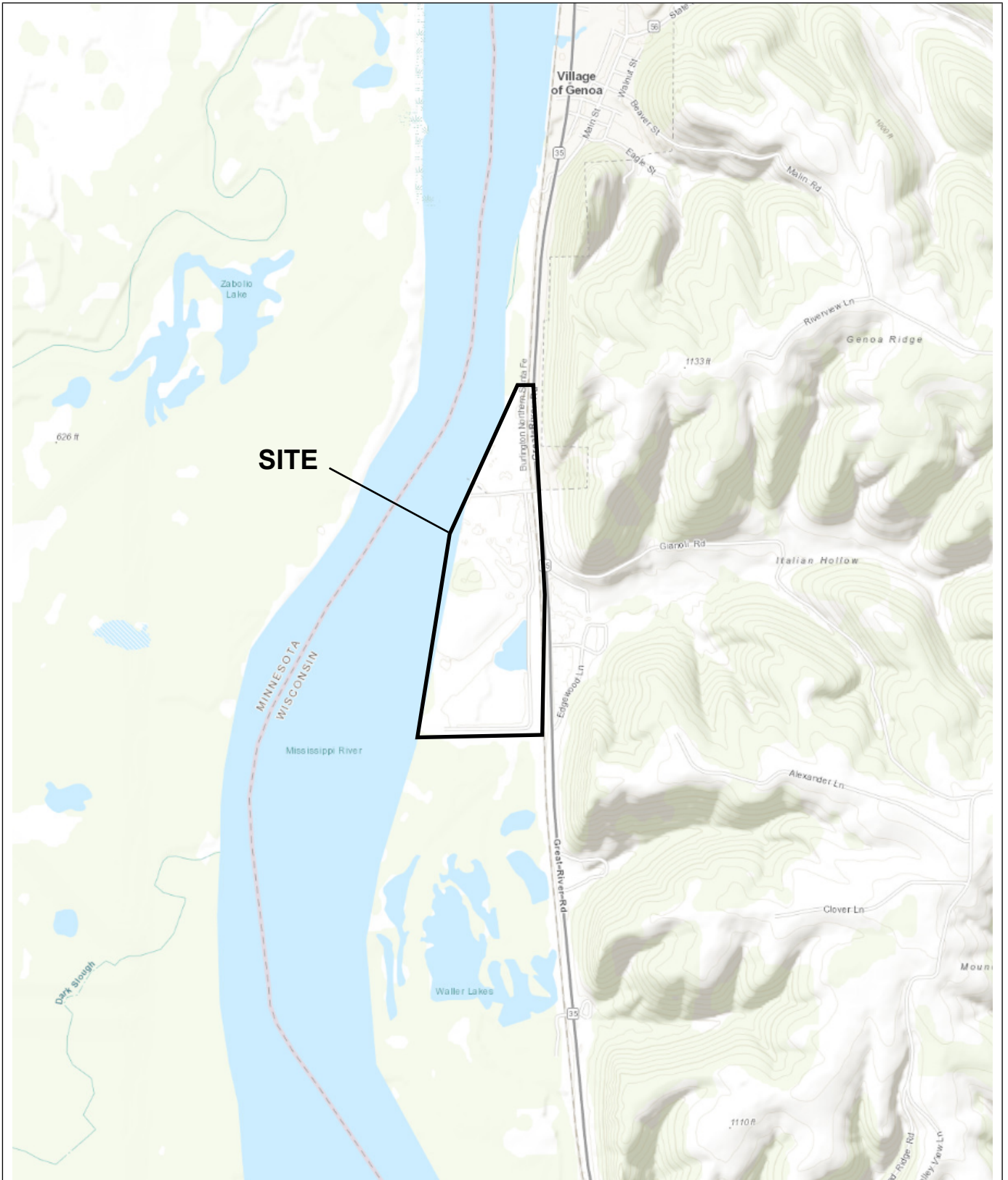
**TABLE 5  
SUMMARY OF DYE RESULTS  
LA CROSSE BOILING WATER REACTOR (LACBWR)  
GENOA, WISCONSIN**

Station Number	Rhodamine WT Concentration (ppb)									Rhodamine WT Concentration (ppb/day)									
	Date Placed		07/12/18	07/19/18	07/26/18	08/02/18	08/09/18	08/16/18	09/11/18 - 09/12/18		03/08/18		07/12/18	07/19/18	07/26/18	08/02/18	08/09/18	08/16/18	09/11/18 - 09/12/18
Date Collected	03/16/18	7/10/2018	07/19/18	07/26/18	08/02/18	08/09/18	08/16/18	09/10/18 - 09/12/18	10/09/18 - 10/10/18	03/16/18	7/10/2018	07/19/18	07/26/18	08/02/18	08/09/18	08/16/18	09/10/18 - 09/12/18	10/09/18 - 10/10/18	
201-A			-	-	-	-	-	-	-			-	-	-	-	-	-	-	
202-B	-		-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	
202-AR			-	-	-	-	-	-	-			-	-	-	-	-	-	-	
203-A	-		-	54.4	529	84.1	12.3	543	940	-		-	7.77	75.57	12.01	1.76	20.88	32.41	
203-B	-		-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	
204-B			-	-	-	-	-	-	-			-	-	-	-	-	-	-	
204-A			-	-	-	-	-	-	-			-	-	-	-	-	-	-	
Well-5*		-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	
Well-7*		-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	
Well-3*		-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	
River			-	-	-	-	-	-	-			-	-	-	-	-	-	-	

**Notes:**

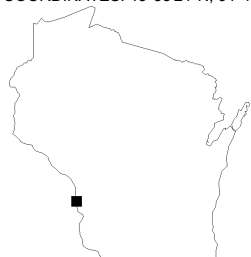
1 pound of RWT was introduced on 07/12/2018 and flushed with approximately 230 gallons of non-chlorinated water  
 \* Water samples submitted. Samples were collected concurrently with sample packets.  
 ppb/day calculated by dividing the concentration detected by the lab in ppb by the number of days the packet was submerged  
 ppb: indicates parts per billion  
 "-": indicates non-detect  
 " ": indicates not sampled

## FIGURES



MAP SOURCE: ESRI

SITE COORDINATES: 43°33'21"N, 91°13'52"W



**HALEY  
ALDRICH**

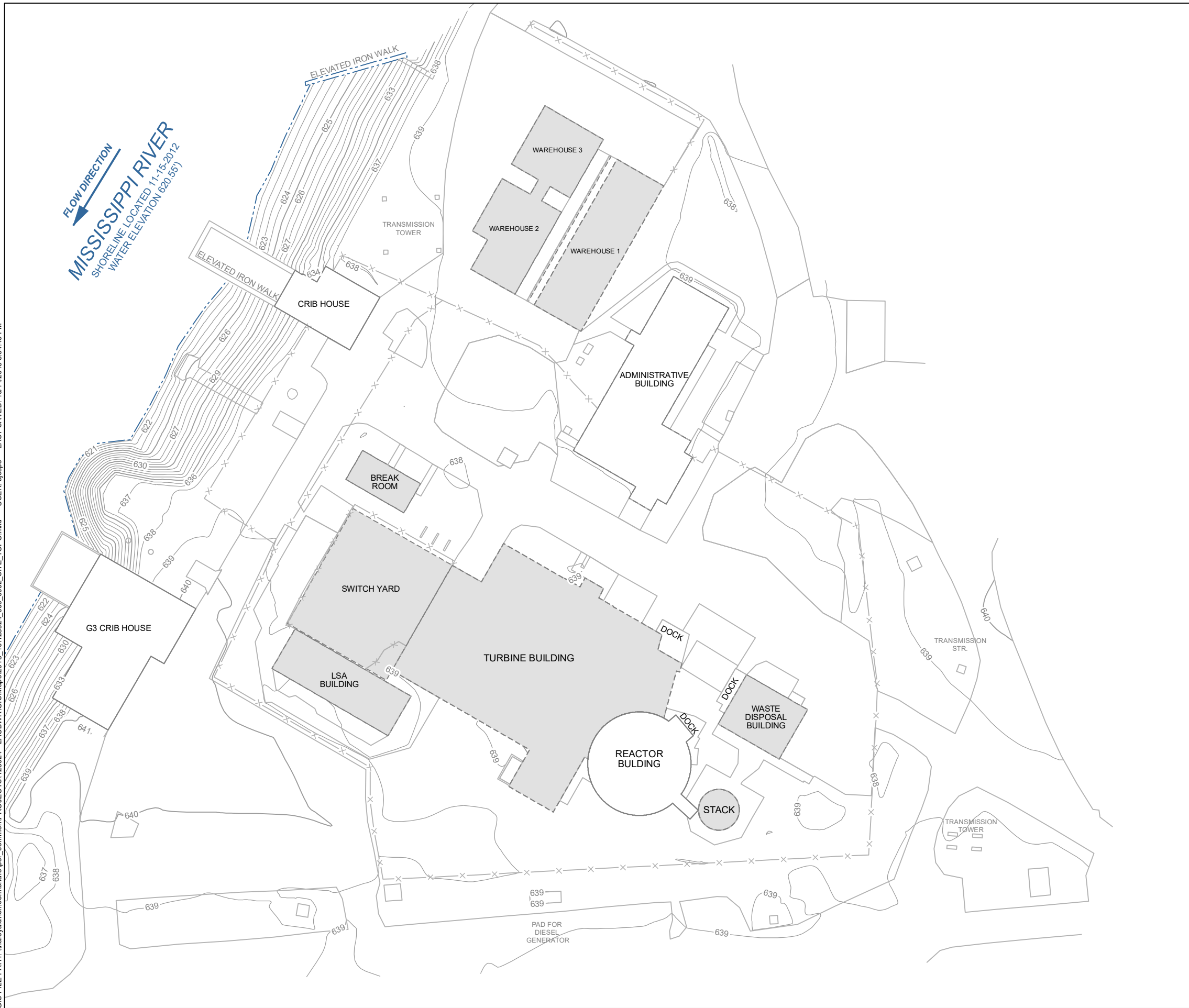
LACBWR  
LACROSSE SOLUTIONS  
GENOA, WISCONSIN

## PROJECT LOCUS

APPROXIMATE SCALE: 1 IN = 2000 FT  
DECEMBER 2017

**FIGURE 1**

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- LEGEND**
- HISTORICAL BUILDING OUTLINE
  - EXISTING BUILDING OUTLINE
  - x— FENCE
  - - - - SHORELINE
  - BASE MAP
  - EXISTING BUILDING FOOTPRINT
  - ▒ HISTORICAL BUILDING FOOTPRINT

- NOTES**
1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
  2. BASE PLAN SOURCE: "TOPOGRAPHIC/SITE SURVEY, DAIRYLAND POWER COOPERATIVE, LACBWR, GENOA, WISCONSIN", DATE 26 NOVEMBER 2012, BY LAMPMAN & ASSICATES



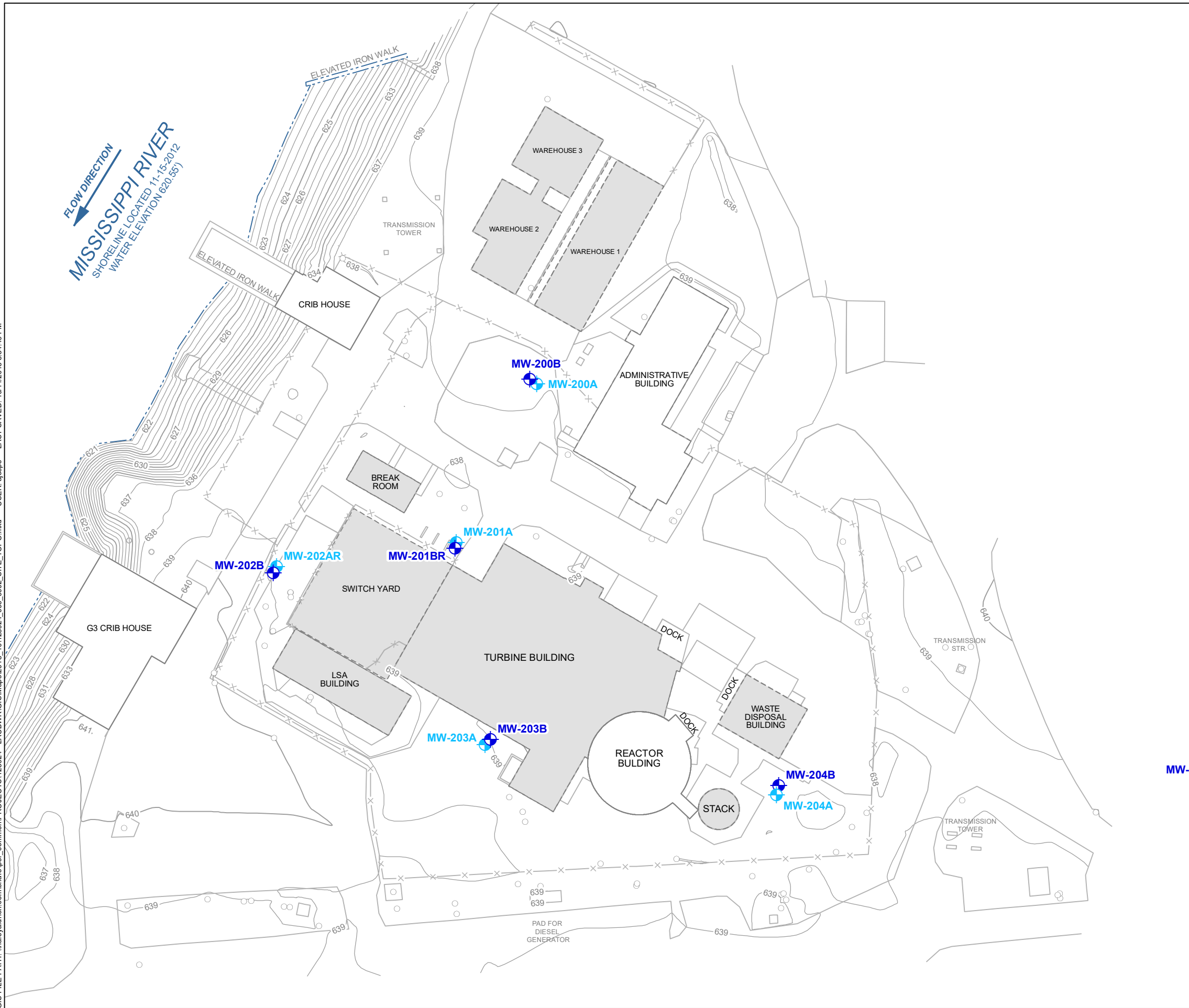
**HALEY ALDRICH**  
LACBWR  
LACROSSESOLUTIONS  
GENOA, WISCONSIN

**CURRENT SITE LOCATIONS**

OCTOBER 2018

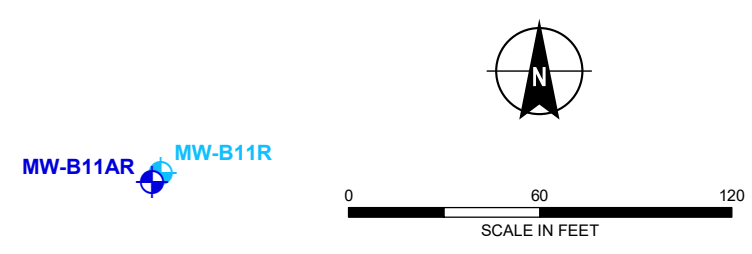
**FIGURE 2**

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- LEGEND**
- DEEP WELL
  - SHALLOW WELL
  - UTILITY
  - HISTORICAL BUILDING OUTLINE
  - EXISTING BUILDING OUTLINE
  - FENCE
  - SHORELINE
  - BASE MAP
  - EXISTING BUILDING FOOTPRINT
  - HISTORICAL BUILDING FOOTPRINT

- NOTES**
1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
  2. BASE PLAN SOURCE: "TOPOGRAPHIC/SITE SURVEY, DAIRYLAND POWER COOPERATIVE, LACBWR, GENOA, WISCONSIN", DATE 26 NOVEMBER 2012, BY LAMPMAN & ASSICATES



**HALEY ALDRICH**  
 LACBWR  
 LACROSSESOLUTIONS  
 GENOA, WISCONSIN

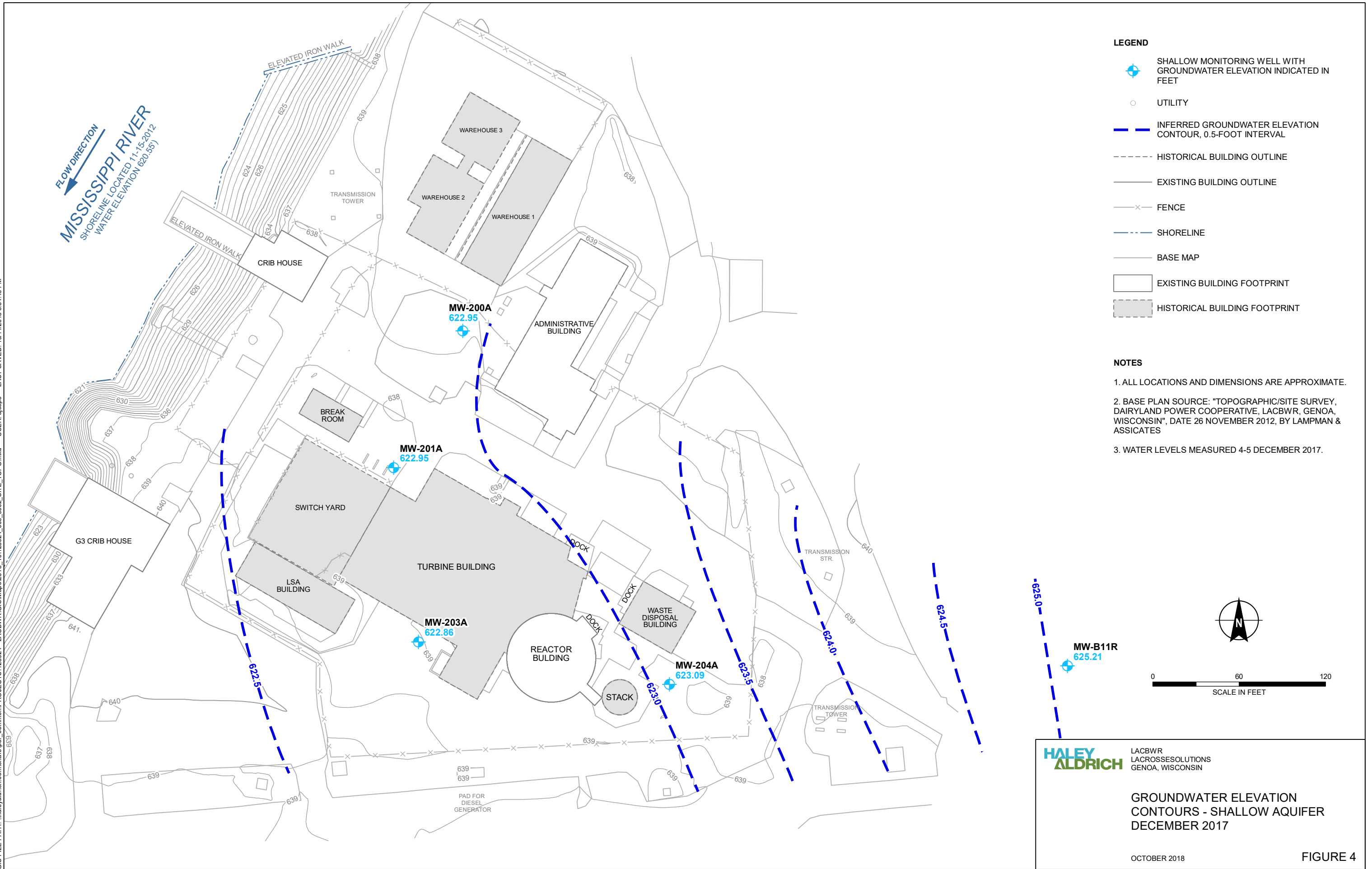
**MONITORING WELL LOCATIONS**

OCTOBER 2018

FIGURE 3



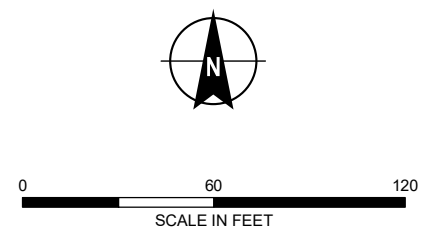
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**FLOW DIRECTION**  
**MISSISSIPPI RIVER**  
 SHORELINE LOCATED 1-15-2012  
 WATER ELEVATION 620.35'

- LEGEND**
- SHALLOW MONITORING WELL WITH GROUNDWATER ELEVATION INDICATED IN FEET
  - UTILITY
  - INFERRED GROUNDWATER ELEVATION CONTOUR, 0.5-FOOT INTERVAL
  - HISTORICAL BUILDING OUTLINE
  - EXISTING BUILDING OUTLINE
  - FENCE
  - SHORELINE
  - BASE MAP
  - EXISTING BUILDING FOOTPRINT
  - HISTORICAL BUILDING FOOTPRINT

- NOTES**
1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
  2. BASE PLAN SOURCE: "TOPOGRAPHIC/SITE SURVEY, DAIRYLAND POWER COOPERATIVE, LACBWR, GENOA, WISCONSIN", DATE 26 NOVEMBER 2012, BY LAMPMAN & ASSICATES
  3. WATER LEVELS MEASURED 4-5 DECEMBER 2017.

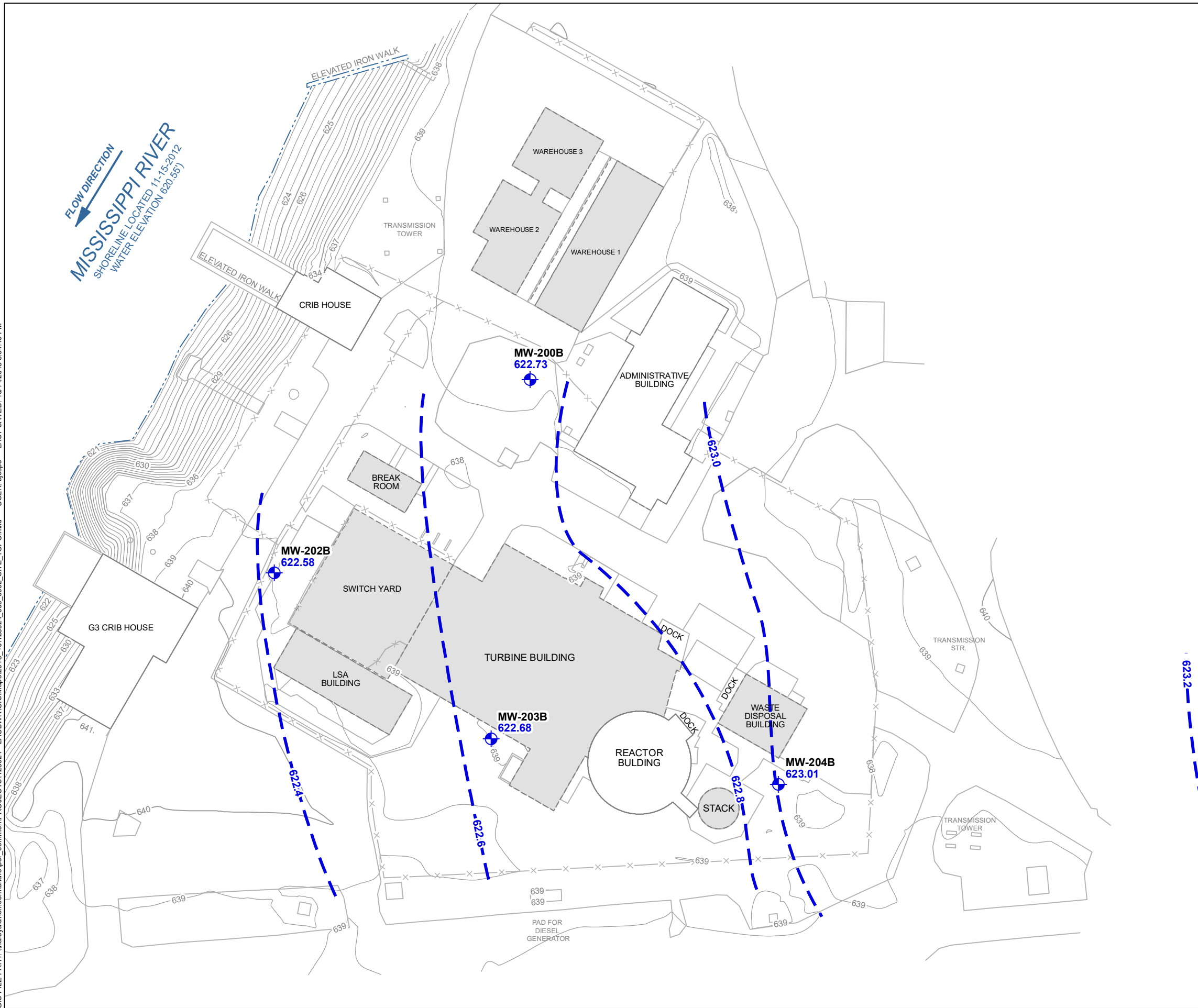


**HALEY ALDRICH** LACBWR  
 LACROSSESOLUTIONS  
 GENOA, WISCONSIN











**GROUNDWATER ELEVATION CONTOURS - SHALLOW AQUIFER DECEMBER 2017**

OCTOBER 2018 FIGURE 4

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**LEGEND**

-  DEEP MONITORING WELL WITH GROUNDWATER ELEVATION INDICATED IN FEET
-  UTILITY
-  INFERRED GROUNDWATER ELEVATION CONTOUR, 0.2-FOOT INTERVAL
-  HISTORICAL BUILDING OUTLINE
-  EXISTING BUILDING OUTLINE
-  FENCE
-  SHORELINE
-  BASE MAP
-  EXISTING BUILDING FOOTPRINT
-  HISTORICAL BUILDING FOOTPRINT

**NOTES**

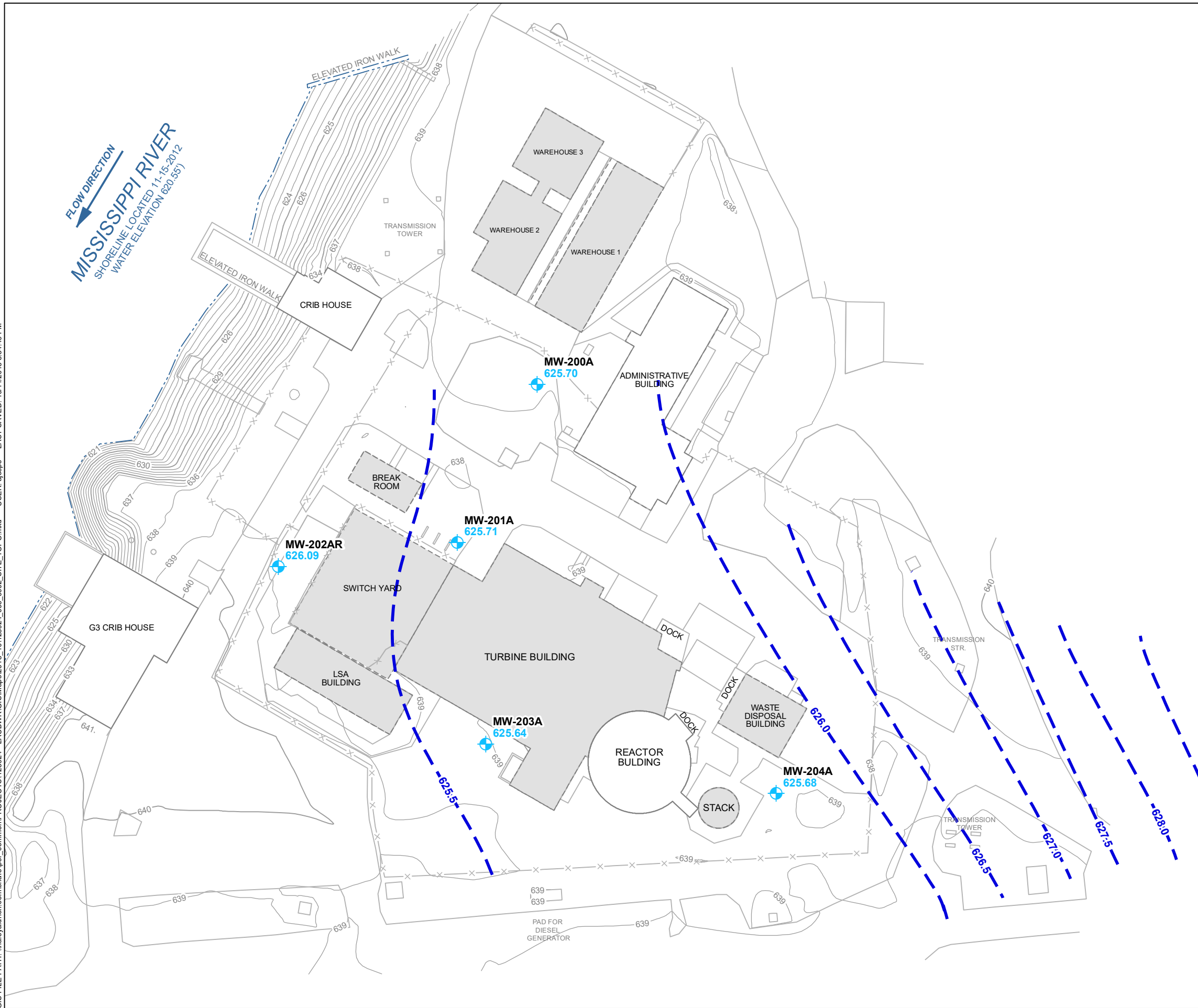
1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. BASE PLAN SOURCE: "TOPOGRAPHIC/SITE SURVEY, DAIRYLAND POWER COOPERATIVE, LACBWR, GENOA, WISCONSIN", DATE 26 NOVEMBER 2012, BY LAMPMAN & ASSICATES
3. WATER LEVELS MEASURED 5-7 DECEMBER 2017

**HALEY ALDRICH** LACBWR  
LACROSSESOLUTIONS  
GENOA, WISCONSIN

**GROUNDWATER ELEVATION CONTOURS - DEEP AQUIFER DECEMBER 2017**

OCTOBER 2018 FIGURE 5

GIS FILE PATH: \\haleyaldrich.com\share\proj\_common\PROJECTS\128924 - LACBWR\GIS\Maps\2018\_10128924\_006\_0002\_SITE\_TOPO.mxd — USER: agospe — LAST SAVED: 10/11/2018 5:34:49 PM



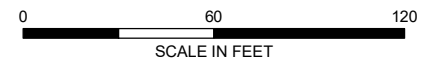
FLOW DIRECTION  
 MISSISSIPPI RIVER  
 SHORELINE LOCATED 11-15-2012  
 WATER ELEVATION (620.555)

**LEGEND**

- SHALLOW MONITORING WELL WITH GROUNDWATER ELEVATION INDICATED IN FEET
- UTILITY
- INFERRED GROUNDWATER ELEVATION CONTOUR, 0.5-FOOT INTERVAL
- HISTORICAL BUILDING OUTLINE
- EXISTING BUILDING OUTLINE
- FENCE
- SHORELINE
- BASE MAP
- EXISTING BUILDING FOOTPRINT
- HISTORICAL BUILDING FOOTPRINT

**NOTES**

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. BASE PLAN SOURCE: "TOPOGRAPHIC/SITE SURVEY, DAIRYLAND POWER COOPERATIVE, LACBWR, GENOA, WISCONSIN", DATE 26 NOVEMBER 2012, BY LAMPMAN & ASSICATES
3. WATER LEVELS MEASURED 4-7 JUNE 2018.



**HALEY ALDRICH**

LACBWR  
 LACROSSESOLUTIONS  
 GENOA, WISCONSIN

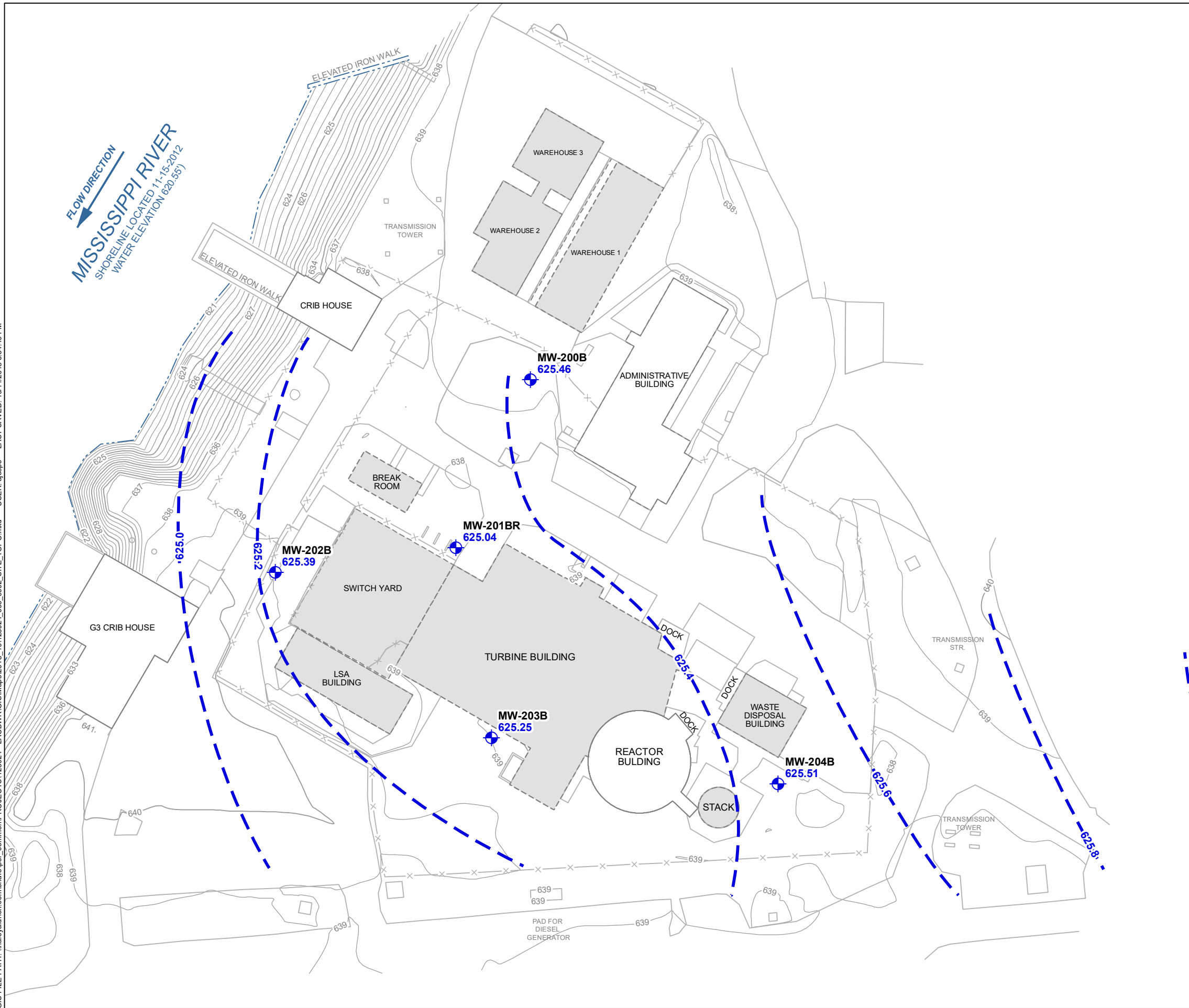
**GROUNDWATER ELEVATION  
 CONTOURS - SHALLOW AQUIFER  
 JUNE 2018**

OCTOBER 2018

FIGURE 6



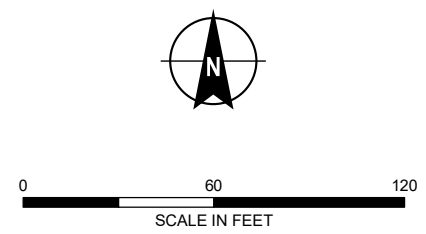
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**LEGEND**

- DEEP MONITORING WELL WITH GROUNDWATER ELEVATION INDICATED IN FEET
- UTILITY
- INFERRED GROUNDWATER ELEVATION CONTOUR, 0.2-FOOT INTERVAL
- HISTORICAL BUILDING OUTLINE
- EXISTING BUILDING OUTLINE
- FENCE
- SHORELINE
- BASE MAP
- EXISTING BUILDING FOOTPRINT
- HISTORICAL BUILDING FOOTPRINT

- NOTES**
1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
  2. BASE PLAN SOURCE: "TOPOGRAPHIC/SITE SURVEY, DAIRYLAND POWER COOPERATIVE, LACBWR, GENOA, WISCONSIN", DATE 26 NOVEMBER 2012, BY LAMPMAN & ASSICATES
  3. WATER LEVELS MEASURED 4-7 JUNE 2018.

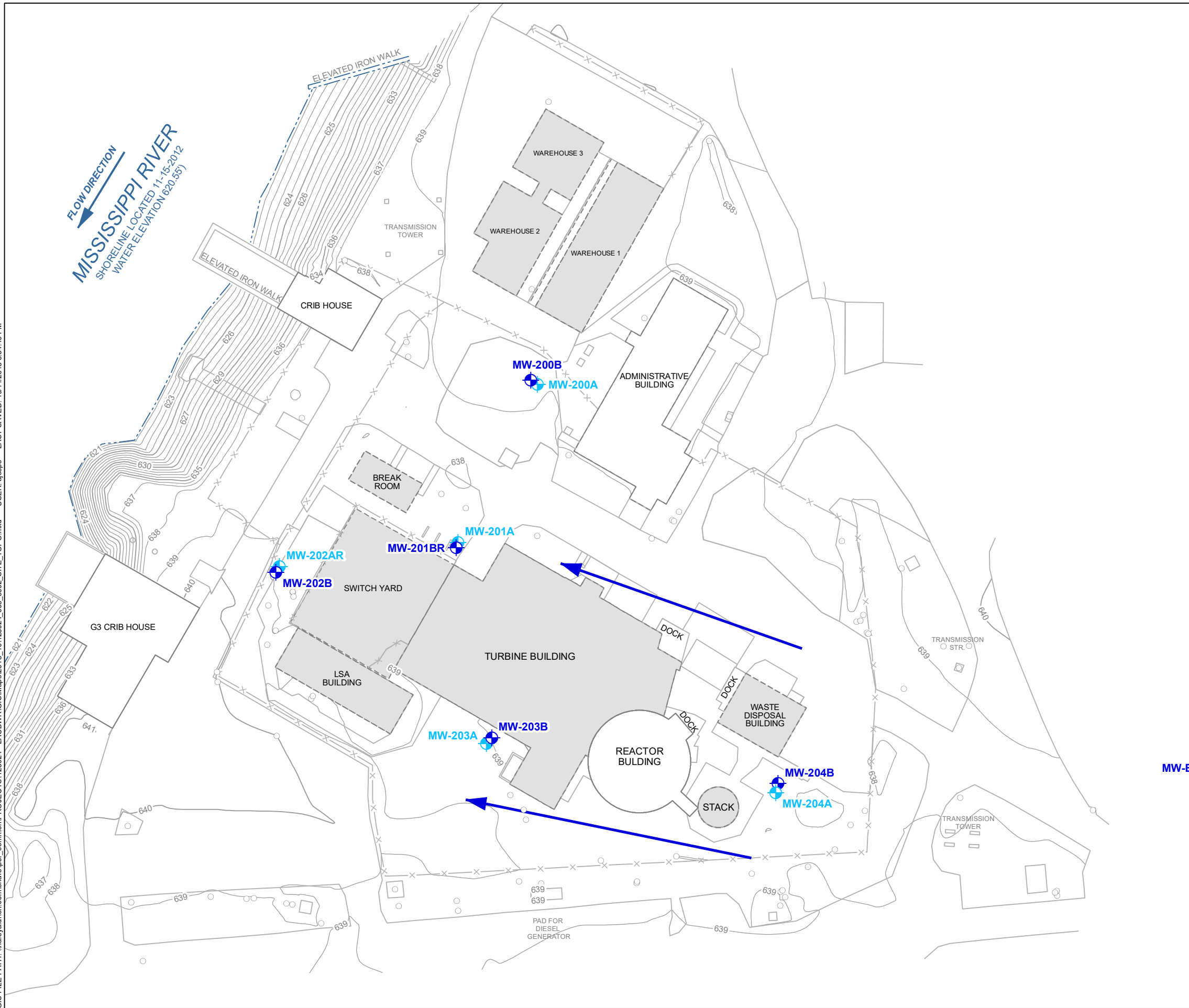


**HALEY ALDRICH** LACBWR  
LACROSSESOLUTIONS  
GENOA, WISCONSIN

**GROUNDWATER ELEVATION CONTOURS - DEEP AQUIFER JUNE 2018**

OCTOBER 2018 FIGURE 7

GIS FILE PATH: \\haleyaldrich.com\share\proj\_common\proj\PROJECTS\128924 - LACBWR\GIS\Maps\2018\_10128924\_006\_002\_SITE\_TOPO.mxd — USER: agospe — LAST SAVED: 10/11/2018 5:34:49 PM



**LEGEND**

- DEEP WELL
- SHALLOW WELL
- UTILITY
- APPROXIMATE DIRECTION OF GROUNDWATER FLOW
- HISTORICAL BUILDING OUTLINE
- EXISTING BUILDING OUTLINE
- FENCE
- SHORELINE
- BASE MAP
- EXISTING BUILDING FOOTPRINT
- HISTORICAL BUILDING FOOTPRINT

**NOTES**

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. BASE PLAN SOURCE: "TOPOGRAPHIC/SITE SURVEY, DAIRYLAND POWER COOPERATIVE, LACBWR, GENOA, WISCONSIN", DATE 26 NOVEMBER 2012, BY LAMPMAN & ASSICATES



0 60 120  
SCALE IN FEET

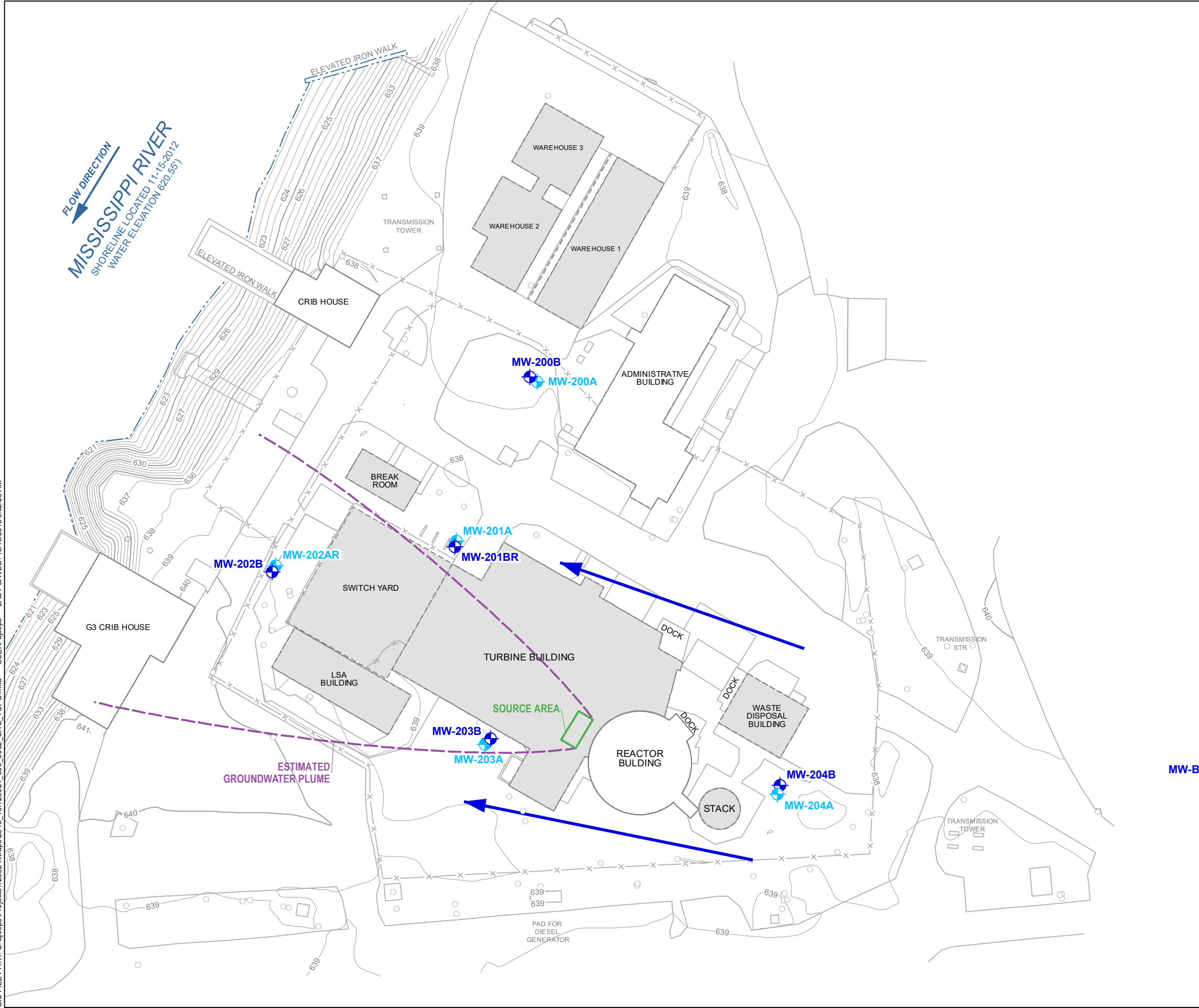
**HALEY ALDRICH**  
LACBWR  
LACROSSESOLUTIONS  
GENOA, WISCONSIN

**PREDICTED GROUNDWATER FLOW PATHWAY**

OCTOBER 2018

FIGURE 8

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- LEGEND**
- DEEP WELL
  - SHALLOW WELL
  - UTILITY
  - APPROXIMATE DIRECTION OF GROUNDWATER FLOW
  - ESTIMATED GROUNDWATER PLUME
  - SOURCE AREA
  - HISTORICAL BUILDING OUTLINE
  - EXISTING BUILDING OUTLINE
  - FENCE
  - SHORELINE
  - BASE MAP
  - EXISTING BUILDING FOOTPRINT
  - HISTORICAL BUILDING FOOTPRINT

**NOTES**

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. BASE PLAN SOURCE: "TOPOGRAPHIC/SITE SURVEY, DAIRYLAND POWER COOPERATIVE, LACBWR, GENOA, WISCONSIN", DATE 26 NOVEMBER 2012, BY LAMPMAN & ASSICATES



0 60 120  
SCALE IN FEET

**HALEY ALDRICH**  
LACBWR  
LACROSSESOLUTIONS  
GENOA, WISCONSIN

**SUMMARY OF TRITIUM AND DYE DETECTIONS**

OCTOBER 2018

**FIGURE 9**

## **APPENDIX A**

### **Pertinent Correspondence**



**State of Wisconsin**  
DEPARTMENT OF NATURAL RESOURCES  
101 S. Webster Street  
P.O. Box 7921  
Madison, WI 53707-7921

**Scott Walker, Governor**  
**Daniel L. Meyer, Secretary**  
Telephone 608-266-2621  
Toll Free 1-888-936-7463  
TTY Access via relay - 711



March 30, 2018

Joseph Nowak  
EnergySolutions  
4601 State Hwy 35  
Genoa, WI 54632

Subject: Reported Contamination at La Crosse Boiling Water Reactor Facility, 4601 State Highway 35,  
Genoa, WI  
DNR BRRTS Activity # 02-63-581112  
DNR FID # 663020930

Dear Mr. Nowak:

On March 14, 2018, Gerry van Noordennen, Vice President of Regulatory Affairs for EnergySolutions, on behalf of EnergySolutions, notified the Department of Natural Resources (DNR) that Tritium had been detected at the site described above.

Based on the information that has been submitted to the DNR regarding this site, we believe you are responsible for investigating and restoring the environment at the above-described site under Section 292.11, Wisconsin Statutes, known as the hazardous substances spill law.

This letter describes the legal responsibilities of a person who is responsible under section 292.11, Wis. Stats., explains what you need to do to investigate and clean up the contamination, and provides you with information about cleanups, environmental consultants, possible financial assistance, and working cooperatively with the DNR or the Department of Agriculture, Trade and Consumer Protection (DATCP).

**Legal Responsibilities:**

Your legal responsibilities are defined both in statute and in administrative codes. The hazardous substances spill law, Section 292.11 (3) Wisconsin Statutes, states:

- **RESPONSIBILITY.** A person who possesses or controls a hazardous substance which is discharged or who causes the discharge of a hazardous substance shall take the actions necessary to restore the environment to the extent practicable and minimize the harmful effects from the discharge to the air, lands, or waters of the state.

Wisconsin Administrative Code chapters NR 700 through NR 754 establish requirements for emergency and interim actions, public information, site investigations, design and operation of remedial action systems, and case closure. Wisconsin Administrative Code chapter NR 140 establishes groundwater standards for contaminants that reach groundwater.

**Steps to Take:**

The longer contamination is left in the environment, the farther it can spread and the more it may cost to clean up. Quick action may lessen damage to your property and neighboring properties and reduce your costs in investigating and cleaning up the contamination. To ensure that your cleanup complies with Wisconsin's laws and administrative codes, you should hire a professional environmental consultant who understands what needs to be done. The following information provides the timeframes and required steps to take. Unless otherwise approved by DNR in writing you must complete the work by the timeframes specified.

1. Within the next **30 days**, by April 29, 2018, you should submit written verification (such as a letter from the consultant) that you have hired an environmental consultant. If you do not take action within this time frame, the DNR may initiate enforcement action against you.
2. Within **60 days**, by May 29, 2018, you must submit a work plan for completing the investigation. The work plan must comply with the requirements in the NR 700 Wis. Adm. Code rule series and should adhere to current DNR technical guidance documents.
3. You must initiate the site investigation within 90 days of submitting the site investigation work plan. You may proceed with the field investigation upon DNR notification to proceed. If the DNR has not responded within 30 days from submittal of the work plan, you are required to proceed with the field investigation. If a fee for DNR review has been submitted, the field investigation must begin within 60 days after receiving DNR approval.
4. Within 60 days after completion of the field investigation and receipt of the laboratory data, you must submit a Site Investigation Report to the DNR or other agency with administrative authority. For sites with agrichemicals contamination, your case will be transferred to the Department of Agriculture, Trade and Consumer Protection for oversight.
5. Within 60 days after submitting the Site Investigation Report, you must submit a remedial actions options report (RAOR). The RAOR shall include an evaluation of Green and Sustainable Remediation opportunities as required by s. NR 722.09 (2m), Wis. Adm. Code.

Sites where discharges to the environment have been reported are entered into the Bureau for Remediation and Redevelopment Tracking System ("BRRTS"), a version of which appears on the DNR's internet site. You may view the information related to your site at any time (<http://dnr.wi.gov/botw/SetUpBasicSearchForm.do>) and use the feedback system to alert us to any errors in the data.

If you want a formal written response from the department on a specific submittal, please be aware that a review fee is required in accordance with ch. NR 749, Wis. Adm. Code. If a fee is not submitted with your reports, you must complete the site investigation and cleanup to maintain your compliance with the spills law and chapters NR 700 through NR754. **The timeframes specified above are required by rule, so do not delay the investigation of your site.** We have provided detailed technical guidance to environmental consultants. Your consultant is expected to know our technical procedures and administrative rules and should be able to answer your questions on meeting cleanup requirements.

All correspondence regarding this site should be sent to:

Tim Zeichert  
Remediation and Redevelopment Program  
Wisconsin Department of Natural Resources  
P. O. Box 7921  
Madison, WI 53707-7921  
Timothy.Zeichert@wisconsin.gov



Unless otherwise directed, submit one paper copy and one electronic copy of plans and reports. To speed processing, correspondence should reference the BRRTS and FID numbers (if assigned) shown at the top of this letter.

### **Site Investigation and Vapor Pathway Analysis**

As you develop the site investigation work plan, we want to remind you to include an assessment of the vapor intrusion pathway. Chapter NR 716, Wisconsin Administrative Code outlines the requirements for investigation of contamination in the environment. Specifically, s. NR 716.11(3) (a) requires that the field investigation determine the “nature, degree and extent, both areal and vertical, of the hazardous substances or environmental pollution in all affected media”. In addition, section NR 716.11(5) (g) and (h) contains the specific requirements for evaluating the presence of vapors in the sub-surface as well as in indoor air.

You will need to include documentation with the Site Investigation Report that explains how the assessment was done. If the vapor pathway is being ruled out, then the report needs to provide the appropriate justification for reaching this conclusion. If the pathway cannot be ruled out, then investigation and, if appropriate, remedial action must be taken to address the risk presented prior to submitting the site for closure. The DNR has developed guidance to help responsible parties and their consultants comply with the requirements described above. The guidance includes a detailed explanation of how to assess the vapor intrusion pathway and provides criteria which identify when an investigation is necessary. The guidance is available at:  
<http://dnr.wi.gov/files/PDF/pubs/rr/RR800.pdf>.

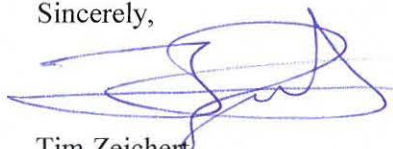
### **Additional Information for Site Owners:**

We encourage you to visit our website at <http://dnr.wi.gov/topic/Brownfields/>, where you can find information on selecting a consultant, financial assistance and understanding the cleanup process. You will also find information there about liability clarification letters, post-cleanup liability and more.

If you have questions, call the DNR Tim Zeichert at 608-266-5788 for more information or visit the RR web site at the address above.

Thank you for your cooperation.

Sincerely,



Tim Zeichert  
Hydrogeologist  
Remediation & Redevelopment Program

cc: Nadia Glucksberg  
Haley & Aldrich, Inc.  
75 Washington Avenue, Suite 1A  
Portland, ME 04101



June 28, 2018

Joseph Nowak  
La Crosse Solutions  
4601 State Hwy 35  
Genoa, WI 54632

Subject: Infiltration/Injection Temporary Exemption Request for  
La Crosse Boiling Water Reactor Facility, S4651 STH 35, Genoa, Wisconsin  
WDNR BRRTS Activity # 02-63-58111

Dear Mr. Nowak:

The purpose of this letter is to provide a temporary exemption for the injection of a remedial material into groundwater. A request for a temporary exemption to inject Rhodamine WT into groundwater at the La Crosse Boiling Water Reactor Facility was received from your consultant, Haley & Aldrich, Inc., on March 16, 2018. The Department of Natural Resources (Department) also received a request for a WPDES General Permit for Contaminated Groundwater from Remedial Action Operation, Request to Perform Infiltration/Injection at the La Crosse Boiling Water Reactor on March 16, 2018. A review fee of \$700.00 was submitted on March 16, 2018. This temporary exemption is intended to provide assurances to LaCrosseSolutions that the environmental cleanup being conducted in response to a release of contaminants on the Property is being conducted in accordance with s. 292.12, Wis. Stats.

Up to one pound of Rhodamine WT dye will be introduced into an existing excavation along the west side of the reactor building where the sump was previously located. The intent of this of this study is to verify the conceptual site model and to evaluate if the Reactor Plant, Generator Plant Access sump is the source for the tritium recently detected in groundwater. The amount of dye to be introduced is intended to minimize the potential for discharge to the Mississippi River.

**NR 140 Temporary Exemption:**

Department approval is hereby granted to LaCrosseSolutions for the injection of Rhodamine WT to groundwater on the La Crosse Boiling Water Reactor Facility property, with certain terms and conditions. The expiration date of this temporary exemption shall be two (2) years from the date of this letter.

The need to obtain a temporary exemption for the injection of a remedial material for which a groundwater quality standard has not been established is required under s. NR 140.28 (1) (d), Wis. Adm. Code. Based on the information provided by your consultant, it appears the requirements for a temporary exemption for the injection of a remedial material for which a groundwater quality standard has not been established under s. NR 140.28 (1) (d) have been or will be met, in accordance with s. NR 140.28 (5) (c) and (d), Wis. Adm. Code.

Department approval is granted with the following terms and conditions:

A. General:

1. The remedial action for restoring contaminated groundwater or soil, and any infiltrated or injected contaminated water and remedial materials, shall achieve the applicable response objectives required by s. NR 140.24 (2) or s. NR 140.26 (2), Wis. Adm. Code, within a reasonable period of time.
2. The type, concentration and volume of substances or remedial material to be infiltrated or injected shall be



minimized to the extent that is necessary for restoration of the contaminated groundwater.

3. Any infiltration or injection of contaminated water or remedial material into groundwater shall not significantly increase the threat to public health or welfare, or to the environment.
4. No uncontaminated or contaminated groundwater, substance or remedial material shall be infiltrated or injected into an area where a floating non-aqueous liquid is present in the contaminated groundwater.
5. There shall be no expansion of soil or groundwater contamination, or migration of any infiltrated or injected contaminated water or remedial material, beyond the edge of previously contaminated areas, except that infiltration or injection into previously uncontaminated areas may be allowed if the Department determines that expansion into adjacent, previously uncontaminated areas is necessary for the restoration of the contaminated groundwater, and the requirements of s. NR 140.18 (1), Wis. Adm. Code will be met.
6. All necessary federal, state and local licenses, permits and other approvals are obtained and compliance with all applicable environmental protection requirements is required. A WPDES general permit for Discharge of Contaminated Groundwater from Remedial Action Operations is required for this action.

B. Specific:

7. LaCrosseSolutions will be responsible for providing an alternative supply of potable water to the users of the water system until such time as the tracer investigation and potable water follow-up sampling is completed and WDNR has approved the conditions for terminating monitoring of the potable water sources (see Condition 14 below).
8. Rhodamine WT concentrations in water used for drinking/consumption must not exceed the level recommended by the Wisconsin Department of Health Services in a letter dated May 29, 2018 to the DNR Groundwater Section Chief (which is the current NSF/ANSI maximum potable water concentration reference value of 0.1 micrograms per liter ( $\mu\text{g/L}$ )).
9. LaCrosseSolutions will implement a communication plan to assure that Public Wells #3 (WUWN: AK185), #5 (AK187), and #7 (WQ177) are not utilized for drinking/consumption until potable water follow-up sampling is completed and WDNR has approved the conditions for terminating monitoring of the potable water sources (see Condition 14 below).
10. The remedial materials to be injected to the groundwater shall be limited to a Rhodamine WT product from a manufacturer that has received a product-specific certification from NSF International to ANSI/NSF Standard 60 for use in drinking water.
11. Public or private drinking water wells which could be impacted by this groundwater investigation must be monitored for Rhodamine WT using an appropriate analytical method with a detection limit below 0.1 micrograms per liter ( $\mu\text{g/L}$ ) in potable water.
12. Public Wells #3 (WUWN: AK185), #5 (AK187), and #7 (WQ177) will be monitored by collecting grab samples from the tap/access point and submitted for analysis.
13. Public Wells #3 (WUWN: AK185), #5 (AK187), and #7 (WQ177) will be sampled at concurrent intervals to samples taken at monitoring wells and then monthly thereafter. WDNR will approve the conditions for terminating the monthly potable water source monitoring in a separate letter based on data, conceptual and numerical model results submitted to WDNR by La Crosse Solutions or their contractor (the general guideline for approving the termination of monitoring of potable water will be approximately six(6) months after, as reviewed and agreed upon by WDNR, model results and data generated by LaCrosseSolutions and their contractor indicates the trailing edge of the tracer plume would be expected to pass hydraulically downgradient of all potable wells, or until a minimum of six consecutive monthly samples from public Wells #3 (WUWN: AK185), #5 (AK187), and #7 (WQ177) test below the value established in condition 8 above).
14. Any monitoring detections, complaints or reports of potential water supply contamination that are received by LaCrosseSolutions the or its contractor as a result of dye water tracer injection activities shall be immediately reported to the Department. Contact Brian Austin, of the DNR's Bureau of Drinking Water and Groundwater program, at 608-266-3415, and by e-mail at [Brian.Austin@wisconsin.gov](mailto:Brian.Austin@wisconsin.gov); and also Tim Zeichert at 608-266-5788, and by email at [Timothy.Zeichert@wisconsin.gov](mailto:Timothy.Zeichert@wisconsin.gov) should any such report need to be made.

15. Should the Department determine that a potable water supply has become contaminated as a result of dye water tracer injection activities, the LaCrosseSolutions will be responsible for remediating the contamination and for providing an alternative supply of potable water to the users of the water system until such time as use of the water system is restored or until a permanent alternative potable water supply is installed.
16. The remedial material and injection project shall be as described in Request to Perform Infiltration/Injection at the La Crosse Boiling Water Reactor on March 16, 2018.
17. *Haley & Aldrich, Inc.* shall notify the Department of field activities no less than one (1) week before implementation.
18. Remediation progress reports shall be submitted with the semi-annual progress reports. The progress reports shall include the groundwater monitoring results. The first report should be submitted not more than six months after the first injection. Recommendations as to the next phase of sampling and/or the need for additional treatment shall be included in a future report. This report shall be submitted as soon as the necessary information is available, and must be submitted prior to the expiration date of this temporary approval.
19. Any significant changes based on information from the injection groundwater monitoring reports or results shall be submitted to the Department for approval prior to the changes being implemented at the La Crosse Boiling Water Reactor Facility site. This includes, but is not limited to, adjustments to the volume/mass of the media injected, additional injection points, number of injection events, and/or changes in the type of remediation media used in the injection points.
20. Modifications to the sampling schedule may be requested.
21. In the event of future injection activities, the responsible party may apply for an extension of this approval. A request for an extension of this approval must be received by the Department before the expiration date.
22. Any permit extension approvals will be dependent on WI DNR review of site-specific data or any other information it deems necessary.
23. Upon completion of the project, the injection holes must be abandoned in accordance with s. NR 141.25, Wis. Adm. Code, and later topped off with grout or native soils if settling occurs, unless converted to NR 141 complying monitoring wells, or an alternative approved by the DNR Project Manager.

Other Monitoring Conditions:

1. That the actual volume injected be recorded on an hourly basis for each day of the project.
2. That baseline monitoring be performed prior to the first injection event, for the following groundwater parameters, at the following wells:
  - a. *Rhodamine WT*
  - b. at monitoring wells and at Public Wells #3 (WUWN: AK185), #5 (AK187), and #7 (WQ177)
3. That a Site-Specific Health and Safety Plan be followed.
4. That the injection is performed at less than 100 psi at a rate which prohibits solution mounding in the aquifer, and plume disfigurement.

Failure to adhere to the provisions of this temporary exemption may result in the Department requiring revisions to the remedial action design, operation or monitoring procedures, or the revocation of this exemption and the implementation of an alternative remedial action to restore soil or groundwater quality, or both.

This request was reviewed in accordance with s. NR 812.05 (4), Wis. Admin. Code (department approval of groundwater tracers), and is approved subject to the conditions listed above. The Department reserves the right to order changes to the approval or make additions to the conditions of approval should conditions arise making such action necessary. The Department may also void this approval if it determines that approval conditions are not being observed.

This approval is valid for two years from the date of the approval. If injection activities have not commenced within two years, the approval shall become void and a new application must be made and approved prior to initiating dye injection activities.

**WPDES Permit**

Your proposed discharge is eligible for coverage under the general Wisconsin Pollutant Discharge Elimination System (WPDES) permit WI\_0046566-06 for Discharge of Contaminated Groundwater from Remedial Action Operations. You are responsible for compliance with the conditions contained in this permit. The permit and factsheet can be downloaded from the DNR website at <http://dnr.wi.gov/topic/wastewater/GeneralPermits.html>. The amended water will be discharged to the groundwater. No pollutants shall be injected into the groundwater, with the exception of those present in the groundwater which will be extracted from the site.

Discharges under this permit are required to be consistent with a discharge management plan that has been approved by the Department. Your plan, titled *Dairyland Power- La Crosse Boiling Water Reactor Site* dated March 16, 2018 will be considered as the required discharge management plan. The analysis results would indicate that monitoring is required for all parameters from ch. NR 140, Tables 1 – 3, detected in the discharge, as specified in part 2.3 of the WPDES permit.

The Rhodamine WT dye will be discharged to the groundwater. Any significant system changes will require Department approval.

The Department hereby authorizes your pollutant discharge under the general WPDES permit for Discharge of Contaminated Groundwater from Remedial Action Operations, (WI-0046566-6). The following conditions are highlighted for your information:

**Other Monitoring and Reporting Conditions:**

Note: These monitoring conditions are in addition to monitoring required by the RR Program for evaluation of remedial action effectiveness.

1. That after completion of the injection phase, quarterly monitoring shall continue for one year from injection completion, with sample collection and analysis completed according to #2 above (baseline monitoring) and the requirements of the accompanying WPDES discharge permit for this site.
2. The discharge limits which must be met are included in the site plan.
3. The monitoring results shall be sent to Tim Zeichert following each sampling event.

If you have any questions regarding this letter, please contact me at 608-266-5788 or [Timothy.Zeichert@wisconsin.gov](mailto:Timothy.Zeichert@wisconsin.gov).

Sincerely,



For

Tim Zeichert  
Hydrogeologist  
Remediation & Redevelopment Program

cc: Nadia Glucksberg, Haley & Aldrich, Inc., 75 Washington Avenue, Suite 1A, Portland, ME 04101  
Brian Austin, DG/5  
Bruce Rheineck, DG/5  
Adam DeWeese, DG/5  
Will Myers, WW, Eau Claire

Appendix 1

## Monitoring Schedules:

RR – Remedial Action Monitoring:

1. That the actual volume of Rhodamine WT injected be recorded.

Wastewater WPDES monitoring:

2. That after completion of the injection phase of the remedial action, all existing monitoring wells and the chosen injection wells be sampled for the parameters listed in 2 above (baseline monitoring).
3. That after completion of the injection phase, quarterly monitoring shall continue for one year from injection completion, with sample collection and analysis completed according to items 2 and 6 above and the requirements of the accompanying WPDES discharge permit for this site.

## Notification Requirements:

1. That the Department be notified immediately of any new or major increase (10-fold change) of groundwater quality enforcement standard exceedances in the water quality monitoring program.

Scott Walker  
Governor



DIVISION OF PUBLIC HEALTH

1 WEST WILSON STREET  
PO BOX 2659  
MADISON WI 53701-2659

Linda Seemeyer  
Secretary

**State of Wisconsin**  
Department of Health Services

Telephone: 608-266-1251  
Fax: 608-267-2832  
TTY: 711 or 800-947-3529

May 29, 2018

Bruce D. Rheineck  
Groundwater Section Chief  
Bureau of Drinking Water and Groundwater  
Wisconsin Department of Natural Resources  
101 S. Webster Street  
Madison, WI 53703

**Subject:** Review of past DHS recommendations on the use of Rhodamine WT

Dear Mr. Rheineck:

This letter is in response to your request for review of past DHS recommendations on the use of groundwater tracer dyes. We understand that your request is due to a proposed use of rhodamine WT in a groundwater investigation at the La Crosse Boiling Water Reactor site in Genoa, Wisconsin. Thus, the present review focuses specifically on previous DHS recommendations for the use of rhodamine WT in groundwater research. Based on our review, DHS' recommendations for rhodamine WT remain valid and are summarized in the statement below:

The use of rhodamine WT for hydrogeological testing should be restricted so that concentrations in drinking water wells do not exceed the current NSF/ANSI maximum potable water concentration reference value of 0.1 micrograms per liter ( $\mu\text{g/L}$ ). Public or private drinking water wells which may be impacted by this groundwater investigation should be monitored for the treatment compound, and DNR should take steps to assure that appropriate analytical methods are employed for measuring these tracer dyes in drinking water. The results of this monitoring should be reported to DNR and DHS. If available analytical methods do not allow measurement of concentrations at the reference values listed above, levels in drinking water wells should be maintained below the lowest detectable concentration.<sup>1</sup>

**DHS Review:** In our review, we did not locate any federal numbers (i.e., drinking water standards, no-adverse-response level, cancer risk level, or guidance values) for rhodamine WT. A review of the Code of Federal Regulations showed that there have been no changes since the Environmental Protection Agency in the Federal Register (Vol. 63, No. 40, 1998) commented on removal of rhodamine WT from the Drinking Water Contaminant Candidate List (CCL) and

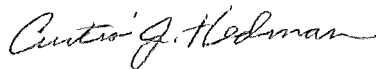
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<sup>1</sup> WI DHS, Memo from Mark Werner, Ph.D. dated February 29, 2000. Subject: Use of tracer dyes in proposed hydrogeological research.

referenced the NSF/ANSI Standard 60, which continues to have a maximum potable water concentration reference value of 0.1 µg/L for rhodamine WT in drinking water. A literature review for rhodamine WT in the Toxline and PubMed databases did not locate any new studies on the toxicology of rhodamine WT that could be related to human health since the last DHS review for this compound. As a result of this review, DNR can continue to use the DHS recommendations for rhodamine WT as previously determined.

We understand that the consultant conducting the groundwater investigation at the La Crosse Boiling Water Reactor may also be considering the use of eosine OJ as a tracer dye. We are currently reviewing our recommendations for that compound and will transmit the results of that review once available. In the meanwhile, please feel free to contact me with any comments or questions about these recommendations.

Sincerely,

A handwritten signature in cursive script that reads "Curtis J. Hedman".

Curtis J. Hedman, PhD  
Toxicologist

Cc: Roy Irving, WI Department of Health Services  
Sarah Yang, WI Department of Health Services  
Jon Meiman, WI Department of Health Services  
William Phelps, WI Department of Natural Resources

## **APPENDIX B**

### **Field Data Records**

Groundwater Sampling

ATTACHMENT 1

LOW-FLOW GROUNDWATER SAMPLING RECORD		Page 1 of 2
PROJECT	L. Acbur GW Sampling	FILE NO. 123724
LOCATION	Genoa, WI	FIELD REP S. Kasey
SAMPLER	S. Kasey	DATE 12/5/17
GROUNDWATER SAMPLING INFORMATION		
Well ID	B11R	Purge rate ~ 90 mL/min
Depth Of Well (ft.) per Log	—	
Reference Mark	top of PVC	
Depth to Water from Reference Mark (ft.)	15.55'	
Time	934	
Depth to Product (ft.)	N/A	}
Field Measured Depth Of Well (ft.)	25.45'	
Inside Diameter (in.)	2 inches	
Standing Water Depth (ft.)	9.90'	
Volume Of Water In Well (gallons/liters)	1.58 gallons	
Purging Device	peristaltic pump	
Volume of Bailer/Pump Capacity	Variable (N/A)	
Cleaning Procedure	dedicate d	
Bails Removed/ Volume Removed	9,810 mL / 2.59 gallons	
Time Purging Started	938	0.09 L/min
Time Purging Stopped	1127	109 minutes 0.024 gal/min
Instrument Used to Monitor Field Parameters	Hanna U-5000	
Sampling Device	peristaltic pump	
Cleaning Procedure	dedicate d	
Color	light brown to clear	
Odor	woodier	



Groundwater Sampling

ATTACHMENT 1

B11R

LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 2 of 2

PROJECT LACOR GW Sampling  
 LOCATION Genoa, WI

FILE NO. 128924-003  
 FIELD REP S. Karey

SAMPLER S. Karey

DATE 12/5/17

GROUNDWATER SAMPLING INFORMATION

TIME SAMPLES TAKEN	Tritium	1100															
	Gamma	1100															
	Cobalt-60	1100															
	Strontium-90	1100															
	Cesium-137	1100															
	HTDs	1100															
		Sample Time: 11:00 Sample ID: B11R-120517															
PARAMETERS	Time	944	949	954	1000	1005	1010	1015	1020	1025	1030	1035	1040	1045	1050	1055	1100
	Temp. C	10.70	10.78	10.83	10.91	9.90	9.84	9.83	9.67	9.88	10.28	10.09	9.70	10.06	9.98	10.12	10.08
	Conductivity (umhos/cm)	1180	1210	1200	1180	1170	1160	1160	1150	1140	1130	1140	1130	1120	1110	1100	1100
	Dissolved Oxygen (mg/L)	4.57	3.68	3.40	3.19	3.09	2.83	2.65	2.55	2.32	2.14	2.04	1.94	1.82	1.71	1.62	1.57
	pH	6.64	6.76	6.78	6.80	6.81	6.82	6.82	6.83	6.84	6.83	6.84	6.84	6.84	6.84	6.85	6.85
	ORP (mV)	-26	-52	-59	-58	-61	-68	-70	-69	-71	-71	-71	-70	-68	-67	-66	-65
	Drawdown Ft	0.33'	0.55'	0.55'	0.55'	0.55'	0.55'	0.55'	0.55'	0.55'	0.55'	0.55'	0.55'	0.55'	0.55'	0.55'	0.55'
	Volume purged/Gals	0.144	0.264	0.384	0.528	0.648	0.768	0.888	1.008	1.128	1.248	1.368	1.488	1.608	1.728	1.848	1.968
	Turbidity (NTU)	102	106	56.5	82.5	23.3	18.6	17.1	13.4	12.8	13.2	11.9	10.3	9.88	11.00	9.97	800

Remarks: (ie: field filtrations, persons communicated with at site, etc.)

DTW 15.88' 16.10' 16.10' 16.10' 16.10' 16.10' 16.10' 16.10' 16.10' 16.10' 16.10' 16.10' 16.10' 16.10' 16.10' 16.10' 16.10'

hls

Groundwater Sampling

ATTACHMENT 1

<b>LOW-FLOW GROUNDWATER SAMPLING RECORD</b>		Page 1 of 2
PROJECT	LACBWR Groundwater	FILE NO. 128924-603
LOCATION	Genoa, WI	FIELD REP M. van Noordennen
SAMPLER	M. van Noordennen	DATE 12.5.17

GROUNDWATER SAMPLING INFORMATION		
Well ID	B11-AR	
Depth Of Well (ft.) per Log	—	
Reference Mark	TOR	
Depth to Water from Reference Mark (ft.)	18.05	
Time	0930	
Depth to Product (ft.)	NM	
Field Measured Depth Of Well (ft.)	46.86	
Inside Diameter (in.)	2	
Standing Water Depth (ft.)	28.81	
Volume Of Water In Well (gallons/liters)	4.61	
Purging Device	Peristaltic Pump	
Volume of Bailer/Pump Capacity	NA	
Cleaning Procedure	NA	
Bails Removed/ Volume Removed	1.52 gallons	
Time Purging Started	0938	
Time Purging Stopped	1010	
Instrument Used to Monitor Field Parameters	Horiba U-52, HACH 2100 Q	
Sampling Device	Peristaltic Pump	
Cleaning Procedure	NA	
Color	Clear	
Odor	None	

ATTACHMENT 1

B11-AR

LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 2 of 2

PROJECT LACBWL Groundwater  
 LOCATION Genoa, WI  
 SAMPLER M. van Noorden

FILE NO. 128924-003  
 FIELD REP M. van Noorden  
 DATE 12-5-17

GROUNDWATER SAMPLING INFORMATION

TIME SAMPLES TAKEN	Tritium		Gamma		Cobalt-60		Strontium-90		Cesium-137		HTDs	
		1010		1010		1010		1010		1010		1010
PARAMETERS	Time	0943	0948	0953	0958	1003	1008					
	Temp. C	11.5	11.1	10.98	10.80	10.58	10.45					
	Conductivity (umhos/cm)	973	983	994	997	997	1000					
	Dissolved Oxygen (mg/L)	5.08	4.80	4.57	4.43	4.27	4.51					
	pH	6.67	6.79	6.84	6.85	6.87	6.88					
	ORP (mV)	227	215	205	198	193	192					
	Drawdown Ft	0.06	0.07	0.05	0.06	0.06	0.05					
	Volume purged/Gals	0.24	0.48	0.71	0.95	1.19	1.43					
	Turbidity (NTU)	4.26	3.71	2.20	1.75	1.81	1.06					

Remarks: (ie: field filtrations, persons communicated with at site, etc.)



Groundwater Sampling

ATTACHMENT 1

LOW-FLOW GROUNDWATER SAMPLING RECORD		Page 1 of 2
PROJECT	<u>LACBWR Sampling</u>	FILE NO. <u>128924-003</u>
LOCATION	<u>Genoa, WI</u>	FIELD REP <u>S. Kaney</u>
SAMPLER	<u>S. Kaney</u>	DATE <u>12/6/17</u>
GROUNDWATER SAMPLING INFORMATION		
Well ID	<u>MW-200A</u>	
Depth Of Well (ft.) per Log	<u>—</u>	
Reference Mark	<u>Top of PVC</u>	
Depth to Water from Reference Mark (ft.)	<u>18.75'</u>	
Time	<u>9:30</u>	
Depth to Product (ft.)	<u>N/A</u>	
Field Measured Depth Of Well (ft.)	<u>27.70'</u>	
Inside Diameter (in.)	<u>2"</u>	
Standing Water Depth (ft.)	<u>8.95'</u>	
Volume Of Water In Well (gallons/liters)	<u>1.43 gallons</u>	
Purging Device	<u>peristaltic pump</u>	
Volume of Bailer/Pump Capacity	<u>N/A</u>	
Cleaning Procedure	<u>dedicated</u>	
Bails Removed/ Volume Removed	<u>5.52 gallons</u>	
Time Purging Started	<u>0938</u>	→ 116 minutes (purge rate ~ 180 mL/min)
Time Purging Stopped	<u>1134</u>	
Instrument Used to Monitor Field Parameters	<u>Horiba U-5000</u>	0.18 L/min 0.048 gal/min
Sampling Device	<u>peristaltic pump</u>	
Cleaning Procedure	<u>dedicated</u>	
Color	<u>clear</u>	
Odor	<u>none</u>	

Groundwater Sampling

ATTACHMENT 1

MW-2004

LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 2 of 2

PROJECT LAEBWR GW Sampling  
 LOCATION Genoa WI  
 SAMPLER S. Kanney

FILE NO. 128924-003  
 FIELD REP S. Kanney  
 DATE 12/6/17

GROUNDWATER SAMPLING INFORMATION

TIME SAMPLES TAKEN	Tritium	1115																	Sample Time: 11:15		
	Gamma	1115																	Sample ID: MW-2004-120617		
	Cobalt-60	1115																			
	Strontium-90	1115																			
	Cesium-137	1115																			
	HTDs	1115																			
PARAMETERS	Time	9:45	9:50	9:55	10:00	10:05	10:10	10:15	10:20	10:25	10:30	10:35	10:40	10:45	10:50	10:55	11:00	11:05	11:10	11:15*	
	Temp. C	8.03	8.23	7.23	7.30	7.27	7.42	7.45	7.71	7.64	7.50	7.43	7.16	7.23	7.35	7.36	7.25	7.31	7.32	7.32	7.23
	Conductivity (umhos/cm)	897	950	1030	1130	1240	1320	1390	1480	1530	1590	1650	1690	1740	1780	1820	1840	1860	1890	1900	
	Dissolved Oxygen (mg/L)	8.25	7.67	7.24	6.77	6.34	5.89	5.48	4.77	4.96	4.57	4.56	4.35	4.14	3.93	3.72	3.52	2.78	2.65	2.40	
	pH	7.20	7.04	7.02	6.98	6.96	6.94	6.94	6.94	6.94	6.95	6.95	6.97	6.93	6.97	6.98	6.98	6.98	6.98	6.98	6.98
	ORP (mV)	5	-22	-21	-36	-53	-62	-70	-79	-88	-96	-104	-109	-112	-114	-116	-118	-119	-121	-122	
	Drawdown Ft	0.02'	0.00'	0.03'	0.03'	0.03'	0.03'	0.03'	0.03'	0.03'	0.03'	0.03'	0.03'	0.03'	0.03'	0.03'	0.03'	0.03'	0.03'	0.03'	0.63'
	Volume purged/Gals	0.34	0.58	0.82	1.06	1.30	1.54	1.78	2.02	2.26	2.50	2.74	2.98	3.22	3.46	3.70	3.94	4.18	4.42	4.66	
	Turbidity (NTU)	149	69.6	33.1	24.9	16.4	11.6	6.41	8.05	5.52	5.40	5.05	3.38	4.22	2.48	2.67	2.81	2.43	1.77	2.42	

Remarks: (ie: field filtrations, persons communicated with at site, etc.)

DTW 18.77 18.75 18.78' →

\* Sampled after this reading even though stabilization had not been achieved. Over 3 well volumes had been purged before sampling had started.

Groundwater Sampling

ATTACHMENT 1

LOW-FLOW GROUNDWATER SAMPLING RECORD		Page 1 of 2
PROJECT	LACBWR Groundwater	FILE NO. 128924.003
LOCATION	Genoa, WI	FIELD REP M. van Noordennen
SAMPLER	M. van Noordennen	DATE 12.6.17
GROUNDWATER SAMPLING INFORMATION		
Well ID	MW. 200B	
Depth Of Well (ft.) per Log	—	
Reference Mark	TOR	
Depth to Water from Reference Mark (ft.)	19.21	
Time	0925	
Depth to Product (ft.)	NM	
Field Measured Depth Of Well (ft.)	57.55	
Inside Diameter (in.)	2	
Standing Water Depth (ft.)	38.34	
Volume Of Water In Well (gallons/liters)	6.13 gallons	
Purging Device	Peristaltic Pump	
Volume of Bailer/Pump Capacity	NA	
Cleaning Procedure	NA	
Bails Removed/ Volume Removed	2.61 gallons	
Time Purging Started	0938	
Time Purging Stopped	1030	
Instrument Used to Monitor Field Parameters	Horiba U-52, HACH 2100 Q	
Sampling Device	Peristaltic Pump	
Cleaning Procedure	NA	
Color	Clear	
Odor	None	



Groundwater Sampling

ATTACHMENT 1

LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 2 of 2

PROJECT LACBWR Groundwater  
 LOCATION Genoa, WI  
 SAMPLER M. van Noorden

FILE NO. 128924-003  
 FIELD REP M. van Noorden  
 DATE 12-6-17

GROUNDWATER SAMPLING INFORMATION

TIME SAMPLES TAKEN	Tritium												
	Gamma												
	Cobalt-60												
	Strontium-90												
	Cesium-137												
	HTDs												
PARAMETERS	Time	0943	0948	0953	0958	1003	1008	1013	1018	1023	1028		
	Temp. C	7.91	8.48	8.63	8.45	8.42	8.47	8.39	8.45	8.38	8.29		
	Conductivity (umhos/cm)	796	858	872	883	898	899	907	905	908	912		
	Dissolved Oxygen (mg/L)	5.19	4.19	3.65	3.28	3.15	2.82	2.67	2.54	2.44	2.39		
	pH	6.99	6.83	6.77	6.78	6.77	6.78	6.78	6.78	6.79	6.77		
	ORP (mV)	27	10	3	-6	-15	-20	-27	-32	-37	-39		
	Drawdown Ft	0	0	0	0	0	0	0	0	0	0		
	Volume purged/Gals	0.25	0.50	0.75	1.00	1.25	1.51	1.76	2.01	2.26	2.51		
	Turbidity (NTU)	83.8	61.1	46.3	32.6	17.1	16.6	12.4	7.39	5.77	5.90		

Remarks: (ie: field filtrations, persons communicated with at site, etc.)

ATTACHMENT 1

LOW-FLOW GROUNDWATER SAMPLING RECORD		Page 1 of 2
PROJECT	LACBWR	FILE NO. 128924-003
LOCATION	Genoa, WI	FIELD REP S. Kaney
SAMPLER	S. Kaney	DATE 12/6/17
GROUNDWATER SAMPLING INFORMATION		
Well ID	2001 MW-201A	
Depth Of Well (ft.) per Log	—	
Reference Mark	Top of PVC	
Depth to Water from Reference Mark (ft.)	17.74'	
Time	1320	
Depth to Product (ft.)	N/A	
Field Measured Depth Of Well (ft.)	27.69'	
Inside Diameter (in.)	2"	
Standing Water Depth (ft.)	9.95	
Volume Of Water In Well (gallons/liters)	1.59 gallons	
Purging Device	peristaltic pump	
Volume of Bailer/Pump Capacity	N/A	
Cleaning Procedure	dedicated	
Bails Removed/ Volume Removed	4.032	
Time Purging Started	1321	84 min
Time Purging Stopped	1445	purge rate: ~ 180 mL/min .180 L/min 0.048 gal/min
Instrument Used to Monitor Field Parameters	Honipa U-5000	
Sampling Device	peristaltic pump	
Cleaning Procedure	dedicated	
Color	clear w/ light brown particulate	
Odor	none	



Groundwater Sampling

ATTACHMENT 1

Mw-2014

LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 2 of 2

PROJECT LACBier FILE NO. 128924-003  
 LOCATION Genoa, WI FIELD REP S. Keney  
 SAMPLER S. Keney DATE 12/6/17

GROUNDWATER SAMPLING INFORMATION

TIME SAMPLES TAKEN	Tritium	1425												Sample Time: 1425 Sample ID: Mw-2014-120617
	Gamma	1425												
	Cobalt-60	1425												
	Strontium-90	1425												
	Cesium-137	1425												
	HTDs	1425												
PARAMETERS	Time	1330	1335	1340	1345	1350	1355	1400	1405	1410	1415	1420	1425	
	Temp. C	7.05	7.81	8.13	8.51	8.55	8.59	8.80	8.85	8.93	9.13	9.10	9.39	
	Conductivity (umhos/cm)	520	534	551	565	579	586	600	609	618	628	638	642	
	Dissolved Oxygen (mg/L)	6.73	6.24	5.75	5.34	5.00	4.73	4.42	4.17	3.96	3.82	3.65	3.52	
	pH	7.28	7.25	7.22	7.21	7.21	7.19	7.17	7.18	7.18	7.17	7.17	7.16	
	ORP (mV)	41	61	71	75	79	81	81	81	80	79	78	77	
	Drawdown Ft	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	
	Volume purged/Gals	0.432	0.670	0.912	1.152	1.392	1.632	1.872	2.112	2.352	2.592	2.832	3.072	
	Turbidity (NTU)	85.8	70.4	53.2	39.0	34.7	23.9	17.0	15.0	12.2	9.12	8.67	6.98	

Remarks: (ie: field filtrations, persons communicated with at site, etc.)

DTW 17.75' 17.75' 17.75' 17.95' 17.75' 17.75' 17.75' 17.75' 17.75' 17.75' 17.75' 17.75'

Groundwater Sampling

ATTACHMENT 1

LOW-FLOW GROUNDWATER SAMPLING RECORD		Page 1 of 2
PROJECT	LACBWR Groundwater	FILE NO. 128924-003
LOCATION	Genoa, WI	FIELD REP M. van Noordemmen
SAMPLER	M. van Noordemmen	DATE 12-7-17
GROUNDWATER SAMPLING INFORMATION		
Well ID	MW-202A	
Depth Of Well (ft.) per Log	—	
Reference Mark	TOR	
Depth to Water from Reference Mark (ft.)	18.64	
Time	1020	
Depth to Product (ft.)	NM	
Field Measured Depth Of Well (ft.)	27.64	
Inside Diameter (in.)	2	
Standing Water Depth (ft.)	9.00	
Volume Of Water In Well (gallons/liters)	1.44	
Purging Device	Peristaltic Pump	
Volume of Bailer/Pump Capacity	NA	
Cleaning Procedure	NA	
Bails Removed/ Volume Removed	1.94 gallons	
Time Purging Started	1030	
Time Purging Stopped	1112	
Instrument Used to Monitor Field Parameters	Hanna U-52, HACH 2100 Q	
Sampling Device	Peristaltic Pump	
Cleaning Procedure	NA	
Color	Clear	
Odor	None	

Groundwater Sampling

ATTACHMENT 1

LOW-FLOW GROUNDWATER SAMPLING RECORD

MW-202A

Page 2 of 2

PROJECT LACBWL Groundwater  
 LOCATION Genos, WI  
 SAMPLER M. van Nooddennen

FILE NO. 128924-003  
 FIELD REP M. van Nooddennen  
 DATE 12-7-17

GROUNDWATER SAMPLING INFORMATION

TIME SAMPLES TAKEN	Tritium	1112											
	Gamma	1112											
	Cobalt-60	1112											
	Strontium-90	1112											
	Cesium-137	1112											
	HTDs	1112											
PARAMETERS	Time	1030	1035	1040	1045	1050	1055	1100	1105	1110			
	Temp. C		0.88	2.24	3.30	4.07	4.44	4.68	4.83	4.86			
	Conductivity (umhos/cm)		741	754	740	733	722	718	716	715			
	Dissolved Oxygen (mg/L)		10.19	8.50	7.44	6.75	6.25	5.90	5.60	5.45			
	pH		7.09	6.92	6.84	6.82	6.82	6.83	6.84	6.84			
	ORP (mV)		70	75	79	82	85	87	88	88			
	Drawdown Ft		0	0	0	0	0	0	0	0			
	Volume purged/Gals		0.23	0.46	0.69	0.92	1.16	1.39	1.62	1.85			
	Turbidity (NTU)		50.2	33.3	21.3	15.5	12.1	8.93	6.14	5.34			

Remarks: (ie: field filtrations, persons communicated with at site, etc.)



Groundwater Sampling

ATTACHMENT 1

LOW-FLOW GROUNDWATER SAMPLING RECORD		Page 1 of 2
PROJECT	LACBR Groundwater	FILE NO. 128924-003
LOCATION	Genoa, WI	FIELD REP M. van Noordennen
SAMPLER	M. van Noordennen	DATE 12-7-17
GROUNDWATER SAMPLING INFORMATION		
Well ID	MW-202B	
Depth Of Well (ft.) per Log	—	
Reference Mark	TOR	
Depth to Water from Reference Mark (ft.)	18.56	
Time	1130	
Depth to Product (ft.)	NM	
Field Measured Depth Of Well (ft.)	55.68	
Inside Diameter (in.)	2	
Standing Water Depth (ft.)	32.12	
Volume Of Water In Well (gallons/liters)	5.94	
Purging Device	Peristaltic Pump	
Volume of Bailer/Pump Capacity	NA	
Cleaning Procedure	NA	
Bails Removed/ Volume Removed	2.71 gallons	
Time Purging Started	1136	
Time Purging Stopped	1233	
Instrument Used to Monitor Field Parameters	Horiba U-52, HA112100Q	
Sampling Device	Peristaltic Pump	
Cleaning Procedure	NA	
Color	None - clear	
Odor	None	

Groundwater Sampling

ATTACHMENT 1

LOW-FLOW GROUNDWATER SAMPLING RECORD											Page 2 of 2	
PROJECT	LACBWR Groundwater						FILE NO.	128924-003				
LOCATION	Genoa, WI						FIELD REP	M. van Noordennen				
SAMPLER	M. van Noordennen						DATE	12-7-17				
GROUNDWATER SAMPLING INFORMATION												
TIME SAMPLES TAKEN	Tritium	1233										
	Gamma	1233										
	Cobalt-60	1233										
	Strontium-90	1233										
	Cesium-137	1233										
	HTDs	1233										
PARAMETERS	Time	1141	1146	1151	1156	1201	1206	1211	1216	1221	1226	1231
	Temp. C	2.89	3.16	3.36	3.71	3.85	3.90	3.98	4.01	4.05	4.14	4.49
	Conductivity (umhos/cm)	1130	1120	1110	1080	1080	1020	1000	988	979	977	968
	Dissolved Oxygen (mg/L)	8.32	7.03	6.22	6.53	6.13	4.78	4.54	4.33	4.17	4.02	3.89
	pH	7.04	6.92	6.86	6.84	6.83	6.83	6.84	6.84	6.84	6.82	6.82
	ORP (mV)	53	0	-14	-21	-25	-30	-34	-37	-40	-42	-46
	Drawdown Ft	0.01	0.01	0.01	0.01	0	0	0	0	0	0	0
	Volume purged/Gals	0.24	0.48	0.71	0.95	1.19	1.43	1.66	1.90	2.14	2.38	2.62
	Turbidity (NTU)	48.8	44.6	50.7	39.6	35.0	29.0	22.9	18.4	16.4	15.5	15.7
Remarks: (ie: field filtrations, persons communicated with at site, etc.)												

Groundwater Sampling

ATTACHMENT 1

LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 1 of 2

PROJECT LACBWR GW Sampling FILE NO. 128924-003  
 LOCATION Benoa, WI FIELD REP S. Kaney  
 SAMPLER S. Kaney DATE 12/7/17

GROUNDWATER SAMPLING INFORMATION

Well ID	NW-203A	
Depth Of Well (ft.) per Log	—	
Reference Mark	Top of PVC	
Depth to Water from Reference Mark (ft.)	18.29'	
Time	830	
Depth to Product (ft.)	N/A	
Field Measured Depth Of Well (ft.)	27.70'	
Inside Diameter (in.)	2"	
Standing Water Depth (ft.)	9.41'	
Volume Of Water In Well (gallons/liters)	1.51 gallons	
Purging Device	peristaltic pump	
Volume of Bailer/Pump Capacity	N/A	
Cleaning Procedure	dedicated	
Bails Removed/ Volume Removed	3.95 gallons	
Time Purging Started	0836	purge rate: ~ 160 mL/min 0.160 <del>gal</del> /min 0.042 gallons/min
Time Purging Stopped	1010	
Instrument Used to Monitor Field Parameters	Horiba U-5000	
Sampling Device	peristaltic pump	
Cleaning Procedure	dedicated	
Color	clear	
Odor	none	



Groundwater Sampling

ATTACHMENT 1

MW-203A

LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 2 of 2

PROJECT LACBUR GW  
 LOCATION Genoa, WI  
 SAMPLER S. Kaney

FILE NO. 128924-003  
 FIELD REP S. Kaney  
 DATE 12/7/17

GROUNDWATER SAMPLING INFORMATION

TIME SAMPLES TAKEN	Tritium	0950	Sample Time: 09:50 Sample ID: MW-203A-120717
	Gamma	0950	
	Cobalt-60	0950	
	Strontium-90	0950	
	Cesium-137	0950	
	HTDs	0950	

PARAMETERS	Time	845	850	855	900	905	910	915	920	925	930	935	940	945	950
	Temp. C	9.16	8.64	8.66	8.63	8.36	8.25	8.09	8.08	8.27	8.29	8.22	8.18	7.97	8.02
	Conductivity (umhos/cm)	661	688	711	744	782	811	833	850	861	861	872	869	875	873
	Dissolved Oxygen (mg/L)	2.88	2.32	1.95	1.71	1.56	1.45	1.38	1.35	1.28	1.24	1.29	1.28	1.26	1.25
	pH	6.71	6.97	7.01	7.00	7.00	7.01	7.02	7.05	7.07	7.09	7.12	7.14	7.15	7.16
	ORP (mV)	85	44	34	18	-9	-27	-41	-55	-67	-78	-89	-96	-100	-104
	Drawdown Ft	0.01	0.03	0.03	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
	Volume purged/Gals	6.378	0.588	0.748	1.008	1.218	1.428	1.638	1.848	2.058	2.268	2.478	2.688	2.898	3.108
	Turbidity (NTU)	161	108	67	50.9	32.8	25.7	21.3	16.0	11.2	9.29	8.42	5.78	5.65	4.96

Remarks: (ie: field filtrations, persons communicated with at site, etc.)

DTW 18.30' 18.31' 18.31' 18.31' 18.31' 18.31' 18.31' 18.31' 18.31' 18.31' 18.31' 18.31' 18.31' 18.31' 18.31'

Groundwater Sampling

ATTACHMENT 1

LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 1 of 2

PROJECT LACBWR Groundwater FILE NO. 128924-003  
 LOCATION Genoa, WI FIELD REP M. van Noordennen  
 SAMPLER M. van Noordennen DATE 12-7-17

GROUNDWATER SAMPLING INFORMATION

Well ID	MW 203B	
Depth Of Well (ft.) per Log	—	
Reference Mark	TOR	
Depth to Water from Reference Mark (ft.)	18.60	
Time	0820	
Depth to Product (ft.)	NM	
Field Measured Depth Of Well (ft.)	57.82	
Inside Diameter (in.)	2	
Standing Water Depth (ft.)	39.22	
Volume Of Water In Well (gallons/liters)	628	
Purging Device	Peristaltic Pump	
Volume of Bailer/Pump Capacity	NA	
Cleaning Procedure	NA	
Bails Removed/ Volume Removed	2.46 gallons	
Time Purging Started	0842	
Time Purging Stopped	0944	
Instrument Used to Monitor Field Parameters	Horiba U-52, HACH 2100 Q	
Sampling Device	Peristaltic Pump	
Cleaning Procedure	NA	
Color	clear	
Odor	NM	



ATTACHMENT 1

MW 203B

LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 2 of 2

PROJECT LACBWL Groundwater  
 LOCATION Genoa, WI  
 SAMPLER M. van Noordennen

FILE NO. 128924-003  
 FIELD REP M. van Noordennen  
 DATE 12-7-17

GROUNDWATER SAMPLING INFORMATION

TIME SAMPLES TAKEN	Tritium		Gamma		Cobalt-60		Strontium-90		Cesium-137		HTDs		
		0944		0944		0944		0944		0944		0944	
PARAMETERS	Time	0847	0852	0857	0902	0907	0912	0917	0922	0927	0932	0937	0942
	Temp. C	9.88	8.98	8.37	8.11	7.44	7.07	6.31	6.49	6.29	6.14	5.79	4.49
	Conductivity (umhos/cm)	588	617	664	683	702	712	725	720	730	734	733	765
	Dissolved Oxygen (mg/L)	12.76	12.38	12.19	11.99	11.93	5.57	5.20	12.20	4.55	4.35	4.23	4.36
	pH	6.32	6.62	6.80	6.90	6.95	7.00	7.03	7.05	7.06	7.06	7.08	7.09
	ORP (mV)	171	96	56	27	10	-3	-15	-24	-33	-39	-46	-49
	Drawdown Ft	0	0	0	0	0	0	0	0	0	0	0	0
	Volume purged/Gals	0.20	0.40	0.59	0.79	0.99	1.19	1.39	1.59	1.78	1.98	2.18	2.38
	Turbidity (NTU)	32.2	20.8	13.7	15.2	10.4	8.32	7.45	5.98	5.28	5.42	5.52	4.99

Remarks: (ie: field filtrations, persons communicated with at site, etc.)

ATTACHMENT 1

LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 1 of 2

PROJECT LACBWR Groundwater FILE NO. 128924-003  
 LOCATION Genoa, WI FIELD REP M. van Noordennen  
 SAMPLER M. van Noordennen DATE 12.6.17

GROUNDWATER SAMPLING INFORMATION

Well ID	MW-204A	
Depth Of Well (ft.) per Log	—	
Reference Mark	TOR	
Depth to Water from Reference Mark (ft.)	17.77	
Time	0810	
Depth to Product (ft.)	NM	
Field Measured Depth Of Well (ft.)	27.00	
Inside Diameter (in.)	2	
Standing Water Depth (ft.)	9.23	
Volume Of Water In Well (gallons/liters)	1.48 gallon	
Purging Device	Peristaltic Pump	
Volume of Bailer/Pump Capacity	NA	
Cleaning Procedure	NA	
Bails Removed/ Volume Removed	1.61 gallon	
Time Purging Started	0819	
Time Purging Stopped	0851	
Instrument Used to Monitor Field Parameters	Horba U-52, HACH 2100 Q	
Sampling Device	Peristaltic Pump	
Cleaning Procedure	NA	
Color	Clear	
Odor	None	

Groundwater Sampling

ATTACHMENT 1

MW-204A

LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 2 of 2

PROJECT LACBWL Groundwater  
 LOCATION Genoa, WI  
 SAMPLER M. van Noordennen

FILE NO. 128924-003  
 FIELD REP M. van Noordennen  
 DATE 12.6.17

GROUNDWATER SAMPLING INFORMATION

TIME SAMPLES TAKEN	Tritium		Gamma		Cobalt-60		Strontium-90		Cesium-137		HTDs	
		0851		0851		0851		0851		0851		0851
PARAMETERS	Time	0824	0829	0834	0839	0844	0849					
	Temp. C	10.87	9.93	9.67	9.51	9.61	9.47					
	Conductivity (umhos/cm)	797	812	816	823	828	826					
	Dissolved Oxygen (mg/L)	4.83	4.32	4.01	3.74	3.47	3.55					
	pH	6.38	6.57	6.62	6.65	6.66	6.65					
	ORP (mV)	283	277	273	268	264	258					
	Drawdown Ft	0.01	0.01	0.01	0.01	0.01	0.01					
	Volume purged/Gals	0.25	0.50	0.75	1.00	1.25	1.51					
	Turbidity (NTU)	14.5	12.3	8.87	7.24	5.48	4.71					

Remarks: (ie: field filtrations, persons communicated with at site, etc.)



ATTACHMENT 1

LOW-FLOW GROUNDWATER SAMPLING RECORD		Page 1 of 2
PROJECT	LCBWR Sampling	FILE NO. 128924-003
LOCATION	Genoa, WI	FIELD REP S. Kanney
SAMPLER	S. Kanney	DATE 12/6/17
GROUNDWATER SAMPLING INFORMATION		
Well ID	MW-204B	Sample Time
Depth Of Well (ft.) per Log	—	0855
Reference Mark	Top of PVC	Sample ID
Depth to Water from Reference Mark (ft.)	17.72'	MW-204B (20017)
Time	818	
Depth to Product (ft.)	N/A	
Field Measured Depth Of Well (ft.)	56.42'	
Inside Diameter (in.)	2"	
Standing Water Depth (ft.)	38.70'	
Volume Of Water In Well (gallons/liters)	6.19 gallons	
Purging Device	peristaltic pump	
Volume of Bailer/Pump Capacity	N/A	
Cleaning Procedure	dedicated	
Bails Removed/ Volume Removed	2.59 gallons	
Time Purging Started	0818	
Time Purging Stopped	0912	54 minutes
Instrument Used to Monitor Field Parameters	Hanba U-5000	purge rate: 1.80 mL/min 1.80 L/min 0.048 gal/min
Sampling Device	peristaltic pump	
Cleaning Procedure	dedicated	
Color	clear w/ fine black particulate	
Odor	none	

Groundwater Sampling

ATTACHMENT 1

MW-204B

LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 2 of 2

PROJECT LACBWR Groundwater Sampling  
 LOCATION Genoa, WI

FILE NO. 128924-003  
 FIELD REP S. Kanay

SAMPLER S. Kanay

DATE 12/6/17

GROUNDWATER SAMPLING INFORMATION

TIME SAMPLES TAKEN	Tritium												
	Gamma												
	Cobalt-60												
	Strontium-90												
	Cesium-137												
	HTDs												
	PARAMETERS	Time	825	830	835	840	845	850					
Temp. C		9.41	9.84	9.82	9.71	9.70	9.46						
Conductivity (umhos/cm)		91310	1270	1260	1250	1250	1250						
Dissolved Oxygen (mg/L)		6.15	4.18	3.52	3.30	3.13	3.17						
pH		6.83	7.19	7.20	7.23	7.23	7.24						
ORP (mV)		136	99	103	104	106	108						
Drawdown Ft		0	0	0	0	0	0						
Volume purged/Gals		0.336	0.576	0.816	1.056	1.096	1.536						
Turbidity (NTU)		11.6	15.7	10.2	7.77	7.16	7.07						

Remarks: (ie: field filtrations, persons communicated with at site, etc.)

DTW 17.72' 17.72' 17.72' 17.72' 17.72' 17.72'

Groundwater Sampling

ATTACHMENT 1

LOW-FLOW GROUNDWATER SAMPLING RECORD		Page 1 of 2
PROJECT	LACBWR Groundwater Sampling	FILE NO. 128924-003
LOCATION	Genoa, WI	FIELD REP S. Kanay
SAMPLER	S. Kanay	DATE 12/7/17
GROUNDWATER SAMPLING INFORMATION		
Well ID	Drinking Well-5	
Depth Of Well (ft.) per Log	-	
Reference Mark	-	
Depth to Water from Reference Mark (ft.)	-	
Time	-	
Depth to Product (ft.)	-	
Field Measured Depth Of Well (ft.)	N/A	
Inside Diameter (in.)	-	
Standing Water Depth (ft.)	N/A	
Volume Of Water In Well (gallons/liters)	-	
Purging Device	production well	
Volume of Bailer/Pump Capacity	N/A	
Cleaning Procedure	N/A	
Bails Removed/ Volume Removed	495 gallons	45 gallons/minute
Time Purging Started	1145	11 minutes
Time Purging Stopped	1156	
Instrument Used to Monitor Field Parameters	Horiba U-5000	
Sampling Device	N/A	
Cleaning Procedure	dedicated	
Color	clear	
Odor	none	



ATTACHMENT 1

Well 5

LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 2 of 2

PROJECT LACBWR Groundwater Sampling  
 LOCATION Genoa, WI

FILE NO. 128924-003

FIELD REP S. Kanay

SAMPLER S. Kanay

DATE 12/7/17

GROUNDWATER SAMPLING INFORMATION

TIME SAMPLES TAKEN	Tritium	1158	Sample Time:																
	Gamma	1158	11:58																
	Cobalt-60	1158	Sample ID:																
	Strontium-90	1158	Well-5-120717																
	Cesium-137	1158																	
	HTDs	1158																	
PARAMETERS	Time	1156																	
	Temp. C	10.72																	
	Conductivity (umhos/cm)	592																	
	Dissolved Oxygen (mg/L)	8.32																	
	pH	7.71																	
	ORP (mV)	104																	
	Drawdown Ft	4.95																	
	Volume purged/Gals	N/A																	
	Turbidity (NTU)	1.17																	

Remarks: (ie: field filtrations, persons communicated with at site, etc.)





ATTACHMENT 1

LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 1 of 2

PROJECT LACBWR Resampling FILE NO. 128924-003  
 LOCATION Genoa, WI FIELD REP S. Kaney  
 SAMPLER S. Kaney (Taylor) DATE 2/1/18

GROUNDWATER SAMPLING INFORMATION

Well ID	MW-202A	Sample ID:
Depth Of Well (ft.) per Log	25	MW-202A-020118
Reference Mark	Top of PVC	Sample Time:
Depth to Water from Reference Mark (ft.)	19.48	1600
Time	1455	
Depth to Product (ft.)	N/A	
Field Measured Depth Of Well (ft.)	27.88	
Inside Diameter (in.)	2 inches	
Standing Water Depth (ft.)	8.40	
Volume Of Water In Well (gallons/liters)	1.34 gallons	
Purging Device	peristaltic pump	
Volume of Bailer/Pump Capacity	variable	
Cleaning Procedure	dedicated	
Bails Removed/ Volume Removed	2.34 gallons	
Time Purging Started	1518*	* had to restart due to
Time Purging Stopped	1617 (59 minutes)	freezing in flow cell causing
Instrument Used to Monitor Field Parameters	Horiba U-5000 S/NP806HY60	the equipment to leak.
Sampling Device	Peristaltic Pump	Purge Rate: ~150 ml/min
Cleaning Procedure	dedicated	
Color	clear	
Odor	none	

ATTACHMENT 1

MW-202A

LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 2 of 2

PROJECT LACBWR Resampling  
 LOCATION Genoa, WI

FILE NO. 128924-003  
 FIELD REP S. Kaney

SAMPLER S. Kaney (Taylor)

DATE 2/1/18

GROUNDWATER SAMPLING INFORMATION

TIME SAMPLES TAKEN	Tritium	1600	Sample ID:									
	Gamma		MW-202A-020118									
	Cobalt-60	1600										
	Strontium-90	1600										
	Cesium-137	1600										
	HTDs											

PARAMETERS	Time	1522	1532	1537	1540	1547	1552	1557						
	Temp. C	6.12	6.67	6.82	6.50	6.29	6.44	6.31						
	Conductivity (umhos/cm)	595	623	627	634	638	640	646						
	Dissolved Oxygen (mg/L)	2.59	1.67	1.34	1.21	1.09	0.96	1.00						
	pH	7.66	7.58	7.55	7.54	7.53	7.53	7.52						
	ORP (mV)	88	83	84	84	83	83	82						
	Drawdown Ft	0.02	0.02	0.02	0.03	0.03	0.03	0.03						
	Volume purged/Gals	0.16	0.56	0.76	0.96	1.16	1.36	1.56						
	Turbidity (NTU)	19.8	11.0	6.90	5.15	4.92	3.38	3.75						

Remarks: (ie: field filtrations, persons communicated with at site, etc.)

DTW 19.50 19.50 19.50 19.51 19.51 19.51 19.51

ATTACHMENT 1

LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 1 of 2

PROJECT LACBWR Resampling  
 LOCATION Genoa, WI

FILE NO. 128924-003  
 FIELD REP S. Kaney

SAMPLER S. Kaney (Taylor)

DATE 2/1/18

GROUNDWATER SAMPLING INFORMATION

Well ID	MW-201A	Sample ID:
Depth Of Well (ft.) per Log	25	MW-201A-020118
Reference Mark	Top of PVC	Sample Time:
Depth to Water from Reference Mark (ft.)	18.48	1400
Time	1235	
Depth to Product (ft.)	N/A	
Field Measured Depth Of Well (ft.)	27.94	
Inside Diameter (in.)	2 inches	
Standing Water Depth (ft.)	9.46	
Volume Of Water In Well (gallons/liters)	1.51 gallons	
Purging Device	peristaltic pump	
Volume of Bailer/Pump Capacity	variable	
Cleaning Procedure	dedicated	
Bails Removed/ Volume Removed	4.65 gallons	
Time Purging Started	1236	
Time Purging Stopped	1404 (88 minutes)	
Instrument Used to Monitor Field Parameters	Honiba U-5000 S/N: PB06HY160	
Sampling Device	peristaltic pump	Purge Rate: ~200ml/min
Cleaning Procedure	dedicated	couldn't slow down or would
Color	clear	start freezing up
Odor	none	

Groundwater Sampling

ATTACHMENT 1

MW-201A

LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 2 of 2

PROJECT LACBWL Resampling  
 LOCATION Genoa, WI

FILE NO. 128924-003  
 FIELD REP S. Kaney

SAMPLER S. Kaney (Taylor)

DATE 2/1/18

GROUNDWATER SAMPLING INFORMATION

TIME SAMPLES TAKEN	Tritium	1400	Sample ID: MW-201A-020118											
	Gamma													
	Cobalt-60	1400												
	Strontium-90	1400												
	Cesium-137	1400												
	HTDs													

PARAMETERS	Time	1241	1246	1251	1256	1301	1306	1311	1316	1321	1326	1331	1336	1341	1346
	Temp. C	6.90	7.09	6.84	6.75	6.65	6.57	6.20	6.41	6.39	6.24	5.55	5.35	4.85	4.29
	Conductivity (umhos/cm)	970	982	986	998	1000	1010	1010	1020	1010	1020	1030	1050	1060	1090
	Dissolved Oxygen (mg/L)	11.24	10.05	9.73	9.34	9.02	8.62	8.48	7.99	7.70	7.37	7.30	7.02	6.84	6.24
	pH	7.39	7.41	7.40	7.39	7.39	7.37	7.37	7.36	7.36	7.35	7.34	7.33	7.33	7.31
	ORP (mV)	101	64	55	45	37	28	25	18	14	8	5	0	-3	-7
	Drawdown Ft	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.03	0.03	0.04	0.04	0.04	0.04	0.04
	Volume purged/Gals	0.345	0.79	1.185	1.52	1.785	2.05	2.35	2.58	2.825	3.11	3.375	3.64	3.905	4.17
	Turbidity (NTU)	139	81.2	82.0	51.1	36.3	32.4	24.3	19.9	17.3	14.7	11.8	12.2	9.21	10.00

Remarks: (ie: field filtrations, persons communicated with at site, etc.)

DTW 18.50 18.50 18.50 18.51 18.51 18.51 18.51 18.51 16.51 16.51 16.51 18.52 18.52 18.52 18.52  
 300ml/min 250ml/min 200ml/min

ATTACHMENT 1

LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 1 of 2

PROJECT LACBWR Resampling  
 LOCATION Genoa, WI

FILE NO. 128924-003

FIELD REP S. Kaney

SAMPLER S. Kaney (Taylor)

DATE 2/1/18

GROUNDWATER SAMPLING INFORMATION

Well ID	MW-203A	Sample ID:
Depth Of Well (ft.) per Log	25	MW-203A-02018
Reference Mark	Top of PVC	Sample Time:
Depth to Water from Reference Mark (ft.)	18.83	11:10
Time	0948	
Depth to Product (ft.)	N/A	
Field Measured Depth Of Well (ft.)	27.97	
Inside Diameter (in.)	2 inches	
Standing Water Depth (ft.)	9.14	
Volume Of Water In Well (gallons/liters)	1.46 gallons	
Purging Device	peristaltic pump	
Volume of Bailer/Pump Capacity	variable	
Cleaning Procedure	dedicated	
Bails Removed/ Volume Removed	5.22 gallons	
Time Purging Started	1002 (79 minutes)	
Time Purging Stopped	1121	
Instrument Used to Monitor Field Parameters	Horiba U-5000 S/N PB064460	
Sampling Device	peristaltic pump	purge rate: ~250 mL/min*
Cleaning Procedure	dedicated	*unable to slow down rate due to freezing temps.
Color	clear	
Odor	none	

ATTACHMENT 1

MW-203A

LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 2 of 2

PROJECT LACBWR Resampling  
 LOCATION Genoa, WI

FILE NO. 128924-003

FIELD REP S. Kanay

SAMPLER S. Kanay (Taylor)

DATE 2/1/18

GROUNDWATER SAMPLING INFORMATION

TIME SAMPLES TAKEN	Tritium	1110	Sample ID: MW-203A-020118
	Gamma		
	Cobalt-60	1110	
	Strontium-90	1110	
	Cesium-137	1110	
	HTDs		

PARAMETERS	Time	1007	1012	1017	1022	1027	1032	1037	1042	1047	1052	1057	1102	1107
	Temp. C	5.56	6.53	6.97	7.05	6.68	6.55	7.13	6.59	6.33	6.54	6.49	6.65	7.21
	Conductivity (umhos/cm)	892	853	834	821	821	818	827	832	847	859	925	891*	867*
	Dissolved Oxygen (mg/L)	12.12	10.01	8.76	8.28	7.72	7.53	6.84	6.59	6.16	7.97	8.70	6.34*	5.00*
	pH	6.78	7.09	7.19	7.26	7.26	7.28	7.29	7.31	7.32	7.32	7.28	7.35	7.36
	ORP (mV)	206	102	84	29	16	5	-13	-25	-33	-44	-72	-80	-80
	Drawdown Ft	0.04	0.06	0.06	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
	Volume purged/Gals	0.33	0.66	0.99	1.32	1.65	1.98	2.31	2.64	2.97	3.30	3.63	3.96	4.29
	Turbidity (NTU)	204	115	82.8	51.5	71.3	55.6	31.2	19.4	14.9	11.1	7.7	7.33	4.79

Remarks: (ie: field filtrations, persons communicated with at site, etc.)

DTW 18.87 18.89 18.89 18.90 18.90 18.90 18.90 18.90 18.90 18.90 18.90 18.90 18.90 18.90

\*values for conductivity and DO began jumping around a lot after being relatively stable. Likely due to freezing weather.





# HEALTH & SAFETY TAILGATE MEETING

PROJECT LACBWR - Groundwater Sampling  
 LOCATION Genoa, WI  
 SUBCONTRACTOR \_\_\_\_\_

H&A FILE NO. 128924<sup>SK 2/1/18</sup> 128924-003  
 PROJECT MGR. J. Kingston  
 DATE 2/1/18

### Required Personal Protective Equipment (PPE):

- steel D
- spikes for ice
- dosimeter

### Site Hazards:

- slips, trips, falls
- radiation
- open excavation
- traffic

### Safety Talk:

- watch step. keep work area clean / tidy
- stay away from high radiation areas / open excavations
- stay away from open excavations, use fall protection when necessary.
- be aware of traffic onsite

I have read and understood the above material.

Samantha Kenny  
 Print your Name

[Signature]  
 Signature

\_\_\_\_\_  
Print your Name

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Print your Name

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Print your Name

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Signature

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Print your Name

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Signature





Form 2

LOW-FLOW GROUNDWATER SAMPLING RECORD		Page 1 of 2
PROJECT	LACWR GW	FILE NO. 128924
LOCATION	Genoa, WI	FIELD REP M. van Noordennen
SAMPLER	M. van Noordennen	DATE 4.3.18
GROUNDWATER SAMPLING INFORMATION		
Well ID	MW. 202B	
Depth Of Well (ft.) per Log	—	
Reference Mark	TOR	
Depth to Water from Reference Mark (ft.)	NM	
Time	NA	
Depth to Product (ft.)	NA	
Field Measured Depth Of Well (ft.)	55.65	
Inside Diameter (in.)	2	
Standing Water Depth (ft.)	NM	
Volume Of Water In Well (gallons/liters)	NM	
Purging Device	Peristaltic Pump	
Volume of Bailer/Pump Capacity	NA	
Cleaning Procedure	NA	
Bails Removed/ Volume Removed	2.75 gal	
Time Purging Started	1303	
Time Purging Stopped	1355	
Instrument Used to Monitor Field Parameters	Horiba U-52, HACH 2100Q	
Sampling Device	Peristaltic Pump	
Cleaning Procedure	NA	
Color	Clear	
Odor	None	

Groundwater Sampling

Form 2

LOW-FLOW GROUNDWATER SAMPLING RECORD

MW-202B

Page 2 of 2

PROJECT LACBWR GW

FILE NO. 128924

LOCATION Genoa, WI

FIELD REP M. van Noordennen

SAMPLER M. van Noordennen

DATE 4-3-18

GROUNDWATER SAMPLING INFORMATION

TIME SAMPLES TAKEN	Tritium		1355										
	Gamma		1355										
	Cobalt-60		1355										
	Strontium-90		1355										
	Cesium-137		1355										
	HTDs		1355										
PARAMETERS	Time	1308	1313	1318	1323	1328	1333	1338	1343	1348	1353		
	Temp. C	7.45	7.73	8.04	8.13	8.21	8.25	8.09	8.12	7.94	7.72		
	Conductivity (umhos/cm)	778	789	891	1020	1030	1040	1040	1040	1050	1050		
	Dissolved Oxygen (mg/L)	6.94	6.85	6.41	5.15	5.24	5.51	4.54	4.37	4.30	4.25		
	pH	6.94	6.91	6.85	6.83	6.87	6.91	6.94	6.97	6.99	7.05		
	ORP (mV)	43	28	4.2	-34	-37	-44	-48	-53	-56	-59		
	Drawdown Ft	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM		
	Volume purged/Gals	0.26	0.53	0.79	1.06	1.32	1.56	1.85	2.11	2.38	2.64		
	Turbidity (NTU)	47.4	38.5	35.4	30.3	29.4	27.0	26.8	25.3	24.9	24.3		

Remarks: (ie: field filtrations, persons communicated with at site, etc.)

\* DTW not working - unable to measure

## Form 2

LOW-FLOW GROUNDWATER SAMPLING RECORD		Page 1 of 2
PROJECT	LACBWR GW	FILE NO. 128924
LOCATION	Genoa, WA	FIELD REP M. van Noordennen
SAMPLER	M. van Noordennen	DATE 4-4-18
GROUNDWATER SAMPLING INFORMATION		
Well ID	MW-203A	
Depth Of Well (ft.) per Log	—	
Reference Mark	TOR	
Depth to Water from Reference Mark (ft.)	16.31	
Time	0845	
Depth to Product (ft.)	NA	
Field Measured Depth Of Well (ft.)	27.67	
Inside Diameter (in.)	2	
Standing Water Depth (ft.)	11.36	
Volume Of Water In Well (gallons/liters)	1.82 gal	
Purging Device	Peristaltic Pump	
Volume of Bailer/Pump Capacity	NA	
Cleaning Procedure	NA	
Bails Removed/ Volume Removed	2.26 gal	
Time Purging Started	0902	
Time Purging Stopped	0959	
Instrument Used to Monitor Field Parameters	Horiba U-52, HACH 2100 Q	
Sampling Device	Peristaltic Pump	
Cleaning Procedure	NA	
Color	Clear	
Odor	None	

Groundwater Sampling

LC-RP-PR-057

Revision 2

Form 2

LOW-FLOW GROUNDWATER SAMPLING RECORD											Page 2 of 2		
PROJECT	LACBWR GW						FILE NO.	128924					
LOCATION	Genee, WI						FIELD REP	M. van Noorden					
SAMPLER	M. van Noorden						DATE	4-4-18					
GROUNDWATER SAMPLING INFORMATION													
TIME SAMPLES TAKEN	Tritium	0959											
	Gamma	0959											
	Cobalt-60	0959											
	Strontium-90	0959											
	Cesium-137	0959											
	HTDs	0959											
PARAMETERS	Time	0907	0912	0917	0922	0927	0932	0937	0942	0947	0952	0957	
	Temp. C	7.89	7.32	6.53	5.94	5.54	5.78	5.24	6.17	5.15	5.35	5.46	
	Conductivity (umhos/cm)	994	1010	1010	1010	1010	1010	1010	1010	1000	1000	1000	
	Dissolved Oxygen (mg/L)	9.22	7.22	6.63	6.42	6.19	6.00	5.67	5.43	5.31	5.18	4.96	
	pH	7.11	7.12	7.06	6.96	6.91	6.89	6.84	6.82	6.81	6.81	6.81	
	ORP (mV)	-53	-67	-64	-58	-54	-52	-50	-50	-50	-51	-52	
	Drawdown Ft	0	0	0	0	0	0	0	0	0	0	0	
	Volume purged/Gals	0.20	0.40	0.59	0.79	0.99	1.19	1.39	1.59	1.78	1.98	2.18	
	Turbidity (NTU)	124	117	101	105	94.0	93.6	66.5	68.3	42.2	39.8	38.8	
Remarks: (ie: field filtrations, persons communicated with at site, etc.)													

Groundwater Sampling

LC-RP-PR-057  
Revision 2

Form 2

LOW-FLOW GROUNDWATER SAMPLING RECORD		Page 1 of 2
PROJECT	LACBWR GW	FILE NO. 128924
LOCATION	Gena, WI	FIELD REP M. van Noordennen
SAMPLER	M. van Noordennen	DATE 4-4-18
GROUNDWATER SAMPLING INFORMATION		
Well ID	MW-203B	
Depth Of Well (ft.) per Log	—	
Reference Mark	TOR	
Depth to Water from Reference Mark (ft.)	16.09	
Time	1037	
Depth to Product (ft.)	NA	
Field Measured Depth Of Well (ft.)	57.80	
Inside Diameter (in.)	2	
Standing Water Depth (ft.)	41.71	
Volume Of Water In Well (gallons/liters)	6.67 gal	
Purging Device	Peristaltic Pump	
Volume of Bailor/Pump Capacity	NA	
Cleaning Procedure	NA	
Bails Removed/ Volume Removed	2.77 gal	
Time Purging Started	1040	
Time Purging Stopped	1122	
Instrument Used to Monitor Field Parameters	Horiba U-52, HACH 2100Q	
Sampling Device	Peristaltic Pump	
Cleaning Procedure	NA	
Color	Clear	
Odor	NONE	



Groundwater Sampling

LC-RP-PR-057

Revision 2

Form 2

LOW-FLOW GROUNDWATER SAMPLING RECORD										mw. 203B		Page 2 of 2	
PROJECT		LACBWR GW						FILE NO.		128924			
LOCATION		Gends, WI						FIELD REP		M. van Noordennen			
SAMPLER		M. van Noordennen						DATE		4-4-18			
GROUNDWATER SAMPLING INFORMATION													
TIME SAMPLES TAKEN	Tritium	1122											
	Gamma	1122											
	Cobalt-60	1122											
	Strontium-90	1122											
	Cesium-137	1122											
	HTDs	1122											
PARAMETERS	Time	1045	1050	1055	1100	1105	1110	1115	1120				
	Temp. C	7.39	7.31	7.47	7.68	7.73	7.88	7.85	7.81				
	Conductivity (umhos/cm)	774	801	821	835	843	848	849	850				
	Dissolved Oxygen (mg/L)	7.42	6.68	6.18	5.79	5.54	5.28	5.06	4.91				
	pH	7.72	7.65	7.62	7.62	7.63	7.63	7.63	7.63				
	ORP (mV)	-38	-57	-62	-65	-68	-70	-71	-72				
	Drawdown Ft	0	0	0	0	0	0	0	0				
	Volume purged/Gals	0.33	0.66	0.99	1.32	1.65	1.98	2.31	2.64				
	Turbidity (NTU)	6.0	5.2	10.7	11.3	11.4	9.6	7.9	6.1				
Remarks: (ie: field filtrations, persons communicated with at site, etc.)													

## Form 2

LOW-FLOW GROUNDWATER SAMPLING RECORD		Page 1 of 2
PROJECT	LACBWR GW	FILE NO. 128924
LOCATION	Genoa, WI	FIELD REP M. van Noordennen
SAMPLER	M. van Noordennen	DATE 4.4.18
GROUNDWATER SAMPLING INFORMATION		
Well ID	MW-202AR	
Depth Of Well (ft.) per Log	—	
Reference Mark	TOR	
Depth to Water from Reference Mark (ft.)	15.37	
Time	1315	
Depth to Product (ft.)	NA	
Field Measured Depth Of Well (ft.)	27.49	
Inside Diameter (in.)	2	
Standing Water Depth (ft.)	12.12	
Volume Of Water In Well (gallons/liters)	1.94 gal	
Purging Device	Peristaltic Pump	
Volume of Bailer/Pump Capacity	NA	
Cleaning Procedure	NA	
Bails Removed/ Volume Removed	4.10 gal	
Time Purging Started	1322	
Time Purging Stopped	1424	
Instrument Used to Monitor Field Parameters	Horiba U-52, HACH 2100Q	
Sampling Device	Peristaltic Pump	
Cleaning Procedure	NA	
Color	Clear	
Odor	None	



Groundwater Sampling

Form 2

LOW-FLOW GROUNDWATER SAMPLING RECORD

MW-202AR

Page 2 of 2

PROJECT LACBWR GW  
 LOCATION Genoa, WI  
 SAMPLER M. van Noordennen

FILE NO. 128924  
 FIELD REP M. van Noordennen  
 DATE 4.4.18

GROUNDWATER SAMPLING INFORMATION

TIME SAMPLES TAKEN	Tritium	1424											
	Gamma	1424											
	Cobalt-60	1424											
	Strontium-90	1424											
	Cesium-137	1424											
	HTDs	1424											
	PARAMETERS	Time	1327	1332	1337	1342	1347	1352	1357	1402	1407	1412	1417
Temp. C	8.04	8.09	7.80	7.57	7.89	7.58	7.53	7.53	7.68	7.76	7.74	7.72	
Conductivity (umhos/cm)	726	728	730	734	736	741	742	744	742	743	742	742	
Dissolved Oxygen (mg/L)	5.93	5.29	5.05	4.82	4.49	4.55	4.32	4.25	4.07	4.04	4.15	4.09	
pH	7.54	7.54	7.54	7.54	7.54	7.60	7.56	7.55	7.55	7.55	7.55	7.55	
ORP (mV)	11	-24	-17	-41	-45	-47	-48	-49	-50	-51	-52	-52	
Drawdown Ft	0	0	0	0	0	0	0	0	0	0	0	0	
Volume purged/Gals	0.33	0.66	0.99	1.32	1.65	1.98	2.31	2.64	2.97	3.30	3.63	3.96	
Turbidity (NTU)	94.3	85.3	71.2	62.6	54.2	47.9	43.5	38.0	34.1	30.1	30.2	30.4	

Remarks: (ie: field filtrations, persons communicated with at site, etc.)

Form 2

B11R

LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 1 of 2

PROJECT LACBWR FILE NO. 128924-003  
 LOCATION Genoa, WI FIELD REP S. Kaney  
 SAMPLER S. Kaney DATE 6/4/18

GROUNDWATER SAMPLING INFORMATION

Well ID	B11R	Sample ID:
Depth Of Well (ft.) per Log	25'	B11R-060418
Reference Mark	Top of PVC	Sample Time: 1145
Depth to Water from Reference Mark (ft.)	11.89	
Time	0957	
Depth to Product (ft.)	N/A	
Field Measured Depth Of Well (ft.)	25.56	
Inside Diameter (in.)	2"	
Standing Water Depth (ft.)	13.67	
Volume Of Water In Well (gallons/liters)	2.38	
Purging Device	peristaltic pump	
Volume of Bailer/Pump Capacity	variable	
Cleaning Procedure	dedicated	
Bails Removed/ Volume Removed	5.31 gal	
Time Purging Started	1002	Purge Rate ~ 150 mL/min ~ 0.040 gal/min
Time Purging Stopped	1216	
Instrument Used to Monitor Field Parameters	Haniba 15004	134 min total
Sampling Device	Peristaltic Pump	
Cleaning Procedure	dedicated	
Color	light brown to yellow	
Odor	none	



*COR/SL*  
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Groundwater Sampling

Form 2

B11R

LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 2 of 2

PROJECT LACBWP FILE NO. 17021 128924-003  
 LOCATION Genoa, WI FIELD REP S. Kaney  
 SAMPLER S. Kaney DATE 6/4/18

GROUNDWATER SAMPLING INFORMATION

TIME SAMPLES TAKEN	Tritium		Sample ID															
	Gamma		B11R - 060418															
	Cobalt-60		Sample Time: 1145															
	Strontium-90																	
	Cesium-137																	
	HTDs																	
PARAMETERS	Time	1017*	1022	1027	1032	1037	1042	1047	1052	1057	1062	1067	1112	1117	1122	1127	1132	1137
	Temp. C	15.63	15.28	15.22	15.20	15.36	15.55	15.63	15.57	15.87	16.00	16.48	16.55	16.45	16.68	16.87	16.85	16.90
	Conductivity (umhos/cm)	1170	1170	1170	1170	1160	1160	1150	1140	1130	1110	1090	1080	1080	1080	1070	1070	1060
	Dissolved Oxygen (mg/L)	2.08	1.88	1.56	1.31	1.03	0.91	0.79	0.71	0.63	0.56	0.47	0.38	0.33	0.28	0.24	0.21	0.19
	pH	6.47	6.81	6.84	6.91	6.95	6.96	6.94	6.87	6.89	6.97	6.96	6.99	6.99	6.96	7.00	7.03	7.01
	ORP (mV)	-2	-37	-50	-58	-64	-60	-56	-50	-61	-63	-65	-65	-68	-63	-71	-74	-72
	Drawdown Ft	1.23	1.24	1.24	1.27	1.24	1.23	1.23	1.24	1.22	1.22	1.22	1.22	1.22	1.23	1.23	1.23	1.23
	Volume purged/Gals	0.60	0.90	1.00	1.20	1.40	1.60	1.80	2.00	2.20	2.40	2.60	2.80	3.00	3.20	3.40	3.60	3.80
	Turbidity (NTU)	296	220	160	102	89.8	62.4	59.9	62.1	31.4	21.6	20.4	17.7	16.4	15.7	13.3	10.8	10.1

1042  
1710  
1050  
0.18  
7.03  
-77  
1.23  
4.20  
9.22

Remarks: (ie: field filtrations, persons communicated with at site, etc.)  
 DTW: 13.12 13.13 13.13 13.16 13.13 13.12 13.13 13.11 13.11 13.11 13.11 13.12 13.12 13.12 13.12

\* parameters not taken for first 15 min due to leaking flow cell.

Form 2

B11AR

LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 1 of 2

PROJECT LCRWR FILE NO. 128924-003  
 LOCATION Genoa, WI FIELD REP S. Kaney  
 SAMPLER S. Kaney DATE 6/4/18

GROUNDWATER SAMPLING INFORMATION

Well ID	B11AR	Sample ID:	
Depth Of Well (ft.) per Log	50'	B11AR-060418	
Reference Mark	Top of PVC	Sample Time:	
Depth to Water from Reference Mark (ft.)	15.22'	1355	
Time	1204		
Depth to Product (ft.)	N/A		
Field Measured Depth Of Well (ft.)	<del>46.65</del> 46.65'		
Inside Diameter (in.)	2"		
Standing Water Depth (ft.)	31.43		
Volume Of Water In Well (gallons/liters)	5.029		
Purging Device	peristaltic pump		
Volume of Bailer/Pump Capacity	variable		
Cleaning Procedure	dedicated		
Bails Removed/ Volume Removed	4.99 gal		
Time Purging Started	<del>1219</del> 1239	759 min	Purge Rate ~ 180 ml/min
Time Purging Stopped	1423	863 min	~ 0.048 gal/min
Instrument Used to Monitor Field Parameters	Hanna U-1500		104 total min
Sampling Device	peristaltic pump		
Cleaning Procedure	dedicated		
Color	clear		
Odor	none		



Groundwater Sampling

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Revision 2

Form 2

BIIAR

LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 2 of 2

PROJECT LACBWL  
LOCATION Genoa, WI  
SAMPLER S. Kaney

FILE NO. 128924-003  
FIELD REP S. Kaney  
DATE 6/4/18

GROUNDWATER SAMPLING INFORMATION

TIME SAMPLES TAKEN	Tritium	1355	Sample ID: BIIAR-060418
	Gamma	1355	
	Cobalt-60	1355	
	Strontium-90	1355	
	Cesium-137	1355	
	HTDs	1355	

PARAMETERS	Time	1244	1249	1254	1259	1304	1309	1314	1319	1324	1329	1334	1339	1344	1349	1354
	Temp. C	20.70	19.66	19.00	18.75	18.59	18.09	18.38	18.57	18.06	18.11	18.12	18.34	18.15	18.15	18.05
	Conductivity (umhos/cm)	862	872	883	887	893	906	896	892	893	892	903	898	900	900	903
	Dissolved Oxygen (mg/L)	3.74	3.48	3.34	3.22	3.10	3.02	2.61	2.66	2.51	2.35	2.25	2.13	3.31	3.31	3.20
	pH	7.75	7.72	7.65	7.67	7.70	7.68	7.70	7.68	7.68	7.68	7.67	7.69	7.68	7.68	7.68
	ORP (mV)	90	89	92	91	89	91	90	91	92	92	92	92	93	93	92
	Drawdown Ft	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
	Volume purged/Gals	0.24	0.48	0.72	0.96	1.20	1.44	1.08	1.92	2.16	2.40	2.64	2.88	3.12	3.36	3.60
	Turbidity (NTU)	5.25	2.73	2.14	1.30	0.91	0.47	0.51	0.42	0.37	0.39	0.30	0.30	0.35	0.35	0.41

Remarks: (ie: field filtrations, persons communicated with at site, etc.)

DTW: 15.26 15.26 15.26 15.26 15.26 15.26 15.26 15.26 15.26 15.26 15.26 15.26 15.26 15.26 15.26 15.26

Purge Rate ml/min ~250 ~180

## Form 2

## LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 1 of 2

PROJECT LACORLFILE NO. 128924-003LOCATION Genoa, WIFIELD REP S. KaneySAMPLER S. KaneyDATE 6/5/18

## GROUNDWATER SAMPLING INFORMATION

Well ID	MW-200A	Sample ID:
Depth Of Well (ft.) per Log	25'	MW-200A-060518
Reference Mark	Top of PVC	Sample Time: 14:20
Depth to Water from Reference Mark (ft.)	16.00'	
Time	1242	
Depth to Product (ft.)	N/A	
Field Measured Depth Of Well (ft.)	27.99'	
Inside Diameter (in.)	2"	
Standing Water Depth (ft.)	11.99	
Volume Of Water In Well (gallons/liters)	1.92 gallons	
Purging Device	peristaltic pump	
Volume of Bailer/Pump Capacity	variable	
Cleaning Procedure	dedicated	
Bails Removed/ Volume Removed	5.952 gal	
Time Purging Started	1244	764 min
Time Purging Stopped	1448	888 min
Instrument Used to Monitor Field Parameters	Horiba U-1500	Purge Rate: ~180 mL/min ~0.048 gal/min
Sampling Device	Peristaltic Pump	
Cleaning Procedure	dedicated	
Color	clear	
Odor	none	



Groundwater Sampling

Form 2

MW-200A

LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 2 of 2

PROJECT LACBUL

FILE NO. 129924-003

LOCATION Genoa WI

FIELD REP S. Kaney

SAMPLER S. Kaney

DATE 6/5/18

GROUNDWATER SAMPLING INFORMATION

TIME SAMPLES TAKEN	Tritium	1420	Sample ID: MW-200A-060518  Sample Time: 1420
	Gamma	1420	
	Cobalt-60	1420	
	Strontium-90	1420	
	Cesium-137	1420	
	HTDs	1420	

PARAMETERS	Time	1250	1255	1300	1305	1310	1315	1320	1325	1330	1335	1340	1345	1350	1355	1400	1405	1410	1415	
	Temp. C	14.44	14.76	15.05	14.25	14.06	13.85	13.78	14.37	15.21	15.38	15.53	15.00	15.20	14.80	15.26	14.61	14.80	15.00	
	Conductivity (umhos/cm)	629	700	753	814	850	873	920	943	954	970	991	1020	1030	1040	1040	1070	1080	1070	
	Dissolved Oxygen (mg/L)	5.68	4.96	4.21	4.01	3.44	3.15	6.14	7.04	7.04	2.00	1.82	1.64	1.52	1.34	1.15	3.84	1.09	1.01	0.94
	pH	7.46	7.33	7.25	7.27	7.33	7.19	7.24	7.17	7.19	7.23	7.22	7.16	7.19	7.15	7.22	7.24	7.20	7.21	
	ORP (mV)	130	115	99	71	39	32	17	13	1	5	7	11	13	17	21	-27	-30	-34	
	Drawdown Ft	0.05	0.05	0.05	0.05	0.05	0.05	0.15	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
	Volume purged/Gals	0.288	0.528	0.768	1.008	1.248	1.488	1.728	1.968	2.208	2.448	2.688	2.928	3.168	3.408	3.648	3.888	4.128	4.368	4.608
	Turbidity (NTU)	69.4	50.1	38.1	28.8	33.9	25.5	19.1	18.0	12.8	10.4	9.87	11.0	7.54	9.35	6.46	6.20	6.58	5.86	4.68

Remarks: (ie: field filtrations, persons communicated with at site, etc.)

DTW: 16.05

Purge Rate: 2.50 1.80



Form 2

LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 1 of 2

PROJECT LACBUR  
 LOCATION Genoa, WI  
 SAMPLER J. Kaney

FILE NO. 128924-003  
 FIELD REP S. Kaney  
 DATE 6/5/18

GROUNDWATER SAMPLING INFORMATION

Well ID	MW-2008	Sample ID:
Depth Of Well (ft.) per Log	55'	MW-2008-060578
Reference Mark	Top of PVC	Sample Time:
Depth to Water from Reference Mark (ft.)	16.48'	1547
Time	1429	
Depth to Product (ft.)	N/A	
Field Measured Depth Of Well (ft.)	57.57'	
Inside Diameter (in.)	2"	
Standing Water Depth (ft.)	41.09	
Volume Of Water In Well (gallons/liters)	6.57 gallons	
Purging Device	peristaltic pump	
Volume of Bailer/Pump Capacity	variable	
Cleaning Procedure	dedicated	
Bails Removed/ Volume Removed	3.95	
Time Purging Started	1452	Purge Rate: ~190 mL/min ~ 0.05 gal/min
Time Purging Stopped	1611	
Instrument Used to Monitor Field Parameters	Hanna U-1500	
Sampling Device	peristaltic pump	
Cleaning Procedure	dedicated	
Color	clear	
Odor	none	

Groundwater Sampling

Form 2

MW-200B

LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 2 of 2

PROJECT LACBOL

FILE NO. 128924-003

LOCATION Genoa, WI

FIELD REP S. Kaney

SAMPLER S. Kaney

DATE 6/5/18

GROUNDWATER SAMPLING INFORMATION

TIME SAMPLES TAKEN	Tritium	1547	Sample ID: MW-200B-060518  Sample Time: 1547
	Gamma	1547	
	Cobalt-60	1547	
	Strontium-90	1547	
	Cesium-137	1547	
	HTDs	1547	

PARAMETERS	Time	1500	1505	1510	1520	1525	1533	1540	1545				
	Temp. C	16.65	15.83	15.78	16.19	16.14	16.02	16.42	16.00				
	Conductivity (umhos/cm)	855	942	979	1010	1010	1010	1010	1020				
	Dissolved Oxygen (mg/L)	3.65	2.78	2.08	1.19	0.91	0.61	0.47	0.37				
	pH	7.82	7.62	7.54	7.60	7.57	7.56	7.59	7.59				
	ORP (mV)	-99	-99	-99	-108	-108	-111	-114	-114				
	Drawdown Ft	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03				
	Volume purged/Gals	0.4	0.65	0.9	1.15	1.4	1.65	1.9	2.15				
	Turbidity (NTU)	27.6	31.2	17.4	10.7	8.57	6.99	6.04	4.81				

Remarks: (ie: field filtrations, persons communicated with at site, etc.)

DTW: 16.51 16.51 16.51 16.51 16.51 16.51 16.51 16.51

Purge Rate: ~190 mg/l →



Form 2

LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 1 of 2

PROJECT LACBWR  
 LOCATION Genoa, WI  
 SAMPLER S. Kaney

FILE NO. 128924  
 FIELD REP S. Kaney  
 DATE 6/6/18

GROUNDWATER SAMPLING INFORMATION

Well ID	MW- <del>201A</del> 201A	Sample ID:
Depth Of Well (ft.) per Log	25'	MW-201A-060618
Reference Mark	Top of PVC	Sample Time: 848
Depth to Water from Reference Mark (ft.)	14.98'	
Time	0714	
Depth to Product (ft.)	N/A	
Field Measured Depth Of Well (ft.)	27.89'	
Inside Diameter (in.)	2"	
Standing Water Depth (ft.)	12.91'	
Volume Of Water In Well (gallons/liters)	2.066 gallons	
Purging Device	peristaltic pump	
Volume of Bailer/Pump Capacity	Variable	
Cleaning Procedure	dedicated	
Bails Removed/ Volume Removed	5.856	
Time Purging Started	0716 436 min	Purge Rate: ~180 mL/min
Time Purging Stopped	0918 558 min	~0.048 gal/min
Instrument Used to Monitor Field Parameters	Horiba U-1500	122 total min
Sampling Device	peristaltic pump	
Cleaning Procedure	dedicated	
Color	clear	
Odor	none	

Form 2

MW-201A

LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 2 of 2

PROJECT LACBOR  
 LOCATION Genoa, WI  
 SAMPLER S. Kanay

FILE NO. 128924-003  
 FIELD REP S. Kanay  
 DATE 6/6/18

GROUNDWATER SAMPLING INFORMATION

TIME SAMPLES TAKEN	Tritium	848													Sample ID:			
	Gamma	848													MW-201A-060618			
	Cobalt-60	848													Samp Time: 848			
	Strontium-90	848																
	Cesium-137	848																
	HTDs	848																
PARAMETERS	Time	725	730	735	740	745	750	755	800	805	870	875	880	830	835	840	845	
	Temp. C	14.99	13.76	12.77	12.59	12.86	12.32	12.63	12.08	11.82	11.90	11.83	11.71	11.67	11.91	11.79	11.85	11.84
	Conductivity (umhos/cm)	812	838	862	861	879	862	860	857	854	856	846	850	851	870	873	875	870
	Dissolved Oxygen (mg/L)	2.34	2.06	1.89	1.68	1.38	1.22	1.23	0.88	0.75	0.64	0.55	0.48	0.41	0.34	0.28	0.24	0.21
	pH	6.80	7.01	7.14	7.21	7.24	7.30	7.33	7.34	7.35	7.35	7.36	7.38	7.37	7.36	7.39	7.38	7.42
	ORP (mV)	-2	-32	-52	-57	-64	-72	-74	-77	-81	-81	-86	-88	-89	-89	-93	-93	-98
	Drawdown Ft	0.03	0.04	0.04	0.064	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
	Volume purged/Gals	0.432	0.672	0.912	1.152	1.392	1.632	1.872	2.112	2.352	2.592	2.832	3.072	3.312	3.552	3.792	4.032	4.272
	Turbidity (NTU)	175	134	93.0	74.3	55.1	41.4	34.1	27.2	20.9	17.9	16.6	13.3	14.2	15.9	16.5	15.2	15.5

Remarks: (ie: field filtrations, persons communicated with at site, etc.)

DTW: 15.01 15.02 15.02 15.02 15.02 15.02 15.02 15.02 15.02 15.02 15.02 15.02 15.02 15.02 15.02 15.02 15.02 15.02

Purge Rate: ~180 mg/L



Form 2

LOW-FLOW GROUNDWATER SAMPLING RECORD		Page 1 of 2
PROJECT	LACBWL	FILE NO. 128924-003
LOCATION	Genoa, WI	FIELD REP S. Kaney
SAMPLER	S. Kaney	DATE 6/6/18
GROUNDWATER SAMPLING INFORMATION		
Well ID	MW-201B	Sample ID:
Depth Of Well (ft.) per Log	55'	MW-201B-060618
Reference Mark	Top of PVC	Sample Time: 1032
Depth to Water from Reference Mark (ft.)	15.32'	
Time	908	
Depth to Product (ft.)	N/A	
Field Measured Depth Of Well (ft.)	55.86' soft bottom	
Inside Diameter (in.)	2"	
Standing Water Depth (ft.)	40.54'	
Volume Of Water In Well (gallons/liters)	6.49 gallons	
Purging Device	Peristaltic pump	
Volume of Bailer/Pump Capacity	Variable	
Cleaning Procedure	dedicated	
Bails Removed/ Volume Removed	3.735	
Time Purging Started	0940	580 min. Purge Rate ~ 170 mL/min
Time Purging Stopped	1103	663 min. ~ 0.045 gal/min
Instrument Used to Monitor Field Parameters	Horiba U-1500	83 min total
Sampling Device	peristaltic pump	
Cleaning Procedure	dedicated	
Color	clear	
Odor	none	

Groundwater Sampling

Form 2

MW-2018

LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 2 of 2

PROJECT LACBWR

FILE NO. 128724-003

LOCATION Genoa, WI

FIELD REP S. Kaney

SAMPLER S. Kaney

DATE 6/6/18

GROUNDWATER SAMPLING INFORMATION

TIME SAMPLES TAKEN	Tritium		Sample ID:										
	Gamma		MW-2018-060618										
	Cobalt-60		Sample Time: 1032										
	Strontium-90												
	Cesium-137												
	HTDs												
PARAMETERS	Time	950	955	1000	1005	1010	1015	1020	1025	1030			
	Temp. C	13.47	12.77	12.74	12.78	12.78	12.80	12.84	13.00	13.26			
	Conductivity (umhos/cm)	933	947	956	948	948	948	948	947	942			
	Dissolved Oxygen (mg/L)	0.21	0.12	0.07	0.04	0.02	0.01	0.00	0.01	0.02			
	pH	7.22	7.23	7.23	7.22	7.24	7.25	7.25	7.26	7.26			
	ORP (mV)	-113	-112	-112	-112	-113	-114	-113	-113	-114			
	Drawdown Ft	0.00	0.00	0.00	0.00	0.02	0.03	0.03	<del>0.03</del>	<del>0.03</del>			
	Volume purged/Gals	0.45	0.675	0.90	1.125	1.35	1.575	1.80	2.025	2.25			
	Turbidity (NTU)	12.0	10.2	6.12	4.54	4.55	3.48	3.15	3.03	3.40			

Remarks: (ie: field filtrations, persons communicated with at site, etc.)

DTW: 15.32 15.32 15.32 15.32 15.34 15.35 15.35 15.35 15.35

Purge Rate: ml/min  
~170 ~170 →



Form 2

LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 1 of 2

PROJECT LACBWR  
 LOCATION Genoa, WI  
 SAMPLER S. Kaney

FILE NO. 128924-003  
 FIELD REP S. Kaney  
 DATE 6/5/18

GROUNDWATER SAMPLING INFORMATION

Well ID	MW-202A	Sampling ID: MW-202A-060518
Depth Of Well (ft.) per Log	25'	
Reference Mark	Top of PVC	Sample Time: 1052
Depth to Water from Reference Mark (ft.)	15.10'	
Time	0920	
Depth to Product (ft.)	N/A	
Field Measured Depth Of Well (ft.)	27.77'	
Inside Diameter (in.)	2"	
Standing Water Depth (ft.)	12.67	
Volume Of Water In Well (gallons/liters)	2.03 gallons	
Purging Device	peristaltic pump	
Volume of Bailer/Pump Capacity	variable	
Cleaning Procedure	dedicated	
Bails Removed/ Volume Removed	3.738 gallons	
Time Purging Started	0950 590	Purge Rate: ~160 mL/min 0.042 gal/min
Time Purging Stopped	1119 679	
Instrument Used to Monitor Field Parameters	Hanba U-1500	
Sampling Device	peristaltic pump	
Cleaning Procedure	dedicated	
Color	clear to slightly cloudy	
Odor	none	

Form 2

LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 2 of 2

PROJECT LACBWSK  
 LOCATION Benda, WI  
 SAMPLER S. Kenney

FILE NO. 128924-023  
 FIELD REP S. Kenney  
 DATE 6/5/18

GROUNDWATER SAMPLING INFORMATION

TIME SAMPLES TAKEN	Tritium	1052	Sample ID: MW-202A-060518 Sample Time: 1052
	Gamma	1052	
	Cobalt-60	1052	
	Strontium-90	1052	
	Cesium-137	1052	
	HTDs	1052	

PARAMETERS	Time	0955	1000	1005	1010	1017	1020	1025	1035	1040	1045	1050	
	Temp. C	18.22	17.15	<del>16.63</del> 16.39	16.39	15.96	16.07	16.23	16.18	16.49	16.45	16.48	
	Conductivity (umhos/cm)	804	817	820	821	834	836	841	845	842	842	842	
	Dissolved Oxygen (mg/L)	0.56	0.31	<del>0.23</del> 0.19	0.19	0.16	0.15	0.15	0.14	0.14	0.14	0.14	
	pH	7.66	<del>7.56</del>	<del>7.53</del> 7.53	7.56	7.53	7.52	7.49	7.60	7.57	7.56	7.57	
	ORP (mV)	42	40	<del>42</del> 38	38	39	39	39	33	34	34	33	
	Drawdown Ft	0.03	0.02	0.02	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	
	Volume purged/Gals	0.21	0.42	0.63	0.84	1.055	1.265	1.475	1.685	1.895	2.105	2.315	
	Turbidity (NTU)	68.8	50.8	<del>43.3</del> 28.2	28.2	23.3	21.3	18.3	13.8	11.5	11.6	9.40	

Remarks: (ie: field filtrations, persons communicated with at site, etc.)

DTW 15.13 15.12 15.12 15.13 15.13 15.13 15.13 15.13 15.13 15.13 15.13 15.13

Purge Rate: 1160 ml/min →



Form 2

LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 1 of 2

PROJECT LACBul FILE NO. 129924  
 LOCATION Genoa, WI FIELD REP S. Kaney  
 SAMPLER S. Kaney DATE 6/5/18

GROUNDWATER SAMPLING INFORMATION

Well ID	MW-202B	Sample ID:
Depth Of Well (ft.) per Log	55'	MW-202B-060518
Reference Mark	Top of PVC	Sample Time: 0852
Depth to Water from Reference Mark (ft.)	15.75'	
Time	0747	Duplicate ID:
Depth to Product (ft.)	N/A	MW-202B-D-060518
Field Measured Depth Of Well (ft.)	55.90'	Sample Time: 0900
Inside Diameter (in.)	2"	
Standing Water Depth (ft.)	40.15'	
Volume Of Water In Well (gallons/liters)	6.424 gal	
Purging Device	peristaltic pump	
Volume of Bailor/Pump Capacity	variable	
Cleaning Procedure	dedicated	
Bails Removed/ Volume Removed	4.99 gallons	
Time Purging Started	0755, 0804 484	*had to stop pump/purge due
Time Purging Stopped	0800*, 0943 583	to leaking flow cell*
Instrument Used to Monitor Field Parameters	Hanna U-1500	Purge Rate: ~180 ml/min
Sampling Device	peristaltic pump	~0.048 gal/min
Cleaning Procedure	dedicated	
Color	clear	
Odor	none	

Groundwater Sampling

Form 2

MW-202B

LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 2 of 2

PROJECT LACBurl  
 LOCATION Genoa, WI  
 SAMPLER S. Kanoy

FILE NO. 128924-003  
 FIELD REP S. Kanoy  
 DATE 6/5/18

GROUNDWATER SAMPLING INFORMATION

TIME SAMPLES TAKEN	Tritium	0852										Sample ID: <u>See</u>		
	Gamma	0852										MW-202B-060518		
	Cobalt-60	0852										Sample Time: 0852		
	Strontium-90	0852												
	Cesium-137	0852										Duplicate: MW-202B-D-060518		
	HTDs	0852										Sample Time: 0900		
PARAMETERS	Time	810	815	0820	0825	0830	835	840	845	0850				
	Temp. C	15.34	15.24	15.16	15.15	15.20	15.40	15.48	15.33	15.47				
	Conductivity (umhos/cm)	1080	1090	1100	1100	1100	1090	1090	1050	1080				
	Dissolved Oxygen (mg/L)	2.92	2.23	1.72	1.45	1.21	0.98	0.82	0.43	0.55				
	pH	7.21	7.28	7.30	7.30	7.33	7.27	7.32	7.36	7.31				
	ORP (mV)	-98	-103	-105	-106	-109	-107	-110	-114	-112				
	Drawdown Ft	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				
	Volume purged/Gals	0.528	0.768	1.008	1.248	1.488	1.728	1.968	2.208	2.448				
	Turbidity (NTU)	2.84	3.87	2.91	2.30	1.98	2.57	1.43	0.98	1.08				

Remarks: (ie: field filtrations, persons communicated with at site, etc.)

DTW 15.75 15.75 15.75 15.75 15.75 15.75 15.75 15.75 15.75 15.75

Purge Rate: -180 -180 -180 -180 -180 -180 -180 -180 -180 -180

ml/min



Form 2

LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 1 of 2

PROJECT LACBWR FILE NO. 128924-003  
 LOCATION Genoa, WI FIELD REP S. Karney  
 SAMPLER S. Karney DATE 6/6/18

GROUNDWATER SAMPLING INFORMATION

Well ID	MW-203A	Sample ID:
Depth Of Well (ft.) per Log	25'	MW-203A-060618
Reference Mark	Top of PVC	Sample Time: 1552
Depth to Water from Reference Mark (ft.)	15.51'	
Time	1355	
Depth to Product (ft.)	N/A	
Field Measured Depth Of Well (ft.)	27.89'	
Inside Diameter (in.)	2"	
Standing Water Depth (ft.)	12.38'	
Volume Of Water In Well (gallons/liters)	1.98 gallons	
Purging Device	Peristaltic pump	
Volume of Bailer/Pump Capacity	variable	
Cleaning Procedure	dedicated	
Bails Removed/ Volume Removed	<del>1402</del> <sup>yr</sup> 6.8 gallons	Purge Rate: ~190 mL/min
Time Purging Started	1402	~0.050 gal/min
Time Purging Stopped	1618	842 min 978 min 136 min total
Instrument Used to Monitor Field Parameters	Honiba U-1500	
Sampling Device	Peristaltic pump	
Cleaning Procedure	dedicated	
Color	clear, *during sampling of final bottle (large 1-gal Nitric poly,	
Odor	none) fine red particulate was observed in sampling tube. Clear w/ fine red particulate).	

Form 2

MW-203A

LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 2 of 2

PROJECT LACBWR

FILE NO. 128924-003

LOCATION Genoa, WI

FIELD REP S. Kaney

SAMPLER S. Kaney

DATE 6/6/18

GROUNDWATER SAMPLING INFORMATION

TIME SAMPLES TAKEN	Tritium	1552	Sample ID:	
	Gamma	1552	MW-203A-060618	
	Cobalt-60	1552	Sample Time: 1552	
	Strontium-90	1552		
	Cesium-137	1552		
	HTDs	1552		

PARAMETERS	Time	1410	1415	1420	1425	1430	1435	1440	1445	1450	1455	1700	1705	1710	1715	1720	1725	1730	1735	1740	1745	1750	1755	1760
	Temp. C	14.63	13.59	13.46	13.62	13.50	13.68	13.62	13.57	13.69	13.59	13.70	13.80	13.76	14.01	13.81	13.86	14.43	14.79	15.31	15.65	15.85		
	Conductivity (umhos/cm)	582	581	580	575	569	568	567	566	562	565	563	559	556	554	550	549	543	539	535	527	527		
	Dissolved Oxygen (mg/L)	3.15	3.01	3.05	2.88	2.82	2.92	2.50	2.37	2.49	2.61	2.36	2.90	4.66	4.41	4.30	4.11	3.85	3.46	3.25	2.73	2.20		
	pH	7.66	7.59	7.57	7.56	7.58	7.57	7.88	7.58	7.57	7.58	7.59	7.59	7.59	7.59	7.59	7.60	7.60	7.60	7.60	7.62	7.55		
	ORP (mV)	-10	-47	-56	267	-73	-79	83	87	89	72	94	98	99	701	102	103	103	104	105	106	704		
	Drawdown Ft	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09		
	Volume purged/Gals	0.44	0.72	0.97	1.22	1.47	1.72	1.97	2.22	2.47	2.72	2.97	3.22	3.47	3.72	3.97	4.22	4.47	4.72	4.97	5.22	5.47		
	Turbidity (NTU)	142	84.5	64.2	69.6	66.4	52.8	47.0	39.0	27.7	23.9	21.7	18.6	14.7	16.0	11.70	10.3	9.92	10.7	8.96	8.29	8.69		

Remarks: (ie: field filtrations, persons communicated with at site, etc.)

D To:	15.60'	15.60'	15.60'	15.60'	15.60'	15.60'	15.60'	15.60'	15.60'	15.60'	15.60'	15.60'	15.60'	15.60'	15.60'	15.60'	15.60'	15.60'	15.60'	15.60'	15.60'	15.60'	15.60'	15.60'
Purge Rate:	~210	~210	~190																					
ng/lk																								

\* Sampled after this reading even though not stable due to 3 well  
 Volumes purged \*



Form 2

LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 1 of 2

PROJECT LACBWL  
 LOCATION Geneva, WI  
 SAMPLER J. Kaney

FILE NO. 128924-003  
 FIELD REP S. Kaney  
 DATE 6/7/18

GROUNDWATER SAMPLING INFORMATION

Well ID	MW-203B	Sample ID:
Depth Of Well (ft.) per Log	55'	MW-203B-060718
Reference Mark	Top of PVC	Sample Time: 0932
Depth to Water from Reference Mark (ft.)	16.03	
Time	0730	
Depth to Product (ft.)	N/A	
Field Measured Depth Of Well (ft.)	58.04	
Inside Diameter (in.)	2"	
Standing Water Depth (ft.)	42.01'	
Volume Of Water In Well (gallons/liters)	6.72 gallons	
Purging Device	Peristaltic Pump	
Volume of Bailer/Pump Capacity	variable	
Cleaning Procedure	dedicated	
Bails Removed/ Volume Removed	~7.47 gallons	
Time Purging Started	0738	458 min
Time Purging Stopped	0959	599 min
Instrument Used to Monitor Field Parameters	Horiba U-1500	Purge Rate ~ 200 mL/min ~ 0.053 gal/min 141 min total
Sampling Device	Peristaltic Pump	
Cleaning Procedure	dedicated	
Color	clear with light brown fine particulate	
Odor	none	

Form 2

MW-203B

LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 2 of 2

PROJECT LACBOR

FILE NO. 128924-003

LOCATION Genoa, WI

FIELD REP S. Kaney

SAMPLER S. Kaney

DATE 6/7/18

GROUNDWATER SAMPLING INFORMATION

TIME SAMPLES TAKEN

Tritium 0932  
 Gamma 0932  
 Cobalt-60 0932  
 Strontium-90 0932  
 Cesium-137 0932  
 HTDs 0932

Sample ID:  
MW-203B-060718  
 Sample Time: 0932

PARAMETERS

Time	745	750	755	800	805	810	815	820	825	830	835	840	845	850	855	900	905	910	915	920	925	0930
Temp. C	15.62	14.98	14.26	14.04	14.02	14.04	13.93	13.87	13.86	13.93	13.87	13.50	13.95	13.85	13.84	13.55	13.92	14.05	14.05	14.05	14.05	14.04
Conductivity (umhos/cm)	782	800	819	824	827	819	816	815	815	814	813	813	813	813	812	812	812	809	810	811	812	813
Dissolved Oxygen (mg/L)	3.69	2.51	1.95	1.65	1.50	1.36	1.36	1.08	0.98	0.78	0.50	0.30	0.09	0.85	0.70	0.50	0.38	0.45	1.37	1.29	1.19	0.88
pH	6.99	7.32	7.54	7.60	7.69	7.69	7.71	7.72	7.75	7.76	7.78	7.78	7.79	7.79	7.78	7.79	7.79	7.82	7.82	7.82	7.81	7.84
ORP (mV)	-40	-120	-139	-145	-148	-148	-149	-151	-154	-155	-158	-157	-154	-158	-158	-159	-159	-161	-162	-162	-162	-163
Drawdown Ft	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Volume purged/Gals	0.371	0.636	0.901	1.16	1.431	1.696	1.961	2.226	2.49	2.76	3.02	3.29	3.55	3.82	4.08	4.35	4.61	4.88	5.14	5.41	5.67	5.94
Turbidity (NTU)	26.2	13.8	13.0	11.9	10.5	8.41	7.14	7.32	5.58	4.33	4.29	4.03	3.80	3.24	3.35	2.73	2.70	2.44	2.33	2.26	1.88	2.13

Remarks: (ie: field filtrations, persons communicated with at site, etc.)

DTW: 16.03 16.03 16.03  
 Purge Rate: ~210 ~210 ~200  
 ng/L



Form 2

LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 1 of 2

PROJECT LACBWR FILE NO. 128924-003  
 LOCATION Genoa, WI FIELD REP S. Kaney  
 SAMPLER S. Kaney DATE 10/7/18

GROUNDWATER SAMPLING INFORMATION

Well ID	MW-204A	Sample ID:
Depth Of Well (ft.) per Log	25'	MW-204A-060718
Reference Mark	Top of PVC	Sample Time: 1332
Depth to Water from Reference Mark (ft.)	15.18'	
Time	1227	
Depth to Product (ft.)	N/A	
Field Measured Depth Of Well (ft.)	27.01'	
Inside Diameter (in.)	2"	
Standing Water Depth (ft.)	11.83	
Volume Of Water In Well (gallons/liters)	1.89 gallons	
Purging Device	Peristaltic Pump	
Volume of Bailer/Pump Capacity	variable	
Cleaning Procedure	dedicated	
Bails Removed/ Volume Removed	4.187 gallons	
Time Purging Started	1230	750 min ~ Purge Rate: ~200 ml/min
Time Purging Stopped	1349	829 min ~ 0.053 gal/min
Instrument Used to Monitor Field Parameters	Haniba U-1500	79 min total
Sampling Device	Peristaltic Pump	
Cleaning Procedure	dedicated	
Color	clear	
Odor	none	

Form 2

MW-204A

LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 2 of 2

PROJECT LACER  
 LOCATION Genoa, WI  
 SAMPLER S. Keney

FILE NO. 128924-003  
 FIELD REP S. Keney  
 DATE 6/17/18

GROUNDWATER SAMPLING INFORMATION

TIME SAMPLES TAKEN	Tritium	1332	Sample ID: MW-204A-060718 Sample Time: 1332
	Gamma	1332	
	Cobalt-60	1332	
	Strontium-90	1332	
	Cesium-137	1332	
	HTDs	1332	

PARAMETERS	Time	1235	1240	1245	1250	1255	1300	1305	1310	1315	1320	1325	1330
	Temp. C	19.21	15.59	14.51	14.15	14.08	14.05	14.09	14.08	14.06	14.17	14.19	14.25
	Conductivity (umhos/cm)	916	950	974	984	977	976	973	973	970 292	967	963	961
	Dissolved Oxygen (mg/L)	5.02	4.48	4.24	3.97	3.65	3.39	3.14	3.06	2.92	2.79	2.73	2.60
	pH	7.74	7.62	7.59	7.58	7.59	7.58	7.58	7.55	7.57	7.57	7.58	7.56
	ORP (mV)	73	85	89	90	90	91	92	93	93	92	92	93
	Drawdown Ft	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
	Volume purged/Gals	0.265	0.53	0.795	1.06	1.325	1.59	1.855	2.12	2.385	2.65	2.915	3.18
	Turbidity (NTU)	14.1	11.2	7.58	5.02	3.87	3.46	4.34	3.46	3.85	3.52	3.64	3.34

Remarks: (ie: field filtrations, persons communicated with at site, etc.)

DTW: 15.25 15.25 15.25 15.25 15.25 15.25 15.25 15.25 15.25 15.25 15.25 15.25 15.25

Purge Rate: ~200  ml/min



Form 2

LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 1 of 2

PROJECT LACBWR  
 LOCATION Genoa, WI  
 SAMPLER S. Kenney

FILE NO. 128924-003  
 FIELD REP S. Kenney  
 DATE 6/7/18

GROUNDWATER SAMPLING INFORMATION

Well ID	MW-204B	Sample ID:
Depth Of Well (ft.) per Log	55'	MW-204B-060718
Reference Mark	Top of PVC	Sample Time: 1157
Depth to Water from Reference Mark (ft.)	15.22'	
Time	1103	
Depth to Product (ft.)	N/A	
Field Measured Depth Of Well (ft.)	56.50	
Inside Diameter (in.)	2"	
Standing Water Depth (ft.)	41.28	
Volume Of Water In Well (gallons/liters)	6.60 gallons	
Purging Device	Peristaltic Pump	
Volume of Bailer/Pump Capacity	variable	
Cleaning Procedure	dedicated	
Bails Removed/ Volume Removed	3.657 gallons	
Time Purging Started	1110	Purge Rate: ~200 ml/min
Time Purging Stopped	1219	~0.053 gal/min
Instrument Used to Monitor Field Parameters	Honda U-1500	69 min total
Sampling Device	Peristaltic Pump	
Cleaning Procedure	dedicated	
Color	clear w/lt. fine black particulate	
Odor	none	



Form 2

MW-204B

LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 2 of 2

PROJECT LAEBWL

FILE NO. 128924-043

LOCATION Genoa, WI

FIELD REP S. Kaney

SAMPLER S. Kaney

DATE 6/7/18

GROUNDWATER SAMPLING INFORMATION

TIME SAMPLES TAKEN	Tritium	1157	Sample ID: MW-204B-060718  Sample Time: 1157
	Gamma	1157	
	Cobalt-60	1157	
	Strontium-90	1157	
	Cesium-137	1157	
	HTDs	1157	

PARAMETERS	Time	1115	1120	1125	1130	1135	1140	1145	1150	1155			
	Temp. C	16.84	15.74	14.84	14.90	14.84	14.69	14.56	14.45	14.15			
	Conductivity (umhos/cm)	1150	1180	1190	1250	1160	1150	1150	1140	1150			
	Dissolved Oxygen (mg/L)	5.56	3.59	2.77	2.22	1.62	1.28	1.03	0.89	0.78			
	pH	7.89	7.62	7.53	7.50	7.47	7.48	7.45	7.49	7.42			
	ORP (mV)	85	86	85	78	76	73	74	69	69			
	Drawdown Ft	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03		
	Volume purged/Gals	0.265	0.53	0.795	1.06	1.325	1.59	1.855	2.12	2.385			
	Turbidity (NTU)	20.0	14.8	11.1	8.52	5.89	6.60	6.53	6.70	4.19			

Remarks: (ie: field filtrations, persons communicated with at site, etc.)

DTW 15.25 15.25 15.25 15.25 15.25 15.25 15.25 15.25 15.25  
 Purge Rate: ~200 ~200 →  
 gal/min

Form 2

LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 1 of 2

PROJECT LtCBWR FILE NO. 128924-003  
 LOCATION Genoa, WI FIELD REP S. Kaney  
 SAMPLER S. Kaney DATE 6/6/18

GROUNDWATER SAMPLING INFORMATION

Well ID	<u>Drinking well - 5</u>	Sample ID:
Depth Of Well (ft.) per Log	<u>-</u>	<u>Well-5-060618</u>
Reference Mark	<u>-</u>	Sample Time: <u>12:42</u>
Depth to Water from Reference Mark (ft.)	<u>-</u>	
Time	<u>-</u>	
Depth to Product (ft.)	<u>-</u>	
Field Measured Depth Of Well (ft.)	<u>-</u>	
Inside Diameter (in.)	<u>-</u>	
Standing Water Depth (ft.)	<u>-</u>	
Volume Of Water In Well (gallons/liters)	<u>-</u>	
Purging Device	<u>Production Well <sup>Sampling nozzle</sup> <del>spigot</del></u>	
Volume of Bailer/Pump Capacity	<u>variable</u>	
Cleaning Procedure	<u>dedicated</u>	
Bails Removed/ Volume Removed	<u>&gt;7200 gallons*</u>	
Time Purging Started	<u>1239*</u>	<u>Purge Rate: ~60 gpm (40-60 gpm)</u>
Time Purging Stopped	<u>1245*</u>	<u>* well had been purging since 1030 at 60 gpm</u>
Instrument Used to Monitor Field Parameters	<u>Honda U-1500</u>	
Sampling Device	<u>Sampling nozzle</u>	
Cleaning Procedure	<u>dedicated</u>	
Color	<u>clear</u>	
Odor	<u>none</u>	



LOW-FLOW GROUNDWATER SAMPLING RECORD

PROJECT LACBWR  
 LOCATION Genda, WI  
 SAMPLER S. Kaney

FILE NO. 128924-003  
 FIELD REP S. Kaney  
 DATE 6/6/18

GROUNDWATER SAMPLING INFORMATION

TIME SAMPLES TAKEN	Tritium	1242	Sample ID: <u>Well-5-060618</u> Sample Time: <u>1242</u>															
	Gamma	1242																
	Cobalt-60	1242																
	Strontium-90	1242																
	Cesium-137	1242																
	HTDs	1242																
PARAMETERS	Time	1240																
	Temp. C	14.06																
	Conductivity (umhos/cm)	607																
	Dissolved Oxygen (mg/L)	6.31																
	pH	7.64																
	ORP (mV)	126																
	Drawdown Ft	-																
	Volume purged/Gals	-																
	Turbidity (NTU)	7.24																

Remarks: (ie: field filtrations, persons communicated with at site, etc.)

Form 2

<b>LOW-FLOW GROUNDWATER SAMPLING RECORD</b>		Page <u>1</u> of <u>2</u>
PROJECT	LAEBUR	FILE NO. 128924-003
LOCATION	Genoa, WI	FIELD REP S. Kaney
SAMPLER	S. Kaney	DATE 6/6/18

GROUNDWATER SAMPLING INFORMATION

Well ID	#62 Drinking Well 7	Sample ID:
Depth Of Well (ft.) per Log	-	Well-7-060618
Reference Mark	-	Sample Time: 1312
Depth to Water from Reference Mark (ft.)	-	
Time	-	
Depth to Product (ft.)	-	
Field Measured Depth Of Well (ft.)	-	
Inside Diameter (in.)	-	
Standing Water Depth (ft.)	-	
Volume Of Water In Well (gallons/liters)	-	
Purging Device	Production Well / Sampling <sup>nozzle</sup> <del>sp</del>	
Volume of Bailer/Pump Capacity	variable	
Cleaning Procedure	dedicated	
Bails Removed/ Volume Removed	> 1000 gallons	
Time Purging Started	1310*	Purge Rate: ~30-50 gpm
Time Purging Stopped	1320*	* well had purged for >20min
Instrument Used to Monitor Field Parameters	Horiba U-1500	at ~50 gpm
Sampling Device	sampling nozzle	
Cleaning Procedure	dedicated	
Color	clear	
Odor	none	



Form 2

Well-7

LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 2 of 2

PROJECT LACBWL

FILE NO. 128924-003

LOCATION Genoa, WI

FIELD REP S. Kaney

SAMPLER S. Kaney

DATE 6/6/18

GROUNDWATER SAMPLING INFORMATION

TIME SAMPLES TAKEN	Tritium	1312	Sample ID: <u>Well-7-060618</u> Sample Time: <u>1312</u>											
	Gamma	1312												
	Cobalt-60	1312												
	Strontium-90	1312												
	Cesium-137	1312												
	HTDs	1312												
PARAMETERS	Time	1312												
	Temp. C	12.88												
	Conductivity (umhos/cm)	564												
	Dissolved Oxygen (mg/L)	6.67												
	pH	7.99												
	ORP (mV)	61												
	Drawdown Ft	-												
	Volume purged/Gals	-												
	Turbidity (NTU)	2.52												

Remarks: (ie: field filtrations, persons communicated with at site, etc.)



Form 2

LOW-FLOW GROUNDWATER SAMPLING RECORD		Page 1 of 2
PROJECT	LACBWR GW Sampling	FILE NO. 128924-003
LOCATION	Genoa, WI	FIELD REP S. Kaney
SAMPLER	S. Kaney	DATE 7/10/18
GROUNDWATER SAMPLING INFORMATION		
Well ID	Drinking well 3	Sample ID:
Depth Of Well (ft.) per Log	-	Well-3-071018
Reference Mark	-	
Depth to Water from Reference Mark (ft.)	-	Sample Time: 1345
Time	-	
Depth to Product (ft.)	N/A	
Field Measured Depth Of Well (ft.)	-	
Inside Diameter (in.)	-	
Standing Water Depth (ft.)	-	
Volume Of Water In Well (gallons/liters)	-	
Purging Device	production well	
Volume of Bailer/Pump Capacity	variable	
Cleaning Procedure	dedicated	
Bails Removed/ Volume Removed	-	
Time Purging Started	1333	through faucet at ~5 gpm
Time Purging Stopped	1349	
Instrument Used to Monitor Field Parameters	Horiba U-52	
Sampling Device	sampling port	
Cleaning Procedure	dedicated	
Color	clear	
Odor	none	

Form 2

LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 2 of 2

PROJECT LACBWR GW Sampling  
 LOCATION Genoa, WI  
 SAMPLER J. Kaney

FILE NO. 128924-003  
 FIELD REP J. Kaney  
 DATE 7/10/18

GROUNDWATER SAMPLING INFORMATION

TIME SAMPLES TAKEN	Tritium	1345	Sample ID: Well-3-071018																	
	Gamma	1345																		
	Cobalt-60	1345																		
	Strontium-90	1345	Sample Time: 1345																	
	Cesium-137	1345																		
	HTDs	1345																		
PARAMETERS	Time	1243																		
	Temp. C	17.74																		
	Conductivity (umhos/cm)	450																		
	Dissolved Oxygen (mg/L)	2.83																		
	pH	8.24																		
	ORP (mV)	-74																		
	Drawdown Ft	-																		
	Volume purged/Gals	-																		
	Turbidity (NTU)	4.05																		

Remarks: (ie: field filtrations, persons communicated with at site, etc.)

Form 2

LOW-FLOW GROUNDWATER SAMPLING RECORD		Page 1 of 2
PROJECT	LACBWL GW Sampling	FILE NO. 128924-003
LOCATION	Gemma.w1	FIELD REP S. Kany
SAMPLER	S. Kany	DATE 7/10/18
GROUNDWATER SAMPLING INFORMATION		
Well ID	Well-5	Sample ID:
Depth Of Well (ft.) per Log	-	Well-5-071018
Reference Mark	-	
Depth to Water from Reference Mark (ft.)	-	Sample Time: 1235
Time	-	
Depth to Product (ft.)	N/A	
Field Measured Depth Of Well (ft.)	-	
Inside Diameter (in.)	-	
Standing Water Depth (ft.)	-	
Volume Of Water In Well (gallons/liters)	-	
Purging Device	production well	
Volume of Bailer/Pump Capacity	variable	
Cleaning Procedure	dedicated	
Bails Removed/ Volume Removed	~60 gpm since 0800	
Time Purging Started	Started running at 0800	1230 ~60 gpm
Time Purging Stopped	1241	
Instrument Used to Monitor Field Parameters	Horiba U-52	
Sampling Device	sampling port	
Cleaning Procedure	dedicated	
Color	clear	
Odor	none	

Form 2

LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 2 of 2

PROJECT LACBUR  
 LOCATION Genoa, WI  
 SAMPLER S. Kaney

FILE NO. 128924-003  
 FIELD REP S. Kaney  
 DATE 7/10/18

GROUNDWATER SAMPLING INFORMATION

TIME SAMPLES TAKEN	Tritium	1235	Sample 10: Well-5-071018 Sample Time: 1235															
	Gamma	1235																
	Cobalt-60	1235																
	Strontium-90	1235																
	Cesium-137	1235																
	HTDs	1235																
PARAMETERS	Time	1235																
	Temp. C	11.50																
	Conductivity (umhos/cm)	618																
	Dissolved Oxygen (mg/L)	7.93																
	pH	8.17																
	ORP (mV)	136																
	Drawdown Ft	-																
	Volume purged/Gals	-																
	Turbidity (NTU)	2.75																

Remarks: (ie: field filtrations, persons communicated with at site, etc.)

Form 2

LOW-FLOW GROUNDWATER SAMPLING RECORD		Page 1 of 2
PROJECT	LACBWL GW Sampling	FILE NO. 128924-003
LOCATION	Genoa, WI	FIELD REP S. Kaney
SAMPLER	S. Kaney	DATE 7/10/18
GROUNDWATER SAMPLING INFORMATION		
Well ID	Well -7	Sample ID:
Depth Of Well (ft.) per Log	-	Well -7-07/018
Reference Mark	-	
Depth to Water from Reference Mark (ft.)	-	Sample Time: 1255
Time	-	
Depth to Product (ft.)	N/A	
Field Measured Depth Of Well (ft.)	-	
Inside Diameter (in.)	-	
Standing Water Depth (ft.)	-	
Volume Of Water In Well (gallons/liters)	-	
Purging Device	production well	
Volume of Bailer/Pump Capacity	variable	
Cleaning Procedure	dedicated	
Bails Removed/ Volume Removed	75 gpm - normal drinking well	
Time Purging Started	1254	
Time Purging Stopped	1304	
Instrument Used to Monitor Field Parameters	Honda U-52	
Sampling Device	Sampling Port	
Cleaning Procedure	dedicated	
Color	clear	
Odor	none	



Groundwater Sampling

Form 2

LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 2 of 2

PROJECT LACBR GW Sampling FILE NO. 128924-003  
 LOCATION Genoa, WI FIELD REP S. Kaney  
 SAMPLER S. Kaney DATE 7/10/18

GROUNDWATER SAMPLING INFORMATION

TIME SAMPLES TAKEN	Tritium	1255	Sample ID: Well-7-071018 Sample Time: 1255															
	Gamma	1255																
	Cobalt-60	1255																
	Strontium-90	1255																
	Cesium-137	1255																
	HTDs	1255																
PARAMETERS	Time	1255																
	Temp. C	15.73																
	Conductivity (umhos/cm)	490																
	Dissolved Oxygen (mg/L)	7.29																
	pH	8.23																
	ORP (mV)	115																
	Drawdown Ft	-																
	Volume purged/Gals	-																
	Turbidity (NTU)	12.9																

Remarks: (ie: field filtrations, persons communicated with at site, etc.)

Form 2

LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 1 of 2

PROJECT	LACBWR GW	FILE NO.	128924
LOCATION	Gendg WI	FIELD REP	M. van Noordennen
SAMPLER	M. van Noordennen	DATE	7/10/18

GROUNDWATER SAMPLING INFORMATION

Well ID	B11-AR
Depth Of Well (ft.) per Log	—
Reference Mark	TOR
Depth to Water from Reference Mark (ft.)	11.73
Time	0850
Depth to Product (ft.)	NA
Field Measured Depth Of Well (ft.)	46.65
Inside Diameter (in.)	2
Standing Water Depth (ft.)	34.92
Volume Of Water In Well (gallons/liters)	5.59 gal
Purging Device	Peristaltic Pump
Volume of Bailer/Pump Capacity	NA
Cleaning Procedure	NA
Bails Removed/ Volume Removed	1.83 gal
Time Purging Started	0901
Time Purging Stopped	0943
Instrument Used to Monitor Field Parameters	Horiba U-52, HACH 2100 Q
Sampling Device	Peristaltic Pump
Cleaning Procedure	NA
Color	clear
Odor	None

Groundwater Sampling

Form 2

LOW-FLOW GROUNDWATER SAMPLING RECORD

B11-AR

Page 2 of 2

PROJECT LACBOR GW

FILE NO. 128924

LOCATION Genoa, WI

FIELD REP M. van Noordennen

SAMPLER M. van Noordennen

DATE 2-10-18

GROUNDWATER SAMPLING INFORMATION

TIME SAMPLES TAKEN	Tritium												
	Gamma												
	Cobalt-60												
	Strontium-90												
	Cesium-137												
	HTDs												
PARAMETERS	Time	0906	0911	0916	0921	0926	0931	0936	0941				
	Temp. C	16.71	15.51	14.97	14.76	14.57	14.41	14.52	14.55				
	Conductivity (umhos/cm)	548	542	544	545	541	546	546	546				
	Dissolved Oxygen (mg/L)	3.75	2.03	1.24	0.79	0.35	0.00	0.00	0.00				
	pH	7.05	7.29	7.36	7.40	7.43	7.44	7.45	7.47				
	ORP (mV)	310	311	313	313	311	309	307	306				
	Drawdown Ft	0.04	0.04	0.06	0.07	0.07	0.07	0.07	0.07				
	Volume purged/Gals	0.22	0.44	0.65	0.87	1.09	1.31	1.53	1.74				
	Turbidity (NTU)	1.9	3.0	3.7	2.8	1.8	0.8	0.7	0.2				

Remarks: (ie: field filtrations, persons communicated with at site, etc.)

①

Groundwater Sampling

Form 2

LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 1 of 2

PROJECT LACBWR GW Sampling  
LOCATION Genoa, WI  
SAMPLER S. Koney

FILE NO. 128924-003  
FIELD REP S. Koney  
DATE 7/10/18

GROUNDWATER SAMPLING INFORMATION

Well ID	B11R	Sample ID: B11R-071018
Depth Of Well (ft.) per Log	25'	
Reference Mark	Top of PVC	Sample Time: 1008
Depth to Water from Reference Mark (ft.)	9.94	
Time	0853	
Depth to Product (ft.)	N/A	
Field Measured Depth Of Well (ft.)	25.38	
Inside Diameter (in.)	2 inches	
Standing Water Depth (ft.)	15.44	
Volume Of Water In Well (gallons/liters)	2.47 gal	
Purging Device	peristaltic pump	
Volume of Bailer/Pump Capacity	variable	
Cleaning Procedure	dedicated	
Bails Removed/ Volume Removed	4.10 gallons	
Time Purging Started	0856	Purge Rate: ~150 mL/min
Time Purging Stopped	1031	~ 0.04 gal/min
Instrument Used to Monitor Field Parameters	Haniba U-5000	
Sampling Device	peristaltic pump	
Cleaning Procedure	dedicated	
Color	clear	
Odor	none	

Groundwater Sampling

Form 2

LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 2 of 2

PROJECT LOCATION LTC BWR - G/W Sampling  
Genoa, WI

FILE NO. 128924-003

FIELD REP S. Kaney

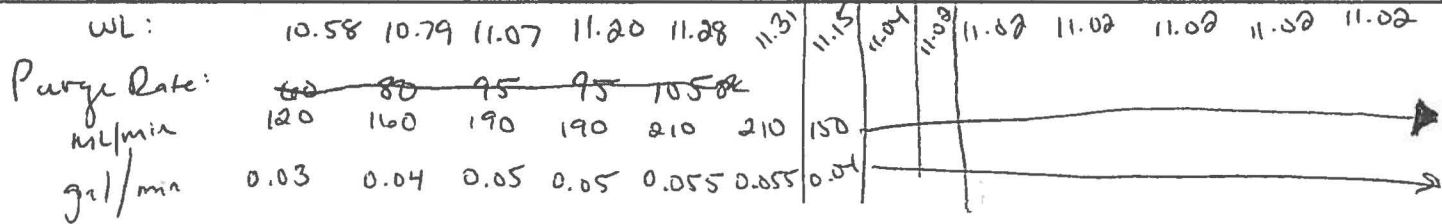
SAMPLER S. Kaney

DATE 7/10/18

GROUNDWATER SAMPLING INFORMATION

TIME SAMPLES TAKEN	Tritium	1008													Sample ID: <u>B11R-071018</u>	
	Gamma	1008														
	Cobalt-60	1008													Sample Time: <u>1008</u>	
	Strontium-90	1008														
	Cesium-137	1008														
	HTDs	1008														
PARAMETERS	Time	0900	0905	0910	0915	0920	0925	0930	0935	0940	0945	0950	0955	1000	1005	
	Temp. C	19.55	17.04	15.90	15.64	15.49	15.55	15.23	16.35	16.36	16.69	16.78	17.35	17.16	17.23	
	Conductivity (umhos/cm)	1150	1200	1200	1200	1180	1180	1160	1150	1140	1140	1130	1120	1120	1120	
	Dissolved Oxygen (mg/L)	3.76	3.30	2.79	2.48	2.16	1.90	1.83	1.74	1.62	1.52	1.44	1.39	1.35	1.30	
	pH	6.84	7.17	7.24	7.27	7.28	7.3	7.32	7.32	7.32	7.33	7.33	7.35	7.36	7.36	
	ORP (mV)	16	-13	-23	-30	-40	50	53	54	53	-51	-52	-61	-64	-64	
	Drawdown Ft	0.64	0.85	1.13	1.26	1.34	1.37	1.21	1.10	1.08	1.08	1.08	1.08	1.08	1.08	
	Volume purged/Gals	0.21	0.41	0.66	0.91	1.185	1.46	1.66	1.86	2.06	2.26	2.46	2.66	2.86	3.06	
	Turbidity (NTU)	105	92.5	64.5	40.3	30.5	29.2	20.1	16.8	14.9	10.1	7.64	6.53	6.20	5.65	

Remarks: (ie: field filtrations, persons communicated with at site, etc.)





Form 2

LOW-FLOW GROUNDWATER SAMPLING RECORD		Page 1 of 2
PROJECT LOCATION	LACBul GW Sampling Genoa, WI	FILE NO. 128924-003 FIELD REP S. Kaney
SAMPLER	S. Kaney	DATE 7/11/18
GROUNDWATER SAMPLING INFORMATION		
Well ID	MW-200A	Sample ID:
Depth Of Well (ft.) per Log	25'	MW-200A-071118
Reference Mark	Top of PVC	Sample Time: 0907
Depth to Water from Reference Mark (ft.)	12.65'	
Time	751	
Depth to Product (ft.)	N/A	
Field Measured Depth Of Well (ft.)	27.78'	
Inside Diameter (in.)	2 inches	
Standing Water Depth (ft.)	15.13'	
Volume Of Water In Well (gallons/liters)	2.42 gallons	
Purging Device	peristaltic pump	
Volume of Bailer/Pump Capacity	variable	
Cleaning Procedure	dedicated	
Bails Removed/ Volume Removed	4.36 gallons	
Time Purging Started	0756	Purge Rate: ~180ml/min
Time Purging Stopped	0927	~0.048 gal/min
Instrument Used to Monitor Field Parameters	Homba U-52	
Sampling Device	peristaltic pump	
Cleaning Procedure	dedicated	
Color	clear	
Odor	none	

Groundwater Sampling

Form 2

LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 2 of 2

PROJECT LACBWL GW Sampling  
 LOCATION Genoa, WI  
 SAMPLER S. Kaney

FILE NO. 128924-023  
 FIELD REP S. Kaney  
 DATE 7/11/18

GROUNDWATER SAMPLING INFORMATION

TIME SAMPLES TAKEN	Tritium	0907	Sample Time: 0907
	Gamma	0907	
	Cobalt-60	0907	
	Strontium-90	0907	
	Cesium-137	0907	
	HTDs	0907	

PARAMETERS	Time	805	810	815	820	825	830	835	840	845	850	855	900	905
	Temp. C	18.79	17.43	16.76	16.61	16.64	16.75	16.76	16.92	17.21	17.05	17.25	17.29	17.62
	Conductivity (umhos/cm)	1250	1310	1330	1350	1370	1360	1370	1370	1370	1380	1370	1360	1350
	Dissolved Oxygen (mg/L)	7.58	5.94	5.51	5.00	1.76	3.82	3.64	1.47	1.41	1.44	1.31	1.27	1.27
	pH	6.86	7.08	7.18	7.25	7.39	7.32	7.33	7.36	7.36	7.39	7.40	7.41	7.42
	ORP (mV)	16	4	-9	21	33	-39	-44	-48	-51	-55	-61	-66	-71
	Drawdown Ft	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
	Volume purged/Gals	0.432	0.672	0.912	1.152	1.392	1.63	1.87	2.11	2.35	2.59	2.83	3.07	3.31
	Turbidity (NTU)	36.4	36.6	27.8	22.5	19.4	18.6	16.5	14.7	13.1	10.9	9.30	8.71	8.03

Remarks: (ie: field filtrations, persons communicated with at site, etc.)

DTW : 12.67 12.67 12.67 12.67 12.67 12.67 12.67 12.67 12.67 12.67 12.67 12.67 12.67 12.67

purge rate: 180 180 180 180 180 180

Form 2

LOW-FLOW GROUNDWATER SAMPLING RECORD		Page	of
PROJECT	LACBWR	FILE NO.	128924-003
LOCATION	66109, WI	FIELD REP	A. Quick
SAMPLER	Adam Quick	DATE	7/11/18
GROUNDWATER SAMPLING INFORMATION			
Well ID	MW-2008		
Depth Of Well (ft.) per Log	55'		
Reference Mark	Top of PVC		
Depth to Water from Reference Mark (ft.)	13.15'		
Time	0739		
Depth to Product (ft.)	NA		
Field Measured Depth Of Well (ft.)	57.56'		
Inside Diameter (in.)	2"		
Standing Water Depth (ft.)	44.41'		
Volume Of Water In Well (gallons/liters)	7.1056 gal		
Purging Device	Resistatic pump		
Volume of Bailer/Pump Capacity	Variable		
Cleaning Procedure	dedicated		
Bails Removed/ Volume Removed	4.028 gal		
Time Purging Started	0744		
Time Purging Stopped	0800		
Instrument Used to Monitor Field Parameters	HORIBA U-52		
Sampling Device	Resistatic pump		
Cleaning Procedure	dedicated		
Color	Clear		
Odor	None		

Groundwater Sampling

Form 2

<b>LOW-FLOW GROUNDWATER SAMPLING RECORD</b>		Page _____ of _____
PROJECT	<u>LACBWR GW Sampling</u>	FILE NO. <u>128924-003</u>
LOCATION	<u>6200A, WI</u>	FIELD REP <u>A. Quick</u>
SAMPLER	<u>A. Quick</u>	DATE <u>7/11/18</u>

**GROUNDWATER SAMPLING INFORMATION**

TIME SAMPLES TAKEN	Tritium	<u>0845</u>												
	Gamma	<u>0845</u>												
	Cobalt-60	<u>0845</u>												
	Strontium-90	<u>0845</u>												
	Cesium-137	<u>0845</u>												
	HTDs	<u>0845</u>												
PARAMETERS	Time	<u>0755</u>	<u>0800</u>	<u>0805</u>	<u>0810</u>	<u>0815</u>	<u>0820</u>	<u>0825</u>	<u>0830</u>	<u>0835</u>	<u>0840</u>			
	Temp. C	<u>14.82</u>	<u>14.41</u>	<u>14.38</u>	<u>14.23</u>	<u>14.19</u>	<u>14.29</u>	<u>14.39</u>	<u>14.32</u>	<u>14.26</u>	<u>14.25</u>			
	Conductivity (umhos/cm)	<u>610</u>	<u>624</u>	<u>628</u>	<u>630</u>	<u>635</u>	<u>638</u>	<u>641</u>	<u>644</u>	<u>643</u>	<u>643</u>			
	Dissolved Oxygen (mg/L)	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>			
	pH	<u>6.76</u>	<u>6.94</u>	<u>6.98</u>	<u>7.01</u>	<u>7.02</u>	<u>7.02</u>	<u>7.05</u>	<u>7.06</u>	<u>7.06</u>	<u>7.08</u>			
	ORP (mV)	<u>-41</u>	<u>-33</u>	<u>-46</u>	<u>-61</u>	<u>-69</u>	<u>-75</u>	<u>-82</u>	<u>-86</u>	<u>-89</u>	<u>-92</u>			
	Drawdown Ft	<u>.01</u>	<u>.01</u>	<u>.01</u>	<u>.01</u>	<u>.01</u>	<u>.01</u>	<u>.01</u>	<u>.01</u>	<u>.01</u>	<u>.01</u>	<u>.01</u>		
	Volume purged/Gals	<u>.265</u>	<u>.53</u>	<u>.795</u>	<u>1.06</u>	<u>1.325</u>	<u>1.59</u>	<u>1.855</u>	<u>2.12</u>	<u>2.385</u>	<u>2.65</u>			
	Turbidity (NTU)	<u>11.6</u>	<u>11.2</u>	<u>7.82</u>	<u>6.67</u>	<u>6.61</u>	<u>5.55</u>	<u>5.35</u>	<u>5.11</u>	<u>4.00</u>	<u>3.18</u>			

Remarks: (ie: field filtrations, persons communicated with at site, etc.)

DTW - 13.14 13.14 →

Purge Rate (mL/min) 200 200 →

Form 2

LOW-FLOW GROUNDWATER SAMPLING RECORD		Page <u>5</u> of <u>2</u>
PROJECT	<u>LAC QWR GW Sampling</u>	FILE NO. <u>128924-003</u>
LOCATION	<u>Genoa, WI</u>	FIELD REP <u>A. Quick</u>
SAMPLER	<u>A. Quick</u>	DATE <u>7/11/18</u>
GROUNDWATER SAMPLING INFORMATION		
Well ID	<u>MW-201A</u>	
Depth Of Well (ft.) per Log	<u>25'</u>	
Reference Mark	<u>Top of PVC</u>	
Depth to Water from Reference Mark (ft.)	<u>11.54'</u>	
Time	<u>1005</u>	
Depth to Product (ft.)	<u>NA</u>	
Field Measured Depth Of Well (ft.)	<u>27.66'</u>	
Inside Diameter (in.)	<u>2 in</u>	
Standing Water Depth (ft.)	<u>16.12'</u>	
Volume Of Water In Well (gallons/liters)	<u>2.58 gal</u>	
Purging Device	<u>peristaltic pump</u>	
Volume of Bailer/Pump Capacity	<u>variable</u>	
Cleaning Procedure	<u>dedicated</u>	
Bails Removed/ Volume Removed	<u>5.247 gal</u>	
Time Purging Started	<u>1018</u>	
Time Purging Stopped	<u>1157</u>	
Instrument Used to Monitor Field Parameters	<u>Horiwa U-52</u>	
Sampling Device	<u>peristaltic pump</u>	
Cleaning Procedure	<u>dedicated</u>	
Color	<u>clear</u>	
Odor	<u>None</u>	



Groundwater Sampling

Form 2

LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 2 of 2

PROJECT LACBWR Gw Sampling FILE NO. 128924-003  
 LOCATION Genoa, WI FIELD REP A. QUICK  
 SAMPLER A. Quick DATE 7/11/18

GROUNDWATER SAMPLING INFORMATION

TIME SAMPLES TAKEN	Tritium	1135														
	Gamma	1135														
	Cobalt-60	1135														
	Strontium-90	1135														
	Cesium-137	1135														
	HTDs	1135														
	PARAMETERS	Time	1025	1030	1035	1040	1045	1050	1055	1100	1105	1110	1115	1120	1125	1130
	Temp. C	16.38	17.49	17.29	16.93	16.80	16.60	16.62	16.64	16.82	16.79	16.91	16.90	16.89	16.88	
	Conductivity (umhos/cm)	532	550	566	573	579	584	588	591	592	593	593	594	593	593	
	Dissolved Oxygen (mg/L)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
	pH	6.95	6.92	6.87	6.90	6.89	6.90	6.90	6.89	6.90	6.90	6.91	6.91	6.91	6.91	
	ORP (mV)	-84	-91	-93	-97	-99	-102	-105	-106	-109	-110	-113	-114	-115	-116	
	Drawdown Ft	.01	.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
	Volume purged/Gals	.371	.636	.901	1.166	1.431	1.696	1.961	2.226	2.491	2.756	3.02	3.29	3.55	3.816	
	Turbidity (NTU)	164	89	69.7	65.4	66.5	46	40.2	34.8	31.8	30.6	26.2	17.7	16.9	17.0	

Remarks: (ie: field filtrations, persons communicated with at site, etc.)

DTW - 11.53 11.53 11.54 →

Flow Rate (ML/min) - 200 200 →

Groundwater Sampling

Form 2

LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 1 of 2

PROJECT LACBR GW Sampling

FILE NO. 128924-003

LOCATION Genoa, WI

FIELD REP S. Koney

SAMPLER S. Koney

DATE 7/11/18

GROUNDWATER SAMPLING INFORMATION

Well ID	MW-201BR	Sample ID:
Depth Of Well (ft.) per Log	55'	MW-201BR-071118
Reference Mark	Top of PVC	Sample Time: 1105
Depth to Water from Reference Mark (ft.)	11.82	
Time	1010	
Depth to Product (ft.)	N/A	
Field Measured Depth Of Well (ft.)	55.86	
Inside Diameter (in.)	2 inches	
Standing Water Depth (ft.)	44.04'	
Volume Of Water In Well (gallons/liters)	7.05 gallons	
Purging Device	Peristaltic Pump	
Volume of Bailer/Pump Capacity	variable	
Cleaning Procedure	dedicated	
Bails Removed/ Volume Removed	<del>105 sk</del> 3.66 gal	
Time Purging Started	1015	Purge Rate: ~190 mL/min
Time Purging Stopped	1128	~0.050 gal/min
Instrument Used to Monitor Field Parameters	Hanna U-52	
Sampling Device	Peristaltic Pump	
Cleaning Procedure	dedicated	
Color	Clear	
Odor	none	

Groundwater Sampling

Form 2

LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 2 of 2

PROJECT LACWR GW Sampling  
 LOCATION Genoa, WI

FILE NO. 128924-003

FIELD REP S. Kaney

SAMPLER S. Kaney


DATE 7/11/18

GROUNDWATER SAMPLING INFORMATION

TIME SAMPLES TAKEN	Tritium	1105										Sample ID: MW-2018R-071118			
	Gamma	1105													
	Cobalt-60	1105										Sample Time: 1105			
	Strontium-90	1105													
	Cesium-137	1105													
	HTDs	1105													
PARAMETERS	Time	1020	1025	1030	1035	1040	1045	1050	1055	1100					
	Temp. C	26.64	25.37	24.61	24.23	24.03	23.91	23.83	24.18	24.24					
	Conductivity (umhos/cm)	753	777	781	792	790	792	788	782	780					
	Dissolved Oxygen (mg/L)	0.99	0.93	0.89	0.88	0.87	0.86	0.84	0.82	0.81					
	pH	7.73	7.65	7.66	7.57	7.56	7.55	7.54	7.54	7.53					
	ORP (mV)	-124	-126	-125	-124	-123	-124	-123	-124	-124					
	Drawdown Ft	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03					
	Volume purged/Gals	0.25	0.50	0.75	1.00	1.25	1.50	1.75	2.00	2.25					
	Turbidity (NTU)	17.8	13.6	9.97	8.28	7.54	5.49	5.38	4.57	4.47					

Remarks: (ie: field filtrations, persons communicated with at site, etc.)

DTW: 11.85 11.85 11.85 11.85 11.85 11.85 11.85 11.85 11.85

Purge Rate: 220 190 190   
 mg/L



Form 2

LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 1 of 2

PROJECT LACBWR GW FILE NO. 128924  
 LOCATION Genoa, WI FIELD REP M. van Noorden  
 SAMPLER M. van Noorden DATE 2.10.18

GROUNDWATER SAMPLING INFORMATION

Well ID	<u>MW-202A</u>
Depth Of Well (ft.) per Log	<u>—</u>
Reference Mark	<u>TOR</u>
Depth to Water from Reference Mark (ft.)	<u>11.53</u>
Time	<u>1330</u>
Depth to Product (ft.)	<u>NA</u>
Field Measured Depth Of Well (ft.)	<u>27.73</u>
Inside Diameter (in.)	<u>2</u>
Standing Water Depth (ft.)	<u>16.20</u>
Volume Of Water In Well (gallons/liters)	<u>2.59 gal</u>
Purging Device	<u>Peristaltic Pump</u>
Volume of Bailer/Pump Capacity	<u>NA</u>
Cleaning Procedure	<u>NA</u>
Bails Removed/ Volume Removed	<u>1.71 gal</u>
Time Purging Started	<u>1335</u>
Time Purging Stopped	<u>1412</u>
Instrument Used to Monitor Field Parameters	<u>Horiba U52 HACH 2100Q</u>
Sampling Device	<u>Peristaltic Pump</u>
Cleaning Procedure	<u>NA</u>
Color	<u>Clear</u>
Odor	<u>None</u>

Groundwater Sampling

Form 2

LOW-FLOW GROUNDWATER SAMPLING RECORD

mw-202A

Page 2 of 2

PROJECT LACBWR GW

FILE NO. 128924

LOCATION Genoa, WI

FIELD REP M. van Noordennen

SAMPLER M. van Noordennen

DATE 7.10.18

GROUNDWATER SAMPLING INFORMATION

TIME SAMPLES TAKEN	Tritium													
	Gamma													
	Cobalt-60													
	Strontium-90													
	Cesium-137													
	HTDs													
PARAMETERS	Time	1346	1345	1350	1355	1400	1405	1410						
	Temp. C	21.01	19.97	17.96	17.87	18.02	18.02	18.10						
	Conductivity (umhos/cm)	421	436	449	447	442	442	442						
	Dissolved Oxygen (mg/L)	0.00	0.00	0.00	0.00	0.00	0.00	0.00						
	pH	7.48	7.43	7.39	7.36	7.34	7.35	7.35						
	ORP (mV)	178	148	118	101	89	86	83						
	Drawdown Ft	0.00	0.00	0.00	0.00	0.00	0.00	0.00						
	Volume purged/Gals	0.23	0.46	0.69	0.92	1.16	1.39	1.62						
	Turbidity (NTU)	34.8	25.6	24.2	23.4	22.0	21.0	20.8						

Remarks: (ie: field filtrations, persons communicated with at site, etc.)



Groundwater Sampling

Form 2

LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 1 of 2

PROJECT LACBWR GW FILE NO. 128924  
 LOCATION Genoa, WI FIELD REP M. van Noordenken  
 SAMPLER M. van Noordenken DATE 7-10-18

GROUNDWATER SAMPLING INFORMATION

Well ID	MW-202B	
Depth Of Well (ft.) per Log	—	
Reference Mark	T&R	
Depth to Water from Reference Mark (ft.)	12.18	
Time	1220	
Depth to Product (ft.)	NA	
Field Measured Depth Of Well (ft.)	55.90	
Inside Diameter (in.)	2	
Standing Water Depth (ft.)	43.72	
Volume Of Water In Well (gallons/liters)	2.00 gal	
Purging Device	Peristaltic Pump	
Volume of Bailer/Pump Capacity	NA	
Cleaning Procedure	NA	
Bails Removed/ Volume Removed	1.86 gal	
Time Purging Started	1230	
Time Purging Stopped	1307	
Instrument Used to Monitor Field Parameters	Horiba U-52, HACH 2100Q	
Sampling Device	Peristaltic Pump	
Cleaning Procedure	NA	
Color	Clear	
Odor	None	

Groundwater Sampling

Form 2

LOW-FLOW GROUNDWATER SAMPLING RECORD

MW-202B

Page 2 of 2

PROJECT LACBWR GW  
 LOCATION Glendale, WI  
 SAMPLER M. van Nooddenken

FILE NO. 128924  
 FIELD REP M. van Nooddenken  
 DATE 7.10.18

GROUNDWATER SAMPLING INFORMATION

TIME SAMPLES TAKEN	Tritium													
	Gamma													
	Cobalt-60													
	Strontium-90													
	Cesium-137													
	HTDs													
PARAMETERS	Time	1235	1240	1245	1250	1255	1300	1305						
	Temp. C	18.25	17.40	17.13	16.91	16.97	16.63	16.64						
	Conductivity (umhos/cm)	663	717	728	743	744	748	747						
	Dissolved Oxygen (mg/L)	0.00	0.00	0.00	0.00	0.00	0.00	0.00						
	pH	7.57	7.38	7.34	7.29	7.27	7.27	7.27						
	ORP (mV)	-58	-76	-80	-86	-89	-92	-94						
	Drawdown Ft	0.02	0.02	0.02	0.03	0.03	0.03	0.03						
	Volume purged/Gals	0.25	0.50	0.75	1.00	1.25	1.51	1.76						
	Turbidity (NTU)	2.8	2.8	3.4	2.3	2.1	2.4	2.1						

Remarks: (ie: field filtrations, persons communicated with at site, etc.)

Form 2

<b>LOW-FLOW GROUNDWATER SAMPLING RECORD</b>		Page 1 of 2
PROJECT LOCATION	LACBWR Gw Sampling Gena, WI	FILE NO. 178924-003 FIELD REP A. Quirk
SAMPLER	A. Quirk	DATE 7/11/18

GROUNDWATER SAMPLING INFORMATION

Well ID	MW-203A
Depth Of Well (ft.) per Log	25'
Reference Mark	TOP OF PVC
Depth to Water from Reference Mark (ft.)	11.99
Time	1245
Depth to Product (ft.)	NA
Field Measured Depth Of Well (ft.)	27.11'
Inside Diameter (in.)	2"
Standing Water Depth (ft.)	15.92'
Volume Of Water In Well (gallons/liters)	2.547 gal
Purging Device	Peristaltic
Volume of Bailer/Pump Capacity	Variable
Cleaning Procedure	dedicated
Bails Removed/ Volume Removed	4.137
Time Purging Started	1306
Time Purging Stopped	1425
Instrument Used to Monitor Field Parameters	Hanna U-52
Sampling Device	peristaltic pump
Cleaning Procedure	dedicated
Color	clear
Odor	None

Groundwater Sampling

Form 2

LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 2 of 2

PROJECT LOCATION LACDWR GW Sampling  
Goose, WI  
 SAMPLER A. Quick

FILE NO. 128929-008  
 FIELD REP A. Quick  
 DATE 7/11/18

GROUNDWATER SAMPLING INFORMATION

TIME SAMPLES TAKEN	Tritium	1405									
	Gamma	1405									
	Cobalt-60	1405									
	Strontium-90	1405									
	Cesium-137	1405									
	HTDs	1405									
PARAMETERS	Time	1315	1320	1325	1330	1335	1340	1345	1350	1355	1400
	Temp. C	19.36	18.93	17.92	17.88	17.47	17.41	17.49	17.6	17.20	17.28
	Conductivity (umhos/cm)	213	214	215	216	215	214	214	213	216	216
	Dissolved Oxygen (mg/L)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	pH	7.19	7.15	7.10	7.03	7.08	7.12	7.08	7.10	7.12	7.10
	ORP (mV)	33	69	28	18	-14	-26	-33	-42	-50	-50
	Drawdown Ft	.02	.02	.01	.01	.01	.01	.01	.01	.01	.01
	Volume purged/Gals	.477	.742	1.007	1.272	1.537	1.802	2.067	2.332	2.597	2.862
	Turbidity (NTU)	23.1	23.8	20.5	20.5	19.7	17.8	16.7	14.9	14.9	13.8

Remarks: (ie: field filtrations, persons communicated with at site, etc.)

DTW - 11.97 11.97 11.98 →  
 Flow Rate (mL/min) - 200 200 →

Form 2

LOW-FLOW GROUNDWATER SAMPLING RECORD		Page 1 of 2
PROJECT	LACBWR Gw Sampling	FILE NO. 128924-003
LOCATION	Genoa, WI	FIELD REP S. Kaney
SAMPLER	S. Kaney	DATE 7/11/18
GROUNDWATER SAMPLING INFORMATION		
Well ID	MW-203B	Sample ID:
Depth Of Well (ft.) per Log	55'	MW-203A-071118
Reference Mark	Top of PVC	Sample Time: 1425
Depth to Water from Reference Mark (ft.)	12.42'	
Time	1300	
Depth to Product (ft.)	NA	
Field Measured Depth Of Well (ft.)	57.79	
Inside Diameter (in.)	2"	
Standing Water Depth (ft.)	45.37'	
Volume Of Water In Well (gallons/liters)	7.24 gal	
Purging Device	Peristaltic Pump	
Volume of Bailer/Pump Capacity	Variable	
Cleaning Procedure	dedicated	
Bails Removed/ Volume Removed	5.29 gallons	
Time Purging Started	1305	Purge Rate: ~205 ml/min
Time Purging Stopped	1443	~0.054 gal/min
Instrument Used to Monitor Field Parameters	Horiba U-52	
Sampling Device	peristaltic pump	
Cleaning Procedure	dedicated	
Color	clear, some fine white particulate near beginning of purging	
Odor	none	



Groundwater Sampling

Form 2

LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 2 of 2

PROJECT LACBWR GW Sampling  
 LOCATION Genoa, WI  
 SAMPLER S. Kaney

FILE NO. 128924-003  
 FIELD REP S. Kaney  
 DATE 7/11/18

GROUNDWATER SAMPLING INFORMATION

TIME SAMPLES TAKEN	Tritium	1425	Sample ID:													
	Gamma	1425	MW-203B-071118													
	Cobalt-60	1425	Sample Time:													
	Strontium-90	1425	1425													
	Cesium-137	1425														
	HTDs	1425														

PARAMETERS	Time	1310	1315	1320	1325	1330	1335	1340	1345	1350	1355	1400	1405	1410	1415	1420
	Temp. C	31.68	27.95	25.48	22.03	20.08	19.13	17.59	20.82	21.28	21.06	21.06	20.84	20.81	21.01	21.17
	Conductivity (umhos/cm)	658	693	738	792	824	842	817	803	791	787	789	796	793	790	789
	Dissolved Oxygen (mg/L)	4.44	3.03	2.86	2.99	2.93	2.78	2.66	3.34	3.19	2.98	2.69	2.59	2.41	2.32	2.21
	pH	7.92	8.03	8.00	8.03	8.05	8.06	8.06	8.08	8.08	8.08	8.09	8.09	8.11	8.11	8.10
	ORP (mV)	104	-119	-128	-131	-137	-139	-141	-144	-146	-148	-150	-152	-153	-155	-155
	Drawdown Ft	0.03	0.04	0.04	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
	Volume purged/Gals	0.27	0.54	0.81	1.08	1.35	1.62	1.89	2.16	2.43	2.70	2.97	3.24	3.51	3.78	4.05
	Turbidity (NTU)	20.9	18.9	14.5	19.4	8.31	8.15	7.68	4.06	7.81	3.89	3.14	2.84	2.85	3.22	2.62

Remarks: (ie: field filtrations, persons communicated with at site, etc.)

DTW:	12.45	12.46	12.46	12.47	12.47	12.47	12.47	12.47	12.47	12.47	12.47	12.47	12.47	12.47	12.47	12.47
Purge Rate: mL/min	250	250	210	205	205	205	205	205	205	205	205	205	205	205	205	205



Form 2

LOW-FLOW GROUNDWATER SAMPLING RECORD		Page 1 of 2
PROJECT	LACBWR GW Sampling	FILE NO. 128924-003
LOCATION	Geoda, WI	FIELD REP A. Quirk
SAMPLER	A. Quirk	DATE 7/10/18
GROUNDWATER SAMPLING INFORMATION		
Well ID	MW-204A	
Depth Of Well (ft.) per Log	25'	
Reference Mark	Top of PVC	
Depth to Water from Reference Mark (ft.)	11.74'	
Time	<del>0735</del> <sup>0735</sup> 0735	
Depth to Product (ft.)	NA	
Field Measured Depth Of Well (ft.)	27.05'	
Inside Diameter (in.)	2"	
Standing Water Depth (ft.)	15.31'	
Volume Of Water In Well (gallons/liters)	2.45 gal	
Purging Device	peristaltic pump	
Volume of Bailer/Pump Capacity	Variable	
Cleaning Procedure	dedicated	
Bails Removed/ Volume Removed	4.505	
Time Purging Started	0750	
Time Purging Stopped	0915	
Instrument Used to Monitor Field Parameters	Hanna U-52	
Sampling Device	peristaltic pump	
Cleaning Procedure	dedicated	
Color	Clear	
Odor	None	

Groundwater Sampling

Form 2

MW-204A

LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 2 of 2

PROJECT LACDWR GW Sampling

FILE NO. 128724-003

LOCATION Genoa, WI

FIELD REP A. Quick

SAMPLER A. Quick

DATE 7/12/18

GROUNDWATER SAMPLING INFORMATION

TIME SAMPLES TAKEN	Tritium	0840										Duplicate: MW-204A-D-071218			
	Gamma	0840													
	Cobalt-60	0840													
	Strontium-90	0840													
	Cesium-137	0840													
	HTDs	0840													
PARAMETERS	Time	0800	0805	0810	0815	0820	0825	0830	0835						
	Temp. C	15.30	14.89	14.80	14.60	14.63	15.03	14.99	14.91						
	Conductivity (umhos/cm)	543	549	549	552	534	531	530	530						
	Dissolved Oxygen (mg/L)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						
	pH	7.14	7.13	7.19	7.21	7.23	7.26	7.26	7.28						
	ORP (mV)	301	295	287	283	275	268	263	259						
	Drawdown Ft	.03	.03	.03	.03	.03	.03	.03	.03						
	Volume purged/Gals	.530	.745	1.06	1.325	1.59	1.855	2.12	2.385						
	Turbidity (NTU)	10.8	5.96	2.57	2.93	2.93	2.13	2.24	1.21						

Remarks: (ie: field filtrations, persons communicated with at site, etc.)

DTW- 11.77 11.77 11.77 11.77 →

Flow Rate (ML/min) 195 200 200 →

Form 2

LOW-FLOW GROUNDWATER SAMPLING RECORD		Page 1 of 2
PROJECT	LAC BULL GW Sampling	FILE NO. 128904-003
LOCATION	Genoa, WI	FIELD REP S. Kaney
SAMPLER	S. Kaney	DATE 7/12/18
GROUNDWATER SAMPLING INFORMATION		
Well ID	MW-204B	Sample ID:
Depth Of Well (ft.) per Log	55'	MW-204B-071218
Reference Mark	Top of PVC	
Depth to Water from Reference Mark (ft.)	11.82'	Sample Time: 0900
Time	745	
Depth to Product (ft.)	N/A	
Field Measured Depth Of Well (ft.)	56.32'	
Inside Diameter (in.)	2 inches	
Standing Water Depth (ft.)	44.50'	
Volume Of Water In Well (gallons/liters)	7.12 gal	
Purging Device	Peristaltic Pump	
Volume of Bailer/Pump Capacity	variable	
Cleaning Procedure	dedicated	
Bails Removed/ Volume Removed	5.13 gallons	
Time Purging Started	747	Purge Rate: ~ 220 ml/min
Time Purging Stopped	0914	~ 0.058 gal/min
Instrument Used to Monitor Field Parameters	Horiba U-52	
Sampling Device	Peristaltic Pump	
Cleaning Procedure	dedicated	
Color	clear	
Odor	none	

Groundwater Sampling

Form 2

LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 2 of 2

PROJECT LACBUR Gw Sampling  
 LOCATION Genoa, WI  
 SAMPLER S. Kaney

FILE NO. 128924-003  
 FIELD REP S. Kaney  
 DATE 7/12/18

GROUNDWATER SAMPLING INFORMATION

TIME SAMPLES TAKEN	Tritium	0900	Sample ID:											
	Gamma	0900	MW-204B-071218											
	Cobalt-60	0900												
	Strontium-90	0900	Sample Time: 0900											
	Cesium-137	0900												
	HTDs	0900												

PARAMETERS	Time	755	800	0805	0810	0815	0820	0825	0830	0835	0840	0845	0850	0855
	Temp. C	14.68	14.57	14.72	14.70	14.68	14.71	14.70	14.89	15.01	15.07	15.25	15.39	15.57
	Conductivity (umhos/cm)	1250	1240	1240	1230	1230	1230	1220	1220	1210	1220	1210	1200	1190
	Dissolved Oxygen (mg/L)	7.57	6.82	5.95	4.79	3.80	3.07	2.72	2.52	2.22	1.96	1.87	1.79	1.69
	pH	6.79	7.21	7.33	7.41	7.45	7.49	7.51	7.53	7.55	7.55	7.57	7.58	7.59
	ORP (mV)	160	143	137	130	109	126	122	121	117	114	112	110	108
	Drawdown Ft	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Volume purged/Gals	0.52	0.84	1.13	1.42	1.71	2.00	2.29	2.58	2.67	3.16	3.45	3.74	4.03
	Turbidity (NTU)	17.4	9.00	7.00	6.08	5.06	4.12	3.66	3.23	2.57	2.13	1.51	2.14	1.40

Remarks: (ie: field filtrations, persons communicated with at site, etc.)

DTW: 11.82 11.82 11.82 11.82 11.82 11.82 11.82 11.82 11.82 11.82 11.82 11.82 11.82 11.82

purge rate: 250 240 220 220 220 220 220 220 220 220 220 220 220 220  
 ml/min



Form 2

LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 1 of 2

PROJECT LACBWL - GW Sampling FILE NO. 128924-004  
 LOCATION Genoa, WI FIELD REP S. Kanay  
 SAMPLER S. Kanay DATE 8/14/18

GROUNDWATER SAMPLING INFORMATION

Well ID	B11R	Sample ID:
Depth Of Well (ft.) per Log	25'	B11R-081418
Reference Mark	Top of PVC	Sample Time: 0956
Depth to Water from Reference Mark (ft.)	13.86	
Time	0833	
Depth to Product (ft.)	N/A	
Field Measured Depth Of Well (ft.)	25.50	
Inside Diameter (in.)	2 inches	
Standing Water Depth (ft.)	11.64 feet	
Volume Of Water In Well (gallons/liters)	1.86 gallons	
Purging Device	peristaltic pump	
Volume of Bailer/Pump Capacity	variable	
Cleaning Procedure	dedicated	
Bails Removed/ Volume Removed	3.77 gallons	
Time Purging Started	0834	Purge Rate ~ 150 ml/min
Time Purging Stopped	1008	~ 0.039 gal/min
Instrument Used to Monitor Field Parameters	Horiba U-52	
Sampling Device	peristaltic pump	
Cleaning Procedure	dedicated	
Color	clear	
Odor	none	



Form 2

LOW-FLOW GROUNDWATER SAMPLING RECORD		Page 1 of 2
PROJECT	LACBWR	FILE NO. 128924-004
LOCATION	Genoa, WI	FIELD REP A. Quick
SAMPLER	Adam Quick	DATE 8/14/2018
GROUNDWATER SAMPLING INFORMATION		
Well ID	B11AR	
Depth Of Well (ft.) per Log	55'	
Reference Mark	Top of PVC	
Depth to Water from Reference Mark (ft.)	17.88'	
Time	0845	
Depth to Product (ft.)	N/A	
Field Measured Depth Of Well (ft.)	46.66'	
Inside Diameter (in.)	2 in	
Standing Water Depth (ft.)	28.78'	
Volume Of Water In Well (gallons/liters)	4.605 gal	
Purging Device	Persistent	
Volume of Bailer/Pump Capacity	Variable	
Cleaning Procedure	Dedicated	
Bails Removed/ Volume Removed	3.44 gal	
Time Purging Started	0853	
Time Purging Stopped	0958	
Instrument Used to Monitor Field Parameters	Horiba 10-52	
Sampling Device	Persistent	
Cleaning Procedure	Dedicated	
Color	Clear (some grey-black particulate at 1.5ft)	
Odor	None	

Form 2

<b>LOW-FLOW GROUNDWATER SAMPLING RECORD</b>		Page 2 of 2
PROJECT	LACBJR	FILE NO. 128924-004
LOCATION	Genoa, NJ	FIELD REP A. Quirk
SAMPLER	A. Quirk	DATE 3/14/2018

GROUNDWATER SAMPLING INFORMATION

TIME SAMPLES TAKEN	Tritium	0945												
	Gamma	0945												
	Cobalt-60	0945												
	Strontium-90	0945												
	Cesium-137	0945												
	HTDs	0945												
PARAMETERS	Time	0910	0915	0920	0925	0930	0935	0940						
	Temp. C	17.9	17.36	17.95	17.11	16.9	17.01	17.12						
	Conductivity (umhos/cm)	.914	.925	.900	.915	.922	.901	.905						
	Dissolved Oxygen (mg/L)	4.13	4.05	3.75	3.65	3.54	3.46	3.38						
	pH	5.73	5.91	6.05	6.14	6.17	6.19	6.21						
	ORP (mV)	119	121	122	125	126	127	128						
	Drawdown Ft	.04	.04	.03	.02	.02	.02	.02						
	Volume purged/Gals	<del>2.34</del> 3.93	1.16	1.42	1.69	1.95	2.21	2.48						
	Turbidity (NTU)	2.18	2.42	2.50	1.79	.95	.62	.56						

Remarks: (ie: field filtrations, persons communicated with at site, etc.)

ML/min - 200 200 →  
 DTU - 17.92 17.92 17.91 17.9 17.9 →

Form 2

LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 1 of 2

PROJECT LACBWR-GW Sampling FILE NO. 128924-004  
 LOCATION Benoa, WI FIELD REP S. Kaney  
 SAMPLER S. Kaney DATE 8/14/18

GROUNDWATER SAMPLING INFORMATION

Well ID	MW-200A	Sample ID:
Depth Of Well (ft.) per Log	25'	MW-200A-081418
Reference Mark	Top of PVC	Same Time: 1412
Depth to Water from Reference Mark (ft.)	18.15	
Time	1304	
Depth to Product (ft.)	N/A	
Field Measured Depth Of Well (ft.)	28.00	
Inside Diameter (in.)	2 inches	
Standing Water Depth (ft.)	9.85'	
Volume Of Water In Well (gallons/liters)	1.57 gal	
Purging Device	Peristaltic Pump	
Volume of Bailer/Pump Capacity	Variable	
Cleaning Procedure	Dedicated	
Bails Removed/ Volume Removed	4.24 gallons	
Time Purging Started	1305	Purge Rate: ~ 210 mL/min
Time Purging Stopped	1422	~ 0.055 gal/min
Instrument Used to Monitor Field Parameters	Hanna U-52	
Sampling Device	Peristaltic Pump	
Cleaning Procedure	dedicated	
Color	Clear	
Odor	none	



Form 2

LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 2 of 2

PROJECT LACBUR-6W Sampling  
LOCATION Genoa, WI

FILE NO. 28924-004  
FIELD REP S. Kaney

SAMPLER S. Kaney

DATE 8/14/18

GROUNDWATER SAMPLING INFORMATION

TIME SAMPLES TAKEN	Tritium	1412	Sample ID: Mw-200A-081418
	Gamma	1412	
	Cobalt-60	1412	
	Strontium-90	1412	
	Cesium-137	1412	
	HTDs	1412	

PARAMETERS	Time	1315	1320	1325	1330	1335	1340	1345	1350	1355	1400	1405	1410
	Temp. C	22.20	20.16	19.40	20.07	19.64	19.05	18.82	19.48	18.42	19.51	19.09	19.65
	Conductivity (umhos/cm)	1360	1470	1530	1530	1570	1610	1650	1640	1690	1660	1680	1670
	Dissolved Oxygen (mg/L)	4.53	4.52	4.45	4.18	4.08	4.06	4.02	3.78	3.91	3.63	3.56	3.46
	pH	7.16	7.09	7.06	7.04	7.03	7.02	7.01	7.01	7.00	7.00	7.00	7.00
	ORP (mV)	215	211	210	208	208	206	197	187	179	173	168	164
	Drawdown Ft	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
	Volume purged/Gals	<del>0.55</del>	0.825	1.1	1.38	1.65	1.93	2.2	2.48	2.75	3.03	3.30	3.58
	Turbidity (NTU)	21.8	21.9	17.9	15.5	13.0	11.0	9.56	7.44	6.75	4.47	4.00	3.57

Remarks: (ie: field filtrations, persons communicated with at site, etc.)

DTW 18.16 18.16 18.16 18.16 18.16 18.16 18.16 18.16 18.16 18.16 18.16 18.16 18.16

Burge Rate:  
mg/L ~210

Form 2

LOW-FLOW GROUNDWATER SAMPLING RECORD		Page 1 of 2
PROJECT	JACBWP	FILE NO. 128924-004
LOCATION	Genou, WI	FIELD REP A. Quick
SAMPLER	A. Quick	DATE 8/14/18
GROUNDWATER SAMPLING INFORMATION		
Well ID	MW-2000	
Depth Of Well (ft.) per Log	55'	
Reference Mark	TOP OF PVC	
Depth to Water from Reference Mark (ft.)	19.16'	
Time	1300	
Depth to Product (ft.)	N/A	
Field Measured Depth Of Well (ft.)	57.55'	
Inside Diameter (in.)	2 in	
Standing Water Depth (ft.)	38.39'	
Volume Of Water In Well (gallons/liters)	6.14 gal	
Purging Device	peristaltic pump	
Volume of Bailer/Pump Capacity	Variable	
Cleaning Procedure	Dedicated	
Bails Removed/ Volume Removed	2.648 gal	
Time Purging Started	1310	
Time Purging Stopped	1400	
Instrument Used to Monitor Field Parameters	Hanna U-52	
Sampling Device	peristaltic	
Cleaning Procedure	Dedicated	
Color	Clear with some Red/Brown sediment at bottom	
Odor	None	

Groundwater Sampling

Form 2

<b>LOW-FLOW GROUNDWATER SAMPLING RECORD</b>		Page 2 of 2
MW-2000-081418		
PROJECT	LACTAR	FILE NO. 128724-004
LOCATION	Genoa, WI	FIELD REP A. QUICK
SAMPLER	A. QUICK	DATE 3/14/18

GROUNDWATER SAMPLING INFORMATION

TIME SAMPLES TAKEN	Tritium	1350											
	Gamma	1350											
	Cobalt-60	1350											
	Strontium-90	1350											
	Cesium-137	1350											
	HTDs	1350											
PARAMETERS	Time	1320	1325	1330	1335	1340	1345	HT					
	Temp. C	16.36	16.28	16.02	15.96	15.99	16.02						
	Conductivity (umhos/cm)	1.02	1.02	1.02	1.02	1.02	1.03						
	Dissolved Oxygen (mg/L)	3.71	2.55	2.02	1.85	1.74	1.75						
	pH	6.43	6.37	6.35	6.34	6.34	6.34						
	ORP (mV)	-88	-99	-106	-108	-109	-111						
	Drawdown Ft	.03	.02	.02	.02	.02	.02						
	Volume purged/Gals	.53	.793	1.058	1.323	1.580	1.853						
	Turbidity (NTU)	14.2	9.07	16.2	7.12	7.25	4.89						

Remarks: (ie: field filtrations, persons communicated with at site, etc.)

M/L/min - 200 200 200  
DTW - 19.14 19.18 19.28

Form 2

LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 1 of 2

PROJECT LACIWR FILE NO. 128924-004  
 LOCATION Garden, WI FIELD REP A. Quick  
 SAMPLER A. Quick DATE 8/15/18

GROUNDWATER SAMPLING INFORMATION

Well ID	MU-201A	
Depth Of Well (ft.) per Log	25'	
Reference Mark	TOP OF PVC	
Depth to Water from Reference Mark (ft.)	17.21'	
Time	0700	
Depth to Product (ft.)	N/A	
Field Measured Depth Of Well (ft.)	27.88'	
Inside Diameter (in.)	2 in	
Standing Water Depth (ft.)	10.67'	
Volume Of Water In Well (gallons/liters)	1.71 gal	
Purging Device	PERISTALTIC PUMP	
Volume of Bailer/Pump Capacity	VARIABLE	
Cleaning Procedure	Dedicated	
Bails Removed/ Volume Removed	4.36 gal	
Time Purging Started	0713	
Time Purging Stopped	0835	
Instrument Used to Monitor Field Parameters	Horiba U-52	
Sampling Device	PERISTALTIC PUMP	
Cleaning Procedure	Dedicated	
Color	Clear (some orange and black PARTICULATE at first)	
Odor	None	

Groundwater Sampling

Form 2

LOW-FLOW GROUNDWATER SAMPLING RECORD

MW-201A-081518

Page 2 of 2

PROJECT LACBWR  
 LOCATION Colona, WI  
 SAMPLER A. Quick

FILE NO. 128924-0001  
 FIELD REP A. Quick  
 DATE 8/15/18

GROUNDWATER SAMPLING INFORMATION

TIME SAMPLES TAKEN	Tritium		0825															
	Gamma		0825															
	Cobalt-60		0825															
	Strontium-90		0825															
	Cesium-137		0825															
	HTDs		0825															
	PARAMETERS	Time	0720	0725	0730	0735	0740	0745	0750	0755	0800	0805	0810	0815	0820			
Temp. C		15.66	15.67	15.79	15.73	15.59	15.5	15.41	15.41	15.61	15.6	15.53	15.7	15.71				
Conductivity (umhos/cm)		1.70	1.70	1.70	1.72	1.74	1.71	1.79	1.8	1.8	1.81	1.82	1.83	1.83				
Dissolved Oxygen (mg/L)		4.47	4.09	4.33	4.18	4.04	3.97	3.67	3.59	3.8	3.71	3.37	3.44	3.55				
pH		4.94	5.11	5.17	5.24	5.29	5.33	5.38	5.38	5.39	5.41	5.43	5.44	5.44				
ORP (mV)		183	172	168	162	155	147	130	116	107	92	86	78	80				
Drawdown Ft		.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01				
Volume purged/Gals		.370	.635	.90	1.165	1.43	1.695	1.96	2.23	2.47	2.76	3.02	3.29	3.56				
Turbidity (NTU)		125	129	117	95.9	54.0	39.8	30.9	24.6	19.0	14.0	11.5	9.86	8.65				

Remarks: (ie: field filtrations, persons communicated with at site, etc.)

ML/min - 200 200  
 OTW - 17.22' 17.22' 17.22'



## Form 2

## LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 1 of 2

PROJECT LACBWR - GWFILE NO. 128924-004LOCATION Genoa, WIFIELD REP S. KaneySAMPLER S. KaneyDATE 8/5/18

## GROUNDWATER SAMPLING INFORMATION

Well ID	MW-201BR	Sample ID: MW-201BR-
Depth Of Well (ft.) per Log	55'	081578
Reference Mark	Top of PVC	Sample Time: 0805
Depth to Water from Reference Mark (ft.)	17.87	
Time	0706	
Depth to Product (ft.)	NA	
Field Measured Depth Of Well (ft.)	55.84	
Inside Diameter (in.)	2 inches	
Standing Water Depth (ft.)	37.97	
Volume Of Water In Well (gallons/liters)	6.08 gallons	
Purging Device	Peristaltic Pump	
Volume of Bailor/Pump Capacity	variable	
Cleaning Procedure	dedicated	
Bails Removed/ Volume Removed	3.51 gallons	
Time Purging Started	0709	Purge Rate: ~200 mL/min
Time Purging Stopped	0816	~0.053 gal/min
Instrument Used to Monitor Field Parameters	Homba U-52	
Sampling Device	Peristaltic Pump	
Cleaning Procedure	dedicated	
Color	clear	
Odor	none	

Groundwater Sampling

Form 2

MW-201BR

LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 2 of 2

PROJECT LtCBWR-GW Sampling  
 LOCATION Genoa, WI

FILE NO. 128924-004  
 FIELD REP S. Laney

SAMPLER S. Laney

DATE 8/15/18

GROUNDWATER SAMPLING INFORMATION

TIME SAMPLES TAKEN	Tritium	0805											Sample ID: MW-201BR-081518  Sample Time: 0805	
	Gamma	0805												
	Cobalt-60	0805												
	Strontium-90	0805												
	Cesium-137	0805												
	HTDs	0805												
	Time	0719	0724	0729	0734	0739	0744	0749	0754	0759	0804			
PARAMETERS	Temp. C	16.13	15.37	15.44	15.38	15.17	15.00	14.93	14.88	14.93	14.70			
	Conductivity (umhos/cm)	984	987	984	984	978	981	980	979	979	980			
	Dissolved Oxygen (mg/L)	1.03	0.91	0.83	0.79	0.76	0.73	0.72	0.69	0.69	0.67			
	pH	6.57	6.64	5.64	6.66	6.67	6.67	6.67	6.68	6.68	6.69			
	ORP (mV)	-108	-115	-118	-120	-120	-120	-121	-120	-120	-120			
	Drawdown Ft	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
	Volume purged/Gals	0.48	0.745	1.01	1.28	1.54	1.805	2.07	2.34	2.60	2.87			
	Turbidity (NTU)	7.23	8.36	6.85	5.68	4.40	5.00	3.22	3.21	2.13	2.04			

Remarks: (ie: field filtrations, persons communicated with at site, etc.)

DTW: ~~18.87 18.87 18.87 18.87 18.87 18.87 18.87 18.87~~ \*  
 17.87 17.87 17.87 17.87 17.87 17.87 17.87 17.87  
 purge rate: ~180 ~200 mg/L →

## Form 2

## LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 1 of 2

PROJECT LACBWL - GW Sampling FILE NO. 128924-004  
 LOCATION Genoa, WI FIELD REP S. Kenney  
 SAMPLER S. Kenney DATE 8/15/18

## GROUNDWATER SAMPLING INFORMATION

Well ID	MW-202AR	Sample ID:
Depth Of Well (ft.) per Log	25'	MW-202AR-081518
Reference Mark	Top of PVC	Sample Time: 1009
Depth to Water from Reference Mark (ft.)	17.79	
Time	0911	
Depth to Product (ft.)	NA	
Field Measured Depth Of Well (ft.)	27.72	
Inside Diameter (in.)	2 inches	
Standing Water Depth (ft.)	9.93	
Volume Of Water In Well (gallons/liters)	1.59 gallons	
Purging Device	Peristaltic Pump	
Volume of Bailer/Pump Capacity	variable	
Cleaning Procedure	dedicated	
Bails Removed/ Volume Removed	2.88 gallons	
Time Purging Started	0912	Purge Rate: ~170 ml/min
Time Purging Stopped	1022	~0.045 gal/min
Instrument Used to Monitor Field Parameters	Horiba U-52	
Sampling Device	Peristaltic Pump	
Cleaning Procedure	dedicated	
Color	clear to light brown	
Odor	none	

Groundwater Sampling

Form 2

LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 2 of 2

PROJECT LACBWR - GW Sampling  
 LOCATION Genoa, WI

FILE NO. 128924-004  
 FIELD REP S. Kaney

SAMPLER S. Kaney  
 DATE 8/15/18

GROUNDWATER SAMPLING INFORMATION

TIME SAMPLES TAKEN	Tritium	1009	Sample ID:										
	Gamma	1009	MW-2021A2-081518										
	Cobalt-60	1009	Sample Time: 1009										
	Strontium-90	1009											
	Cesium-137	1009											
	HTDs	1009											

PARAMETERS	Time	0922	0927	0932	0937	0942	0947	0952	0957	1002	1007		
	Temp. C	21.36	19.67	17.58	17.49	16.86	16.56	16.45	16.38	16.36	16.38		
	Conductivity (umhos/cm)	920	911	924	920	913	907	906	906	902	893		
	Dissolved Oxygen (mg/L)	7.01	6.19	5.47	5.57	5.33	4.93	4.98	4.91	4.89	4.88		
	pH	7.13	7.12	7.09	7.10	7.10	7.09	7.08	7.07	7.07	7.08		
	ORP (mV)	186	184	177	174	175	176	178	180	183	185		
	Drawdown Ft	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
	Volume purged/Gals	0.33	0.50	0.68	0.85	1.07	1.30	1.52	1.75	1.97	2.20		
	Turbidity (NTU)	91.0	90.6	65.2	42.0	26.9	15.5	13.4	11.5	9.39	8.23		

Remarks: (ie: field filtrations, persons communicated with at site, etc.)

DTW: 17.79 17.79 17.79 17.79 17.79 17.79 17.79 17.79 17.79 17.79

Purge Rat: ~125 ~185 ~140 ~125 ~170 →

Form 2

LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 1 of 2

PROJECT LACBWR FILE NO. 128924-004  
 LOCATION Graca, WI FIELD REP A. Quirk  
 SAMPLER A. Quirk DATE 8/15/2018

GROUNDWATER SAMPLING INFORMATION

Well ID	MW-202B
Depth Of Well (ft.) per Log	55'
Reference Mark	TOP of PVC
Depth to Water from Reference Mark (ft.)	18.47'
Time	<del>0910</del> 0910
Depth to Product (ft.)	N/A
Field Measured Depth Of Well (ft.)	55.85'
Inside Diameter (in.)	2 in
Standing Water Depth (ft.)	37.38'
Volume Of Water In Well (gallons/liters)	5.981 gal
Purging Device	Resistatic
Volume of Bailer/Pump Capacity	variable
Cleaning Procedure	Dedicated
Bails Removed/ Volume Removed	2.92 gal
Time Purging Started	0915
Time Purging Stopped	1010
Instrument Used to Monitor Field Parameters	Hanna U-52
Sampling Device	Resistatic
Cleaning Procedure	Dedicated
Color	Clear (some small grey/white particulate at first)
Odor	None



Form 2

LOW-FLOW GROUNDWATER SAMPLING RECORD

MW-2023-081518

Page 2 of 2

PROJECT LALDWR  
 LOCATION GL704, WF  
 SAMPLER A. Quirk

FILE NO. 123724-004  
 FIELD REP A. Quirk  
 DATE 8/15/2018

GROUNDWATER SAMPLING INFORMATION

TIME SAMPLES TAKEN	Tritium	1000											
	Gamma	1000											
	Cobalt-60	1000											
	Strontium-90	1000											
	Cesium-137	1000											
	HTDs	1000											
	Time	0920	0925	0930	0935	0940	0945	0950	0955				
PARAMETERS	Temp. C	16.26	16.14	16.08	15.92	15.70	15.65	15.63	15.63				
	Conductivity (umhos/cm)	.308	.304	.372	1.02	1.04	1.05	1.04	1.04				
	Dissolved Oxygen (mg/L)	4.08	2.83	2.32	2.01	1.76	1.43	1.33	1.32				
	pH	6.00	6.12	6.07	5.95	5.89	5.84	5.83	5.82				
	ORP (mV)	-6	-136	-140	-134	-132	<del>132</del> -132	-132	-131				
	Drawdown Ft	.01	.00	.00	.00	.00	.00	.00	.00				
	Volume purged/Gals	.265	.53	.795	1.06	1.325	1.59	1.86	2.125				
	Turbidity (NTU)	25.5	25.4	12.7	5.45	4.58	3.85	4.19	4.01				

Remarks: (ie: field filtrations, persons communicated with at site, etc.)

ML/min - 200 200 ~~200~~ 200  
 DTW - 18.48 18.47



Form 2

LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 1 of 2

PROJECT LACBWR FILE NO. 128924-004  
 LOCATION Genoa, WI FIELD REP A. Quirk  
 SAMPLER A. Quirk DATE 8/15/18

GROUNDWATER SAMPLING INFORMATION

Well ID	MW-203A
Depth Of Well (ft.) per Log	25'
Reference Mark	Top of PVC
Depth to Water from Reference Mark (ft.)	17.95'
Time	1400
Depth to Product (ft.)	N/A
Field Measured Depth Of Well (ft.)	27.95'
Inside Diameter (in.)	2 in
Standing Water Depth (ft.)	10'
Volume Of Water In Well (gallons/liters)	1.6 gal
Purging Device	Peristaltic pump
Volume of Bailer/Pump Capacity	Variable
Cleaning Procedure	Dedicated
Bails Removed/ Volume Removed	3.541 gal
Time Purging Started	1415
Time Purging Stopped	1522
Instrument Used to Monitor Field Parameters	Hanna U-52
Sampling Device	Peristaltic pump
Cleaning Procedure	Dedicated
Color	Clear (some small brown particulate at 17.95')
Odor	None

Groundwater Sampling

Form 2

LOW-FLOW GROUNDWATER SAMPLING RECORD

MW-203A-03518

Page 2 of 2

PROJECT LACOR  
 LOCATION Genex, WI  
 SAMPLER A. Quirk

FILE NO. 123924-004  
 FIELD REP A. Quirk  
 DATE 3/15/18

GROUNDWATER SAMPLING INFORMATION

TIME SAMPLES TAKEN	Tritium		Gamma		Cobalt-60		Strontium-90		Cesium-137		HTDs		
		1510		1510		1510		1510		1510		1510	
PARAMETERS	Time	1420	1425	1430	1435	1440	1445	1450	1455	1500	1505		
	Temp. C	21.48	20.46	19.92	19.96	19.54	19.24	19.22	19.25	19.28	19.33		
	Conductivity (umhos/cm)	.338	.323	.312	.308	.304	.304	.305	.305	.306	.305		
	Dissolved Oxygen (mg/L)	2.82	2.81	2.41	2.28	1.89	1.81	1.74	1.65	1.64	1.58		
	pH	6.11	6.11	6.11	6.11	6.07	6.08	6.07	6.06	6.06	6.05		
	ORP (mV)	100	96	92	87	67	57	47	30	26	23		
	Drawdown Ft	.02	.02	.01	.01	.01	.01	.01	.01	.01	.01		
	Volume purged/Gals	.251	.516	.781	1.05	1.311	1.576	1.841	2.11	2.371	2.64		
	Turbidity (NTU)	76.1	42.3	28.6	17.8	14.1	10.8	10.0	8.87	7.54	6.93		

Remarks: (ie: field filtrations, persons communicated with at site, etc.)

ML/min - 190 200 200 →  
 DTU - 17.97 17.97 17.96 17.96 →

Form 2

LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 1 of 2

PROJECT LOCATION LACBWSL - GW Sampling  
Genoa, WI

FILE NO. 128924004  
FIELD REP S. Kaney

SAMPLER S. Kaney DATE 8/15/18

GROUNDWATER SAMPLING INFORMATION

Well ID	MW-203B	Sample ID:
Depth Of Well (ft.) per Log	55'	MW-203B-081518
Reference Mark	Top of PVC	
Depth to Water from Reference Mark (ft.)	18.34'	Sample Time: 1456
Time	1405	
Depth to Product (ft.)	NA	
Field Measured Depth Of Well (ft.)	58.01'	
Inside Diameter (in.)	2 inches	
Standing Water Depth (ft.)	39.67'	
Volume Of Water In Well (gallons/liters)	6.35 gallons	
Purging Device	Peristaltic Pump	
Volume of Bailer/Pump Capacity	variable	
Cleaning Procedure	dedicated	
Bails Removed/ Volume Removed	3.44 gallons	
Time Purging Started	1409	Purge Rate: ~210 mL/min
Time Purging Stopped	1509	~0.055 gal/min
Instrument Used to Monitor Field Parameters	Horiba U-52	
Sampling Device	Peristaltic Pump	
Cleaning Procedure	dedicated	
Color	clear	
Odor	none	

Groundwater Sampling

Form 2

LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 2 of 2

PROJECT LACBWR-GW Sampling  
 LOCATION Genoa, WI  
 SAMPLER S. Kaney

FILE NO. 128924-004  
 FIELD REP S. Kaney  
 DATE 8/15/18

GROUNDWATER SAMPLING INFORMATION

TIME SAMPLES TAKEN	Tritium	1456										Sample ID:		
	Gamma	1456										Mw-2038-081518		
	Cobalt-60	1456												
	Strontium-90	1456										Sample Time: 1456		
	Cesium-137	1456												
	HTDs	1456												
PARAMETERS	Time	1414	1419	1424	1429	1434	1439	1444	1449	1454				
	Temp. C	24.36	23.76	23.88	23.94	24.2	24.50	24.62	24.66	24.81				
	Conductivity (umhos/cm)	582	521	606	624	630	630	624	629	634				
	Dissolved Oxygen (mg/L)	0.76	0.68	0.46	0.46	0.46	0.39	0.38	0.37	0.36				
	pH	7.46	7.39	7.34	7.31	7.31	7.30	7.30	7.29	7.29				
	ORP (mV)	-155	-164	-166	-168	-169	-169	-170	-170	-170				
	Drawdown Ft	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				
	Volume purged/Gals	0.34	0.66	0.95	1.22	1.50	1.78	2.05	2.33	2.61				
	Turbidity (NTU)	28.2	21.6	14.7	13.4	13.3	8.00	7.20	6.36	8.27				

Remarks: (ie: field filtrations, persons communicated with at site, etc.)

DTW: 18.34 18.34 18.34 18.24 18.34 18.34 18.34 18.34 18.34

Purge Rate: ~260 ~240 ~220 ~210  $\rightarrow$   
 mg/l



Form 2

LOW-FLOW GROUNDWATER SAMPLING RECORD		Page 1 of 2
PROJECT	LACBWR	FILE NO. 128924-004
LOCATION	Genoa, WI	FIELD REP A. QUICK
SAMPLER	A. Quick	DATE 8/14/18
GROUNDWATER SAMPLING INFORMATION		
Well ID	MLW-204A	
Depth Of Well (ft.) per Log	25'	
Reference Mark	TOP OF PVC	
Depth to Water from Reference Mark (ft.)	17.48'	
Time	1100	
Depth to Product (ft.)	N/A	
Field Measured Depth Of Well (ft.)	26.99'	
Inside Diameter (in.)	2 in	
Standing Water Depth (ft.)	9.51'	
Volume Of Water In Well (gallons/liters)	1.522 gal	
Purging Device	Peristaltic Pump	
Volume of Bailer/Pump Capacity	Variable	
Cleaning Procedure	Dedicated	
Bails Removed/ Volume Removed	2.765 gal	
Time Purging Started	1105	
Time Purging Stopped	1200	
Instrument Used to Monitor Field Parameters	Horiba U-52	
Sampling Device	peristaltic	
Cleaning Procedure	Dedicated	
Color	Clear	Some grey-black particulate at first
Odor	None	

Form 2

LOW-FLOW GROUNDWATER SAMPLING RECORD

MW-204A-D-081418 MW-204A-081418

Page 2 of 2

PROJECT LACBWR  
 LOCATION Genoa, WI  
 SAMPLER A. Quick

FILE NO. 128924-004  
 FIELD REP A. Quick  
 DATE 8/14/2018

GROUNDWATER SAMPLING INFORMATION

TIME SAMPLES TAKEN	Tritium	1140											
	Gamma	1140											
	Cobalt-60	1140											
	Strontium-90	1140											
	Cesium-137	1140											
	HTDs	1140											
PARAMETERS	Time	1110	1115	1120	1125	1130	1135						
	Temp. C	17.14	16.92	16.72	16.72	16.91	16.86						
	Conductivity (umhos/cm)	1.48	1.49	1.49	1.48	1.48	1.47						
	Dissolved Oxygen (mg/L)	5.19	5.02	4.87	4.63	4.49	4.45						
	pH	6.31	6.28	6.26	6.24	6.22	6.21						
	ORP (mV)	112	110	109	108	110	111						
	Drawdown Ft	.03	.03	.03	.03	.03	.03						
	Volume purged/Gals	.251	.502	.753	1.004	1.255	1.51						
	Turbidity (NTU)	4.91	4.49	3.62	2.78	1.22	.81						

Remarks: (ie: field filtrations, persons communicated with at site, etc.)

ML/m<sup>3</sup> - 140 190 190  
 OTU - 17.51 17.51 17.51

Groundwater Sampling

Form 2

LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 1 of 2

PROJECT LACBWL  
 LOCATION Genoa, WI  
 SAMPLER S. Karney

FILE NO. 128924-024  
 FIELD REP S. Karney  
 DATE 8/14/15

GROUNDWATER SAMPLING INFORMATION

Well ID	MW-204B	Sample ID:
Depth Of Well (ft.) per Log	55'	MW-204B-087418
Reference Mark	Top of PVC	Sample Time:
Depth to Water from Reference Mark (ft.)	17.57	1147
Time	1058	
Depth to Product (ft.)	N/A	
Field Measured Depth Of Well (ft.)	56.52	
Inside Diameter (in.)	2 inches	
Standing Water Depth (ft.)	38.95	
Volume Of Water In Well (gallons/liters)	6.23	
Purging Device	Peristaltic Pump	
Volume of Bailer/Pump Capacity	Variable	
Cleaning Procedure	Dedicated	
Bails Removed/ Volume Removed	3.23	
Time Purging Started	1100	Purge Rate: ~210 mL/min
Time Purging Stopped	1157	~0.055 gal/min
Instrument Used to Monitor Field Parameters	Hanna U-52	
Sampling Device	Peristaltic Pump	
Cleaning Procedure	dedicated	
Color	clear w/ fine black particulate (at beginning of purging)	
Odor	none	

Groundwater Sampling

Form 2

LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 2 of 2

PROJECT LACBWL - Gw Sampling  
 LOCATION Genoa, WI

FILE NO. 128924-004

FIELD REP S. Kanoy

SAMPLER S. Kanoy

DATE 8/14/18

GROUNDWATER SAMPLING INFORMATION

TIME SAMPLES TAKEN	Tritium	1147									Sample ID: MW-204B-081418		
	Gamma	1147											
	Cobalt-60	1147									Sample Time: 1147		
	Strontium-90	1147											
	Cesium-137	1147											
	HTDs	1147											
PARAMETERS	Time	1105	1110	1115	1120	1125	1130	1135	1140	1145			
	Temp. C	18.11	16.18	16.90	16.44	16.47	16.72	16.36	15.96	16.15			
	Conductivity (umhos/cm)	1050	1120	1180	1190	1190	1186	1200	1200	1200			
	Dissolved Oxygen (mg/L)	1.04	0.78	0.69	0.66	0.65	0.61	0.60	0.60	0.58			
	pH	7.26	7.36	7.27	7.16	7.12	7.10	7.09	7.09	7.08			
	ORP (mV)	186	162	152	137	126	117	112	108	107			
	Drawdown Ft	0.03	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05			
	Volume purged/Gals	0.32	0.64	0.92	1.195	1.47	1.75	2.02	2.30	2.57			
	Turbidity (NTU)	14.9	9.76	11.5	6.27	7.31	6.82	5.46	6.61	3.97			

Remarks: (ie: field filtrations, persons communicated with at site, etc.)

DTW: 17.60 17.62 17.62 17.62 17.62 17.62 17.62 17.62 17.62 17.62

Purge Rate: ~240 ~240 ~210  $\longrightarrow$   
 mg/L

Form 2

LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 1 of 2

PROJECT LACBWL- GW Sampling FILE NO. 128924-004  
 LOCATION Genoa, WI FIELD REP S. Kaney  
 SAMPLER S. Kaney / A. Quick DATE 8/15/18

GROUNDWATER SAMPLING INFORMATION

Well ID	<u>well-3</u>	<u>well ID: well-3-081518</u>
Depth Of Well (ft.) per Log	<u>-</u>	<u>Sample ID:</u>
Reference Mark	<u>-</u>	
Depth to Water from Reference Mark (ft.)	<u>-</u>	<u>Sample Time: 1055</u>
Time	<u>-</u>	
Depth to Product (ft.)	<u>N/A</u>	
Field Measured Depth Of Well (ft.)	<u>-</u>	
Inside Diameter (in.)	<u>-</u>	
Standing Water Depth (ft.)	<u>-</u>	
Volume Of Water In Well (gallons/liters)	<u>-</u>	
Purging Device	<u>production well</u>	
Volume of Bailer/Pump Capacity	<u>variable</u>	
Cleaning Procedure	<u>dedicated</u>	
Bails Removed/ Volume Removed	<u>-</u>	
Time Purging Started	<u>1035</u>	
Time Purging Stopped	<u>1057</u>	
Instrument Used to Monitor Field Parameters	<u>Horiba U-52</u>	
Sampling Device	<u>faucet</u>	
Cleaning Procedure	<u>dedicated</u>	
Color	<u>clear</u>	
Odor	<u>none</u>	



Groundwater Sampling

Form 2

LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 2 of 2

PROJECT LACBLR-GW Sampling  
 LOCATION Bena, WI  
 SAMPLER S. Kaney

FILE NO. 128924-004  
 FIELD REP S. Kaney  
 DATE 8/15/18

GROUNDWATER SAMPLING INFORMATION

TIME SAMPLES TAKEN	Tritium	1055	Sample ID: well-3-081518 Sample Time: 1055															
	Gamma	1055																
	Cobalt-60	1055																
	Strontium-90	1055																
	Cesium-137	1055																
	HTDs	1055																
PARAMETERS	Time	1055																
	Temp. C	18.33																
	Conductivity (umhos/cm)	432																
	Dissolved Oxygen (mg/L)	4.52																
	pH	7.48																
	ORP (mV)	-60																
	Drawdown Ft	-																
	Volume purged/Gals	-																
	Turbidity (NTU)	4.33																

Remarks: (ie: field filtrations, persons communicated with at site, etc.)

Form 2

LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 2 of 2

PROJECT LACBWR-GW Sampling  
 LOCATION Genoa, WI

FILE NO. 128924-001  
 FIELD REP S. Kaney

SAMPLER S. Kaney

DATE 8/15/18

GROUNDWATER SAMPLING INFORMATION

Well ID	<u>Well-5</u>	Sample ID:
Depth Of Well (ft.) per Log	<u>-</u>	<u>Well-5-087518</u>
Reference Mark	<u>-</u>	
Depth to Water from Reference Mark (ft.)	<u>-</u>	Sample Time: <u>1305</u>
Time	<u>-</u>	
Depth to Product (ft.)	<u>NA</u>	
Field Measured Depth Of Well (ft.)	<u>-</u>	
Inside Diameter (in.)	<u>-</u>	
Standing Water Depth (ft.)	<u>-</u>	
Volume Of Water In Well (gallons/liters)	<u>-</u>	
Purging Device	<u>production well</u>	
Volume of Bailer/Pump Capacity	<u>variable</u>	
Cleaning Procedure	<u>dedicated</u>	
Bails Removed/ Volume Removed	<u>-</u>	
Time Purging Started	<u>0700</u>	
Time Purging Stopped	<u>1309</u>	
Instrument Used to Monitor Field Parameters	<u>Horiba U-52</u>	
Sampling Device	<u>sampling spigot</u>	
Cleaning Procedure	<u>dedicated</u>	
Color	<u>Clear</u>	
Odor	<u>none</u>	

Form 2

LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 2 of 2

PROJECT LACBust - Gw Sampling  
 LOCATION Genoa, WI

FILE NO. 128924-004  
 FIELD REP S. Kaney

SAMPLER S. Kaney

DATE 8/15/18

GROUNDWATER SAMPLING INFORMATION

TIME SAMPLES TAKEN	Tritium	1305	Sample ID: well-5-081518																	
	Gamma	1305																		
	Cobalt-60	1305																		
	Strontium-90	1305	Sample ID: 1305																	
	Cesium-137	1305																		
	HTDs	1305																		
PARAMETERS	Time	1305																		
	Temp. C	14.66																		
	Conductivity (umhos/cm)	680																		
	Dissolved Oxygen (mg/L)	11.84																		
	pH	7.69																		
	ORP (mV)	220																		
	Drawdown Ft	-																		
	Volume purged/Gals	-																		
Turbidity (NTU)	1.69																			

Remarks: (ie: field filtrations, persons communicated with at site, etc.)

Form 2

LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 1 of 2

PROJECT LACBWR-GW Sampling  
LOCATION Genoa, WI

FILE NO. 128924-004  
FIELD REP S. Kaney

SAMPLER S. Kaney

DATE 8/15/18

GROUNDWATER SAMPLING INFORMATION

Well ID	<u>well-7</u>	Sample ID:
Depth Of Well (ft.) per Log	<u>-</u>	<u>well-7-081518</u>
Reference Mark	<u>-</u>	Sample Time: <u>1320</u>
Depth to Water from Reference Mark (ft.)	<u>-</u>	
Time	<u>-</u>	
Depth to Product (ft.)	<u>NA</u>	
Field Measured Depth Of Well (ft.)	<u>-</u>	
Inside Diameter (in.)	<u>-</u>	
Standing Water Depth (ft.)	<u>-</u>	
Volume Of Water In Well (gallons/liters)	<u>-</u>	
Purging Device	<u>Production well</u>	
Volume of Bailer/Pump Capacity	<u>variable</u>	
Cleaning Procedure	<u>dedicated</u>	
Bails Removed/ Volume Removed	<u>-</u>	
Time Purging Started	<u>1309</u>	
Time Purging Stopped	<u>1323</u>	
Instrument Used to Monitor Field Parameters	<u>Honba U-52</u>	
Sampling Device	<u>sampling port</u>	
Cleaning Procedure	<u>dedicated</u>	
Color	<u>clear</u>	
Odor	<u>none</u>	

Form 2

LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 2 of 2

PROJECT LACBull-GW Sampling FILE NO. 128924-004  
 LOCATION Genoa, WI FIELD REP S. Kaney  
 SAMPLER S. Kaney DATE 8/15/18

GROUNDWATER SAMPLING INFORMATION

TIME SAMPLES TAKEN	Tritium	1320	Sample ID: Well-7-081518 Sample Time: 1320																	
	Gamma	1320																		
	Cobalt-60	1320																		
	Strontium-90	1320																		
	Cesium-137	1320																		
	HTDs	1320																		
PARAMETERS	Time	1320																		
	Temp. C	14.35																		
	Conductivity (umhos/cm)	525																		
	Dissolved Oxygen (mg/L)	14.32																		
	pH	7.67																		
	ORP (mV)	168																		
	Drawdown Ft	-																		
	Volume purged/Gals	-																		
	Turbidity (NTU)	2.50																		

Remarks: (ie: field filtrations, persons communicated with at site, etc.)



Form 2

LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 1 of 2

PROJECT	LACBWL - GW Sampling	FILE NO.	128924-004
LOCATION	Genoa, WI	FIELD REP	S. Kaney
SAMPLER	S. Kaney	DATE	9/10/18

GROUNDWATER SAMPLING INFORMATION

Well ID	Drinkingwell-3	Sample ID:
Depth Of Well (ft.) per Log	-	well-3-09/10/18
Reference Mark	-	
Depth to Water from Reference Mark (ft.)	-	Sample Time 1515
Time	-	
Depth to Product (ft.)	-	
Field Measured Depth Of Well (ft.)	-	
Inside Diameter (in.)	-	
Standing Water Depth (ft.)	-	
Volume Of Water In Well (gallons/liters)	-	
Purging Device	Sampling port	
Volume of Bailer/Pump Capacity	variable	
Cleaning Procedure	dedicated	
Bails Removed/ Volume Removed	-	
Time Purging Started	1503 (turned on sampling port)	
Time Purging Stopped	1516	
Instrument Used to Monitor Field Parameters	Hanna U-5000	
Sampling Device	sampling port	
Cleaning Procedure	dedicated	
Color	clear	
Odor	none	

Form 2

LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 2 of 2

PROJECT LAEBWR - GW Sampling  
LOCATION Genoa, WI

FILE NO. 128924-004  
FIELD REP S. Kaney

SAMPLER S. Kaney

DATE 9/10/18

GROUNDWATER SAMPLING INFORMATION

TIME SAMPLES TAKEN	Tritium	1515	Sample ID: well-3-091018 Sample Time: 1515										
	Gamma	1515											
	Cobalt-60	1515											
	Strontium-90	1515											
	Cesium-137	1515											TSS / 1515
	HTDs	1515											TDS / 1515

PARAMETERS	Time	1515																	
	Temp. C	21.47																	
	Conductivity (umhos/cm)	431																	
	Dissolved Oxygen (mg/L)	3.23																	
	pH	8.02																	
	ORP (mV)	146																	
	Drawdown Ft	-																	
	Volume purged/Gals	-																	
	Turbidity (NTU)	13.9																	

Remarks: (ie: field filtrations, persons communicated with at site, etc.)

Form 2

LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 1 of 2

PROJECT LAC BWR - GW Sampling FILE NO. 128924-004  
 LOCATION Genoa, WI FIELD REP S. Kenny  
 SAMPLER S. Kenny DATE 9/11/18

GROUNDWATER SAMPLING INFORMATION

Well ID	<u>Well-5</u>	Sample ID:
Depth Of Well (ft.) per Log	-	<u>well-5-091118</u>
Reference Mark	-	
Depth to Water from Reference Mark (ft.)	-	Sample Time: <u>1240</u>
Time	-	
Depth to Product (ft.)	-	
Field Measured Depth Of Well (ft.)	-	
Inside Diameter (in.)	-	
Standing Water Depth (ft.)	-	
Volume Of Water In Well (gallons/liters)	-	
Purging Device	<u>production well</u>	
Volume of Bailer/Pump Capacity	<u>variable</u>	
Cleaning Procedure	<u>dedicated</u>	
Bails Removed/ Volume Removed	-	
Time Purging Started	<u>1230</u>	
Time Purging Stopped	<u>1245</u>	
Instrument Used to Monitor Field Parameters	<u>Honiba U-5000</u>	
Sampling Device	<u>PR sampling port</u>	
Cleaning Procedure	<u>dedicated</u>	
Color	<u>clear</u>	
Odor	<u>none</u>	

Form 2

LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 2 of 2

PROJECT LACBWR - GWS Sampling  
 LOCATION Genoa, WI  
 SAMPLER S. Kany

FILE NO. 128924-004  
 FIELD REP S. Kany  
 DATE 9/11/18

GROUNDWATER SAMPLING INFORMATION

TIME SAMPLES TAKEN	Tritium	1240	Sample ID:										
	Gamma	1240	well-5-091118										
	Cobalt-60	1240	Sample Time: 1240										
	Strontium-90	1240											
	Cesium-137	1240	TSS	1240									
	HTDs	1240	TDS	1240									
PARAMETERS	Time	1240											
	Temp. C	16.72											
	Conductivity (umhos/cm)	550											
	Dissolved Oxygen (mg/L)	10.45											
	pH	7.29											
	ORP (mV)	125											
	Drawdown Ft	-											
	Volume purged/Gals	-											
	Turbidity (NTU)	1.10											

Remarks: (ie: field filtrations, persons communicated with at site, etc.)

Form 2

LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 2 of 2

PROJECT LACBWL - GW Sampling FILE NO. 128924-004  
 LOCATION Genoa, WI FIELD REP S. Kaney  
 SAMPLER S. Kaney DATE 9/11/18

GROUNDWATER SAMPLING INFORMATION

Well ID	<u>Drinking well-7</u>	Sample ID:
Depth Of Well (ft.) per Log	-	<u>well-7-091118</u>
Reference Mark	-	
Depth to Water from Reference Mark (ft.)	-	Sample Time: <u>1255</u>
Time	-	
Depth to Product (ft.)	-	
Field Measured Depth Of Well (ft.)	-	
Inside Diameter (in.)	-	
Standing Water Depth (ft.)	-	
Volume Of Water In Well (gallons/liters)	-	
Purging Device	<u>production well</u>	
Volume of Bailer/Pump Capacity	<u>variable</u>	
Cleaning Procedure	<u>dedicated</u>	
Bails Removed/ Volume Removed	-	
Time Purging Started	<u>1247</u>	
Time Purging Stopped	<u>1302</u>	
Instrument Used to Monitor Field Parameters	<u>Hanna U-5000</u>	
Sampling Device	<u>↓ sampling port</u>	
Cleaning Procedure	<u>dedicated</u>	
Color	<u>clear</u>	<u>abundant air bubbles</u>
Odor	<u>none</u>	

Groundwater Sampling

Form 2

LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 2 of 2

PROJECT LACBWR - GW Sampling  
 LOCATION Genoa, WI  
 SAMPLER S. Kaney

FILE NO. 128924-004  
 FIELD REP S. Kaney  
 DATE 9/11/18

GROUNDWATER SAMPLING INFORMATION

TIME SAMPLES TAKEN	Tritium		Sample ID:																
		1255	well-7-091118																
	PARAMETERS		1255	Sample Time: 1255															
			1255																
			1255																
			1255	TSS / 1255															
		1255	TDS / 1255																
	Time	1255																	
	Temp. C	14.15																	
	Conductivity (umhos/cm)	523																	
	Dissolved Oxygen (mg/L)	11.08																	
	pH	7.65																	
	ORP (mV)	152																	
	Drawdown Ft	-																	
	Volume purged/Gals	-																	
	Turbidity (NTU)	6.62																	

Remarks: (ie: field filtrations, persons communicated with at site, etc.)



Groundwater Sampling

LC-RP-PR-057  
Revision 2

Form 2

LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 1 of 2

PROJECT LACBWR - GW Sampling FILE NO. 128924-004  
 LOCATION Benois FIELD REP S. Kanney  
 SAMPLER S. Kanney DATE 9/10/18

GROUNDWATER SAMPLING INFORMATION

Well ID	B11R	Sample ID:
Depth Of Well (ft.) per Log	Top of PVC	B11R-091018
Reference Mark	25'	Sample Time: 0925
Depth to Water from Reference Mark (ft.)	12.05	
Time	0828	
Depth to Product (ft.)	N/A	
Field Measured Depth Of Well (ft.)	25.54	
Inside Diameter (in.)	2	
Standing Water Depth (ft.)	14.49	
Volume Of Water In Well (gallons/liters)	2.32 gal	
Purging Device	peristaltic pump	
Volume of Bailer/Pump Capacity	variable	
Cleaning Procedure	dedicated	
Bails Removed/ Volume Removed	3.25 gal	
Time Purging Started	0830	Purge Rate: ~150 ml/min
Time Purging Stopped	0951	~0.040 gal/min
Instrument Used to Monitor Field Parameters	Horiba U-5000	
Sampling Device	peristaltic pump	
Cleaning Procedure	dedicated	
Color	clear	
Odor	none	

Groundwater Sampling

Form 2

LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 2 of 2

PROJECT LOCATION LACBUSEL - GW Sampling  
Genoa, WI

FILE NO. 128924-504  
FIELD REP S. Kaney

SAMPLER S. Kaney

DATE 9/10/18

GROUNDWATER SAMPLING INFORMATION

TIME SAMPLES TAKEN	Tritium	0925										Sample ID: BIR-091018	
	Gamma	0925											
	Cobalt-60	0925											
	Strontium-90	0925											
	Cesium-137	0925	TSS				0925						
	HTDs	0925	TDS				0925						
PARAMETERS	Time	0840	0845	0850	0855	0900	0905	0910	0915	0920	0925		
	Temp. C	14.77	16.23	15.94	15.78	15.84	15.89	15.92	15.99	16.04	16.10		
	Conductivity (umhos/cm)	979	1000	1020	1030	1040	1050	1060	1070	1070	1080		
	Dissolved Oxygen (mg/L)	1.74	1.08	0.76	0.75	0.53	0.46	0.39	0.30	0.24	0.21		
	pH	6.81	7.02	7.13	7.22	7.26	7.33	7.50	7.52	7.57	7.60		
	ORP (mV)	-8	-23	-28	-33	-38	-47	-54	-57	-60	-65		
	Drawdown Ft	0.05 <del>0.07</del>	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10		
	Volume purged/Gals	0.40	0.61	0.81	1.01	1.21	1.41	1.61	1.81	2.01	2.21		
	Turbidity (NTU)	35.1	20.8	16.2	13.8	13.1	11.2	9.53	9.57	9.27	7.90		

Remarks: (ie: field filtrations, persons communicated with at site, etc.)

DTW: 12.05 12.10 12.10 12.10 12.10 12.10 12.10 12.10 12.10 12.10

purge rate ml/min: 150 100 150 150 →

Groundwater Sampling

LC-RP-PR-057

Revision 2

Form 2

LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 1 of 2

PROJECT LACBWR FILE NO. 128924-004  
 LOCATION Green, WI FIELD REP A. Quirk  
 SAMPLER A. Quirk DATE 9/10/18

GROUNDWATER SAMPLING INFORMATION

Well ID	B11AR
Depth Of Well (ft.) per Log	55'
Reference Mark	TOP OF PVC
Depth to Water from Reference Mark (ft.)	13.9'
Time	0830
Depth to Product (ft.)	-
Field Measured Depth Of Well (ft.)	46.66'
Inside Diameter (in.)	2 in
Standing Water Depth (ft.)	32.76'
Volume Of Water In Well (gallons/liters)	5.2416 gals
Purging Device	Peristaltic Pump
Volume of Bailer/Pump Capacity	Variable
Cleaning Procedure	Dedicated
Bails Removed/ Volume Removed	4.79 gals
Time Purging Started	0835
Time Purging Stopped	1000
Instrument Used to Monitor Field Parameters	HORIBA U-52
Sampling Device	Peristaltic pump
Cleaning Procedure	Dedicated
Color	Clear with some small particulate
Odor	None

Groundwater Sampling

Form 2

B11AR

LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 2 of 2

PROJECT LACOR  
 LOCATION Genoa, WI  
 SAMPLER A. Quirk

FILE NO. 128124-004  
 FIELD REP A. Quirk  
 DATE 9/10/2018

GROUNDWATER SAMPLING INFORMATION

TIME SAMPLES TAKEN	Tritium		0935									
	Gamma		0935									
	Cobalt-60		0935									
	Strontium-90		0935									
	Cesium-137		0935		TSS		0935					
	HTDs		0935		TDS		0935					
	PARAMETERS	Time	0840	0845	0850	0855	0900	0905	0910	0915	0920	0925
Temp. C		14.42	14.40	14.08	13.98	14.11	14.22	14.37	14.41	14.67	14.69	14.71
Conductivity (µmhos/cm)		.896	.895	.897	.898	.897	.896	.894	.892	.890	.889	.888
Dissolved Oxygen (mg/L)		8.05	8.01	7.74	7.77	7.47	7.22	7.05	6.87	6.57	6.52	6.51
pH		7.32	7.34	7.44	7.45	7.48	7.50	7.52	7.52	7.53	7.55	7.55
ORP (mV)		252	252	252	252	246	242	241	239	235	233	232
Drawdown Ft		.02	.02	.01	.01	.01	.01	.01	.01	.01	.01	.01
Volume purged/Gals		.554	.818	1.082	1.346	1.6104	1.875	2.14	2.403	2.67	2.931	3.20
Turbidity (NTU)		7.08	5.17	2.67	1.62	1.24	.89	.67	.53	.41	.42	.39

Remarks: (ie: field filtrations, persons communicated with at site, etc.)

Flow Rate - 210 mL/min 200 mL/min →  
 OTW - 14.01' 14.01' 14.01' →

Groundwater Sampling

Form 2

LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 1 of 4

PROJECT LACBWS - GW Sampling FILE NO. 128924-004  
 LOCATION Gensa, WI FIELD REP S. Kaney  
 SAMPLER S. Kaney DATE 9/10/18

GROUNDWATER SAMPLING INFORMATION

Well ID	MW-200A	Sample ID:
Depth Of Well (ft.) per Log	25'	MW-200A-091018
Reference Mark	Top of PVC	Sample Time: 1308
Depth to Water from Reference Mark (ft.)	15.41	
Time	1222	Duplicate:
Depth to Product (ft.)	N/A	MW-200A-D-091018
Field Measured Depth Of Well (ft.)	27.99	
Inside Diameter (in.)	2	
Standing Water Depth (ft.)	12.58	
Volume Of Water In Well (gallons/liters)	2.01 gal	
Purging Device	peristaltic pump	
Volume of Bailer/Pump Capacity	perisox variable	
Cleaning Procedure	dedicated	
Bails Removed/ Volume Removed	4.90 gal	
Time Purging Started	1224	Purge Rate: ~190 ml/min
Time Purging Stopped	1402	~0.05 gal/min
Instrument Used to Monitor Field Parameters	Honda U-5000	
Sampling Device	peristaltic pump	
Cleaning Procedure	dedicated	
Color	clear	
Odor	none	

Groundwater Sampling

Form 2

LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 2 of 2

PROJECT UCBWR - GW Sampling  
 LOCATION Genoa, WI

FILE NO. 128924-004  
 FIELD REP S. Laney

SAMPLER S. Laney

DATE 9/10/18

GROUNDWATER SAMPLING INFORMATION

TIME SAMPLES TAKEN	Tritium	1308	Sample ID:		
	Gamma	1308	MW-200A-091018		
	Cobalt-60	1308	Sample Time: 1308		
	Strontium-90	1308			
	Cesium-137	1308	TSS	1308	Duplicate: MW-200A-0-091018
	HTDs	1308	TDS	1308	

PARAMETERS	Time	1229	1234	1239	1244	1249	1254	1259	1304				
	Temp. C	19.42	17.97	17.15	17.58	17.42	17.41	17.41	17.41				
	Conductivity (umhos/cm)	1790	1690	1640	1570	1450	1390	1370	1340				
	Dissolved Oxygen (mg/L)	3.24	2.00	1.61	1.20	0.95	0.70	0.52	0.44				
	pH	7.95	8.08	8.15	8.19	8.21	8.24	8.25	8.28				
	ORP (mV)	-160	-159	-164	-167	-170	-172	-174	-177				
	Drawdown Ft	0.61	0.00	0.00	0.00	0.00	0.00	0.00	0.00				
	Volume purged/Gals	0.25	0.50	0.75	1.00	1.25	1.50	1.75	2.00				
	Turbidity (NTU)	11.1	6.29	5.57	8.46	3.48	1.83	3.38	2.93				

Remarks: (ie: field filtrations, persons communicated with at site, etc.)

OTW: 15.42 15.41 15.41 15.41 15.41 15.41 15.41 15.41

Purge Rate ml/min: 210 190 190 →



Groundwater Sampling

LC-RP-PR-05  
Revision

Form 2

LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 1 of 2

PROJECT LACBWR FILE NO. 123924-004  
 LOCATION Genoa, WI FIELD REP A. Quirk  
A. Quirk DATE 9/10/18  
 SAMPLER

GROUNDWATER SAMPLING INFORMATION

Well ID	MW-200B
Depth Of Well (ft.) per Log	65'
Reference Mark	TOP OF PVC
Depth to Water from Reference Mark (ft.)	15.25'
Time	<del>1220</del> 1220
Depth to Product (ft.)	—
Field Measured Depth Of Well (ft.)	57.58'
Inside Diameter (in.)	2 in
Standing Water Depth (ft.)	42.33'
Volume Of Water In Well (gallons/liters)	6.773 gals
Purging Device	Peristaltic pump
Volume of Bailer/Pump Capacity	variable
Cleaning Procedure	Dedicated
Bails Removed/ Volume Removed	4.474 gals
Time Purging Started	1225
Time Purging Stopped	1350
Instrument Used to Monitor Field Parameters	Hanba U-52
Sampling Device	Peristaltic pump
Cleaning Procedure	Dedicated
Color	Clear with some small grey particulate
Odor	None

Groundwater Sampling

Form 2

LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 2 of 2


PROJECT LACBWR  
 LOCATION Genoa, WI  
 SAMPLER A. Quick

FILE NO. 122924-004  
 FIELD REP A. Quick  
 DATE 9/10/18

GROUNDWATER SAMPLING INFORMATION

TIME SAMPLES TAKEN	Tritium	1325										
	Gamma	1325										
	Cobalt-60	1325										
	Strontium-90	1325										
	Cesium-137	1325										
	HTDs	1325										
PARAMETERS	Time	1230	1235	1240	1245	1250	1255	1300	1305	1310	1315	1320
	Temp. C	18.23	17.47	17.05	16.61	16.09	16.14	15.92	16.04	16.03	16.03	16.01
	Conductivity (µmhos/cm)	.910	.922	.925	.931	.944	.945	.952	.951	.955	.959	.960
	Dissolved Oxygen (mg/L)	2.91	2.62	2.34	1.93	5.53	6.74	5.93	5.33	5.11	5.08	5.05
	pH	7.81	7.75	7.70	7.65	7.63	7.62	7.62	7.63	7.63	7.63	7.63
	ORP (mV)	-65	-75	-83	-91	-96	-100	-102	-105	-107	-109	-110
	Drawdown Ft	.03	.03	.01	.01	.01	.01	.01	.01	.01	.01	.01
	Volume purged/Gals	.251	.515	.779	1.043	1.31	1.571	1.84	2.10	2.36	2.63	2.89
	Turbidity (NTU)	22.6	19.5	17.4	19.6	11.9	10.3	8.11	5.16	5.18	2.93	2.08

Remarks: (ie: field filtrations, persons communicated with at site, etc.)

Flow Rate (ml/min) 190 200 200 

DTW (ft) 15.28' 15.28' 15.26' 

Form 2

LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 1 of 2

PROJECT	<u>LACBWR</u>	FILE NO.	<u>12-8724-004</u>
LOCATION	<u>GCNDA, LSI</u>	FIELD REP	<u>A. Quirk</u>
SAMPLER	<u>A. Quirk</u>	DATE	<u>9/11/2018</u>

GROUNDWATER SAMPLING INFORMATION

Well ID	MW-201A
Depth Of Well (ft.) per Log	25'
Reference Mark	TOP OF PVC
Depth to Water from Reference Mark (ft.)	14.11'
Time	0805
Depth to Product (ft.)	-
Field Measured Depth Of Well (ft.)	27.9'
Inside Diameter (in.)	2 in
Standing Water Depth (ft.)	13.79'
Volume Of Water In Well (gallons/liters)	2.21 gals
Purging Device	Peristaltic Pump
Volume of Bailer/Pump Capacity	Variable
Cleaning Procedure	Dedicated
Bails Removed/ Volume Removed	3.924 gals
Time Purging Started	0815
Time Purging Stopped	0935
Instrument Used to Monitor Field Parameters	Horiba U-52
Sampling Device	Peristaltic Pump
Cleaning Procedure	Dedicated
Color	Clear with some small grey particulate
Odor	None

Groundwater Sampling

Form 2

LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 2 of 2

PROJECT LACBWR  
 LOCATION 6690a, WI  
A. Jovik  
 SAMPLER

FILE NO. 126924-004  
 FIELD REP A. Jovik  
 DATE 7/11/2018

GROUNDWATER SAMPLING INFORMATION

TIME SAMPLES TAKEN	Tritium	0910											
	Gamma	0910											
	Cobalt-60	0910											
	Strontium-90	0910											
	Cesium-137	0910											
	HTDs	0910											
PARAMETERS	Time	0820	0825	0830	<del>0835</del>	0840	0845	0850	0855	0900	0905		
	Temp. C	13.71	13.48	13.33	13.36	13.35	13.29	13.26	13.32	13.33	13.33		
	Conductivity <sup>mS</sup> (µmhos/cm)	1.22	1.20	1.24	1.25	1.30	1.29	1.30	1.30	1.32	1.32		
	Dissolved Oxygen (mg/L)	3.87	2.31	1.43	1.53	1.35	1.22	1.17	1.06	1.05	1.03		
	pH	6.32	6.58	6.60	6.63	6.65	6.66	6.67	6.68	6.68	6.69		
	ORP (mV)	-52	-55	-79	-83	-85	-88	-88	-86	-83	-81		
	Drawdown Ft	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02		
	Volume purged/Gals	.502	.753	1.02	1.28	1.55	1.81	2.074	2.34	2.602	2.867		
	Turbidity (NTU)	48.6	48.3	50.5	42.4	31.5	25.4	21.5	19.4	19.1	18.4		

Remarks: (ie: field filtrations, persons communicated with at site, etc.)

Flow Rate (ml/min) 190 190 200  $\longrightarrow$   
 DTW (ft) - 14.13 14.13 14.3  $\longrightarrow$

Form 2

LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 1 of 2

PROJECT LAC Best-GW Sampling FILE NO. 128924-004  
 LOCATION Genoa, WI FIELD REP S. Kaney  
 SAMPLER S. Kaney DATE 9/11/18

GROUNDWATER SAMPLING INFORMATION

Well ID	MW-201BR	Sample ID: MW-201BR-091118
Depth Of Well (ft.) per Log	55'	
Reference Mark	Top of PVC	Sample Time: 0858
Depth to Water from Reference Mark (ft.)	13.86	
Time	0809	
Depth to Product (ft.)	N/A	
Field Measured Depth Of Well (ft.)	55.82	
Inside Diameter (in.)	2	
Standing Water Depth (ft.)	41.96	
Volume Of Water In Well (gallons/liters)	6.71 gal	
Purging Device	peristaltic pump	
Volume of Bailer/Pump Capacity	Variable	
Cleaning Procedure	dedicated	
Bails Removed/ Volume Removed	3.45 gal	
Time Purging Started	0812	Purge Rate: ~190 mL/min ~0.05 gal/min
Time Purging Stopped	0921	
Instrument Used to Monitor Field Parameters	Hanna U-5000	
Sampling Device	Peristaltic Pump	
Cleaning Procedure	dedicated	
Color	clear	
Odor	none	

Form 2

LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 2 of 2

PROJECT LACBWR - Gw Sampling  
LOCATION Genoa, WI

FILE NO. 128924-004

FIELD REP S. Kaney

SAMPLER S. Kaney

DATE 9/11/18

GROUNDWATER SAMPLING INFORMATION

TIME SAMPLES TAKEN	Tritium	0858	Sample ID: MW-201BR-091118	
	Gamma	0858		
	Cobalt-60	0858		
	Strontium-90	0858		
	Cesium-137	0858		
	HTDs	0858		
			Sample Time: 0858	
			TSS	0858
			TDS	0858

PARAMETERS	Time	0820	0825	0830	0835	0840	0845	0850	0855				
	Temp. C	17.34	15.17	14.61	14.43	14.13	14.03	13.9 <sup>3</sup>	13.85				
	Conductivity (umhos/cm)	849	889	903	910	918	920	925	928				
	Dissolved Oxygen (mg/L)	0.36	0.08	0.00	0.00	0.00	0.00	0.00	0.00				
	pH	6.89	7.11	7.22	7.30	7.38	7.43	7.47	7.53				
	ORP (mV)	-153	-161	-164	-165	-166	-167	-167	-168				
	Drawdown Ft	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03				
	Volume purged/Gals	0.4	0.65	0.90	1.15	1.40	1.65	1.90	2.15				
	Turbidity (NTU)	8.98	7.02	5.32	5.00	4.66	5.23	4.11	3.61				

Remarks: (ie: field filtrations, persons communicated with at site, etc.)

DTW: 13.89 13.89 13.89 13.89 13.89 13.89 13.89 13.89

Purge Rate: 170 190  $\longrightarrow$   
ml/min



Groundwater Sampling

LC-RP-PR-05  
Revision

Form 2

LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 1 of 2

PROJECT LCBWR - GW Sampling FILE NO. 128924-004  
 LOCATION Genoa, WI FIELD REP S. Kaney  
 SAMPLER S. Kaney DATE 9/11/18

GROUNDWATER SAMPLING INFORMATION

Well ID	MW-202AR	Sample ID:
Depth Of Well (ft.) per Log	25'	MW-202AR-091118
Reference Mark	Top of PVC	
Depth to Water from Reference Mark (ft.)	13.81	Sample Time:
Time	1007	1108
Depth to Product (ft.)	N/A	
Field Measured Depth Of Well (ft.)	27.70	
Inside Diameter (in.)	2	
Standing Water Depth (ft.)	13.91	
Volume Of Water In Well (gallons/liters)	2.23 gal	
Purging Device	Peristaltic Pump	
Volume of Bailer/Pump Capacity	variable	
Cleaning Procedure	dedicated	
Bails Removed/ Volume Removed	3.94 gal	
Time Purging Started	1008	Purge Rate: ~180 mL/min
Time Purging Stopped	1130	~0.048 gal/min
Instrument Used to Monitor Field Parameters	Hanna U-5000	
Sampling Device	Peristaltic Pump	
Cleaning Procedure	dedicated	
Color	clear	
Odor	none	

Groundwater Sampling

Form 2

LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 2 of 2

PROJECT LOCATION LACBURR - GW Sampling  
Genoa, WI

SAMPLER S. Kaney

FILE NO. 128924-004

FIELD REP S. Kaney

DATE 9/11/15

GROUNDWATER SAMPLING INFORMATION

TIME SAMPLES TAKEN	Tritium	1108	Sample ID:	
	Gamma	1108	MW-202AR-091118	
	Cobalt-60	1108	Sample Time: 1108	
	Strontium-90	1108		
	Cesium-137	1108	TSS	1108
	HTDs	1108	TDS	1108

PARAMETERS	Time	1015	1020	1025	1030	1030	1041	1045	1050	1055	1100	1105
	Temp. C	16.56	16.28	15.84	15.88	15.84	15.78	15.79	15.83	15.89	15.89	15.89
	Conductivity (umhos/cm)	1340	1340	1330	1330	1320	1320	1320	1320	1320	1320	1320
	Dissolved Oxygen (mg/L)	3.99	4.01	3.72	3.53	3.41	3.34	3.30	3.34	3.34	3.37	3.35
	pH	7.78	7.84	7.91	7.92	7.95	7.98	8.00	7.97	7.97	7.99	8.00
	ORP (mV)	-69	-58	-51	-42	-35	-33	-32	-30	-30	-30	-30
	Drawdown Ft	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Volume purged/Gals	0.34	0.58	0.82	1.06	1.35	1.69	1.78	2.02	2.26	2.50	2.74
	Turbidity (NTU)	41.2	41.1	27.3	25.9	16.2	13.4	12.0	11.1	8.29	7.14	7.35

Remarks: (ie: field filtrations, persons communicated with at site, etc.)

OTW: 13.81 13.81 13.83 13.81 13.81 13.81 13.81 13.81 13.81 13.81 13.81 13.81

purge Rate: 150 170 190 180 →  
ml/min

Groundwater Sampling

LC-RP-PR-05  
Revision

Form 2

LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 1 of 2

PROJECT LACBWR  
 LOCATION Genoa, WI  
 SAMPLER A. Quirk

FILE NO. 12824-004  
 FIELD REP A. Quirk  
 DATE 9/11/18

GROUNDWATER SAMPLING INFORMATION

Well ID	MW-202B
Depth Of Well (ft.) per Log	55'
Reference Mark	Top of PVC
Depth to Water from Reference Mark (ft.)	14.44'
Time	1005
Depth to Product (ft.)	—
Field Measured Depth Of Well (ft.)	55.87'
Inside Diameter (in.)	2 in
Standing Water Depth (ft.)	41.43'
Volume Of Water In Well (gallons/liters)	6.63 gals
Purging Device	Peristaltic pump
Volume of Bailer/Pump Capacity	variable
Cleaning Procedure	Dedicated
Bails Removed/ Volume Removed	4.782 gals
Time Purging Started	1015
Time Purging Stopped	1140
Instrument Used to Monitor Field Parameters	Horiba U-52
Sampling Device	peristaltic pump
Cleaning Procedure	Dedicated
Color	Clear, some grey/black particulate
Odor	none

Groundwater Sampling

Form 2

LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 2 of 2

PROJECT LACBWR  
 LOCATION G. Coon, WI  
 SAMPLER A. Quirk

FILE NO. 123924-004  
 FIELD REP A. Quirk  
 DATE 9/11/18

GROUNDWATER SAMPLING INFORMATION

TIME SAMPLES TAKEN	Tritium	1110	
	Gamma	1110	
	Cobalt-60	1110	
	Strontium-90	1110	
	Cesium-137	1110	TSS   1110
	HTDs	1110	TDS   1110

PARAMETERS	Time	<del>1020</del> 1020	<del>1025</del> 1025	1030	1035	1040	1045	1050	1055	1100	1105		
	Temp. C	15.37	15.57	16.53	17.52	17.56	17.87	18.36	18.70	18.8	18.86		
	Conductivity (umhos/cm)	<sup>ms/cm</sup> 863	<sup>ms/cm</sup> 948	<sup>ms/cm</sup> 972	953	951	937	920	906	903	899		
	Dissolved Oxygen (mg/L)	4.23	3.56	7.23	6.36	5.93	5.47	4.91	4.35	4.24	4.28		
	pH	6.90	6.90	6.89	6.90	6.90	6.91	6.91	6.91	6.91	6.91		
	ORP (mV)	-102	-105	-109	-115	-116	-117	-119	-121	-121	-122		
	Drawdown Ft	.01	.01	.01	0.01	0.01	.01	.01	.01	.01	.01		
	Volume purged/Gals	.555	.82	1.083	1.35	1.612	1.876	2.14	2.404	2.67	2.933		
	Turbidity (NTU)	4.74	7.69	3.78	2.30	1.86	1.18	1.06	1.72	1.63	1.48		

Remarks: (ie: field filtrations, persons communicated with at site, etc.)

Flow Rate - 210 200 200 →  
 (mL/min)  
 DTW ~ 14.45 14.45 →

Groundwater Sampling

LC-RP-PR-05  
Revision

Form 2

LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 1 of 2

PROJECT	<u>LACBWR</u>	FILE NO.	<u>128924-004</u>
LOCATION	<u>Genoa, VT</u>	FIELD REP	<u>A. Quick</u>
SAMPLER	<u>A. Quick</u>	DATE	<u>9/11/18</u>

GROUNDWATER SAMPLING INFORMATION

Well ID	<u>MW-203A</u>
Depth Of Well (ft.) per Log	<u>25'</u>
Reference Mark	<u>TOP OF PVC</u>
Depth to Water from Reference Mark (ft.)	<u>14.28'</u>
Time	<u>1345</u>
Depth to Product (ft.)	<u>—</u>
Field Measured Depth Of Well (ft.)	<u>27.94'</u>
Inside Diameter (in.)	<u>2 in</u>
Standing Water Depth (ft.)	<u>13.66'</u>
Volume Of Water In Well (gallons/liters)	<u>2.18L gal</u>
Purging Device	<u>Peristaltic pump</u>
Volume of Bailer/Pump Capacity	<u>variable</u>
Cleaning Procedure	<u>Dedicated</u>
Bails Removed/ Volume Removed	<u>4.23 gal</u>
Time Purging Started	<u>1355</u>
Time Purging Stopped	<u>1515</u>
Instrument Used to Monitor Field Parameters	<u>Horiba U-52</u>
Sampling Device	<u>Peristaltic pump</u>
Cleaning Procedure	<u>Dedicated</u>
Color	<u>Clear with some brownish-red particulate</u>
Odor	<u>None</u>

Groundwater Sampling

Form 2

LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 2 of 2

PROJECT LACBWR  
 LOCATION Genoa, WI  
 SAMPLER A. Quirk

FILE NO. 128924-004  
 FIELD REP A. Quirk  
 DATE 9/11/18

GROUNDWATER SAMPLING INFORMATION

TIME SAMPLES TAKEN	Tritium	1450											
	Gamma	1450											
	Cobalt-60	1450											
	Strontium-90	1450											
	Cesium-137	1450	TSS				1450						
	HTDs	1450	TDS				1450						
PARAMETERS	Time	1400	1405	1410	1415	1420	1425	1430	1435	1440	1445		
	Temp. C	25.14	24.87	24.91	23.84	24.12	24.00	23.88	23.86	23.85	23.89		
	Conductivity (umhos/cm)	216	210	176	<del>173</del>	167	166	166	168	166	164		
	Dissolved Oxygen (mg/L)	2.61	1.24	.93	6.11	1.17	.89	.95	1.01	1.01	1.0		
	pH	6.97	6.96	6.98	6.95	6.95	6.93	6.93	6.92	6.93	6.94		
	ORP (mV)	-131	-129	-126	-114	-114	-113	-111	-107	-105	-103		
	Drawdown Ft	.02	.02	.01	.01	.01	.01	.01	.01	.01	.01		
	Volume purged/Gals	.2642	.53	.793	1.06	1.32	1.585	1.85	2.114	2.378	2.642		
	Turbidity (NTU)	47.9	45.8	26.1	21.6	20.4	18.7	19.0	18.5	18.2	17.9		

Remarks: (ie: field filtrations, persons communicated with at site, etc.)

Flow Rate 200 200 200 →  
 (ML/min)  
 DTW (ft) 14.30 14.30 14.29 →



Form 2

LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 1 of 2

PROJECT LACBUSE - Gw Sampling FILE NO. 128924-004  
 LOCATION Genoa, WI FIELD REP S. Kaney  
 SAMPLER S. Kaney DATE 9/11/18

GROUNDWATER SAMPLING INFORMATION

Well ID	MW-203B	Sample ID:
Depth Of Well (ft.) per Log	55'	MW-203B-091118
Reference Mark	Top of PVC	
Depth to Water from Reference Mark (ft.)	14.44'	Sample Time: 1438
Time	1343	
Depth to Product (ft.)	N/A	
Field Measured Depth Of Well (ft.)	58.02'	
Inside Diameter (in.)	2	
Standing Water Depth (ft.)	43.61	
Volume Of Water In Well (gallons/liters)	6.98 gal	
Purging Device	Peristaltic Pump	
Volume of Bailer/Pump Capacity	variable	
Cleaning Procedure	dedicated	
Bails Removed/ Volume Removed	4.25	
Time Purging Started	1351	Purge Rate: ~190 mL/min
Time Purging Stopped	1501	~0.05 gal/min
Instrument Used to Monitor Field Parameters	Horiba U-5000	
Sampling Device	Peristaltic Pump	
Cleaning Procedure	dedicated	
Color	clear*	
Odor	none	

Groundwater Sampling

Form 2

LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 2 of 2

PROJECT LOCATION LACBurl - Gw Sampling  
Genoa, WI

FILE NO. 128924-004

FIELD REP S. Kaney

SAMPLER S. Kaney

DATE 9/11/18

GROUNDWATER SAMPLING INFORMATION

TIME SAMPLES TAKEN	Tritium	1438								Sample ID:			
	Gamma	1438								MW-203B-091118			
	Cobalt-60	1438											
	Strontium-90	1438								Sample Time: 1438			
	Cesium-137	1438	TSS				1438						
	HTDs	1438	TDS				1438						
PARAMETERS	Time	1400	1405	1410	1415	1420	1425	1430	1435				
	Temp. C	21.23	20.93	21.41	22.03	22.29	22.51	22.77	23.37				
	Conductivity (umhos/cm)	685	782	807	803	809	800	796	787				
	Dissolved Oxygen (mg/L)	0.74	0.20	0.12	0.02	0.04	0.00	0.00	0.00				
	pH	8.35	8.29	8.28	8.35	8.39	8.40	8.43	8.45				
	ORP (mV)	-233	-228	-226	-226	-227	-226	-228	-227				
	Drawdown Ft	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				
	Volume purged/Gals	0.59	0.89	1.67	1.95	2.20	2.45	2.70	2.95				
	Turbidity (NTU)	12.4	6.10	5.47	4.68	4.87	5.21	4.39	4.22				

Remarks: (ie: field filtrations, persons communicated with at site, etc.)

DTW: 14.44 14.44 14.44 14.44 14.44 14.40 14.40 14.40

Purge Rate: 250 230 210 210 190  $\longrightarrow$   
ml/min

\* During sampling, noticed that some fine brown particulate was present in samples.

Form 2

LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 1 of 2

PROJECT	<u>LACBWR</u>	FILE NO.	<u>128924-004</u>
LOCATION	<u>Green, WI</u>	FIELD REP	<u>A. Quick</u>
SAMPLER	<u>A. Quick</u>	DATE	<u>9/12/18</u>

GROUNDWATER SAMPLING INFORMATION

Well ID	<u>MW-224A</u>
Depth Of Well (ft.) per Log	<u>25'</u>
Reference Mark	<u>TOP OF PVC</u>
Depth to Water from Reference Mark (ft.)	<u>13.86'</u>
Time	<u>0905</u>
Depth to Product (ft.)	<u>—</u>
Field Measured Depth Of Well (ft.)	<u>26.99'</u>
Inside Diameter (in.)	<u>2 in</u>
Standing Water Depth (ft.)	<u>13.13'</u>
Volume Of Water In Well (gallons/liters)	<u>2.101 gal</u>
Purging Device	<u>peristaltic pump</u>
Volume of Bailer/Pump Capacity	<u>variable</u>
Cleaning Procedure	<u>Dedicated</u>
Bails Removed/ Volume Removed	<u>3.461 gal</u>
Time Purging Started	<u>0915</u>
Time Purging Stopped	<u>1020</u>
Instrument Used to Monitor Field Parameters	<u>Horizon U-52</u>
Sampling Device	<u>peristaltic pump</u>
Cleaning Procedure	<u>Dedicated</u>
Color	<u>Clear, some small particulate</u>
Odor	<u>None</u>

Groundwater Sampling

Form 2

LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 2 of 2



PROJECT LACBWR  
 LOCATION Geaca, WI  
 SAMPLER A. Quick

FILE NO. 128924-004  
 FIELD REP A. Quick  
 DATE 9/12/18

GROUNDWATER SAMPLING INFORMATION

TIME SAMPLES TAKEN	Tritium	1000											
	Gamma	1000											
	Cobalt-60	1000											
	Strontium-90	1000											
	Cesium-137	1000					TSS		1000				
	HTDs	1000					TDS		1000				
PARAMETERS	Time	0920	0925	0930	0935	0940	0945	0950	0955				
	Temp. C	16.39	17.52	17.58	17.68	17.77	17.86	17.85	17.88				
	Conductivity (umhos/cm)	853	832	826	821	815	813	814	812				
	Dissolved Oxygen (mg/L)	8.64	1.74	1.44	1.35	1.00	.94	.93	.92				
	pH	6.80	6.87	6.89	6.90	6.92	6.92	6.93	6.94				
	ORP (mV)	161	152	148	142	134	129	125	121				
	Drawdown Ft	.01	.01	.01	.01	.01	.01	.01	.01				
	Volume purged/Gals	.277	.555	.82	1.083	1.35	1.612	1.876	2.14				
	Turbidity (NTU)	8.36	8.08	5.98	4.96	4.57	3.67	3.32	3.39				

Remarks: (ie: field filtrations, persons communicated with at site, etc.)

Flow Rate (mL/min) - 210 210 200   
 OTW (Ft) - 13.87' 13.87' 

Form 2

LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 1 of 2

PROJECT LACBul-GW Sampling  
 LOCATION Genoa, WI  
 SAMPLER S. Raney

FILE NO. 128924-004  
 FIELD REP S. Raney  
 DATE 9/12/18

GROUNDWATER SAMPLING INFORMATION

Well ID	MW-204B	Sample ID:
Depth Of Well (ft.) per Log	255'	MW-204B-091218
Reference Mark	Top of PVC	
Depth to Water from Reference Mark (ft.)	13.90	Sample Time: 1012
Time	0911	
Depth to Product (ft.)	N/A	
Field Measured Depth Of Well (ft.)	56.55	
Inside Diameter (in.)	2	
Standing Water Depth (ft.)	42.65	
Volume Of Water In Well (gallons/liters)	6.82 gal	
Purging Device	Peristaltic Pump	
Volume of Bailer/Pump Capacity	variable	
Cleaning Procedure	Dedicated	
Bails Removed/ Volume Removed	4.20 gal	
Time Purging Started	0912	Purge Rate ~ 170 mL/min
Time Purging Stopped	1042	~ 0.045 gal/min
Instrument Used to Monitor Field Parameters	Honba U-8000	
Sampling Device	Peristaltic Pump	
Cleaning Procedure	Dedicated	
Color	clear	
Odor	none	

Groundwater Sampling

Form 2

LOW-FLOW GROUNDWATER SAMPLING RECORD

Page 2 of 2

PROJECT LOCATION LACBUSH - GWS Sampling FILE NO. 128924-004  
 LOCATION Genoa, WI FIELD REP S. Vanej  
 SAMPLER S. Vanej DATE 9/12/18

GROUNDWATER SAMPLING INFORMATION

TIME SAMPLES TAKEN	Tritium	1012	Sample ID:	
	Gamma	1012	MW-2048-091218	
	Cobalt-60	1012	Sample Time: 1012	
	Strontium-90	1012		
	Cesium-137	1012	TSS	1012
	HTDs	1012	TDS	1012

PARAMETERS	Time	0920	0925	0930	0935	0940	0945	0950	0955	1000	1005	1010
	Temp. C	16.98	16.70	16.68	16.79	17.58	16.82	16.75	16.85	16.82	16.83	16.89
	Conductivity (umhos/cm)	1100	1110	1110	1110	1090	1110	1110	1110	1110	1110	1110
	Dissolved Oxygen (mg/L)	0.75	0.36	0.21	0.10	0.09	0.00	0.00	0.00	0.00	0.00	0.00
	pH	6.76	7.07	7.21	7.31	7.37	7.44	7.48	7.52	7.56	7.60	7.63
	ORP (mV)	61	46	41	36	34	33	35	34	33	31	31
	Drawdown Ft	0.02	0.01	0.01	<del>0.11</del>	0.01	0.01	0.01	0.01	0.01	0.01	0.01
	Volume purged/Gals	0.55	0.78	1.00	1.23	1.45	1.68	1.90	2.13	2.35	2.58	2.80
	Turbidity (NTU)	6.88	6.25	5.55	4.58	3.65	3.59	3.29	2.41	2.33	2.24	1.80

Remarks: (ie: field filtrations, persons communicated with at site, etc.)

DTW 13.92 13.91 13.91 13.91 13.91 13.91 13.91 13.91 13.91 13.91 13.91 13.91

Purge Rate 260 170 170 170  →  
 of ml/min



## **APPENDIX C**

### **Analytical Laboratory Data**



December 28, 2017

Mr. Jason Q. Spaide  
LaCrosseSolutions  
S4601 State Hwy 35  
Genoa, Wisconsin 54632

Re: LACBWR Site Restoration Project  
Work Order: 439672

Dear Mr. Spaide:

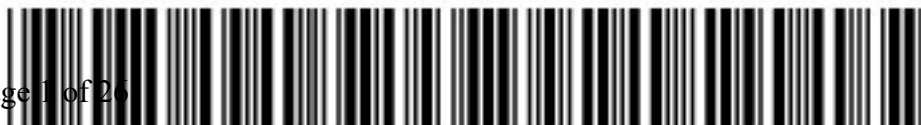
GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on December 08, 2017. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

Our policy is to provide high quality, personalized analytical services to enable you to meet your analytical needs on time every time. We trust that you will find everything in order and to your satisfaction. If you have any questions, please do not hesitate to call me at (843) 556-8171, ext. 4453.

Sincerely,

Edith Kent  
Project Manager

Purchase Order: 672583  
Enclosures



## GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 – (843) 556-8171 – www.gel.com

### Certificate of Analysis Report for

ENRG070 LaCrosseSolutions, LLC (672583)

Client SDG: 439672 GEL Work Order: 439672

**The Qualifiers in this report are defined as follows:**

- \* A quality control analyte recovery is outside of specified acceptance criteria
- \*\* Analyte is a Tracer compound
- \*\* Analyte is a surrogate compound
- U Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the Certificate of Analysis.

The designation ND, if present, appears in the result column when the analyte concentration is not detected above the limit as defined in the 'U' qualifier above.

This data report has been prepared and reviewed in accordance with GEL Laboratories LLC standard operating procedures. Please direct any questions to your Project Manager, Edith Kent.



Reviewed by \_\_\_\_\_

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Report Date: December 28, 2017

Company : LaCrosseSolutions  
 Address : S4601 State Hwy 35  
  
 Genoa, Wisconsin 54632  
 Contact: Mr. Jason Q. Spaide  
 Project: LACBWR Site Restoration Project

Client Sample ID: MW-200A-120617	Project: ENRG07001
Sample ID: 439672001	Client ID: ENRG070
Matrix: Ground Water	
Collect Date: 06-DEC-17 11:15	
Receive Date: 08-DEC-17	
Collector: Client	

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Rad Gamma Spec Analysis</b>													
Gammaspec, Gamma, Liquid, Cs-137, Co-60 "As Received"													
Cesium-137	U	0.559	+/-5.19	9.59	10.0	pCi/L			BSW1	12/12/17	0933	1725109	1
Cobalt-60	U	-1.24	+/-4.48	8.56		pCi/L							
<b>Rad Gas Flow Proportional Counting</b>													
GFPC, Sr90, liquid "As Received"													
Strontium-90	U	1.31	+/-0.935	1.48	2.00	pCi/L			LXB3	12/20/17	1122	1726108	2
<b>Rad Liquid Scintillation Analysis</b>													
LSC, Tritium Dist, Liquid "As Received"													
Tritium	U	244	+/-355	604	700	pCi/L			MXH8	12/14/17	1352	1725414	3
Liquid Scint Ni63, Liquid "As Received"													
Nickel-63	U	0.184	+/-18.3	31.8	50.0	pCi/L			TXJ1	12/23/17	0821	1725411	4

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 901.1	
2	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified	
3	EPA 906.0 Modified	
4	DOE RESL Ni-1, Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Strontium Carrier	GFPC, Sr90, liquid "As Received"			90.4	(25%-125%)
Nickel Carrier	Liquid Scint Ni63, Liquid "As Received"			82.9	(25%-125%)

**Notes:**  
 Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Report Date: December 28, 2017

Company : LaCrosseSolutions  
 Address : S4601 State Hwy 35  
  
 Genoa, Wisconsin 54632  
 Contact: Mr. Jason Q. Spaide  
 Project: LACBWR Site Restoration Project

Client Sample ID: MW-200B-120617	Project: ENRG07001
Sample ID: 439672002	Client ID: ENRG070
Matrix: Ground Water	
Collect Date: 06-DEC-17 10:30	
Receive Date: 08-DEC-17	
Collector: Client	

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Rad Gamma Spec Analysis</b>													
Gammaspec, Gamma, Liquid, Cs-137, Co-60 "As Received"													
Cesium-137	U	-2.36	+/-3.41	5.59	10.0	pCi/L			BSW1	12/12/17	0934	1725109	1
Cobalt-60	U	3.19	+/-3.20	8.12		pCi/L							
<b>Rad Gas Flow Proportional Counting</b>													
GFPC, Sr90, liquid "As Received"													
Strontium-90	U	0.548	+/-0.849	1.47	2.00	pCi/L			LXB3	12/20/17	1122	1726108	2
<b>Rad Liquid Scintillation Analysis</b>													
LSC, Tritium Dist, Liquid "As Received"													
Tritium	U	128	+/-346	604	700	pCi/L			MXH8	12/14/17	1413	1725414	3
Liquid Scint Ni63, Liquid "As Received"													
Nickel-63	U	-3.58	+/-17.2	30.2	50.0	pCi/L			TXJ1	12/23/17	0837	1725411	4

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 901.1	
2	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified	
3	EPA 906.0 Modified	
4	DOE RESL Ni-1, Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Strontium Carrier	GFPC, Sr90, liquid "As Received"			91.7	(25%-125%)
Nickel Carrier	Liquid Scint Ni63, Liquid "As Received"			87.3	(25%-125%)

**Notes:**  
 Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Report Date: December 28, 2017

Company : LaCrosseSolutions  
 Address : S4601 State Hwy 35  
  
 Genoa, Wisconsin 54632  
 Contact: Mr. Jason Q. Spaide  
 Project: LACBWR Site Restoration Project

Client Sample ID: MW-201A-120617	Project: ENRG07001
Sample ID: 439672003	Client ID: ENRG070
Matrix: Ground Water	
Collect Date: 06-DEC-17 14:25	
Receive Date: 08-DEC-17	
Collector: Client	

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Rad Gamma Spec Analysis</b>													
Gammaspec, Gamma, Liquid, Cs-137, Co-60 "As Received"													
Cesium-137	U	2.45	+/-4.14	8.40	10.0	pCi/L			BSW1	12/12/17	1120	1725109	1
Cobalt-60	U	2.80	+/-4.44	10.0		pCi/L							
<b>Rad Gas Flow Proportional Counting</b>													
GFPC, Sr90, liquid "As Received"													
Strontium-90	U	0.343	+/-0.599	1.06	2.00	pCi/L			LXB3	12/20/17	1123	1726108	2
<b>Rad Liquid Scintillation Analysis</b>													
LSC, Tritium Dist, Liquid "As Received"													
Tritium	U	-192	+/-322	603	700	pCi/L			MXH8	12/14/17	1435	1725414	3
Liquid Scint Ni63, Liquid "As Received"													
Nickel-63	U	0.537	+/-18.0	31.3	50.0	pCi/L			TXJ1	12/23/17	0853	1725411	4

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 901.1	
2	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified	
3	EPA 906.0 Modified	
4	DOE RESL Ni-1, Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Strontium Carrier	GFPC, Sr90, liquid "As Received"			87.9	(25%-125%)
Nickel Carrier	Liquid Scint Ni63, Liquid "As Received"			84.5	(25%-125%)

**Notes:**  
 Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit



# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Report Date: December 28, 2017

Company : LaCrosseSolutions  
 Address : S4601 State Hwy 35  
  
 Genoa, Wisconsin 54632  
 Contact: Mr. Jason Q. Spaide  
 Project: LACBWR Site Restoration Project

Client Sample ID: MW-202A-120717	Project: ENRG07001
Sample ID: 439672004	Client ID: ENRG070
Matrix: Ground Water	
Collect Date: 07-DEC-17 11:12	
Receive Date: 08-DEC-17	
Collector: Client	

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Rad Gamma Spec Analysis</b>													
Gammaspec, Gamma, Liquid, Cs-137, Co-60 "As Received"													
Cesium-137	U	-0.896	+/-5.42	9.49	10.0	pCi/L			BSW1	12/12/17	1120	1725109	1
Cobalt-60	U	-2.38	+/-4.99	8.72		pCi/L							
<b>Rad Gas Flow Proportional Counting</b>													
GFPC, Sr90, liquid "As Received"													
Strontium-90	U	-0.359	+/-0.512	1.08	2.00	pCi/L			LXB3	12/20/17	1252	1726108	2
<b>Rad Liquid Scintillation Analysis</b>													
LSC, Tritium Dist, Liquid "As Received"													
Tritium	U	-11.3	+/-338	607	700	pCi/L			MXH8	12/14/17	1456	1725414	3
Liquid Scint Ni63, Liquid "As Received"													
Nickel-63	U	2.46	+/-18.1	31.3	50.0	pCi/L			TXJ1	12/23/17	0910	1725411	4

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 901.1	
2	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified	
3	EPA 906.0 Modified	
4	DOE RESL Ni-1, Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Strontium Carrier	GFPC, Sr90, liquid "As Received"			108	(25%-125%)
Nickel Carrier	Liquid Scint Ni63, Liquid "As Received"			84.5	(25%-125%)

**Notes:**  
 Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Report Date: December 28, 2017

Company : LaCrosseSolutions  
 Address : S4601 State Hwy 35  
  
 Genoa, Wisconsin 54632  
 Contact: Mr. Jason Q. Spaide  
 Project: LACBWR Site Restoration Project

Client Sample ID: MW-202B-120717	Project: ENRG07001
Sample ID: 439672005	Client ID: ENRG070
Matrix: Ground Water	
Collect Date: 07-DEC-17 12:33	
Receive Date: 08-DEC-17	
Collector: Client	

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Rad Gamma Spec Analysis</b>													
Gammaspec, Gamma, Liquid, Cs-137, Co-60 "As Received"													
Cesium-137	U	-1.72	+/-5.69	10.1	10.0	pCi/L			BSW1	12/12/17	1121	1725109	1
Cobalt-60	U	-3.67	+/-4.29	6.73		pCi/L							
<b>Rad Gas Flow Proportional Counting</b>													
GFPC, Sr90, liquid "As Received"													
Strontium-90	U	0.390	+/-0.606	1.05	2.00	pCi/L			LXB3	12/20/17	1125	1726108	2
<b>Rad Liquid Scintillation Analysis</b>													
LSC, Tritium Dist, Liquid "As Received"													
Tritium	U	-193	+/-320	599	700	pCi/L			MXH8	12/14/17	1517	1725414	3
Liquid Scint Ni63, Liquid "As Received"													
Nickel-63	U	-0.455	+/-17.5	30.5	50.0	pCi/L			TXJ1	12/23/17	0926	1725411	4

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 901.1	
2	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified	
3	EPA 906.0 Modified	
4	DOE RESL Ni-1, Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Strontium Carrier	GFPC, Sr90, liquid "As Received"			96.8	(25%-125%)
Nickel Carrier	Liquid Scint Ni63, Liquid "As Received"			87.3	(25%-125%)

**Notes:**  
 Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Report Date: December 28, 2017

Company : LaCrosseSolutions  
 Address : S4601 State Hwy 35  
  
 Genoa, Wisconsin 54632  
 Contact: Mr. Jason Q. Spaide  
 Project: LACBWR Site Restoration Project

Client Sample ID: MW-203A-120717	Project: ENRG07001
Sample ID: 439672006	Client ID: ENRG070
Matrix: Ground Water	
Collect Date: 07-DEC-17 09:50	
Receive Date: 08-DEC-17	
Collector: Client	

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Rad Gamma Spec Analysis</b>													
Gammaspec, Gamma, Liquid, Cs-137, Co-60 "As Received"													
Cesium-137	U	1.08	+/-4.46	9.04	10.0	pCi/L			BSW1	12/12/17	1147	1725109	1
Cobalt-60	U	0.389	+/-5.62	11.1		pCi/L							
<b>Rad Gas Flow Proportional Counting</b>													
GFPC, Sr90, liquid "As Received"													
Strontium-90	U	-0.517	+/-0.526	1.17	2.00	pCi/L			LXB3	12/20/17	1126	1726108	2
<b>Rad Liquid Scintillation Analysis</b>													
LSC, Tritium Dist, Liquid "As Received"													
Tritium		13000	+/-874	610	700	pCi/L			MXH8	12/14/17	1539	1725414	3
Liquid Scint Ni63, Liquid "As Received"													
Nickel-63	U	7.03	+/-17.8	30.4	50.0	pCi/L			TXJ1	12/23/17	0942	1725411	4

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 901.1	
2	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified	
3	EPA 906.0 Modified	
4	DOE RESL Ni-1, Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Strontium Carrier	GFPC, Sr90, liquid "As Received"			95.5	(25%-125%)
Nickel Carrier	Liquid Scint Ni63, Liquid "As Received"			86.9	(25%-125%)

**Notes:**  
 Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Report Date: December 28, 2017

Company : LaCrosseSolutions  
 Address : S4601 State Hwy 35  
  
 Genoa, Wisconsin 54632  
 Contact: Mr. Jason Q. Spaide  
 Project: LACBWR Site Restoration Project

Client Sample ID: MW-203B-120717	Project: ENRG07001
Sample ID: 439672007	Client ID: ENRG070
Matrix: Ground Water	
Collect Date: 07-DEC-17 09:44	
Receive Date: 08-DEC-17	
Collector: Client	

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Rad Gamma Spec Analysis</b>													
Gammaspec, Gamma, Liquid, Cs-137, Co-60 "As Received"													
Cesium-137	U	-0.562	+/-3.30	6.34	10.0	pCi/L			BSW1	12/12/17	1148	1725109	1
Cobalt-60	U	-1.54	+/-4.27	8.28		pCi/L							
<b>Rad Gas Flow Proportional Counting</b>													
GFPC, Sr90, liquid "As Received"													
Strontium-90	U	-0.256	+/-0.538	1.14	2.00	pCi/L			LXB3	12/20/17	1126	1726108	2
<b>Rad Liquid Scintillation Analysis</b>													
LSC, Tritium Dist, Liquid "As Received"													
Tritium	U	13.1	+/-338	604	700	pCi/L			MXH8	12/14/17	1600	1725414	3
Liquid Scint Ni63, Liquid "As Received"													
Nickel-63	U	-5.67	+/-17.4	30.7	50.0	pCi/L			TXJ1	12/23/17	0958	1725411	4

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 901.1	
2	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified	
3	EPA 906.0 Modified	
4	DOE RESL Ni-1, Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Strontium Carrier	GFPC, Sr90, liquid "As Received"			87.9	(25%-125%)
Nickel Carrier	Liquid Scint Ni63, Liquid "As Received"			86.1	(25%-125%)

**Notes:**  
 Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Report Date: December 28, 2017

Company : LaCrosseSolutions  
 Address : S4601 State Hwy 35  
  
 Genoa, Wisconsin 54632  
 Contact: Mr. Jason Q. Spaide  
 Project: LACBWR Site Restoration Project

Client Sample ID: MW-204A-120617	Project: ENRG07001
Sample ID: 439672008	Client ID: ENRG070
Matrix: Ground Water	
Collect Date: 06-DEC-17 08:51	
Receive Date: 08-DEC-17	
Collector: Client	

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Rad Gamma Spec Analysis</b>													
Gammaspec, Gamma, Liquid, Cs-137, Co-60 "As Received"													
Cesium-137	U	1.72	+/-5.24	9.70	10.0	pCi/L			BSW1	12/12/17	1158	1725109	1
Cobalt-60	U	-0.771	+/-5.63	11.4		pCi/L							
<b>Rad Gas Flow Proportional Counting</b>													
GFPC, Sr90, liquid "As Received"													
Strontium-90	U	0.380	+/-0.595	1.04	2.00	pCi/L			LXB3	12/20/17	1126	1726108	2
<b>Rad Liquid Scintillation Analysis</b>													
LSC, Tritium Dist, Liquid "As Received"													
Tritium	U	211	+/-356	610	700	pCi/L			MXH8	12/14/17	1622	1725414	3
Liquid Scint Ni63, Liquid "As Received"													
Nickel-63	U	-7.5	+/-17.8	31.5	50.0	pCi/L			TXJ1	12/23/17	1015	1725411	4

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 901.1	
2	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified	
3	EPA 906.0 Modified	
4	DOE RESL Ni-1, Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Strontium Carrier	GFPC, Sr90, liquid "As Received"			104	(25%-125%)
Nickel Carrier	Liquid Scint Ni63, Liquid "As Received"			84.1	(25%-125%)

**Notes:**  
 Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Report Date: December 28, 2017

Company : LaCrosseSolutions  
 Address : S4601 State Hwy 35  
  
 Genoa, Wisconsin 54632  
 Contact: Mr. Jason Q. Spaide  
 Project: LACBWR Site Restoration Project

Client Sample ID: MW-204B-120617	Project: ENRG07001
Sample ID: 439672009	Client ID: ENRG070
Matrix: Ground Water	
Collect Date: 06-DEC-17 08:55	
Receive Date: 08-DEC-17	
Collector: Client	

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Rad Gamma Spec Analysis</b>													
Gammaspec, Gamma, Liquid, Cs-137, Co-60 "As Received"													
Cesium-137	U	0.793	+/-3.77	7.34	10.0	pCi/L			BSW1	12/12/17	1159	1725109	1
Cobalt-60	U	1.96	+/-4.73	10.1		pCi/L							
<b>Rad Gas Flow Proportional Counting</b>													
GFPC, Sr90, liquid "As Received"													
Strontium-90	U	0.937	+/-0.801	1.28	2.00	pCi/L			LXB3	12/20/17	1127	1726108	2
<b>Rad Liquid Scintillation Analysis</b>													
LSC, Tritium Dist, Liquid "As Received"													
Tritium	U	-179	+/-325	607	700	pCi/L			MXH8	12/14/17	1643	1725414	3
Liquid Scint Ni63, Liquid "As Received"													
Nickel-63	U	4.95	+/-16.1	27.8	50.0	pCi/L			TXJ1	12/23/17	1031	1725411	4

The following Analytical Methods were performed:

Method	Description	Analyst	Comments
1	EPA 901.1		
2	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified		
3	EPA 906.0 Modified		
4	DOE RESL Ni-1, Modified		

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Strontium Carrier	GFPC, Sr90, liquid "As Received"			86.6	(25%-125%)
Nickel Carrier	Liquid Scint Ni63, Liquid "As Received"			95.2	(25%-125%)

**Notes:**  
 Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit



# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Report Date: December 28, 2017

Company : LaCrosseSolutions  
 Address : S4601 State Hwy 35  
  
 Genoa, Wisconsin 54632  
 Contact: Mr. Jason Q. Spaide  
 Project: LACBWR Site Restoration Project

Client Sample ID: B11AR-D-120517	Project: ENRG07001
Sample ID: 439672010	Client ID: ENRG070
Matrix: Ground Water	
Collect Date: 05-DEC-17 10:10	
Receive Date: 08-DEC-17	
Collector: Client	

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Rad Gamma Spec Analysis</b>													
Gammaspec, Gamma, Liquid, Cs-137, Co-60 "As Received"													
Cesium-137	U	-0.274	+/-4.93	9.33	10.0	pCi/L			BSW1	12/12/17	1159	1725109	1
Cobalt-60	U	-1.0	+/-5.26	10.2		pCi/L							
<b>Rad Gas Flow Proportional Counting</b>													
GFPC, Sr90, liquid "As Received"													
Strontium-90	U	0.0335	+/-0.561	1.10	2.00	pCi/L			LXB3	12/20/17	1127	1726108	2
<b>Rad Liquid Scintillation Analysis</b>													
LSC, Tritium Dist, Liquid "As Received"													
Tritium	U	-85.9	+/-337	616	700	pCi/L			MXH8	12/14/17	1705	1725414	3
Liquid Scint Ni63, Liquid "As Received"													
Nickel-63	U	-5.69	+/-17.5	30.9	50.0	pCi/L			TXJ1	12/23/17	1047	1725411	4

The following Analytical Methods were performed:

Method	Description	Analyst	Comments
1	EPA 901.1		
2	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified		
3	EPA 906.0 Modified		
4	DOE RESL Ni-1, Modified		

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Strontium Carrier	GFPC, Sr90, liquid "As Received"			84.1	(25%-125%)
Nickel Carrier	Liquid Scint Ni63, Liquid "As Received"			85.7	(25%-125%)

**Notes:**  
 Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

# GEL LABORATORIES LLC

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## Certificate of Analysis

Report Date: December 28, 2017

Company : LaCrosseSolutions  
 Address : S4601 State Hwy 35  
  
 Genoa, Wisconsin 54632  
 Contact: Mr. Jason Q. Spaide  
 Project: LACBWR Site Restoration Project

Client Sample ID: B11AR-120517	Project: ENRG07001
Sample ID: 439672011	Client ID: ENRG070
Matrix: Ground Water	
Collect Date: 05-DEC-17 10:10	
Receive Date: 08-DEC-17	
Collector: Client	

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Rad Gamma Spec Analysis</b>													
Gammaspec, Gamma, Liquid, Cs-137, Co-60 "As Received"													
Cesium-137	U	8.00	+/-10.5	8.88	10.0	pCi/L			BSW1	12/12/17	1339	1725109	1
Cobalt-60	U	-1.94	+/-6.37	11.6		pCi/L							
<b>Rad Gas Flow Proportional Counting</b>													
GFPC, Sr90, liquid "As Received"													
Strontium-90	U	-0.784	+/-0.396	1.03	2.00	pCi/L			LXB3	12/20/17	1531	1726108	2
<b>Rad Liquid Scintillation Analysis</b>													
LSC, Tritium Dist, Liquid "As Received"													
Tritium	U	-243	+/-322	610	700	pCi/L			MXH8	12/14/17	1726	1725414	3
Liquid Scint Ni63, Liquid "As Received"													
Nickel-63	U	-6.1	+/-17.1	30.1	50.0	pCi/L			TXJ1	12/23/17	1104	1725411	4

The following Analytical Methods were performed:

Method	Description	Analyst	Comments
1	EPA 901.1		
2	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified		
3	EPA 906.0 Modified		
4	DOE RESL Ni-1, Modified		

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Strontium Carrier	GFPC, Sr90, liquid "As Received"			103	(25%-125%)
Nickel Carrier	Liquid Scint Ni63, Liquid "As Received"			87.7	(25%-125%)

**Notes:**

Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

# GEL LABORATORIES LLC

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## Certificate of Analysis

Report Date: December 28, 2017

Company : LaCrosseSolutions  
 Address : S4601 State Hwy 35  
  
 Genoa, Wisconsin 54632  
 Contact: Mr. Jason Q. Spaide  
 Project: LACBWR Site Restoration Project

Client Sample ID: B11R-120517	Project: ENRG07001
Sample ID: 439672012	Client ID: ENRG070
Matrix: Ground Water	
Collect Date: 05-DEC-17 11:00	
Receive Date: 08-DEC-17	
Collector: Client	

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Rad Gamma Spec Analysis</b>													
Gammaspec, Gamma, Liquid, Cs-137, Co-60 "As Received"													
Cesium-137	U	1.81	+/-4.06	8.41	10.0	pCi/L			BSW1	12/12/17	1340	1725109	1
Cobalt-60	U	-2.31	+/-5.16	9.50		pCi/L							
<b>Rad Gas Flow Proportional Counting</b>													
GFPC, Sr90, liquid "As Received"													
Strontium-90	U	-0.313	+/-0.572	1.20	2.00	pCi/L			LXB3	12/20/17	1252	1726108	2
<b>Rad Liquid Scintillation Analysis</b>													
LSC, Tritium Dist, Liquid "As Received"													
Tritium	U	-89.2	+/-331	606	700	pCi/L			MXH8	12/14/17	1748	1725414	3
Liquid Scint Ni63, Liquid "As Received"													
Nickel-63	U	-4.5	+/-17.6	31.0	50.0	pCi/L			TXJ1	12/23/17	1120	1725411	4

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 901.1	
2	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified	
3	EPA 906.0 Modified	
4	DOE RESL Ni-1, Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Strontium Carrier	GFPC, Sr90, liquid "As Received"			90.4	(25%-125%)
Nickel Carrier	Liquid Scint Ni63, Liquid "As Received"			85.3	(25%-125%)

**Notes:**  
 Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Report Date: December 28, 2017

Company : LaCrosseSolutions  
 Address : S4601 State Hwy 35  
  
 Genoa, Wisconsin 54632  
 Contact: Mr. Jason Q. Spaide  
 Project: LACBWR Site Restoration Project

Client Sample ID: Well-5-120717	Project: ENRG07001
Sample ID: 439672013	Client ID: ENRG070
Matrix: Ground Water	
Collect Date: 07-DEC-17 11:58	
Receive Date: 08-DEC-17	
Collector: Client	

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Rad Gamma Spec Analysis</b>													
Gammaspec, Gamma, Liquid, Cs-137, Co-60 "As Received"													
Cesium-137	U	-1.03	+/-4.12	7.36	10.0	pCi/L			BSW1	12/12/17	1340	1725109	1
Cobalt-60	U	0.457	+/-4.65	9.50		pCi/L							
<b>Rad Gas Flow Proportional Counting</b>													
GFPC, Sr90, liquid "As Received"													
Strontium-90	U	-0.25	+/-0.443	0.969	2.00	pCi/L			LXB3	12/20/17	1127	1726108	2
<b>Rad Liquid Scintillation Analysis</b>													
LSC, Tritium Dist, Liquid "As Received"													
Tritium	U	-127	+/-330	609	700	pCi/L			MXH8	12/14/17	1809	1725414	3
Liquid Scint Ni63, Liquid "As Received"													
Nickel-63	U	-14.5	+/-18.1	32.6	50.0	pCi/L			TXJ1	12/23/17	1136	1725411	4

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 901.1	
2	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified	
3	EPA 906.0 Modified	
4	DOE RESL Ni-1, Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Strontium Carrier	GFPC, Sr90, liquid "As Received"			96.8	(25%-125%)
Nickel Carrier	Liquid Scint Ni63, Liquid "As Received"			81.3	(25%-125%)

**Notes:**  
 Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

# GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

## QC Summary

Report Date: December 28, 2017

Page 1 of 3

LaCrosseSolutions  
S4601 State Hwy 35  
Genoa, Wisconsin

Contact: Mr. Jason Q. Spaide

Workorder: 439672

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Rad Gamma Spec</b>											
Batch	1725109										
QC1203935587	439672001	DUP									
Cesium-137	U	0.559	U	1.13	pCi/L	N/A			N/A BSW1	12/12/17	13:41
	Uncertainty	+/-5.19		+/-5.17							
Cobalt-60	U	-1.24	U	0.695	pCi/L	N/A			N/A		
	Uncertainty	+/-4.48		+/-4.73							
QC1203935588	LCS										
Americium-241	1.10E+05			1.18E+05	pCi/L		108	(75%-125%)		12/12/17	13:47
	Uncertainty			+/-4010							
Cesium-137	41600			42200	pCi/L		101	(75%-125%)			
	Uncertainty			+/-867							
Cobalt-60	35700			38200	pCi/L		107	(75%-125%)			
	Uncertainty			+/-989							
QC1203935586	MB										
Cesium-137			U	-3.52	pCi/L					12/12/17	13:40
	Uncertainty			+/-3.29							
Cobalt-60			U	2.01	pCi/L						
	Uncertainty			+/-4.94							
<b>Rad Gas Flow</b>											
Batch	1726108										
QC1203938223	439672001	DUP									
Strontium-90	U	1.31	U	0.059	pCi/L	N/A			N/A LXB3	12/20/17	11:28
	Uncertainty	+/-0.935		+/-0.666							
QC1203938224	LCS										
Strontium-90	78.8			70.6	pCi/L		89.5	(75%-125%)		12/20/17	11:28
	Uncertainty			+/-3.99							
QC1203938222	MB										
Strontium-90			U	-2.71	pCi/L					12/20/17	11:28
	Uncertainty			+/-0.669							

# GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

## QC Summary

Workorder: 439672

Page 2 of 3

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Rad Liquid Scintillation</b>											
Batch 1725411											
QC1203936552	439672001	DUP									
Nickel-63			U	0.184	U	-10.4	pCi/L	N/A	N/A	TXJ1	12/23/17 12:09
			Uncertainty	+/-18.3		+/-19.1					
QC1203936553	LCS										
Nickel-63				891		826	pCi/L	92.7	(75%-125%)		12/23/17 12:25
				Uncertainty		+/-44.5					
QC1203936551	MB										
Nickel-63			U			-3.17	pCi/L				12/23/17 11:53
			Uncertainty			+/-17.3					
Batch 1725414											
QC1203936558	439672001	DUP									
Tritium			U	244	U	32.2	pCi/L	N/A	N/A	MXH8	12/14/17 18:52
			Uncertainty	+/-355		+/-333					
QC1203936560	LCS										
Tritium				2180		1780	pCi/L	81.8	(75%-125%)		12/14/17 19:35
				Uncertainty		+/-431					
QC1203936557	MB										
Tritium			U			-57.7	pCi/L				12/14/17 18:31
			Uncertainty			+/-322					
QC1203936559	439672001	MS									
Tritium			U	4360	U	244	pCi/L	87.4	(75%-125%)		12/14/17 19:13
			Uncertainty	+/-355		+/-901					

**Notes:**

Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

The Qualifiers in this report are defined as follows:

- \*\* Analyte is a Tracer compound
- < Result is less than value reported
- > Result is greater than value reported
- BD Results are either below the MDC or tracer recovery is low
- FA Failed analysis.
- H Analytical holding time was exceeded
- J Value is estimated
- K Analyte present. Reported value may be biased high. Actual value is expected to be lower.
- L Analyte present. Reported value may be biased low. Actual value is expected to be higher.
- M M if above MDC and less than LLD



# GEL LABORATORIES LLC

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## QC Summary

Workorder: 439672

Page 3 of 3

Parname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
M	REMP Result > MDC/CL and < RDL										
N/A	RPD or %Recovery limits do not apply.										
N1	See case narrative										
ND	Analyte concentration is not detected above the detection limit										
NJ	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier										
Q	One or more quality control criteria have not been met. Refer to the applicable narrative or DER.										
R	Sample results are rejected										
U	Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.										
UI	Gamma Spectroscopy--Uncertain identification										
UJ	Gamma Spectroscopy--Uncertain identification										
UL	Not considered detected. The associated number is the reported concentration, which may be inaccurate due to a low bias.										
X	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier										
Y	Other specific qualifiers were required to properly define the results. Consult case narrative.										
^	RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.										
h	Preparation or preservation holding time was exceeded										

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.

^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.

\* Indicates that a Quality Control parameter was not within specifications.

For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

**Radiochemistry  
Technical Case Narrative  
LaCrosseSolutions, LLC (ENRG)  
SDG #: 439672**

**Product:** Gammascpec, Gamma, Liquid, Cs-137, Co-60

**Analytical Method:** EPA 901.1

**Analytical Procedure:** GL-RAD-A-013 REV# 27

**Analytical Batch:** 1725109

The following samples were analyzed using the above methods and analytical procedure(s).

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
439672001	MW-200A-120617
439672002	MW-200B-120617
439672003	MW-201A-120617
439672004	MW-202A-120717
439672005	MW-202B-120717
439672006	MW-203A-120717
439672007	MW-203B-120717
439672008	MW-204A-120617
439672009	MW-204B-120617
439672010	B11AR-D-120517
439672011	B11AR-120517
439672012	B11R-120517
439672013	Well-5-120717
1203935586	Method Blank (MB)
1203935587	439672001(MW-200A-120617) Sample Duplicate (DUP)
1203935588	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

**Data Summary:**

There are no exceptions, anomalies or deviations from the specified methods. All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable.

**Product:** GFPC, Sr90, liquid

**Analytical Method:** EPA 905.0 Modified/DOE RP501 Rev. 1 Modified

**Analytical Procedure:** GL-RAD-A-004 REV# 19

**Analytical Batch:** 1726108

The following samples were analyzed using the above methods and analytical procedure(s).

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
439672001	MW-200A-120617
439672002	MW-200B-120617
439672003	MW-201A-120617

439672004	MW-202A-120717
439672005	MW-202B-120717
439672006	MW-203A-120717
439672007	MW-203B-120717
439672008	MW-204A-120617
439672009	MW-204B-120617
439672010	B11AR-D-120517
439672011	B11AR-120517
439672012	B11R-120517
439672013	Well-5-120717
1203938222	Method Blank (MB)
1203938223	439672001(MW-200A-120617) Sample Duplicate (DUP)
1203938224	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

**Data Summary:**

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

**Technical Information**

**Negative > 3 sigma TPU**

Sample results were more negative than the three sigma TPU. The background control charts were examined and the detectors were determined to be fully functional.

Sample	Analyte	Value
1203938222 (MB)	Strontium-90	Negative Result > 3 sigma value
439672011 (B11AR-120517)	Strontium-90	Negative Result > 3 sigma value

**Recounts**

Samples 439672004 (MW-202A-120717), 439672011 (B11AR-120517) and 439672012 (B11R-120517) were recounted due to results more negative than the three sigma TPU. The second counts are reported.

**Product: Liquid Scint Ni63, Liquid**

**Analytical Method:** DOE RESL Ni-1, Modified

**Analytical Procedure:** GL-RAD-A-022 REV# 18

**Analytical Batch:** 1725411

The following samples were analyzed using the above methods and analytical procedure(s).

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
439672001	MW-200A-120617
439672002	MW-200B-120617
439672003	MW-201A-120617
439672004	MW-202A-120717
439672005	MW-202B-120717
439672006	MW-203A-120717

439672007	MW-203B-120717
439672008	MW-204A-120617
439672009	MW-204B-120617
439672010	B11AR-D-120517
439672011	B11AR-120517
439672012	B11R-120517
439672013	Well-5-120717
1203936551	Method Blank (MB)
1203936552	439672001(MW-200A-120617) Sample Duplicate (DUP)
1203936553	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

**Data Summary:**

There are no exceptions, anomalies or deviations from the specified methods. All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable.

**Product: LSC, Tritium Dist, Liquid**

**Analytical Method:** EPA 906.0 Modified

**Analytical Procedure:** GL-RAD-A-002 REV# 22

**Analytical Batch:** 1725414

The following samples were analyzed using the above methods and analytical procedure(s).

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
439672001	MW-200A-120617
439672002	MW-200B-120617
439672003	MW-201A-120617
439672004	MW-202A-120717
439672005	MW-202B-120717
439672006	MW-203A-120717
439672007	MW-203B-120717
439672008	MW-204A-120617
439672009	MW-204B-120617
439672010	B11AR-D-120517
439672011	B11AR-120517
439672012	B11R-120517
439672013	Well-5-120717
1203936557	Method Blank (MB)
1203936558	439672001(MW-200A-120617) Sample Duplicate (DUP)
1203936559	439672001(MW-200A-120617) Matrix Spike (MS)
1203936560	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

**Data Summary:**

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

### **Miscellaneous Information**

#### **Additional Comments**

The matrix spike, 1203936559 (MW-200A-120617MS), aliquot was reduced to conserve sample volume.

### **Certification Statement**

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.







**SAMPLE RECEIPT & REVIEW FORM**

Client: <u>ENRB</u>		SDG/AR/COC/Work Order: <u>439672</u>	
Received By: <u>P. [Signature]</u>		Date Received: <u>12-8-17</u>	
Carrier and Tracking Number		Circle Applicable: <u>FedEx Express</u> FedEx Ground   UPS   Field Services   Courier   Other <u>8016 0937 1317</u> <u>8016 0937 1306</u> <u>8016 0937 1328</u>	
Suspected Hazard Information	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.	
Shipped as a DOT Hazardous?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Hazard Class Shipped: _____ UN#: _____	
COC/Samples marked or classified as radioactive?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): <u>0</u> CPM / mR/Hr Classified as: Rad 1   Rad 2   Rad 3	
Is package, COC, and/or Samples marked HAZ?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	If yes, select Hazards below, and contact the GEL Safety Group. PCB's   Flammable   Foreign Soil   RCRA   Asbestos   Beryllium   Other: _____	

Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1 Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>			Circle Applicable: Seals broken   Damaged container   Leaking container   Other (describe)
2 Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>			
3 Samples requiring cold preservation within (0 ≤ 6 deg. C)?*			<input checked="" type="checkbox"/>	Preservation Method: Wet Ice   Ice Packs   Dry ice <u>None</u> Other: *all temperatures are recorded in Celsius <b>TEMP: 19°C</b>
4 Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>			Temperature Device Serial #: <u>1R4-17</u> Secondary Temperature Device Serial # (If Applicable): _____
5 Sample containers intact and sealed?	<input checked="" type="checkbox"/>			Circle Applicable: Seals broken   Damaged container   Leaking container   Other (describe)
6 Samples requiring chemical preservation at proper pH?	<input checked="" type="checkbox"/>			Sample ID's and Containers Affected: If Preservation added, Lot#: _____
7 Do any samples require Volatile Analysis?			<input checked="" type="checkbox"/>	If Yes, Are Encores or Soil Kits present? Yes ___ No ___ (If yes, take to VOA Freezer) Do VOA vials contain acid preservation? Yes ___ No ___ N/A (If unknown, select No) VOA vials free of headspace? Yes ___ No ___ N/A Sample ID's and containers affected: _____
8 Samples received within holding time?	<input checked="" type="checkbox"/>			ID's and tests affected: _____
9 Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>			Sample ID's and containers affected: _____
10 Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>			Sample ID's affected: _____
11 Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>			Sample ID's affected: <u>SEE below</u> <u>ex 12/18/17</u>
12 Are sample containers identifiable as GEL provided?	<input checked="" type="checkbox"/>			
13 COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>			

Comments (Use Continuation Form if needed):  
~~Lab did not receive #3 containers for the following~~  
~~MW-201A-120617   ex 12/11/17~~  
~~MW-202A-120617~~  
~~MW-204A-120617~~  
~~MW-204B-120617~~

PM (or PMA) review: Initials [Signature] Date 12/11/17 Page 1 of 1

**List of current GEL Certifications as of 28 December 2017**

<b>State</b>	<b>Certification</b>
Alaska	UST-0110
Arkansas	88-0651
CLIA	42D0904046
California	2940
Colorado	SC00012
Connecticut	PH-0169
Delaware	SC00012
DoD ELAP/ ISO17025 A2LA	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330-15-00283, P330-15-00253
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC00012
Idaho Chemistry	SC00012
Idaho Radiochemistry	SC00012
Illinois NELAP	200029
Indiana	C-SC-01
Kansas NELAP	E-10332
Kentucky SDWA	90129
Kentucky Wastewater	90129
Louisiana NELAP	03046 (AI33904)
Louisiana SDWA	LA180011
Maryland	270
Massachusetts	M-SC012
Michigan	9976
Mississippi	SC00012
Nebraska	NE-OS-26-13
Nevada	SC000122018-1
New Hampshire NELAP	205415
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
North Dakota	R-158
Oklahoma	9904
Pennsylvania NELAP	68-00485
Puerto Rico	SC00012
S.Carolina Radchem	10120002
South Carolina Chemistry	10120001
Tennessee	TN 02934
Texas NELAP	T104704235-17-12
Utah NELAP	SC000122017-25
Vermont	VT87156
Virginia NELAP	460202
Washington	C780
West Virginia	997404





# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Report Date: February 19, 2018

Company : LaCrosseSolutions  
 Address : S4601 State Hwy 35  
  
 Genoa, Wisconsin 54632  
 Contact: Mr. Jason Q. Spaide  
 Project: LACBWR Site Restoration Project

Client Sample ID: MW-201A-020118	Project: ENRG07001
Sample ID: 442980001	Client ID: ENRG070
Matrix: Ground Water	
Collect Date: 01-FEB-18 14:00	
Receive Date: 02-FEB-18	
Collector: Client	

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Rad Gamma Spec Analysis</b>													
Gammascpec, Gamma, Liquid, Cs-137, Co-60 "As Received"													
Cesium-137	U	-2.17	+/-2.85	4.83	10.0	pCi/L		BSW1	02/05/18	1524	1736722		1
Cobalt-60	U	1.23	+/-2.64	5.60		pCi/L							
<b>Rad Gas Flow Proportional Counting</b>													
GFPC, Sr90, liquid "As Received"													
Strontium-90	U	-0.0488	+/-0.516	1.03	2.00	pCi/L		LXB3	02/17/18	1157	1736908		2
<b>Rad Liquid Scintillation Analysis</b>													
LSC, Tritium Dist, Liquid "As Received"													
Tritium	U	264	+/-255	422	700	pCi/L		MXH8	02/13/18	1612	1737624		3

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 901.1	
2	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified	
3	EPA 906.0 Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Strontium Carrier	GFPC, Sr90, liquid "As Received"			90.7	(25%-125%)

**Notes:**

Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit



**GEL LABORATORIES LLC**  
 2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

**Certificate of Analysis**

Report Date: February 19, 2018

Company : LaCrosseSolutions  
 Address : S4601 State Hwy 35  
 Genoa, Wisconsin 54632  
 Contact: Mr. Jason Q. Spaide  
 Project: LACBWR Site Restoration Project

Client Sample ID: MW-202A-020118	Project: ENRG07001
Sample ID: 442980002	Client ID: ENRG070
Matrix: Ground Water	
Collect Date: 01-FEB-18 16:00	
Receive Date: 02-FEB-18	
Collector: Client	

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Rad Gamma Spec Analysis</b>													
Gammascpec, Gamma, Liquid, Cs-137, Co-60 "As Received"													
Cesium-137	U	0.167	+/-2.62	4.91	10.0	pCi/L		BSWI	02/05/18	1524	1736722		1
Cobalt-60	U	0.345	+/-2.79	5.63		pCi/L							
<b>Rad Gas Flow Proportional Counting</b>													
GFPC, Sr90, liquid "As Received"													
Strontium-90	U	0.590	+/-0.758	1.29	2.00	pCi/L		LXB3	02/17/18	1157	1736908		2
<b>Rad Liquid Scintillation Analysis</b>													
LSC, Tritium Dist, Liquid "As Received"													
Tritium		13200	+/-785	419	700	pCi/L		MXH8	02/13/18	1633	1737624		3

The following Analytical Methods were performed:

Method	Description	Analyst Comments
	EPA 901.1	
	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified	
	EPA 906.0 Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Strontium Carrier	GFPC, Sr90, liquid "As Received"			76.7	(25%-125%)

**Notes:**

Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Report Date: February 19, 2018

Company : LaCrosseSolutions  
 Address : S4601 State Hwy 35  
  
 Genoa, Wisconsin 54632  
 Contact: Mr. Jason Q. Spaide  
 Project: LACBWR Site Restoration Project

Client Sample ID: MW-203A-020118	Project: ENRG07001
Sample ID: 442980003	Client ID: ENRG070
Matrix: Ground Water	
Collect Date: 01-FEB-18 11:10	
Receive Date: 02-FEB-18	
Collector: Client	

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Rad Gamma Spec Analysis</b>													
Gammascpec, Gamma, Liquid, Cs-137, Co-60 "As Received"													
Cesium-137	U	-0.94	+/-3.22	5.70	10.0	pCi/L		BSW1	02/05/18	1524	1736722		1
Cobalt-60	U	0.947	+/-2.58	5.60		pCi/L							
<b>Rad Gas Flow Proportional Counting</b>													
GFPC, Sr90, liquid "As Received"													
Strontium-90	U	-0.269	+/-0.454	0.983	2.00	pCi/L		LXB3	02/17/18	1157	1736908		2
<b>Rad Liquid Scintillation Analysis</b>													
LSC, Tritium Dist, Liquid "As Received"													
Tritium		24200	+/-1040	416	700	pCi/L		MXH8	02/13/18	1654	1737624		3

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 901.1	
2	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified	
3	EPA 906.0 Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Strontium Carrier	GFPC, Sr90, liquid "As Received"			100	(25%-125%)

**Notes:**

Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

## GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

### QC Summary

Report Date: February 19, 2018

Page 1 of

LaCrosseSolutions  
S4601 State Hwy 35  
Genoa, Wisconsin

Contact: Mr. Jason Q. Spaide

Workorder: 442980

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Rad Gamma Spec</b>											
Batch 1736722											
QC1203965077 442980001 DUP											
Cesium-137	U	-2.17	U	-1.59	pCi/L	N/A		N/A BSW1		02/06/18	05:3
	Uncertainty	+/-2.85		+/-3.70							
Cobalt-60	U	1.23	U	1.37	pCi/L	N/A		N/A			
	Uncertainty	+/-2.64		+/-4.22							
QC1203965078 LCS											
Americium-241	1.10E+05			1.13E+05	pCi/L		103	(75%-125%)		02/05/18	15:3
	Uncertainty			+/-1570							
Cesium-137	41400			43400	pCi/L		105	(75%-125%)			
	Uncertainty			+/-711							
Cobalt-60	35000			36600	pCi/L		105	(75%-125%)			
	Uncertainty			+/-770							
QC1203965076 MB											
Cesium-137			U	0.507	pCi/L					02/05/18	15:2
	Uncertainty			+/-2.94							
Cobalt-60			U	1.01	pCi/L						
	Uncertainty			+/-2.96							
<b>Rad Gas Flow</b>											
Batch 1736908											
QC1203965621 442980003 DUP											
Strontium-90	U	-0.269	U	-0.116	pCi/L	N/A		N/A LXB3		02/17/18	11:5
	Uncertainty	+/-0.454		+/-0.486							
QC1203965622 LCS											
Strontium-90	78.5			74.0	pCi/L		94.3	(75%-125%)		02/17/18	11:5
	Uncertainty			+/-3.58							
QC1203965620 MB											
Strontium-90			U	-0.129	pCi/L					02/17/18	11:5
	Uncertainty			+/-0.435							

# GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

## QC Summary

Workorder: 442980

Page 2 of

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Rad Liquid Scintillation</b>											
Batch 1737624											
QC1203967431 442980001 DUP											
Tritium	U	264	U	-13.8	pCi/L	N/A			N/AMXH8	02/13/18	17:3
	Uncertainty	+/-255		+/-227							
QC1203967433 LCS											
Tritium	2580			2470	pCi/L		95.7	(75%-125%)		02/13/18	18:2
	Uncertainty			+/-401							
QC1203967430 MB											
Tritium			U	235	pCi/L					02/13/18	17:1
	Uncertainty			+/-248							
QC1203967432 442980001 MS											
Tritium	5170	U	264	5220	pCi/L		101	(75%-125%)		02/13/18	17:5
	Uncertainty		+/-255	+/-802							

**Notes:**

Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

The Qualifiers in this report are defined as follows:

- \*\* Analyte is a Tracer compound
- < Result is less than value reported
- > Result is greater than value reported
- BD Results are either below the MDC or tracer recovery is low
- FA Failed analysis.
- H Analytical holding time was exceeded
- J Value is estimated
- K Analyte present. Reported value may be biased high. Actual value is expected to be lower.
- L Analyte present. Reported value may be biased low. Actual value is expected to be higher.
- M M if above MDC and less than LLD
- M REMP Result > MDC/CL and < RDL
- N/A RPD or %Recovery limits do not apply.
- N1 See case narrative
- ND Analyte concentration is not detected above the detection limit
- NJ Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Q One or more quality control criteria have not been met. Refer to the applicable narrative or DER.
- R Sample results are rejected
- U Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.
- UI Gamma Spectroscopy--Uncertain identification
- UJ Gamma Spectroscopy--Uncertain identification

### GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

### QC Summary

Workorder: 442980

Page 3 of

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
----------	-----	--------	------	----	-------	------	------	-------	-------	------	------

- UL Not considered detected. The associated number is the reported concentration, which may be inaccurate due to a low bias.
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Y Other specific qualifiers were required to properly define the results. Consult case narrative.
- ^ RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.
- h Preparation or preservation holding time was exceeded

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.  
 ^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.  
 \* Indicates that a Quality Control parameter was not within specifications.  
 For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

**Radiochemistry  
Technical Case Narrative  
LaCrosseSolutions, LLC (ENRG)  
SDG #: 442980**

**Product:** Gammascpec, Gamma, Liquid, Cs-137, Co-60  
**Analytical Method:** EPA 901.1  
**Analytical Procedure:** GL-RAD-A-013 REV# 27  
**Analytical Batch:** 1736722

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
442980001	MW-201A-020118
442980002	MW-202A-020118
442980003	MW-203A-020118
1203965076	Method Blank (MB)
1203965077	442980001(MW-201A-020118) Sample Duplicate (DUP)
1203965078	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

**Data Summary:**

There are no exceptions, anomalies or deviations from the specified methods. All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable.

**Product:** GFPC, Sr90, liquid  
**Analytical Method:** EPA 905.0 Modified/DOE RP501 Rev. 1 Modified  
**Analytical Procedure:** GL-RAD-A-004 REV# 19  
**Analytical Batch:** 1736908

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
442980001	MW-201A-020118
442980002	MW-202A-020118
442980003	MW-203A-020118
1203965620	Method Blank (MB)
1203965621	442980003(MW-203A-020118) Sample Duplicate (DUP)
1203965622	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

**Data Summary:**

There are no exceptions, anomalies or deviations from the specified methods. All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable.



**Product:** LSC, Tritium Dist, Liquid

**Analytical Method:** EPA 906.0 Modified

**Analytical Procedure:** GL-RAD-A-002 REV# 22

**Analytical Batch:** 1737624

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
442980001	MW-201A-020118
442980002	MW-202A-020118
442980003	MW-203A-020118
1203967430	Method Blank (MB)
1203967431	442980001(MW-201A-020118) Sample Duplicate (DUP)
1203967432	442980001(MW-201A-020118) Matrix Spike (MS)
1203967433	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

#### **Data Summary:**

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

#### **Technical Information**

##### **Recounts**

Samples 442980002 (MW-202A-020118) and 442980003 (MW-203A-020118) were recounted to verify sample results. The recount results are similar to the original results. Original results are reported.

#### **Miscellaneous Information**

##### **Additional Comments**

The matrix spike, 1203967432 (MW-201A-020118MS), aliquot was reduced to conserve sample volume.

#### **Certification Statement**

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.





Laboratories LLC

em 2/2/18

## SAMPLE RECEIPT &amp; REVIEW FORM

Client: <u>HAAT ENRG</u>		SDG/AR/COC/Work Order:			
Received By: <u>ZKW</u>		Date Received: <u>2/2/18</u>			
Carrier and Tracking Number		Circle Applicable: <input checked="" type="radio"/> FedEx Express <input type="radio"/> FedEx Ground <input type="radio"/> UPS <input type="radio"/> Field Services <input type="radio"/> Courier <input type="radio"/> Other <u>7895 7221 2841</u>			
		*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.			
Suspected Hazard Information	Yes	No			
Shipped as a DOT Hazardous?		<input checked="" type="checkbox"/>	Hazard Class Shipped: _____ UN#: _____		
COC/Samples marked or classified as radioactive?		<input checked="" type="checkbox"/>	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): <u>0</u> (CPM) mR/Hr Classified as: Rad 1 Rad 2 Rad 3		
Is package, COC, and/or Samples marked HAZ?		<input checked="" type="checkbox"/>	If yes, select Hazards below, and contact the GEL Safety Group. PCB's Flammable Foreign Soil RCRA Asbestos Beryllium Other:		
Sample Receipt Criteria		Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1	Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2	Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>			
3	Samples requiring cold preservation within (0 ≤ deg. C)?*		<input checked="" type="checkbox"/>		Preservation Method: Wet ice Ice Packs Dry ice <input checked="" type="radio"/> None Other: _____ *all temperatures are recorded in Celsius <u>TEMP: 18°C</u>
4	Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>			Temperature Device Serial #: <u>IR3-16</u> Secondary Temperature Device Serial # (If Applicable): _____
5	Sample containers intact and sealed?	<input checked="" type="checkbox"/>			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
6	Samples requiring chemical preservation at proper pH?	<input checked="" type="checkbox"/>			Sample ID's and Containers Affected: If Preservation added, Lot#:
7	Do any samples require Volatile Analysis?			<input checked="" type="checkbox"/>	If Yes, Are Encores or Soil Kits present? Yes ___ No ___ (If yes, take to VOA Freezer) Do VOA vials contain acid preservation? Yes ___ No ___ N/A ___ (If unknown, select No) VOA vials free of headspace? Yes ___ No ___ N/A ___ Sample ID's and containers affected:
8	Samples received within holding time?	<input checked="" type="checkbox"/>			ID's and tests affected:
9	Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>			Sample ID's and containers affected:
10	Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>			Sample ID's affected:
11	Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>			Sample ID's affected:
12	Are sample containers identifiable as GEL provided?	<input checked="" type="checkbox"/>			
13	COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>			
Comments (Use Continuation Form if needed):					

PM (or PMA) review: Initials emDate 2/2/18Page 1 of 1

GL-CHL-SR-001 Rev 5



**List of current GEL Certifications as of 19 February 2018**

<b>State</b>	<b>Certification</b>
Alaska	UST-0110
Arkansas	88-0651
CLIA	42D0904046
California	2940
Colorado	SC00012
Connecticut	PH-0169
Delaware	SC00012
DoD ELAP/ ISO17025 A2LA	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330-15-00283, P330-15-00253
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC00012
Idaho Chemistry	SC00012
Idaho Radiochemistry	SC00012
Illinois NELAP	200029
Indiana	C-SC-01
Kansas NELAP	E-10332
Kentucky SDWA	90129
Kentucky Wastewater	90129
Louisiana NELAP	03046 (A133904)
Louisiana SDWA	LA180011
Maryland	270
Massachusetts	M-SC012
Michigan	9976
Mississippi	SC00012
Nebraska	NE-OS-26-13
Nevada	SC000122018-1
New Hampshire NELAP	205415
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
North Dakota	R-158
Oklahoma	9904
Pennsylvania NELAP	68-00485
Puerto Rico	SC00012
S.Carolina Radchem	10120002
South Carolina Chemistry	10120001
Tennessee	TN 02934
Texas NELAP	T104704235-18-13
Utah NELAP	SC000122017-25
Vermont	VT87156
Virginia NELAP	460202
Washington	C780
West Virginia	997404



May 03, 2018

Mr. Jason Q. Spaide  
LaCrosseSolutions  
S4601 State Hwy 35  
Genoa, Wisconsin 54632

Re: LACBWR Site Restoration Project  
Work Order: 447454

Dear Mr. Spaide:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on April 06, 2018. This revised data report has been prepared and reviewed in accordance with GEL's standard operating procedures. The data package has been revised to correct the sample ID for sample 447454003 to the correct well name.

Our policy is to provide high quality, personalized analytical services to enable you to meet your analytical needs on time every time. We trust that you will find everything in order and to your satisfaction. If you have any questions, please do not hesitate to call me at (843) 556-8171, ext. 4453.

Sincerely,

Edith Kent  
Project Manager

Purchase Order: 672583  
Chain of Custody: 2018-04  
Enclosures



## GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 – (843) 556-8171 – www.gel.com

### Certificate of Analysis Report for

ENRG070 LaCrosseSolutions, LLC (672583)

Client SDG: 447454 GEL Work Order: 447454

**The Qualifiers in this report are defined as follows:**

- \* A quality control analyte recovery is outside of specified acceptance criteria
- \*\* Analyte is a Tracer compound
- \*\* Analyte is a surrogate compound
- U Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the Certificate of Analysis.

The designation ND, if present, appears in the result column when the analyte concentration is not detected above the limit as defined in the 'U' qualifier above.

This data report has been prepared and reviewed in accordance with GEL Laboratories LLC standard operating procedures. Please direct any questions to your Project Manager, Edith Kent.



Reviewed by \_\_\_\_\_



# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Report Date: May 3, 2018

Company : LaCrosseSolutions  
 Address : S4601 State Hwy 35  
  
 Genoa, Wisconsin 54632  
 Contact: Mr. Jason Q. Spaide  
 Project: LACBWR Site Restoration Project

Client Sample ID: MW-202B-040318	Project: ENRG07001
Sample ID: 447454001	Client ID: ENRG070
Matrix: Ground Water	
Collect Date: 03-APR-18 13:55	
Receive Date: 06-APR-18	
Collector: Client	

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Rad Gamma Spec Analysis</b>													
Gammaspec, Gamma, Cs-137, Co-60, Eu-152, Eu-154 "As Received"													
Cesium-137	U	0.913	+/-3.39	6.55	10.0	pCi/L			BSW1	04/09/18	0908	1753942	1
Cobalt-60	U	2.07	+/-3.18	6.69		pCi/L							
Europium-152	U	-10.3	+/-10.0	16.5		pCi/L							
Europium-154	U	1.48	+/-10.1	19.4		pCi/L							
<b>Rad Gas Flow Proportional Counting</b>													
GFPC, Sr90, liquid "As Received"													
Strontium-90	U	-0.418	+/-0.541	1.19	2.00	pCi/L			LXB3	04/20/18	1354	1754057	2
<b>Rad Liquid Scintillation Analysis</b>													
LSC, Tritium Dist, Liquid "As Received"													
Tritium	U	113	+/-239	415	700	pCi/L			MXH8	04/13/18	1536	1755011	3
Liquid Scint Ni63, Liquid "As Received"													
Nickel-63	U	-6.87	+/-18.4	32.2	50.0	pCi/L			TXJ1	04/26/18	0758	1755082	4

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 901.1	
2	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified	
3	EPA 906.0 Modified	
4	DOE RESL Ni-1, Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Strontium Carrier	GFPC, Sr90, liquid "As Received"			109	(25%-125%)
Nickel Carrier	Liquid Scint Ni63, Liquid "As Received"			87.1	(25%-125%)

**Notes:**  
 Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

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## Certificate of Analysis

Report Date: May 3, 2018

Company : LaCrosseSolutions  
Address : S4601 State Hwy 35  
  
Genoa, Wisconsin 54632  
Contact: Mr. Jason Q. Spaide  
Project: LACBWR Site Restoration Project

Client Sample ID: MW-203A-040418      Project: ENRG07001  
Sample ID: 447454002      Client ID: ENRG070  
Matrix: Ground Water  
Collect Date: 04-APR-18 09:59  
Receive Date: 06-APR-18  
Collector: Client

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Rad Gamma Spec Analysis</b>													
Gammaspec, Gamma, Cs-137, Co-60, Eu-152, Eu-154 "As Received"													
Cesium-137	U	0.951	+/-3.47	5.74	10.0	pCi/L			BSW1	04/09/18	0908	1753942	1
Cobalt-60	U	0.866	+/-4.82	5.89		pCi/L							
Europium-152	U	-2.01	+/-7.97	14.1		pCi/L							
Europium-154	U	-2.24	+/-7.87	14.6		pCi/L							
<b>Rad Gas Flow Proportional Counting</b>													
GFPC, Sr90, liquid "As Received"													
Strontium-90	U	-0.30	+/-0.935	1.95	2.00	pCi/L			LXB3	04/20/18	1354	1754057	2
<b>Rad Liquid Scintillation Analysis</b>													
LSC, Tritium Dist, Liquid "As Received"													
Tritium		12100	+/-722	409	700	pCi/L			MXH8	04/13/18	1557	1755011	3
Liquid Scint Ni63, Liquid "As Received"													
Nickel-63	U	15.2	+/-20.4	34.4	50.0	pCi/L			TXJ1	04/26/18	0016	1755082	4

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 901.1	
2	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified	
3	EPA 906.0 Modified	
4	DOE RESL Ni-1, Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Strontium Carrier	GFPC, Sr90, liquid "As Received"			62.8	(25%-125%)
Nickel Carrier	Liquid Scint Ni63, Liquid "As Received"			76.2	(25%-125%)

### Notes:

Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor      Lc/LC: Critical Level  
DL: Detection Limit      PF: Prep Factor  
MDA: Minimum Detectable Activity      RL: Reporting Limit  
MDC: Minimum Detectable Concentration      SQL: Sample Quantitation Limit

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## Certificate of Analysis

Report Date: May 3, 2018

Company : LaCrosseSolutions  
 Address : S4601 State Hwy 35  
  
 Genoa, Wisconsin 54632  
 Contact: Mr. Jason Q. Spaide  
 Project: LACBWR Site Restoration Project

Client Sample ID: MW-203B-040418	Project: ENRG07001
Sample ID: 447454003	Client ID: ENRG070
Matrix: Ground Water	
Collect Date: 04-APR-18 11:22	
Receive Date: 06-APR-18	
Collector: Client	

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Rad Gamma Spec Analysis</b>													
Gammaspec, Gamma, Cs-137, Co-60, Eu-152, Eu-154 "As Received"													
Cesium-137	U	0.447	+/-2.66	4.98	10.0	pCi/L			BSW1	04/09/18	0908	1753942	1
Cobalt-60	U	2.36	+/-2.85	6.23		pCi/L							
Europium-152	U	0.294	+/-7.31	13.6		pCi/L							
Europium-154	U	7.39	+/-6.82	16.0		pCi/L							
<b>Rad Gas Flow Proportional Counting</b>													
GFPC, Sr90, liquid "As Received"													
Strontium-90	U	-0.00534	+/-0.995	1.87	2.00	pCi/L			LXB3	04/20/18	1354	1754057	2
<b>Rad Liquid Scintillation Analysis</b>													
LSC, Tritium Dist, Liquid "As Received"													
Tritium	U	226	+/-246	413	700	pCi/L			MXH8	04/13/18	1618	1755011	3
Liquid Scint Ni63, Liquid "As Received"													
Nickel-63	U	6.25	+/-18.0	30.7	50.0	pCi/L			TXJ1	04/26/18	0048	1755082	4

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 901.1	
2	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified	
3	EPA 906.0 Modified	
4	DOE RESL Ni-1, Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Strontium Carrier	GFPC, Sr90, liquid "As Received"			93	(25%-125%)
Nickel Carrier	Liquid Scint Ni63, Liquid "As Received"			85.2	(25%-125%)

**Notes:**  
 Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

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## Certificate of Analysis

Report Date: May 3, 2018

Company : LaCrosseSolutions  
 Address : S4601 State Hwy 35  
  
 Genoa, Wisconsin 54632  
 Contact: Mr. Jason Q. Spaide  
 Project: LACBWR Site Restoration Project

Client Sample ID: MW-202AR-040418	Project: ENRG07001
Sample ID: 447454004	Client ID: ENRG070
Matrix: Ground Water	
Collect Date: 04-APR-18 14:24	
Receive Date: 06-APR-18	
Collector: Client	

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Rad Gamma Spec Analysis</b>													
Gammaspec, Gamma, Cs-137, Co-60, Eu-152, Eu-154 "As Received"													
Cesium-137	U	0.0594	+/-2.66	4.95	10.0	pCi/L			BSW1	04/09/18	0909	1753942	1
Cobalt-60	U	0.123	+/-2.74	5.49		pCi/L							
Europium-152	U	1.21	+/-6.90	13.1		pCi/L							
Europium-154	U	0.446	+/-7.50	15.1		pCi/L							
<b>Rad Gas Flow Proportional Counting</b>													
GFPC, Sr90, liquid "As Received"													
Strontium-90	U	0.304	+/-0.928	1.73	2.00	pCi/L			LXB3	04/20/18	1354	1754057	2
<b>Rad Liquid Scintillation Analysis</b>													
LSC, Tritium Dist, Liquid "As Received"													
Tritium		702	+/-283	415	700	pCi/L			MXH8	04/13/18	1639	1755011	3
Liquid Scint Ni63, Liquid "As Received"													
Nickel-63	U	11.7	+/-20.2	34.2	50.0	pCi/L			TXJ1	04/26/18	0120	1755082	4

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 901.1	
2	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified	
3	EPA 906.0 Modified	
4	DOE RESL Ni-1, Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Strontium Carrier	GFPC, Sr90, liquid "As Received"			67.4	(25%-125%)
Nickel Carrier	Liquid Scint Ni63, Liquid "As Received"			76.6	(25%-125%)

**Notes:**  
 Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

# GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

## QC Summary

Report Date: May 3, 2018

Page 1 of 3

**LaCrosseSolutions**  
**S4601 State Hwy 35**  
**Genoa, Wisconsin**  
**Contact: Mr. Jason Q. Spaide**

**Workorder: 447454**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Rad Gamma Spec</b>											
Batch	1753942										
QC1204004697	447454001 DUP										
Cesium-137	U	0.913	U	1.62	pCi/L	N/A		N/A	BSW1	04/09/18	14:28
	Uncertainty	+/-3.39		+/-2.88							
Cobalt-60	U	2.07	U	-0.579	pCi/L	N/A		N/A			
	Uncertainty	+/-3.18		+/-5.23							
Europium-152	U	-10.3	U	0.0642	pCi/L	N/A		N/A			
	Uncertainty	+/-10.0		+/-7.21							
Europium-154	U	1.48	U	-3.17	pCi/L	N/A		N/A			
	Uncertainty	+/-10.1		+/-8.49							
QC1204004698	LCS										
Americium-241	1.10E+05			1.18E+05	pCi/L		107	(75%-125%)		04/09/18	15:11
	Uncertainty			+/-3130							
Cesium-137	41300			42200	pCi/L		102	(75%-125%)			
	Uncertainty			+/-822							
Cobalt-60	34200			35900	pCi/L		105	(75%-125%)			
	Uncertainty			+/-937							
Europium-152			U	-419	pCi/L						
	Uncertainty			+/-357							
Europium-154			U	3.64	pCi/L						
	Uncertainty			+/-228							
QC1204004696	MB										
Cesium-137			U	0.229	pCi/L					04/09/18	09:09
	Uncertainty			+/-3.00							
Cobalt-60			U	-0.261	pCi/L						
	Uncertainty			+/-3.05							
Europium-152			U	2.74	pCi/L						
	Uncertainty			+/-7.66							
Europium-154			U	1.29	pCi/L						
	Uncertainty			+/-8.98							

# GEL LABORATORIES LLC

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## QC Summary

Workorder: 447454

Page 2 of 3

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Rad Gas Flow</b>											
Batch 1754057											
QC1204005047	447454004	DUP									
Strontium-90			U	0.304	U	-0.328	pCi/L	N/A	N/A	LXB3	04/20/18 13:54
			Uncertainty	+/-0.928		+/-0.976					
QC1204005048	LCS										
Strontium-90				78.2		68.5	pCi/L	87.7	(75%-125%)		04/20/18 13:54
				Uncertainty		+/-4.72					
QC1204005046	MB										
Strontium-90			U		-1.22	pCi/L					04/20/18 13:54
			Uncertainty		+/-0.616						
<b>Rad Liquid Scintillation</b>											
Batch 1755011											
QC1204007187	447454001	DUP									
Tritium			U	113	U	192	pCi/L	N/A	N/A	MXH8	04/13/18 19:06
			Uncertainty	+/-239		+/-238					
QC1204007189	LCS										
Tritium				2560		2750	pCi/L	108	(75%-125%)		04/13/18 19:49
				Uncertainty		+/-399					
QC1204007186	MB										
Tritium			U		102	pCi/L					04/13/18 18:45
			Uncertainty		+/-234						
QC1204007188	447454001	MS									
Tritium			U	5120	U	113	pCi/L	117	(75%-125%)		04/13/18 19:27
			Uncertainty	+/-239		+/-820					
Batch 1755082											
QC1204007368	447454001	DUP									
Nickel-63			U	-6.87	U	-8.06	pCi/L	N/A	N/A	TXJ1	04/26/18 08:30
			Uncertainty	+/-18.4		+/-18.4					
QC1204007369	LCS										
Nickel-63				1330		1440	pCi/L	108	(75%-125%)		04/26/18 02:55
				Uncertainty		+/-46.6					
QC1204007367	MB										
Nickel-63			U		10.2	pCi/L					04/26/18 01:51
			Uncertainty		+/-18.4						

**Notes:**

Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).  
 The Qualifiers in this report are defined as follows:



# GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

## QC Summary

Workorder: 447454

Page 3 of 3

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
**	Analyte is a Tracer compound										
<	Result is less than value reported										
>	Result is greater than value reported										
BD	Results are either below the MDC or tracer recovery is low										
FA	Failed analysis.										
H	Analytical holding time was exceeded										
J	Value is estimated										
K	Analyte present. Reported value may be biased high. Actual value is expected to be lower.										
L	Analyte present. Reported value may be biased low. Actual value is expected to be higher.										
M	M if above MDC and less than LLD										
M	REMP Result > MDC/CL and < RDL										
N/A	RPD or %Recovery limits do not apply.										
N1	See case narrative										
ND	Analyte concentration is not detected above the detection limit										
NJ	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier										
Q	One or more quality control criteria have not been met. Refer to the applicable narrative or DER.										
R	Sample results are rejected										
U	Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.										
UI	Gamma Spectroscopy--Uncertain identification										
UJ	Gamma Spectroscopy--Uncertain identification										
UL	Not considered detected. The associated number is the reported concentration, which may be inaccurate due to a low bias.										
X	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier										
Y	Other specific qualifiers were required to properly define the results. Consult case narrative.										
^	RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.										
h	Preparation or preservation holding time was exceeded										

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.

^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.

\* Indicates that a Quality Control parameter was not within specifications.

For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

**Radiochemistry  
Technical Case Narrative  
LaCrosseSolutions, LLC (ENRG)  
SDG #: 447454**

**Product:** Gammaspec, Gamma, Cs-137, Co-60, Eu-152, Eu-154

**Analytical Method:** EPA 901.1

**Analytical Procedure:** GL-RAD-A-013 REV# 27

**Analytical Batch:** 1753942

The following samples were analyzed using the above methods and analytical procedure(s).

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
447454001	MW-202B-040318
447454002	MW-203A-040418
447454003	MW-203B-040418
447454004	MW-202AR-040418
1204004696	Method Blank (MB)
1204004697	447454001(MW-202B-040318) Sample Duplicate (DUP)
1204004698	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

**Data Summary:**

There are no exceptions, anomalies or deviations from the specified methods. All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable.

**Product:** GFPC, Sr90, liquid

**Analytical Method:** EPA 905.0 Modified/DOE RP501 Rev. 1 Modified

**Analytical Procedure:** GL-RAD-A-004 REV# 19

**Analytical Batch:** 1754057

The following samples were analyzed using the above methods and analytical procedure(s).

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
447454001	MW-202B-040318
447454002	MW-203A-040418
447454003	MW-203B-040418
447454004	MW-202AR-040418
1204005046	Method Blank (MB)
1204005047	447454004(MW-202AR-040418) Sample Duplicate (DUP)
1204005048	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

**Data Summary:**

There are no exceptions, anomalies or deviations from the specified methods. All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable.

**Product:** LSC, Tritium Dist, Liquid

**Analytical Method:** EPA 906.0 Modified

**Analytical Procedure:** GL-RAD-A-002 REV# 22

**Analytical Batch:** 1755011

The following samples were analyzed using the above methods and analytical procedure(s).

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
447454001	MW-202B-040318
447454002	MW-203A-040418
447454003	MW-203B-040418
447454004	MW-202AR-040418
1204007186	Method Blank (MB)
1204007187	447454001(MW-202B-040318) Sample Duplicate (DUP)
1204007188	447454001(MW-202B-040318) Matrix Spike (MS)
1204007189	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

**Data Summary:**

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

**Technical Information**

**Recounts**

Samples 447454002 (MW-203A-040418) and 447454004 (MW-202AR-040418) were recounted to verify sample results. The recount results are similar to the original results. Original results are reported.

**Miscellaneous Information**

**Additional Comments**

The matrix spike, 1204007188 (MW-202B-040318MS), aliquot was reduced to conserve sample volume.

**Product:** Liquid Scint Ni63, Liquid

**Analytical Method:** DOE RESL Ni-1, Modified

**Analytical Procedure:** GL-RAD-A-022 REV# 18

**Analytical Batch:** 1755082

The following samples were analyzed using the above methods and analytical procedure(s).

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
447454001	MW-202B-040318
447454002	MW-203A-040418
447454003	MW-203B-040418
447454004	MW-202AR-040418
1204007367	Method Blank (MB)
1204007368	447454001(MW-202B-040318) Sample Duplicate (DUP)
1204007369	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

**Data Summary:**

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

**Technical Information**

**Recounts**

Samples 1204007368 (MW-202B-040318DUP) and 447454001 (MW-202B-040318) were recounted due to high relative percent difference/relative error ratio. The recounts are reported.

**Certification Statement**

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

Page: 1 of 1  
 Project # 128924  
 GEL Quote #: \_\_\_\_\_  
 CCG Number <sup>(1)</sup>: 2018-04  
 PON Number: 44-428924-004



**Laboratories LLC**  
 Chemistry | Radiochemistry | Radiobioassay | Specialty Analytics

GEL Laboratories, LLC  
 2040 Savage Road  
 Charleston, SC 29407  
 Phone: (843) 556-8171  
 Fax: (843) 766-1178

**Chain of Custody and Analytical Request**

GEL Work Order Number: 44745 / GEL Project Manager: \_\_\_\_\_

Client Name: Energy Solutions Phone # 860 810 3152

Sample Analysis Requested <sup>(5)</sup> (Fill in the number of containers for each test)

Project/Site Name: LACBWR Fax # \_\_\_\_\_

Should this sample be considered: \_\_\_\_\_  
 Total number of containers: \_\_\_\_\_  
 NI NI NI NI NI  
 ← Preservative Type (6)

Address: Genoa, WI

Collected By: M. van Nooddennen Send Results To: M. van Nooddennen / J. Spaide

Comments  
 Note: extra sample is required for sample specific QC

Sample ID <i>* For composites - indicate start and stop date/time</i>	*Date Collected (mm-dd-yy)	*Time Collected (Military) (hhmm)	QC Code <sup>(2)</sup>	Field Filtered <sup>(3)</sup>	Sample Matrix <sup>(4)</sup>	Radioactive Please supply isotopic info.	(7) Known or possible hazards	Total number of containers	NI	NI	NI	NI	NI	NI	NI	NI
MW-202B-040318	4.3.18	1355	N	N	GW	N	1	3	X	X	X	X	X	X	X	X
MW-203A-040418	4.4.18	0959	N	N	GW	N	1	3	X	X	X	X	X	X	X	X
MW-203B-040418	4.4.18	1122	N	N	GW	N	1	3	X	X	X	X	X	X	X	X
MW-202AR-040418	4.4.18	1424	N	N	GW	N	1	3	X	X	X	X	X	X	X	X


**Chain of Custody Signatures**

TAT Requested: Normal:  Rush: \_\_\_\_\_ Specify: \_\_\_\_\_ (Subject to Surcharge)

Relinquished By (Signed)	Date	Time	Received by (signed)	Date	Time
<u>[Signature]</u>	<u>4.4.18</u>	<u>1540</u>	<u>[Signature]</u>	<u>4/6/18</u>	<u>855</u>

Fax Results: [ ] Yes  No  
 Select Deliverable: [ ] C of A [ ] QC Summary [ ] level 1  Level 2 [ ] Level 3 [ ] Level 4  
 Additional Remarks:  
 For Lab Receiving Use Only: Custody Seal Intact? [ ] Yes [ ] No Cooler Temp: \_\_\_\_\_ °C

> For sample shipping and delivery details, see Sample Receipt & Review form (SRR.) Sample Collection Time Zone: [ ] Eastern [ ] Pacific  Central [ ] Mountain [ ] Other: \_\_\_\_\_

- Chain of Custody Number = Client Determined
- QC Codes: N = Normal Sample, TB = Trip Blank, FD = Field Duplicate, EB = Equipment Blank, MS = Matrix Spike Sample, MSD = Matrix Spike Duplicate Sample, G = Grab, C = Composite
- Field Filtered: For liquid matrices, indicate with a - Y - for yes the sample was field filtered or - N - for sample was not field filtered.
- Matrix Codes: DW=Drinking Water, GW=Groundwater, SW=Surface Water, WW=Waste Water, W=Water, ML=Misc Liquid, SO=Soil, SD=Sediment, SL=Sludge, SS=Solid Waste, O=Oil, F=Filter, P=Wipe, U=Urine, F=Faecal, N=Nasal
- Sample Analysis Requested: Analytical method requested (i.e. 8260B, 6010B/7470A) and number of containers provided for each (i.e. 8260B - 3, 6010B/7470A - 1).
- Preservative Type: HA = Hydrochloric Acid, NI = Nitric Acid, SH = Sodium Hydroxide, SA = Sulfuric Acid, AA = Ascorbic Acid, HX = Hexane, ST = Sodium Thiosulfate, If no preservative is added = leave field blank

<p>7.) Are there any known or possible hazards associated with these samples?</p> <p><b>RCRA Metals</b></p> <p>As = Arsenic Hg= Mercury          Ba = Barium Se= Selenium          Cd = Cadmium Ag= Silver          Cr = Chromium MR= Miscellaneous          Pb = Lead RCRA metals</p>	<p><b>Characteristic Hazards</b></p> <p>FL = Flammable/Ignitable          CO = Corrosive          RE = Reactive</p> <p><b>TSCA Regulated</b></p> <p>PCB = Polychlorinated biphenyls</p>	<p><b>Listed Waste</b></p> <p>LW= Listed Waste          (F,K,P and U-listed wastes.)          Waste code(s): _____</p>	<p><b>Other</b></p> <p>OT= Other / Unknown          (i.e.: High/low pH, asbestos, beryllium, irritants, other misc. health hazards, etc.)          Description: _____</p>	<p>Please provide any additional details below regarding handling and/or disposal concerns. (i.e.: Origin of sample(s), type of site collected from, odd matrices, etc.)</p>
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**List of current GEL Certifications as of 27 April 2018**

<b>State</b>	<b>Certification</b>
Alaska	17-018
Arkansas	88-0651
CLIA	42D0904046
California	2940
Colorado	SC00012
Connecticut	PH-0169
Delaware	SC00012
DoD ELAP/ ISO17025 A2LA	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330-15-00283, P330-15-00253
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC00012
Idaho Chemistry	SC00012
Idaho Radiochemistry	SC00012
Illinois NELAP	200029
Indiana	C-SC-01
Kansas NELAP	E-10332
Kentucky SDWA	90129
Kentucky Wastewater	90129
Louisiana NELAP	03046 (AI33904)
Louisiana SDWA	LA180011
Maryland	270
Massachusetts	M-SC012
Michigan	9976
Mississippi	SC00012
Nebraska	NE-OS-26-13
Nevada	SC000122018-1
New Hampshire NELAP	205415
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
North Dakota	R-158
Oklahoma	9904
Pennsylvania NELAP	68-00485
Puerto Rico	SC00012
S. Carolina Radiochem	10120002
South Carolina Chemistry	10120001
Tennessee	TN 02934
Texas NELAP	T104704235-18-13
Utah NELAP	SC000122018-26
Vermont	VT87156
Virginia NELAP	460202
Washington	C780
West Virginia	997404



July 09, 2018

Mr. Jason Q. Spaide  
LaCrosseSolutions  
S4601 State Hwy 35  
Genoa, Wisconsin 54632

Re: LACBWR Site Restoration Project  
Work Order: 452092

Dear Mr. Spaide:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on June 08, 2018. This revised data report has been prepared and reviewed in accordance with GEL's standard operating procedures. The data package has been revised to include Eu-152 and Eu-154 as part of the Gamma reporting list.

Our policy is to provide high quality, personalized analytical services to enable you to meet your analytical needs on time every time. We trust that you will find everything in order and to your satisfaction. If you have any questions, please do not hesitate to call me at (843) 556-8171, ext. 4453.

Sincerely,

Edith Kent  
Project Manager

Purchase Order: 672583  
Enclosures



## GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 – (843) 556-8171 – www.gel.com

### Certificate of Analysis Report for

ENRG070 LaCrosseSolutions, LLC (672583)

Client SDG: 452092 GEL Work Order: 452092

**The Qualifiers in this report are defined as follows:**

- \* A quality control analyte recovery is outside of specified acceptance criteria
- \*\* Analyte is a Tracer compound
- \*\* Analyte is a surrogate compound
- U Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the Certificate of Analysis.

The designation ND, if present, appears in the result column when the analyte concentration is not detected above the limit as defined in the 'U' qualifier above.

This data report has been prepared and reviewed in accordance with GEL Laboratories LLC standard operating procedures. Please direct any questions to your Project Manager, Edith Kent.



Reviewed by \_\_\_\_\_

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Report Date: July 9, 2018

Company : LaCrosseSolutions  
 Address : S4601 State Hwy 35  
  
 Genoa, Wisconsin 54632  
 Contact: Mr. Jason Q. Spaide  
 Project: LACBWR Site Restoration Project

Client Sample ID: MW-200A-060518	Project: ENRG07001
Sample ID: 452092001	Client ID: ENRG070
Matrix: Water	
Collect Date: 05-JUN-18 14:20	
Receive Date: 08-JUN-18	
Collector: Client	

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Rad Gamma Spec Analysis</b>													
Gammaspec, Gamma, Cs-137, Co-60, Eu-152, Eu-154 "As Received"													
Cesium-137	U	1.54	+/-3.16	6.41	10.0	pCi/L			BSW1	06/18/18	1218	1772357	1
Cobalt-60	U	3.17	+/-3.01	7.48		pCi/L							
Europium-152	U	-2.27	+/-8.07	15.0		pCi/L							
Europium-154	U	0.326	+/-10.4	20.9		pCi/L							
<b>Rad Gas Flow Proportional Counting</b>													
GFPC, Sr90, Liquid "As Received"													
Strontium-90	U	0.101	+/-0.780	1.48	2.00	pCi/L			LXB3	06/26/18	1429	1774624	2
<b>Rad Liquid Scintillation Analysis</b>													
LSC, Tritium Dist, Liquid "As Received"													
Tritium	U	-21.4	+/-240	436	700	pCi/L			MXH8	06/11/18	1120	1772051	3
<b>Liquid Scint Ni63, Liquid "As Received"</b>													
Nickel-63	U	-9.23	+/-21.8	38.3	50.0	pCi/L			TXJ1	06/29/18	1817	1772444	4

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 901.1	
2	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified	
3	EPA 906.0 Modified	
4	DOE RESL Ni-1, Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Strontium Carrier	GFPC, Sr90, Liquid "As Received"			85.9	(25%-125%)
Nickel Carrier	Liquid Scint Ni63, Liquid "As Received"			82.4	(25%-125%)

**Notes:**  
 Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Report Date: July 9, 2018

Company : LaCrosseSolutions  
 Address : S4601 State Hwy 35  
  
 Genoa, Wisconsin 54632  
 Contact: Mr. Jason Q. Spaide  
 Project: LACBWR Site Restoration Project

Client Sample ID: MW-200B-060518	Project: ENRG07001
Sample ID: 452092002	Client ID: ENRG070
Matrix: Water	
Collect Date: 05-JUN-18 15:47	
Receive Date: 08-JUN-18	
Collector: Client	

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Rad Gamma Spec Analysis</b>													
Gammaspec, Gamma, Cs-137, Co-60, Eu-152, Eu-154 "As Received"													
Cesium-137	U	-0.481	+/-3.34	5.89	10.0	pCi/L			BSW1	06/18/18	1219	1772357	1
Cobalt-60	U	1.58	+/-3.52	7.21		pCi/L							
Europium-152	U	2.04	+/-8.21	15.4		pCi/L							
Europium-154	U	-1.27	+/-10.0	18.7		pCi/L							
<b>Rad Gas Flow Proportional Counting</b>													
GFPC, Sr90, Liquid "As Received"													
Strontium-90	U	0.129	+/-0.909	1.74	2.00	pCi/L			LXB3	06/26/18	1429	1774624	2
<b>Rad Liquid Scintillation Analysis</b>													
LSC, Tritium Dist, Liquid "As Received"													
Tritium	U	-10.8	+/-236	427	700	pCi/L			MXH8	06/11/18	1141	1772051	3
Liquid Scint Ni63, Liquid "As Received"													
Nickel-63	U	-5.96	+/-21.4	37.5	50.0	pCi/L			TXJ1	06/29/18	1844	1772444	4

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 901.1	
2	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified	
3	EPA 906.0 Modified	
4	DOE RESL Ni-1, Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Strontium Carrier	GFPC, Sr90, Liquid "As Received"			69.2	(25%-125%)
Nickel Carrier	Liquid Scint Ni63, Liquid "As Received"			82.8	(25%-125%)

**Notes:**  
 Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Report Date: July 9, 2018

Company : LaCrosseSolutions  
 Address : S4601 State Hwy 35  
  
 Genoa, Wisconsin 54632  
 Contact: Mr. Jason Q. Spaide  
 Project: LACBWR Site Restoration Project

Client Sample ID: MW-201A-060618	Project: ENRG07001
Sample ID: 452092003	Client ID: ENRG070
Matrix: Water	
Collect Date: 06-JUN-18 08:48	
Receive Date: 08-JUN-18	
Collector: Client	

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Rad Gamma Spec Analysis</b>													
Gammaspec, Gamma, Cs-137, Co-60, Eu-152, Eu-154 "As Received"													
Cesium-137	U	-1.03	+/-3.55	5.97	10.0	pCi/L			BSW1	06/18/18	1219	1772357	1
Cobalt-60	U	-0.219	+/-3.45	6.74		pCi/L							
Europium-152	U	-2.18	+/-7.87	14.5		pCi/L							
Europium-154	U	-0.877	+/-9.31	18.2		pCi/L							
<b>Rad Gas Flow Proportional Counting</b>													
GFPC, Sr90, Liquid "As Received"													
Strontium-90	U	0.110	+/-0.874	1.68	2.00	pCi/L			LXB3	06/26/18	1429	1774624	2
<b>Rad Liquid Scintillation Analysis</b>													
LSC, Tritium Dist, Liquid "As Received"													
Tritium	U	245	+/-255	426	700	pCi/L			MXH8	06/11/18	1203	1772051	3
Liquid Scint Ni63, Liquid "As Received"													
Nickel-63	U	-16.9	+/-22.0	39.1	50.0	pCi/L			TXJ1	06/29/18	1910	1772444	4

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 901.1	
2	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified	
3	EPA 906.0 Modified	
4	DOE RESL Ni-1, Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Strontium Carrier	GFPC, Sr90, Liquid "As Received"			74	(25%-125%)
Nickel Carrier	Liquid Scint Ni63, Liquid "As Received"			80.1	(25%-125%)

**Notes:**  
 Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit



# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Report Date: July 9, 2018

Company : LaCrosseSolutions  
 Address : S4601 State Hwy 35  
 Genoa, Wisconsin 54632  
 Contact: Mr. Jason Q. Spaide  
 Project: LACBWR Site Restoration Project

Client Sample ID: MW-201B-060618 Project: ENRG07001  
 Sample ID: 452092004 Client ID: ENRG070  
 Matrix: Water  
 Collect Date: 06-JUN-18 10:32  
 Receive Date: 08-JUN-18  
 Collector: Client

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Rad Gamma Spec Analysis</b>													
Gammaspec, Gamma, Cs-137, Co-60, Eu-152, Eu-154 "As Received"													
Cesium-137	U	2.03	+/-3.51	7.45	10.0	pCi/L			BSW1	06/18/18	1220	1772357	1
Cobalt-60	U	-1.66	+/-5.09	8.17		pCi/L							
Europium-152	U	-6.07	+/-11.7	18.4		pCi/L							
Europium-154	U	-0.503	+/-10.4	21.5		pCi/L							
<b>Rad Gas Flow Proportional Counting</b>													
GFPC, Sr90, Liquid "As Received"													
Strontium-90	U	-0.105	+/-0.885	1.69	2.00	pCi/L			LXB3	06/26/18	1429	1774624	2
<b>Rad Liquid Scintillation Analysis</b>													
LSC, Tritium Dist, Liquid "As Received"													
Tritium	U	176	+/-250	425	700	pCi/L			MXH8	06/11/18	1224	1772051	3
<b>Liquid Scint Ni63, Liquid "As Received"</b>													
Nickel-63	U	-1.69	+/-22.3	38.8	50.0	pCi/L			TXJ1	06/29/18	1937	1772444	4

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 901.1	
2	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified	
3	EPA 906.0 Modified	
4	DOE RESL Ni-1, Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Strontium Carrier	GFPC, Sr90, Liquid "As Received"			97.9	(25%-125%)
Nickel Carrier	Liquid Scint Ni63, Liquid "As Received"			81.3	(25%-125%)

**Notes:**  
 Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor                      Lc/LC: Critical Level  
 DL: Detection Limit                      PF: Prep Factor  
 MDA: Minimum Detectable Activity      RL: Reporting Limit  
 MDC: Minimum Detectable Concentration      SQL: Sample Quantitation Limit

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Report Date: July 9, 2018

Company : LaCrosseSolutions  
 Address : S4601 State Hwy 35  
  
 Genoa, Wisconsin 54632  
 Contact: Mr. Jason Q. Spaide  
 Project: LACBWR Site Restoration Project

Client Sample ID: MW-202A-060518	Project: ENRG07001
Sample ID: 452092005	Client ID: ENRG070
Matrix: Water	
Collect Date: 05-JUN-18 10:52	
Receive Date: 08-JUN-18	
Collector: Client	

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Rad Gamma Spec Analysis</b>													
<b>Gammascpec, Gamma, Cs-137, Co-60, Eu-152, Eu-154 "As Received"</b>													
Cesium-137	U	0.328	+/-3.97	7.47	10.0	pCi/L		BSW1	06/18/18	1355	1772357		1
Cobalt-60	U	2.85	+/-4.57	9.92		pCi/L							
Europium-152	U	10.8	+/-9.59	20.0		pCi/L							
Europium-154	U	13.6	+/-9.97	25.6		pCi/L							
<b>Rad Gas Flow Proportional Counting</b>													
<b>GFPC, Sr90, Liquid "As Received"</b>													
Strontium-90	U	-0.172	+/-0.803	1.63	2.00	pCi/L		LXB3	06/26/18	1429	1774624		2
<b>Rad Liquid Scintillation Analysis</b>													
<b>LSC, Tritium Dist, Liquid "As Received"</b>													
Tritium		1100	+/-305	414	700	pCi/L		MXH8	06/11/18	1246	1772051		3
<b>Liquid Scint Ni63, Liquid "As Received"</b>													
Nickel-63	U	3.58	+/-22.9	39.4	50.0	pCi/L		TXJ1	06/29/18	2003	1772444		4

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 901.1	
2	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified	
3	EPA 906.0 Modified	
4	DOE RESL Ni-1, Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Strontium Carrier	GFPC, Sr90, Liquid "As Received"			76.4	(25%-125%)
Nickel Carrier	Liquid Scint Ni63, Liquid "As Received"			79.7	(25%-125%)

**Notes:**  
 Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Report Date: July 9, 2018

Company : LaCrosseSolutions  
 Address : S4601 State Hwy 35  
  
 Genoa, Wisconsin 54632  
 Contact: Mr. Jason Q. Spaide  
 Project: LACBWR Site Restoration Project

Client Sample ID: MW-202B-060518	Project: ENRG07001
Sample ID: 452092006	Client ID: ENRG070
Matrix: Water	
Collect Date: 05-JUN-18 08:52	
Receive Date: 08-JUN-18	
Collector: Client	

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Rad Gamma Spec Analysis</b>													
Gammaspec, Gamma, Cs-137, Co-60, Eu-152, Eu-154 "As Received"													
Cesium-137	U	0.756	+/-3.72	7.42	10.0	pCi/L			BSW1	06/18/18	1356	1772357	1
Cobalt-60	U	-0.909	+/-3.59	6.73		pCi/L							
Europium-152	U	-3.01	+/-12.7	20.9		pCi/L							
Europium-154	U	-5.6	+/-12.5	21.9		pCi/L							
<b>Rad Gas Flow Proportional Counting</b>													
GFPC, Sr90, Liquid "As Received"													
Strontium-90	U	-0.796	+/-0.656	1.56	2.00	pCi/L			LXB3	06/26/18	1429	1774624	2
<b>Rad Liquid Scintillation Analysis</b>													
LSC, Tritium Dist, Liquid "As Received"													
Tritium	U	-11.2	+/-231	418	700	pCi/L			MXH8	06/11/18	1307	1772051	3
Liquid Scint Ni63, Liquid "As Received"													
Nickel-63	U	-6.9	+/-22.1	38.8	50.0	pCi/L			TXJ1	06/29/18	2030	1772444	4

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 901.1	
2	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified	
3	EPA 906.0 Modified	
4	DOE RESL Ni-1, Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Strontium Carrier	GFPC, Sr90, Liquid "As Received"			85.9	(25%-125%)
Nickel Carrier	Liquid Scint Ni63, Liquid "As Received"			81.3	(25%-125%)

**Notes:**  
 Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Report Date: July 9, 2018

Company : LaCrosseSolutions  
 Address : S4601 State Hwy 35  
  
 Genoa, Wisconsin 54632  
 Contact: Mr. Jason Q. Spaide  
 Project: LACBWR Site Restoration Project

Client Sample ID: MW-203A-060618	Project: ENRG07001
Sample ID: 452092007	Client ID: ENRG070
Matrix: Water	
Collect Date: 06-JUN-18 15:52	
Receive Date: 08-JUN-18	
Collector: Client	

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Rad Gamma Spec Analysis</b>													
Gammaspec, Gamma, Cs-137, Co-60, Eu-152, Eu-154 "As Received"													
Cesium-137	U	-3.15	+/-4.96	7.85	10.0	pCi/L			BSW1	06/18/18	1356	1772357	1
Cobalt-60	U	3.27	+/-5.77	8.17		pCi/L							
Europium-152	U	-8.19	+/-9.80	14.9		pCi/L							
Europium-154	U	-6.08	+/-10.7	18.9		pCi/L							
<b>Rad Gas Flow Proportional Counting</b>													
GFPC, Sr90, Liquid "As Received"													
Strontium-90	U	0.579	+/-1.05	1.86	2.00	pCi/L			LXB3	06/26/18	1429	1774624	2
<b>Rad Liquid Scintillation Analysis</b>													
LSC, Tritium Dist, Liquid "As Received"													
Tritium		11900	+/-713	428	700	pCi/L			MXH8	06/11/18	1328	1772051	3
<b>Liquid Scint Ni63, Liquid "As Received"</b>													
Nickel-63	U	6.28	+/-21.5	36.9	50.0	pCi/L			TXJ1	06/29/18	2056	1772444	4

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 901.1	
2	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified	
3	EPA 906.0 Modified	
4	DOE RESL Ni-1, Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Strontium Carrier	GFPC, Sr90, Liquid "As Received"			59.7	(25%-125%)
Nickel Carrier	Liquid Scint Ni63, Liquid "As Received"			85.9	(25%-125%)

**Notes:**  
 Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Report Date: July 9, 2018

Company : LaCrosseSolutions  
 Address : S4601 State Hwy 35  
  
 Genoa, Wisconsin 54632  
 Contact: Mr. Jason Q. Spaide  
 Project: LACBWR Site Restoration Project

Client Sample ID: MW-203B-060718	Project: ENRG07001
Sample ID: 452092008	Client ID: ENRG070
Matrix: Water	
Collect Date: 07-JUN-18 09:32	
Receive Date: 08-JUN-18	
Collector: Client	

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Rad Gamma Spec Analysis</b>													
Gammaspec, Gamma, Cs-137, Co-60, Eu-152, Eu-154 "As Received"													
Cesium-137	U	0.322	+/-3.25	6.09	10.0	pCi/L			BSW1	06/18/18	1356	1772357	1
Cobalt-60	U	0.618	+/-2.92	6.21		pCi/L							
Europium-152	U	0.478	+/-9.67	18.0		pCi/L							
Europium-154	U	2.28	+/-9.18	19.2		pCi/L							
<b>Rad Gas Flow Proportional Counting</b>													
GFPC, Sr90, Liquid "As Received"													
Strontium-90	U	0.894	+/-1.01	1.68	2.00	pCi/L			LXB3	06/26/18	1429	1774624	2
<b>Rad Liquid Scintillation Analysis</b>													
LSC, Tritium Dist, Liquid "As Received"													
Tritium	U	-43.8	+/-231	423	700	pCi/L			MXH8	06/11/18	1350	1772051	3
<b>Liquid Scint Ni63, Liquid "As Received"</b>													
Nickel-63	U	-3.13	+/-21.4	37.3	50.0	pCi/L			TXJ1	06/29/18	2123	1772444	4

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 901.1	
2	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified	
3	EPA 906.0 Modified	
4	DOE RESL Ni-1, Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Strontium Carrier	GFPC, Sr90, Liquid "As Received"			62.1	(25%-125%)
Nickel Carrier	Liquid Scint Ni63, Liquid "As Received"			84	(25%-125%)

**Notes:**  
 Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Report Date: July 9, 2018

Company : LaCrosseSolutions  
 Address : S4601 State Hwy 35  
  
 Genoa, Wisconsin 54632  
 Contact: Mr. Jason Q. Spaide  
 Project: LACBWR Site Restoration Project

Client Sample ID: MW-204A-060718	Project: ENRG07001
Sample ID: 452092009	Client ID: ENRG070
Matrix: Water	
Collect Date: 07-JUN-18 13:32	
Receive Date: 08-JUN-18	
Collector: Client	

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Rad Gamma Spec Analysis</b>													
Gammaspec, Gamma, Cs-137, Co-60, Eu-152, Eu-154 "As Received"													
Cesium-137	U	-3.19	+/-4.13	6.64	10.0	pCi/L			BSW1	06/18/18	1357	1772357	1
Cobalt-60	U	0.114	+/-4.63	8.84		pCi/L							
Europium-152	U	-5.77	+/-10.7	18.8		pCi/L							
Europium-154	U	6.04	+/-13.6	27.5		pCi/L							
<b>Rad Gas Flow Proportional Counting</b>													
GFPC, Sr90, Liquid "As Received"													
Strontium-90	U	0.723	+/-0.944	1.61	2.00	pCi/L			LXB3	06/26/18	1432	1774624	2
<b>Rad Liquid Scintillation Analysis</b>													
LSC, Tritium Dist, Liquid "As Received"													
Tritium	U	329	+/-260	423	700	pCi/L			MXH8	06/11/18	1411	1772051	3
Liquid Scint Ni63, Liquid "As Received"													
Nickel-63	U	17.4	+/-22.9	38.6	50.0	pCi/L			TXJ1	06/29/18	2150	1772444	4

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 901.1	
2	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified	
3	EPA 906.0 Modified	
4	DOE RESL Ni-1, Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Strontium Carrier	GFPC, Sr90, Liquid "As Received"			100	(25%-125%)
Nickel Carrier	Liquid Scint Ni63, Liquid "As Received"			81.3	(25%-125%)

**Notes:**  
 Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit



# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Report Date: July 9, 2018

Company : LaCrosseSolutions  
 Address : S4601 State Hwy 35  
  
 Genoa, Wisconsin 54632  
 Contact: Mr. Jason Q. Spaide  
 Project: LACBWR Site Restoration Project

Client Sample ID: MW-204B-060718	Project: ENRG07001
Sample ID: 452092010	Client ID: ENRG070
Matrix: Water	
Collect Date: 07-JUN-18 11:57	
Receive Date: 08-JUN-18	
Collector: Client	

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Rad Gamma Spec Analysis</b>													
Gammaspec, Gamma, Cs-137, Co-60, Eu-152, Eu-154 "As Received"													
Cesium-137	U	-1.76	+/-2.93	5.09	10.0	pCi/L			BSW1	06/18/18	1357	1772357	1
Cobalt-60	U	0.179	+/-3.23	6.20		pCi/L							
Europium-152	U	0.934	+/-9.69	16.5		pCi/L							
Europium-154	U	8.92	+/-10.8	22.6		pCi/L							
<b>Rad Gas Flow Proportional Counting</b>													
GFPC, Sr90, Liquid "As Received"													
Strontium-90	U	-1.11	+/-0.763	1.73	2.00	pCi/L			LXB3	06/26/18	1432	1774624	2
<b>Rad Liquid Scintillation Analysis</b>													
LSC, Tritium Dist, Liquid "As Received"													
Tritium	U	83.4	+/-241	423	700	pCi/L			MXH8	06/11/18	1433	1772051	3
<b>Liquid Scint Ni63, Liquid "As Received"</b>													
Nickel-63	U	-9.86	+/-21.7	38.2	50.0	pCi/L			TXJ1	06/29/18	2216	1772444	4

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 901.1	
2	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified	
3	EPA 906.0 Modified	
4	DOE RESL Ni-1, Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Strontium Carrier	GFPC, Sr90, Liquid "As Received"			103	(25%-125%)
Nickel Carrier	Liquid Scint Ni63, Liquid "As Received"			82.8	(25%-125%)

**Notes:**  
 Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Report Date: July 9, 2018

Company : LaCrosseSolutions  
 Address : S4601 State Hwy 35  
  
 Genoa, Wisconsin 54632  
 Contact: Mr. Jason Q. Spaide  
 Project: LACBWR Site Restoration Project

Client Sample ID: B11R-060418	Project: ENRG07001
Sample ID: 452092011	Client ID: ENRG070
Matrix: Water	
Collect Date: 04-JUN-18 11:45	
Receive Date: 08-JUN-18	
Collector: Client	

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Rad Gamma Spec Analysis</b>													
Gammaspec, Gamma, Cs-137, Co-60, Eu-152, Eu-154 "As Received"													
Cesium-137	U	1.68	+/-3.07	6.18	10.0	pCi/L			BSW1	06/18/18	1358	1772357	1
Cobalt-60	U	0.199	+/-4.17	5.73		pCi/L							
Europium-152	U	-0.331	+/-7.30	13.9		pCi/L							
Europium-154	U	-2.21	+/-8.75	17.0		pCi/L							
<b>Rad Gas Flow Proportional Counting</b>													
GFPC, Sr90, Liquid "As Received"													
Strontium-90	U	0.166	+/-0.628	1.16	2.00	pCi/L			LXB3	06/27/18	0759	1774624	2
<b>Rad Liquid Scintillation Analysis</b>													
LSC, Tritium Dist, Liquid "As Received"													
Tritium	U	49.4	+/-237	420	700	pCi/L			MXH8	06/11/18	1454	1772051	3
Liquid Scint Ni63, Liquid "As Received"													
Nickel-63	U	-5.48	+/-22.3	39.0	50.0	pCi/L			TXJ1	06/29/18	2243	1772444	4

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 901.1	
2	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified	
3	EPA 906.0 Modified	
4	DOE RESL Ni-1, Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Strontium Carrier	GFPC, Sr90, Liquid "As Received"			100	(25%-125%)
Nickel Carrier	Liquid Scint Ni63, Liquid "As Received"			82.4	(25%-125%)

**Notes:**  
 Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

# GEL LABORATORIES LLC

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## Certificate of Analysis

Report Date: July 9, 2018

Company : LaCrosseSolutions  
 Address : S4601 State Hwy 35  
  
 Genoa, Wisconsin 54632  
 Contact: Mr. Jason Q. Spaide  
 Project: LACBWR Site Restoration Project

Client Sample ID: B11AR-060418	Project: ENRG07001
Sample ID: 452092012	Client ID: ENRG070
Matrix: Water	
Collect Date: 04-JUN-18 13:55	
Receive Date: 08-JUN-18	
Collector: Client	

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Rad Gamma Spec Analysis</b>													
Gammaspec, Gamma, Cs-137, Co-60, Eu-152, Eu-154 "As Received"													
Cesium-137	U	0.702	+/-3.25	6.32	10.0	pCi/L			BSW1	06/18/18	1358	1772357	1
Cobalt-60	U	-0.767	+/-2.71	5.40		pCi/L							
Europium-152	U	0.210	+/-9.42	17.7		pCi/L							
Europium-154	U	3.81	+/-9.47	20.7		pCi/L							
<b>Rad Gas Flow Proportional Counting</b>													
GFPC, Sr90, Liquid "As Received"													
Strontium-90	U	0.389	+/-1.05	1.91	2.00	pCi/L			LXB3	06/26/18	1429	1774624	2
<b>Rad Liquid Scintillation Analysis</b>													
LSC, Tritium Dist, Liquid "As Received"													
Tritium	U	309	+/-261	428	700	pCi/L			MXH8	06/11/18	1515	1772051	3
<b>Liquid Scint Ni63, Liquid "As Received"</b>													
Nickel-63	U	-1.61	+/-22.4	38.9	50.0	pCi/L			TXJ1	06/29/18	2309	1772444	4

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 901.1	
2	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified	
3	EPA 906.0 Modified	
4	DOE RESL Ni-1, Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Strontium Carrier	GFPC, Sr90, Liquid "As Received"			69.2	(25%-125%)
Nickel Carrier	Liquid Scint Ni63, Liquid "As Received"			80.5	(25%-125%)

**Notes:**  
 Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Report Date: July 9, 2018

Company : LaCrosseSolutions  
 Address : S4601 State Hwy 35  
  
 Genoa, Wisconsin 54632  
 Contact: Mr. Jason Q. Spaide  
 Project: LACBWR Site Restoration Project

Client Sample ID: Well-5-060618	Project: ENRG07001
Sample ID: 452092013	Client ID: ENRG070
Matrix: Water	
Collect Date: 06-JUN-18 12:42	
Receive Date: 08-JUN-18	
Collector: Client	

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Rad Gamma Spec Analysis</b>													
Gammaspec, Gamma, Cs-137, Co-60, Eu-152, Eu-154 "As Received"													
Cesium-137	U	-1.02	+/-2.84	5.10	10.0	pCi/L			BSW1	06/18/18	1358	1772357	1
Cobalt-60	U	0.189	+/-3.88	7.76		pCi/L							
Europium-152	U	-4.54	+/-10.6	17.5		pCi/L							
Europium-154	U	-3.98	+/-9.77	15.5		pCi/L							
<b>Rad Gas Flow Proportional Counting</b>													
GFPC, Sr90, Liquid "As Received"													
Strontium-90	U	0.970	+/-0.959	1.57	2.00	pCi/L			LXB3	06/26/18	1429	1774624	2
<b>Rad Liquid Scintillation Analysis</b>													
LSC, Tritium Dist, Liquid "As Received"													
Tritium	U	-166	+/-226	433	700	pCi/L			MXH8	06/11/18	1537	1772051	3
<b>Liquid Scint Ni63, Liquid "As Received"</b>													
Nickel-63	U	-9.21	+/-21.9	38.4	50.0	pCi/L			TXJ1	06/29/18	2336	1772444	4

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 901.1	
2	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified	
3	EPA 906.0 Modified	
4	DOE RESL Ni-1, Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Strontium Carrier	GFPC, Sr90, Liquid "As Received"			85.9	(25%-125%)
Nickel Carrier	Liquid Scint Ni63, Liquid "As Received"			81.6	(25%-125%)

**Notes:**  
 Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Report Date: July 9, 2018

Company : LaCrosseSolutions  
 Address : S4601 State Hwy 35  
  
 Genoa, Wisconsin 54632  
 Contact: Mr. Jason Q. Spaide  
 Project: LACBWR Site Restoration Project

Client Sample ID: Well-7-060618	Project: ENRG07001
Sample ID: 452092014	Client ID: ENRG070
Matrix: Water	
Collect Date: 06-JUN-18 13:12	
Receive Date: 08-JUN-18	
Collector: Client	

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Rad Gamma Spec Analysis</b>													
Gammaspec, Gamma, Cs-137, Co-60, Eu-152, Eu-154 "As Received"													
Cesium-137	U	-0.149	+/-4.00	7.43	10.0	pCi/L			BSW1	06/18/18	1359	1772357	1
Cobalt-60	U	1.57	+/-4.26	9.06		pCi/L							
Europium-152	U	-1.03	+/-11.2	19.6		pCi/L							
Europium-154	U	6.22	+/-17.7	24.1		pCi/L							
<b>Rad Gas Flow Proportional Counting</b>													
GFPC, Sr90, Liquid "As Received"													
Strontium-90	U	-0.205	+/-0.653	1.30	2.00	pCi/L			LXB3	06/27/18	0759	1774624	2
<b>Rad Liquid Scintillation Analysis</b>													
LSC, Tritium Dist, Liquid "As Received"													
Tritium	U	124	+/-245	424	700	pCi/L			MXH8	06/11/18	1558	1772051	3
Liquid Scint Ni63, Liquid "As Received"													
Nickel-63	U	-5.36	+/-22.8	39.9	50.0	pCi/L			TXJ1	06/30/18	0003	1772444	4

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 901.1	
2	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified	
3	EPA 906.0 Modified	
4	DOE RESL Ni-1, Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Strontium Carrier	GFPC, Sr90, Liquid "As Received"			95.5	(25%-125%)
Nickel Carrier	Liquid Scint Ni63, Liquid "As Received"			78.9	(25%-125%)

**Notes:**  
 Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Report Date: July 9, 2018

Company : LaCrosseSolutions  
 Address : S4601 State Hwy 35  
  
 Genoa, Wisconsin 54632  
 Contact: Mr. Jason Q. Spaide  
 Project: LACBWR Site Restoration Project

Client Sample ID: MW-202B-D-060518	Project: ENRG07001
Sample ID: 452092015	Client ID: ENRG070
Matrix: Water	
Collect Date: 05-JUN-18 09:00	
Receive Date: 08-JUN-18	
Collector: Client	

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Rad Gamma Spec Analysis</b>													
Gammaspec, Gamma, Cs-137, Co-60, Eu-152, Eu-154 "As Received"													
Cesium-137	U	1.25	+/-3.67	7.25	10.0	pCi/L			BSW1	06/18/18	1359	1772357	1
Cobalt-60	U	-1.5	+/-3.62	6.67		pCi/L							
Europium-152	U	1.04	+/-9.61	18.4		pCi/L							
Europium-154	U	10.2	+/-13.7	29.7		pCi/L							
<b>Rad Gas Flow Proportional Counting</b>													
GFPC, Sr90, Liquid "As Received"													
Strontium-90	U	0.843	+/-0.918	1.53	2.00	pCi/L			LXB3	06/26/18	1429	1774624	2
<b>Rad Liquid Scintillation Analysis</b>													
LSC, Tritium Dist, Liquid "As Received"													
Tritium	U	-220	+/-217	425	700	pCi/L			MXH8	06/11/18	1620	1772051	3
Liquid Scint Ni63, Liquid "As Received"													
Nickel-63	U	-4.7	+/-22.7	39.7	50.0	pCi/L			TXJ1	06/30/18	0029	1772444	4

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 901.1	
2	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified	
3	EPA 906.0 Modified	
4	DOE RESL Ni-1, Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Strontium Carrier	GFPC, Sr90, Liquid "As Received"			95.5	(25%-125%)
Nickel Carrier	Liquid Scint Ni63, Liquid "As Received"			80.5	(25%-125%)

**Notes:**  
 Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

# GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

## QC Summary

Report Date: July 9, 2018

Page 1 of 3

**LaCrosseSolutions**  
**S4601 State Hwy 35**  
**Genoa, Wisconsin**

**Contact: Mr. Jason Q. Spaide**

**Workorder: 452092**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Rad Gamma Spec</b>											
Batch	1772357										
QC1204046726 452092001 DUP											
Cesium-137	U	1.54	U	-0.417	pCi/L	N/A		N/A	BSW1	06/18/18	15:31
	Uncertainty	+/-3.16		+/-3.35							
Cobalt-60	U	3.17	U	-2.29	pCi/L	N/A		N/A			
	Uncertainty	+/-3.01		+/-4.20							
Europium-152	U	-2.27	U	-0.519	pCi/L	N/A		N/A			
	Uncertainty	+/-8.07		+/-11.2							
Europium-154	U	0.326	U	4.34	pCi/L	N/A		N/A			
	Uncertainty	+/-10.4		+/-11.5							
QC1204046727 LCS											
Americium-241		1.10E+05		1.23E+05	pCi/L		112	(75%-125%)		06/18/18	15:33
	Uncertainty			+/-3820							
Cesium-137		41100		42900	pCi/L		104	(75%-125%)			
	Uncertainty			+/-849							
Cobalt-60		33400		34800	pCi/L		104	(75%-125%)			
	Uncertainty			+/-921							
Europium-152			U	-171	pCi/L						
	Uncertainty			+/-381							
Europium-154			U	-175	pCi/L						
	Uncertainty			+/-239							
QC1204046725 MB											
Cesium-137			U	2.40	pCi/L					06/18/18	15:31
	Uncertainty			+/-3.35							
Cobalt-60			U	-0.0582	pCi/L						
	Uncertainty			+/-3.74							
Europium-152			U	4.39	pCi/L						
	Uncertainty			+/-9.57							
Europium-154			U	7.69	pCi/L						
	Uncertainty			+/-9.18							



# GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

## QC Summary

Workorder: 452092

Page 2 of 3

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Rad Gas Flow</b>											
Batch 1774624											
QC1204052018	452092005	DUP									
Strontium-90			U	-0.172	U	1.14	pCi/L	N/A	N/A	LXB3	06/26/18 14:29
			Uncertainty	+/-0.803		+/-0.971					
QC1204052019	LCS										
Strontium-90				77.8		71.4	pCi/L	91.7	(75%-125%)		06/26/18 14:29
			Uncertainty			+/-4.34					
QC1204052017	MB										
Strontium-90					U	0.381	pCi/L				06/26/18 14:29
			Uncertainty			+/-0.994					
<b>Rad Liquid Scintillation</b>											
Batch 1772051											
QC1204046084	452092001	DUP									
Tritium			U	-21.4	U	-74.3	pCi/L	N/A	N/A	AMXH8	06/11/18 17:02
			Uncertainty	+/-240		+/-228					
QC1204046086	LCS										
Tritium				2540		2610	pCi/L	103	(75%-125%)		06/11/18 17:45
			Uncertainty			+/-398					
QC1204046083	MB										
Tritium					U	-116	pCi/L				06/11/18 16:41
			Uncertainty			+/-223					
QC1204046085	452092001	MS									
Tritium				5070	U	-21.4	pCi/L	90.6	(75%-125%)		06/11/18 17:24
			Uncertainty	+/-240		+/-763					
Batch 1772444											
QC1204047017	452092001	DUP									
Nickel-63			U	-9.23	U	-7.53	pCi/L	N/A	N/A	TXJ1	06/30/18 01:22
			Uncertainty	+/-21.8		+/-21.8					
QC1204047018	LCS										
Nickel-63				1330		1330	pCi/L	99.8	(75%-125%)		06/30/18 01:49
			Uncertainty			+/-50.6					
QC1204047016	MB										
Nickel-63					U	-3.09	pCi/L				06/30/18 00:56
			Uncertainty			+/-22.6					

**Notes:**

Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).  
 The Qualifiers in this report are defined as follows:

# GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

## QC Summary

Workorder: 452092

Page 3 of 3

Parname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
**	Analyte is a Tracer compound										
<	Result is less than value reported										
>	Result is greater than value reported										
BD	Results are either below the MDC or tracer recovery is low										
FA	Failed analysis.										
H	Analytical holding time was exceeded										
J	Value is estimated										
K	Analyte present. Reported value may be biased high. Actual value is expected to be lower.										
L	Analyte present. Reported value may be biased low. Actual value is expected to be higher.										
M	M if above MDC and less than LLD										
M	REMP Result > MDC/CL and < RDL										
N/A	RPD or %Recovery limits do not apply.										
N1	See case narrative										
ND	Analyte concentration is not detected above the detection limit										
NJ	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier										
Q	One or more quality control criteria have not been met. Refer to the applicable narrative or DER.										
R	Sample results are rejected										
U	Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.										
UI	Gamma Spectroscopy--Uncertain identification										
UJ	Gamma Spectroscopy--Uncertain identification										
UL	Not considered detected. The associated number is the reported concentration, which may be inaccurate due to a low bias.										
X	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier										
Y	Other specific qualifiers were required to properly define the results. Consult case narrative.										
^	RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.										
h	Preparation or preservation holding time was exceeded										

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.  
^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.  
\* Indicates that a Quality Control parameter was not within specifications.  
For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

**Radiochemistry**  
**Technical Case Narrative**  
**LaCrosseSolutions, LLC (ENRG)**  
**SDG #: 452092**

**Product:** Gammascpec, Gamma, Cs-137, Co-60, Eu-152, Eu-154

**Analytical Method:** EPA 901.1

**Analytical Procedure:** GL-RAD-A-013 REV# 27

**Analytical Batch:** 1772357

The following samples were analyzed using the above methods and analytical procedure(s).

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
452092001	MW-200A-060518
452092002	MW-200B-060518
452092003	MW-201A-060618
452092004	MW-201B-060618
452092005	MW-202A-060518
452092006	MW-202B-060518
452092007	MW-203A-060618
452092008	MW-203B-060718
452092009	MW-204A-060718
452092010	MW-204B-060718
452092011	B11R-060418
452092012	B11AR-060418
452092013	Well-5-060618
452092014	Well-7-060618
452092015	MW-202B-D-060518
1204046725	Method Blank (MB)
1204046726	452092001(MW-200A-060518) Sample Duplicate (DUP)
1204046727	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

**Data Summary:**

There are no exceptions, anomalies or deviations from the specified methods. All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable.

**Product:** GFPC, Sr90, Liquid

**Analytical Method:** EPA 905.0 Modified/DOE RP501 Rev. 1 Modified

**Analytical Procedure:** GL-RAD-A-004 REV# 20

**Analytical Batch:** 1774624

The following samples were analyzed using the above methods and analytical procedure(s).

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
452092001	MW-200A-060518

452092002	MW-200B-060518
452092003	MW-201A-060618
452092004	MW-201B-060618
452092005	MW-202A-060518
452092006	MW-202B-060518
452092007	MW-203A-060618
452092008	MW-203B-060718
452092009	MW-204A-060718
452092010	MW-204B-060718
452092011	B11R-060418
452092012	B11AR-060418
452092013	Well-5-060618
452092014	Well-7-060618
452092015	MW-202B-D-060518
1204052017	Method Blank (MB)
1204052018	452092005(MW-202A-060518) Sample Duplicate (DUP)
1204052019	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

**Data Summary:**

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

**Technical Information**

**Recounts**

Sample 452092011 (B11R-060418) was recounted due to results more negative than the three sigma TPU. The second count is reported. Sample 452092014 (Well-7-060618) was recounted due to a suspected false positive. The recount is reported.

**Product: LSC, Tritium Dist, Liquid**

**Analytical Method:** EPA 906.0 Modified

**Analytical Procedure:** GL-RAD-A-002 REV# 22

**Analytical Batch:** 1772051

The following samples were analyzed using the above methods and analytical procedure(s).

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
452092001	MW-200A-060518
452092002	MW-200B-060518
452092003	MW-201A-060618
452092004	MW-201B-060618
452092005	MW-202A-060518
452092006	MW-202B-060518
452092007	MW-203A-060618
452092008	MW-203B-060718
452092009	MW-204A-060718
452092010	MW-204B-060718
452092011	B11R-060418

452092012	B11AR-060418
452092013	Well-5-060618
452092014	Well-7-060618
452092015	MW-202B-D-060518
1204046083	Method Blank (MB)
1204046084	452092001(MW-200A-060518) Sample Duplicate (DUP)
1204046085	452092001(MW-200A-060518) Matrix Spike (MS)
1204046086	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

**Data Summary:**

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

**Technical Information**

**Recounts**

Samples 452092005 (MW-202A-060518) and 452092007 (MW-203A-060618) were recounted to verify sample results. The recount results are similar to the original results. Original results are reported.

**Miscellaneous Information**

**Additional Comments**

The matrix spike, 1204046085 (MW-200A-060518MS), aliquot was reduced to conserve sample volume.

**Product: Liquid Scint Ni63, Liquid**

**Analytical Method:** DOE RESL Ni-1, Modified

**Analytical Procedure:** GL-RAD-A-022 REV# 18

**Analytical Batch:** 1772444

The following samples were analyzed using the above methods and analytical procedure(s).

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
452092001	MW-200A-060518
452092002	MW-200B-060518
452092003	MW-201A-060618
452092004	MW-201B-060618
452092005	MW-202A-060518
452092006	MW-202B-060518
452092007	MW-203A-060618
452092008	MW-203B-060718
452092009	MW-204A-060718
452092010	MW-204B-060718
452092011	B11R-060418
452092012	B11AR-060418
452092013	Well-5-060618
452092014	Well-7-060618
452092015	MW-202B-D-060518
1204047016	Method Blank (MB)

1204047017                      452092001(MW-200A-060518) Sample Duplicate (DUP)  
1204047018                      Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

**Data Summary:**

There are no exceptions, anomalies or deviations from the specified methods. All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable.

**Certification Statement**

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

Page: 1 of 2  
Project # \_\_\_\_\_  
GEL Quote #: \_\_\_\_\_  
COC Number (1): \_\_\_\_\_



Laboratories LLC

Chemistry | Radiochemistry | Radiobioassay | Specialty Analytics

Chain of Custody and Analytical Request

GEL Laboratories, LLC  
2040 Savage Road  
Charleston, SC 29407  
Phone: (843) 556-8171  
Fax: (843) 766-1178

PO Number: 672583

GEL Work Order Number: 452092 GEL Project Manager: \_\_\_\_\_

Client Name: Energy Solutions Phone # 860-817-3152

Project/Site Name: LACBWR Fax # \_\_\_\_\_

Address: Genoa, WI

Collected By: S. Kaney Send Results To: mvanordennen@valtalydrich.com

Sample Analysis Requested (5) (Fill in the number of containers for each test)

Sample ID <i>* For composites - indicate start and stop date/time</i>	*Date Collected (mm-dd-yy)	*Time Collected (Military) (hhmm)	QC Code (2)	Field Filtered (3)	Sample Matrix (4)	Radioactive Please supply isotopic info.	(7) Known or possible hazards	Total number of containers	NI		SH		Preservative Type (6)	Comments Note: extra sample is required for sample specific QC
									Co-60, Cs-137	H-3	Sr-90, Ni-63			
MW-200A-060518	06/05/18	1420	N	N	GW			3	X	X	X			
MW-200B-060518	06/05/18	1547	N	N	GW			3	X	X	X			
MW-201A-060618	06/06/18	0848	N	N	GW			3	X	X	X			
MW-201B-060618	06/06/18	1032	N	N	GW			3	X	X	X			
MW-202A-060518	06/05/18	1052	N	N	GW			3	X	X	X			
MW-202B-060518	06/05/18	0852	N	N	GW			3	X	X	X			
MW-203A-060618	06/06/18	1552	N	N	GW			3	X	X	X			
MW-203B-060718	06/07/18	0932	N	N	GW			3	X	X	X			
MW-204A-060718	06/07/18	1332	N	N	GW			3	X	X	X			
MW-204B-060718	06/07/18	1157	N	N	GW			3	X	X	X			

Chain of Custody Signatures TAT Requested: Normal:  Rush:  Specify:  (Subject to Surcharge)

Requisitioned By (Signed)	Date	Time	Received by (signed)	Date	Time	Fax Results: [ ] Yes [ ] No
<i>[Signature]</i>	6/17/18	1630	FEDEX			Select Deliverable: [ ] C of A [ ] QC Summary [ ] level 1 [ ] Level 2 [ ] Level 3 <input checked="" type="checkbox"/> Level 4
			<i>[Signature]</i>	6/18/18	0855	Additional Remarks:
						For Lab Receiving Use Only: Custody Seal Intact? [ ] Yes [ ] No Cooler Temp: _____ °C

> For sample shipping and delivery details, see Sample Receipt & Review form (SRR.) Sample Collection Time Zone: [ ] Eastern [ ] Pacific [ ] Central [ ] Mountain [ ] Other:

- 1.) Chain of Custody Number = Client Determined
- 2.) QC Codes: N = Normal Sample, TB = Trip Blank, FD = Field Duplicate, EB = Equipment Blank, MS = Matrix Spike Sample, MSD = Matrix Spike Duplicate Sample, G = Grab, C = Composite
- 3.) Field Filtered: For liquid matrices, indicate with a - Y - for yes the sample was field filtered or - N - for sample was not field filtered.
- 4.) Matrix Codes: DW=Drinking Water, GW=Groundwater, SW=Surface Water, WW=Waste Water, W=Water, ML=Misc Liquid, SO=Soil, SD=Sediment, SL=Sludge, SS=Solid Waste, O=Oil, F=Filter, P=Wipe, U=Urine, F=Fecal, N=Nasal
- 5.) Sample Analysis Requested: Analytical method requested (i.e. 8260B, 6010B/7470A) and number of containers provided for each (i.e. 8260B - 3, 6010B/7470A - 1).
- 6.) Preservative Type: HA = Hydrochloric Acid, NI = Nitric Acid, SH = Sodium Hydroxide, SA = Sulfuric Acid, AA = Ascorbic Acid, HX = Hexane, ST = Sodium Thiosulfate, If no preservative is added = leave field blank

*\*\* 3-day Rush TAT for Tritium results. Normal TAT for all other analysis.*

7.) Are there any known or possible hazards associated with these samples?	<b>Characteristic Hazards</b> FL = Flammable/Ignitable CO = Corrosive RE = Reactive	<b>Listed Waste</b> LW = Listed Waste (F, K, P and U-listed wastes.) Waste code(s):	<b>Other</b> OT = Other / Unknown (i.e.: High/low pH, asbestos, beryllium, irritants, other misc. health hazards, etc.) Description:	Please provide any additional details below regarding handling and/or disposal concerns. (i.e.: Origin of sample(s), type of site collected from, odd matrices, etc.)
<b>RCRA Metals</b> As = Arsenic Hg = Mercury Ba = Barium Se = Selenium Cd = Cadmium Ag = Silver Cr = Chromium MR = Miscellaneous Pb = Lead RCRA metals	<b>TSCA Regulated</b> PCB = Polychlorinated biphenyls			



Page: 2 of 2  
Project # \_\_\_\_\_  
GEL Quote #: \_\_\_\_\_  
COC Number (1): \_\_\_\_\_  
PO Number: 672583



Laboratories LLC  
Chemistry | Radiochemistry | Radiobiology | Specialty Analytics

GEL Laboratories, LLC  
2040 Savage Road  
Charleston, SC 29407  
Phone: (843) 556-8171  
Fax: (843) 766-1178

### Chain of Custody and Analytical Request

GEL Work Order Number: 452092 GEL Project Manager: \_\_\_\_\_

Client Name: Energy Solutions Phone # 860-877-3152  
Project/Site Name: LACBWR Fax # \_\_\_\_\_  
Address: Genoa WI  
Collected By: S. Kency Send Results To: mvannosrdemen@haleyaldri.com

Sample Analysis Requested (5) (Fill in the number of containers for each test)

Sample ID <i>* For composites - indicate start and stop date/time</i>	*Date Collected (mm-dd-yy)	*Time Collected (Military) (hhmm)	QC Code (2)	Field Filtered (3)	Sample Matrix (4)	Radioactive Please supply isotopic info.	(7) Known or possible hazards	Total number of containers	Sample Analysis Requested (5)			Preservative Type (6)	Comments Note: extra sample is required for sample specific QC
									NI	NI	NI		
B11R-060418	06/04/18	1145	N	N	GW			3	X	X	X		
B11AR-060418	06/04/18	1355	N	N	GW			3	X	X	X		
Well-5-060618	06/06/18	1242	N	N	GW			3	X	X	X		
Well-7-060618	06/06/18	1312	N	N	GW			3	X	X	X		
MW-203B-D-060518	06/05/18	0900	FD	N	GW			3	X	X	X		

#### Chain of Custody Signatures

TAT Requested: Normal:  Rush:  Specify: \*\* (Subject to Surcharge)

Relinquished By (Signed)	Date	Time	Received by (signed)	Date	Time
<i>[Signature]</i>	6/7/18	1630	1 FEDEX		
			2 <i>[Signature]</i>	6/8/18	0855
			3 <i>[Signature]</i>		

Fax Results:  Yes  No  
Select Deliverable:  C of A  QC Summary  level 1  Level 2  Level 3  Level 4  
Additional Remarks:  
For Lab Receiving Use Only: Custody Seal Intact?  Yes  No Cooler Temp: \_\_\_\_\_ °C

> For sample shipping and delivery details, see Sample Receipt & Review form (SRR.) Sample Collection Time Zone:  Eastern  Pacific  Central  Mountain  Other:

- Chain of Custody Number = Client Determined
- QC Codes: N = Normal Sample, TB = Trip Blank, FD = Field Duplicate, EB = Equipment Blank, MS = Matrix Spike Sample, MSD = Matrix Spike Duplicate Sample, G = Grab, C = Composite
- Field Filtered: For liquid matrices, indicate with a - Y - for yes the sample was field filtered or - N - for sample was not field filtered.
- Matrix Codes: DW=Drinking Water, GW=Groundwater, SW=Surface Water, WW=Waste Water, W=Water, ML=Misc Liquid, SO=Soil, SD=Sediment, SL=Sludge, SS=Solid Waste, O=Oil, F=Filter, P=Wipe, U=Urine, F=Faecal, N=Nasal
- Sample Analysis Requested: Analytical method requested (i.e. 8260B, 6010B/7470A) and number of containers provided for each (i.e. 8260B - 3, 6010B/7470A - 1).
- Preservative Type: HA = Hydrochloric Acid, NI = Nitric Acid, SH = Sodium Hydroxide, SA = Sulfuric Acid, AA = Ascorbic Acid, HX = Hexane, ST = Sodium Thiosulfate, If no preservative is added = leave field blank

\*\* 3-day Rush TAT for Tritium results.  
Normal TAT for all other analysis.

7.) Are there any known or possible hazards associated with these samples?	<b>Characteristic Hazards</b> FL = Flammable/Ignitable CO = Corrosive RE = Reactive	<b>Listed Waste</b> LW = Listed Waste (F, K, P and U-listed wastes.) Waste code(s):	<b>Other</b> OT = Other / Unknown (i.e.: High/low pH, asbestos, beryllium, irritants, other misc. health hazards, etc.) Description:	Please provide any additional details below regarding handling and/or disposal concerns. (i.e.: Origin of sample(s), type of site collected from, odd matrices, etc.)
<b>RCRA Metals</b> As = Arsenic Hg = Mercury Ba = Barium Se = Selenium Cd = Cadmium Ag = Silver Cr = Chromium MR = Miscellaneous Pb = Lead RCRA metals	<b>TSCA Regulated</b> PCB = Polychlorinated biphenyls			

**SAMPLE RECEIPT & REVIEW FORM**

Client: <b>ENRG</b>	SDG/AR/COC/Work Order: <b>452092</b>		
Received By: <b>C. TARPLIN</b>	Date Received: <b>06-08-2018</b>		<b>EK</b>
Carrier and Tracking Number	Circle Applicable: FedEx Express   FedEx Ground   UPS   Field Services   Courier   Other		
	<b>7813 2335 2166</b> <b>7813 2332 2071</b> <b>7813 2329 5979</b> <b>7813 2333 9824</b>		
Suspected Hazard Information	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.
Shipped as a DOT Hazardous?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Hazard Class Shipped: _____ UN#: _____
COC/Samples marked or classified as radioactive?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): <u>0</u> <b>CPM</b> / mR/Hr Classified as: Rad 1   Rad 2   Rad 3
Is package, COC, and/or Samples marked HAZ?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	If yes, select Hazards below, and contact the GEL Safety Group. PCB's   Flammable   Foreign Soil   RCRA   Asbestos   Beryllium   Other: _____

Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1 Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>			Circle Applicable: Seals broken   Damaged container   Leaking container   Other (describe)
2 Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>			
3 Samples requiring cold preservation within (0 ≤ deg. C)?*	<input type="checkbox"/>		<input checked="" type="checkbox"/>	Preservation Method: Wet Ice   Ice Packs   Dry ice   None   Other: *all temperatures are recorded in Celsius <b>TEMP: 22°C</b>
4 Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>			<b>Temperature Device Serial #:</b> <u>IR4-17</u> Secondary Temperature Device Serial # (If Applicable): _____
5 Sample containers intact and sealed?	<input checked="" type="checkbox"/>			Circle Applicable: Seals broken   Damaged container   Leaking container   Other (describe)
6 Samples requiring chemical preservation at proper pH?	<input checked="" type="checkbox"/>			Sample ID's and Containers Affected: If Preservation added, Lot#: _____
7 Do any samples require Volatile Analysis?	<input checked="" type="checkbox"/>			If Yes, Are Encores or Soil Kits present? Yes ___ No ___ (If yes, take to VOA Freezer) Do VOA vials contain acid preservation? Yes ___ No ___ N/A ___ (If unknown, select No) VOA vials free of headspace? Yes ___ No ___ N/A ___ Sample ID's and containers affected:
8 Samples received within holding time?	<input checked="" type="checkbox"/>			ID's and tests affected:
9 Sample ID's on COC match ID's on bottles?	<input type="checkbox"/>		<input checked="" type="checkbox"/>	Sample ID's and containers affected: <b>X MW-203B-D-060518 says MW-202B-D-060518 bottles</b>
10 Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>			Sample ID's affected:
11 Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>			Sample ID's affected:
12 Are sample containers identifiable as GEL provided?	<input checked="" type="checkbox"/>			
13 COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>			

Comments (Use Continuation Form if needed):

PM (or PMA) review: Initials CT Date 6/11/18 Page 1 of 1

**Subject:** FW: Water Sample Results  
**From:** "Jason Q. Spaide" <jqspaide@energysolutions.com>  
**Date:** 6/12/2018 4:06 PM  
**To:** Edie Kent <emk@gel.com>  
**CC:** "Joseph D. Jacobsen" <jdjacobsen@energysolutions.com>

Edie-

Please see clarification below. Please let me know if you require any additional information.

Regards,

**Jason Q Spaide**  
**LACBWR D&D Manager**  
*LaCrosseSolutions*  
S4601 State Hwy 35  
Genoa, WI 54632  
[jqspaide@energysolutions.com](mailto:jqspaide@energysolutions.com)

**Cell:** (314) 440-3915  
**Work Cell:** (608) 386-8359  
**Office:** (608) 689-4224

---

**From:** Kaney, Samantha [mailto:SKaney@haleyaldrich.com]  
**Sent:** Tuesday, June 12, 2018 2:52 PM  
**To:** Jason Q. Spaide  
**Cc:** Glucksberg, Nadia; van Noordennen, Miles  
**Subject:** RE: Water Sample Results

Jason,

Edie was correct. The Sample ID on the sample container (MW-202B-D-060518, sample time 09:00) is correct. I accidentally but 203B on the chain.

I apologize for the mix up.

Please let me know if you have any further questions.

Thank you,

**Samantha Kaney, G.I.T.**  
Staff Geologist

**Haley & Aldrich, Inc.**  
400 E. Van Buren St | Suite 545

Phoenix, AZ 85004

T: (602) 760.2441

C: (815) 742.1363

[www.haleyaldrich.com](http://www.haleyaldrich.com)

---

**From:** Jason Q. Spaide <jqspaide@energysolutions.com>  
**Sent:** Tuesday, June 12, 2018 14:33  
**To:** Kaney, Samantha <SKaney@haleyaldrich.com>  
**Cc:** Glucksberg, Nadia <NGlucksberg@haleyaldrich.com>; van Noordennen, Miles <MvanNoordennen@haleyaldrich.com>  
**Subject:** FW: Water Sample Results

Sam-

Please see below a question regarding the Samples sent to GEL last week. Could you help out with this?

Thanks

**Jason Q Spaide**  
**LACBWR D&D Manager**  
**LaCrosseSolutions**  
**S4601 State Hwy 35**  
**Genoa, WI 54632**  
[jqspaide@energysolutions.com](mailto:jqspaide@energysolutions.com)

**Cell:** (314) 440-3915  
**Work Cell:** (608) 386-8359  
**Office:** (608) 689-4224

---

**From:** Edie Kent [<mailto:emk@gel.com>]  
**Sent:** Tuesday, June 12, 2018 2:30 PM  
**To:** Jason Q. Spaide  
**Cc:** Joseph D. Jacobsen  
**Subject:** Re: Water Sample Results

The Tritium analysis is completed. However, I have a sample receipt issue that I need you to clarify before I send results. Sample MW-203B-D-060518 has MW-202B-D-060518 listed on the sample containers. I suspect the ID on the containers is the correct one. Can you verify the correct ID?

Edie

On 6/12/2018 1:46 PM, Jason Q. Spaide wrote:

Edie-

Good Afternoon. Do you have an update on when we would see results for the water samples ( H<sup>3</sup> ) sent out last week? I assumed that it would be tomorrow or Thursdya but wanted to follow up to be sure.

Thanks,

**Jason Q Spaide**  
**LACBWR D&D Manager**  
**LaCrosseSolutions**  
**S4601 State Hwy 35**  
**Genoa, WI 54632**  
[jqspaide@energysolutions.com](mailto:jqspaide@energysolutions.com)

**Cell: (314) 440-3915**  
**Work Cell: (608) 386-8359**  
**Office: (608) 689-4224**

--

**Edith M. Kent**  
**Project Manager**

2040 Savage Road, Charleston, SC 29407 | PO Box 30712, Charleston, SC 29417

Office Direct: 843.769.7385 | Office Main: 843.556.8171 | Fax: 843.766.1178

E-Mail: [emk@gel.com](mailto:emk@gel.com) | Website: [www.gel.com](http://www.gel.com)

**Analytical Testing | Environmental | Engineering | Surveying**

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<http://www.gellaboratories.com>

**Subject:** Re: FW: GEL Analytical Report- SDG 452092

**From:** Edie Kent <emk@gel.com>

**Date:** 7/9/2018 5:47 PM

**To:** "Jason Q. Spaide" <jqspaide@energysolutions.com>

**CC:** "Scott G. Zoller" <sgzoller@energysolutions.com>, "Joseph D. Jacobsen" <jdjacobsen@energysolutions.com>, "Joe A. Nowak" <janowak@energysolutions.com>

Jason:

We will be able to report Eu-152 and Eu-154 as part of the Gamma list. I will have a revised report for you shortly.

Edie

On 7/9/2018 11:23 AM, Edie Kent wrote:

Jason:

Let me have the lab look at the data. I'll let you know.

Edie

On 7/9/2018 9:27 AM, Jason Q. Spaide wrote:

Edie-

Would it be possible to add to report Eu-152 and Eu-154 to GEL Analytical Report-SDG 452092 and resubmit?

Thank You,

Jason Q Spaide  
LACBWR D&D Manager  
LaCrosseSolutions  
S4601 State Hwy 35  
Genoa, WI 54632  
[jqspaide@energysolutions.com](mailto:jqspaide@energysolutions.com)

Cell: (314) 440-3915  
Work Cell: (608) 386-8359  
Office: (608) 689-4210

-----Original Message-----

From: Scott G. Zoller  
Sent: Monday, July 09, 2018 7:45 AM  
To: Jason Q. Spaide

Cc: Joe A. Nowak; Joseph D. Jacobsen  
Subject: RE: GEL Analytical Report- SDG 452092

Jason,

Can you ask Edie to report Eu-152 and Eu-154 for the analyses? They shouldn't have to recount the samples, just add the Europium to the reporting library for gamma spec. We also have to add to upcoming samples.

-SZ

-----Original Message-----

From: Jason Q. Spaide  
Sent: Monday, July 09, 2018 7:14 AM  
To: Scott G. Zoller  
Cc: Joe A. Nowak  
Subject: RE: GEL Analytical Report- SDG 452092

Scott-

Disregard, these were the last ones that were already in the table.

Jason Q Spaide  
LACBWR D&D Manager  
LaCrosseSolutions  
S4601 State Hwy 35  
Genoa, WI 54632  
[jqspaide@energysolutions.com](mailto:jqspaide@energysolutions.com)

Cell: (314) 440-3915  
Work Cell: (608) 386-8359  
Office: (608) 689-4224

-----Original Message-----

From: Jason Q. Spaide  
Sent: Monday, July 09, 2018 7:10 AM  
To: Scott G. Zoller  
Cc: Joe Nowak ([janowak@energysolutions.com](mailto:janowak@energysolutions.com))  
Subject: FW: GEL Analytical Report- SDG 452092

Scott-

Please find attached the latest H3 data. Could you please update the H3 table for me?

Thank You,

Jason Q Spaide  
LACBWR D&D Manager  
LaCrosseSolutions  
S4601 State Hwy 35  
Genoa, WI 54632  
[jqspaide@energysolutions.com](mailto:jqspaide@energysolutions.com)



Cell: (314) 440-3915  
Work Cell: (608) 386-8359  
Office: (608) 689-4224

-----Original Message-----

From: Edie Kent [<mailto:Edie.Kent@gel.com>]  
Sent: Friday, July 06, 2018 3:34 PM  
To: Jason Q. Spaide; Joseph D. Jacobsen  
Cc: [kai02071@gel.com](mailto:kai02071@gel.com)  
Subject: GEL Analytical Report- SDG 452092

Attached are the results for the samples received on June 08, 2018. Please contact us if there are any questions.

Sincerely,  
Edith Kent

--

**Edith M. Kent**  
Project Manager



2040 Savage Road, Charleston, SC 29407 | PO Box 30712, Charleston, SC 29417  
Office Direct: 843.769.7385 | Office Main: 843.556.8171 | Fax: 843.766.1178  
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--

**Edith M. Kent**  
Project Manager



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E-Mail: [emk@gel.com](mailto:emk@gel.com) | Website: [www.gel.com](http://www.gel.com)

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**List of current GEL Certifications as of 02 July 2018**

<b>State</b>	<b>Certification</b>
Alaska	17-018
Arkansas	88-0651
CLIA	42D0904046
California	2940
Colorado	SC00012
Connecticut	PH-0169
Delaware	SC00012
DoD ELAP/ ISO17025 A2LA	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330-15-00283, P330-15-00253
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC00012
Idaho Chemistry	SC00012
Idaho Radiochemistry	SC00012
Illinois NELAP	200029
Indiana	C-SC-01
Kansas NELAP	E-10332
Kentucky SDWA	90129
Kentucky Wastewater	90129
Louisiana NELAP	03046 (AI33904)
Louisiana SDWA	LA180011
Maryland	270
Massachusetts	M-SC012
Michigan	9976
Mississippi	SC00012
Nebraska	NE-OS-26-13
Nevada	SC000122018-1
New Hampshire NELAP	205415
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
North Dakota	R-158
Oklahoma	9904
Pennsylvania NELAP	68-00485
Puerto Rico	SC00012
S. Carolina Radiochem	10120002
South Carolina Chemistry	10120001
Tennessee	TN 02934
Texas NELAP	T104704235-18-13
Utah NELAP	SC000122018-26
Vermont	VT87156
Virginia NELAP	460202
Washington	C780
West Virginia	997404



July 30, 2018

Mr. Jason Q. Spaide  
LaCrosseSolutions  
S4601 State Hwy 35  
Genoa, Wisconsin 54632

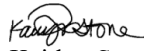
Re: LACBWR Site Restoration Project  
Work Order: 454574

Dear Mr. Spaide:

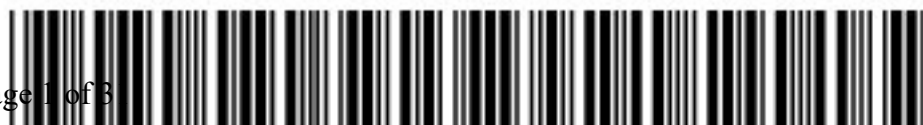
GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on July 13, 2018. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

Our policy is to provide high quality, personalized analytical services to enable you to meet your analytical needs on time every time. We trust that you will find everything in order and to your satisfaction. If you have any questions, please do not hesitate to call me at (843) 556-8171, ext. 4453.

Sincerely,

  
Kaitlyn Stone for  
Edith Kent  
Project Manager

Purchase Order: 672583  
Chain of Custody: 2018-0712  
Enclosures



# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 – (843) 556-8171 – www.gel.com

## Certificate of Analysis Report for

ENRG070 LaCrosseSolutions, LLC (672583)

Client SDG: 454574 GEL Work Order: 454574

**The Qualifiers in this report are defined as follows:**

- \* A quality control analyte recovery is outside of specified acceptance criteria
- \*\* Analyte is a Tracer compound
- \*\* Analyte is a surrogate compound
- U Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the Certificate of Analysis.

The designation ND, if present, appears in the result column when the analyte concentration is not detected above the limit as defined in the 'U' qualifier above.

This data report has been prepared and reviewed in accordance with GEL Laboratories LLC standard operating procedures. Please direct any questions to your Project Manager, Edith Kent.

Reviewed by \_\_\_\_\_



# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Report Date: July 30, 2018

Company : LaCrosseSolutions  
 Address : S4601 State Hwy 35  
  
 Genoa, Wisconsin 54632  
 Contact: Mr. Jason Q. Spaide  
 Project: LACBWR Site Restoration Project

Client Sample ID: MW-202AR-071018	Project: ENRG07001
Sample ID: 454574001	Client ID: ENRG070
Matrix: Ground Water	
Collect Date: 10-JUL-18 14:12	
Receive Date: 13-JUL-18	
Collector: Client	

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Rad Gamma Spec Analysis</b>													
Gammaspec, Gamma, Cs-137, Co-60, Eu-152, Eu-154 "As Received"													
Cesium-137	U	-3.12	+/-4.06	6.50	10.0	pCi/L			BSW1	07/16/18	1106	1782348	1
Cobalt-60	U	-0.0719	+/-4.01	7.73		pCi/L							
Europium-152	U	0.598	+/-10.4	18.8		pCi/L							
Europium-154	U	-18.7	+/-19.5	22.1		pCi/L							
<b>Rad Gas Flow Proportional Counting</b>													
GFPC, Sr90, liquid "As Received"													
Strontium-90	U	1.36	+/-0.947	1.45	2.00	pCi/L			LXB3	07/19/18	1230	1782510	2
<b>Rad Liquid Scintillation Analysis</b>													
LSC, Tritium Dist, Liquid "As Received"													
Tritium	U	281	+/-294	492	700	pCi/L			MXH8	07/16/18	1206	1782193	3
Liquid Scint Ni63, Liquid "As Received"													
Nickel-63	U	14.2	+/-20.6	34.8	50.0	pCi/L			TXJ1	07/27/18	1407	1782215	4

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 901.1	
2	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified	
3	EPA 906.0 Modified	
4	DOE RESL Ni-1, Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Strontium Carrier	GFPC, Sr90, liquid "As Received"			93.1	(25%-125%)
Nickel Carrier	Liquid Scint Ni63, Liquid "As Received"			82.4	(25%-125%)

**Notes:**  
 Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Report Date: July 30, 2018

Company : LaCrosseSolutions  
 Address : S4601 State Hwy 35  
  
 Genoa, Wisconsin 54632  
 Contact: Mr. Jason Q. Spaide  
 Project: LACBWR Site Restoration Project

Client Sample ID: MW-202B-071018	Project: ENRG07001
Sample ID: 454574002	Client ID: ENRG070
Matrix: Ground Water	
Collect Date: 10-JUL-18 13:07	
Receive Date: 13-JUL-18	
Collector: Client	

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Rad Gamma Spec Analysis</b>													
<b>Gammascpec, Gamma, Cs-137, Co-60, Eu-152, Eu-154 "As Received"</b>													
Cesium-137	U	0.731	+/-3.33	6.26	10.0	pCi/L			BSW1	07/16/18	1106	1782348	1
Cobalt-60	U	3.41	+/-3.57	8.01		pCi/L							
Europium-152	U	0.281	+/-9.01	16.5		pCi/L							
Europium-154	U	12.0	+/-9.52	22.4		pCi/L							
<b>Rad Gas Flow Proportional Counting</b>													
<b>GFPC, Sr90, liquid "As Received"</b>													
Strontium-90	U	-0.0289	+/-0.741	1.46	2.00	pCi/L			LXB3	07/19/18	1230	1782510	2
<b>Rad Liquid Scintillation Analysis</b>													
<b>LSC, Tritium Dist, Liquid "As Received"</b>													
Tritium	U	-170	+/-257	482	700	pCi/L			MXH8	07/16/18	1228	1782193	3
<b>Liquid Scint Ni63, Liquid "As Received"</b>													
Nickel-63	U	0.561	+/-19.4	33.5	50.0	pCi/L			TXJ1	07/27/18	1438	1782215	4

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 901.1	
2	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified	
3	EPA 906.0 Modified	
4	DOE RESL Ni-1, Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Strontium Carrier	GFPC, Sr90, liquid "As Received"			88.3	(25%-125%)
Nickel Carrier	Liquid Scint Ni63, Liquid "As Received"			82.8	(25%-125%)

**Notes:**

Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Report Date: July 30, 2018

Company : LaCrosseSolutions  
 Address : S4601 State Hwy 35  
  
 Genoa, Wisconsin 54632  
 Contact: Mr. Jason Q. Spaide  
 Project: LACBWR Site Restoration Project

Client Sample ID: Well-7-071018	Project: ENRG07001
Sample ID: 454574003	Client ID: ENRG070
Matrix: Drinking Water (Potable)	
Collect Date: 10-JUL-18 12:55	
Receive Date: 13-JUL-18	
Collector: Client	

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Rad Gamma Spec Analysis</b>													
Gammaspec, Gamma, Cs-137, Co-60, Eu-152, Eu-154 "As Received"													
Cesium-137	U	0.607	+/-3.29	6.27	10.0	pCi/L			BSW1	07/16/18	1107	1782348	1
Cobalt-60	U	1.09	+/-2.68	5.73		pCi/L							
Europium-152	U	0.291	+/-9.09	17.1		pCi/L							
Europium-154	U	0.821	+/-9.17	16.1		pCi/L							
<b>Rad Gas Flow Proportional Counting</b>													
GFPC, Sr90, liquid "As Received"													
Strontium-90	U	0.903	+/-0.908	1.49	2.00	pCi/L			LXB3	07/19/18	1230	1782510	2
<b>Rad Liquid Scintillation Analysis</b>													
LSC, Tritium Dist, Liquid "As Received"													
Tritium	U	-49.3	+/-271	499	700	pCi/L			BXM4	07/16/18	1143	1782177	3
Liquid Scint Ni63, Liquid "As Received"													
Nickel-63	U	23.4	+/-20.2	33.6	50.0	pCi/L			TXJ1	07/27/18	1509	1782215	4

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 901.1	
2	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified	
3	EPA 906.0	
4	DOE RESL Ni-1, Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Strontium Carrier	GFPC, Sr90, liquid "As Received"			85.9	(25%-125%)
Nickel Carrier	Liquid Scint Ni63, Liquid "As Received"			83.6	(25%-125%)

**Notes:**  
 Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit



# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Report Date: July 30, 2018

Company : LaCrosseSolutions  
 Address : S4601 State Hwy 35  
  
 Genoa, Wisconsin 54632  
 Contact: Mr. Jason Q. Spaide  
 Project: LACBWR Site Restoration Project

Client Sample ID: Well-5-071018	Project: ENRG07001
Sample ID: 454574004	Client ID: ENRG070
Matrix: Drinking Water (Potable)	
Collect Date: 10-JUL-18 12:35	
Receive Date: 13-JUL-18	
Collector: Client	

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Rad Gamma Spec Analysis</b>													
<b>Gammascpec, Gamma, Cs-137, Co-60, Eu-152, Eu-154 "As Received"</b>													
Cesium-137	U	1.00	+/-3.04	5.97	10.0	pCi/L			BSW1	07/16/18	1107	1782348	1
Cobalt-60	U	0.954	+/-2.20	5.21		pCi/L							
Europium-152	U	1.70	+/-7.70	14.9		pCi/L							
Europium-154	U	-2.29	+/-9.91	16.8		pCi/L							
<b>Rad Gas Flow Proportional Counting</b>													
<b>GFPC, Sr90, liquid "As Received"</b>													
Strontium-90	U	-0.335	+/-0.698	1.48	2.00	pCi/L			LXB3	07/19/18	1230	1782510	2
<b>Rad Liquid Scintillation Analysis</b>													
<b>LSC, Tritium Dist, Liquid "As Received"</b>													
Tritium	U	1.44	+/-276	501	700	pCi/L			BXM4	07/16/18	1205	1782177	3
<b>Liquid Scint Ni63, Liquid "As Received"</b>													
Nickel-63	U	2.58	+/-19.6	33.7	50.0	pCi/L			TXJ1	07/27/18	1541	1782215	4

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 901.1	
2	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified	
3	EPA 906.0	
4	DOE RESL Ni-1, Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Strontium Carrier	GFPC, Sr90, liquid "As Received"			85.9	(25%-125%)
Nickel Carrier	Liquid Scint Ni63, Liquid "As Received"			82.4	(25%-125%)

**Notes:**

Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Report Date: July 30, 2018

Company : LaCrosseSolutions  
 Address : S4601 State Hwy 35  
  
 Genoa, Wisconsin 54632  
 Contact: Mr. Jason Q. Spaide  
 Project: LACBWR Site Restoration Project

Client Sample ID: B11R-071018	Project: ENRG07001
Sample ID: 454574005	Client ID: ENRG070
Matrix: Ground Water	
Collect Date: 10-JUL-18 10:08	
Receive Date: 13-JUL-18	
Collector: Client	

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Rad Gamma Spec Analysis</b>													
Gammaspec, Gamma, Cs-137, Co-60, Eu-152, Eu-154 "As Received"													
Cesium-137	U	2.50	+/-3.73	7.65	10.0	pCi/L			BSW1	07/16/18	1111	1782348	1
Cobalt-60	U	-0.979	+/-5.62	8.98		pCi/L							
Europium-152	U	-6.29	+/-9.45	16.8		pCi/L							
Europium-154	U	-1.7	+/-11.6	22.3		pCi/L							
<b>Rad Gas Flow Proportional Counting</b>													
GFPC, Sr90, liquid "As Received"													
Strontium-90	U	0.0515	+/-0.825	1.59	2.00	pCi/L			LXB3	07/19/18	1230	1782510	2
<b>Rad Liquid Scintillation Analysis</b>													
LSC, Tritium Dist, Liquid "As Received"													
Tritium	U	-191	+/-255	482	700	pCi/L			MXH8	07/16/18	1249	1782193	3
<b>Liquid Scint Ni63, Liquid "As Received"</b>													
Nickel-63	U	7.01	+/-18.8	32.1	50.0	pCi/L			TXJ1	07/27/18	1612	1782215	4

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 901.1	
2	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified	
3	EPA 906.0 Modified	
4	DOE RESL Ni-1, Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Strontium Carrier	GFPC, Sr90, liquid "As Received"			81.1	(25%-125%)
Nickel Carrier	Liquid Scint Ni63, Liquid "As Received"			87.1	(25%-125%)

**Notes:**  
 Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Report Date: July 30, 2018

Company : LaCrosseSolutions  
 Address : S4601 State Hwy 35  
  
 Genoa, Wisconsin 54632  
 Contact: Mr. Jason Q. Spaide  
 Project: LACBWR Site Restoration Project

Client Sample ID: B11-AR-071018	Project: ENRG07001
Sample ID: 454574006	Client ID: ENRG070
Matrix: Ground Water	
Collect Date: 10-JUL-18 09:43	
Receive Date: 13-JUL-18	
Collector: Client	

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Rad Gamma Spec Analysis</b>													
Gammaspec, Gamma, Cs-137, Co-60, Eu-152, Eu-154 "As Received"													
Cesium-137	U	-4.69	+/-4.38	6.79	10.0	pCi/L			BSW1	07/16/18	1111	1782348	1
Cobalt-60	U	-3.02	+/-3.76	6.12		pCi/L							
Europium-152	U	8.76	+/-10.6	21.4		pCi/L							
Europium-154	U	2.90	+/-14.9	29.4		pCi/L							
<b>Rad Gas Flow Proportional Counting</b>													
GFPC, Sr90, liquid "As Received"													
Strontium-90	U	-0.0161	+/-0.520	1.06	2.00	pCi/L			LXB3	07/19/18	1230	1782510	2
<b>Rad Liquid Scintillation Analysis</b>													
LSC, Tritium Dist, Liquid "As Received"													
Tritium	U	-238	+/-257	493	700	pCi/L			MXH8	07/16/18	1311	1782193	3
<b>Liquid Scint Ni63, Liquid "As Received"</b>													
Nickel-63	U	2.80	+/-20.4	35.1	50.0	pCi/L			TXJ1	07/27/18	1643	1782215	4

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 901.1	
2	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified	
3	EPA 906.0 Modified	
4	DOE RESL Ni-1, Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Strontium Carrier	GFPC, Sr90, liquid "As Received"			100	(25%-125%)
Nickel Carrier	Liquid Scint Ni63, Liquid "As Received"			80.1	(25%-125%)

**Notes:**  
 Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Report Date: July 30, 2018

Company : LaCrosseSolutions  
 Address : S4601 State Hwy 35  
  
 Genoa, Wisconsin 54632  
 Contact: Mr. Jason Q. Spaide  
 Project: LACBWR Site Restoration Project

Client Sample ID: Well-3-071018	Project: ENRG07001
Sample ID: 454574007	Client ID: ENRG070
Matrix: Drinking Water (Potable)	
Collect Date: 10-JUL-18 13:45	
Receive Date: 13-JUL-18	
Collector: Client	

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Rad Gamma Spec Analysis</b>													
Gammaspec, Gamma, Cs-137, Co-60, Eu-152, Eu-154 "As Received"													
Cesium-137	U	2.65	+/-3.38	6.60	10.0	pCi/L			BSW1	07/16/18	1120	1782348	1
Cobalt-60	U	-1.85	+/-3.41	6.23		pCi/L							
Europium-152	U	4.70	+/-10.5	19.5		pCi/L							
Europium-154	U	-3.56	+/-10.7	17.6		pCi/L							
<b>Rad Gas Flow Proportional Counting</b>													
GFPC, Sr90, liquid "As Received"													
Strontium-90	U	-0.0243	+/-0.634	1.24	2.00	pCi/L			LXB3	07/20/18	1149	1782510	2
<b>Rad Liquid Scintillation Analysis</b>													
LSC, Tritium Dist, Liquid "As Received"													
Tritium	U	-99	+/-267	501	700	pCi/L			BXM4	07/16/18	1226	1782177	3
Liquid Scint Ni63, Liquid "As Received"													
Nickel-63	U	12.8	+/-20.0	33.9	50.0	pCi/L			TXJ1	07/27/18	1714	1782215	4

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 901.1	
2	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified	
3	EPA 906.0	
4	DOE RESL Ni-1, Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Strontium Carrier	GFPC, Sr90, liquid "As Received"			85.9	(25%-125%)
Nickel Carrier	Liquid Scint Ni63, Liquid "As Received"			82.4	(25%-125%)

**Notes:**  
 Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

# GEL LABORATORIES LLC

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## Certificate of Analysis

Report Date: July 30, 2018

Company : LaCrosseSolutions  
 Address : S4601 State Hwy 35  
  
 Genoa, Wisconsin 54632  
 Contact: Mr. Jason Q. Spaide  
 Project: LACBWR Site Restoration Project

Client Sample ID: MW-200A-071118	Project: ENRG07001
Sample ID: 454574008	Client ID: ENRG070
Matrix: Ground Water	
Collect Date: 11-JUL-18 09:07	
Receive Date: 13-JUL-18	
Collector: Client	

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Rad Gamma Spec Analysis</b>													
Gammaspec, Gamma, Cs-137, Co-60, Eu-152, Eu-154 "As Received"													
Cesium-137	U	0.456	+/-3.51	6.66	10.0	pCi/L			BSW1	07/16/18	1121	1782348	1
Cobalt-60	U	-0.315	+/-3.05	6.15		pCi/L							
Europium-152	U	0.631	+/-8.97	17.0		pCi/L							
Europium-154	U	4.10	+/-10.4	22.1		pCi/L							
<b>Rad Gas Flow Proportional Counting</b>													
GFPC, Sr90, liquid "As Received"													
Strontium-90	U	0.197	+/-0.837	1.53	2.00	pCi/L			LXB3	07/19/18	1230	1782510	2
<b>Rad Liquid Scintillation Analysis</b>													
LSC, Tritium Dist, Liquid "As Received"													
Tritium	U	-226	+/-247	473	700	pCi/L			MXH8	07/16/18	1332	1782193	3
<b>Liquid Scint Ni63, Liquid "As Received"</b>													
Nickel-63	U	0.0695	+/-21.7	37.5	50.0	pCi/L			TXJ1	07/27/18	1745	1782215	4

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 901.1	
2	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified	
3	EPA 906.0 Modified	
4	DOE RESL Ni-1, Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Strontium Carrier	GFPC, Sr90, liquid "As Received"			90.7	(25%-125%)
Nickel Carrier	Liquid Scint Ni63, Liquid "As Received"			74.6	(25%-125%)

**Notes:**  
 Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

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## Certificate of Analysis

Report Date: July 30, 2018

Company : LaCrosseSolutions  
 Address : S4601 State Hwy 35  
  
 Genoa, Wisconsin 54632  
 Contact: Mr. Jason Q. Spaide  
 Project: LACBWR Site Restoration Project

Client Sample ID: MW-200B-071118	Project: ENRG07001
Sample ID: 454574009	Client ID: ENRG070
Matrix: Ground Water	
Collect Date: 11-JUL-18 08:45	
Receive Date: 13-JUL-18	
Collector: Client	

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Rad Gamma Spec Analysis</b>													
Gammaspec, Gamma, Cs-137, Co-60, Eu-152, Eu-154 "As Received"													
Cesium-137	U	-0.606	+/-4.10	7.28	10.0	pCi/L			BSW1	07/16/18	1129	1782348	1
Cobalt-60	U	-1.86	+/-4.03	7.06		pCi/L							
Europium-152	U	10.3	+/-10.6	21.1		pCi/L							
Europium-154	U	-5.49	+/-10.8	18.9		pCi/L							
<b>Rad Gas Flow Proportional Counting</b>													
GFPC, Sr90, liquid "As Received"													
Strontium-90	U	-0.751	+/-0.831	1.88	2.00	pCi/L			LXB3	07/19/18	1230	1782510	2
<b>Rad Liquid Scintillation Analysis</b>													
LSC, Tritium Dist, Liquid "As Received"													
Tritium	U	-214	+/-250	477	700	pCi/L			MXH8	07/16/18	1353	1782193	3
<b>Liquid Scint Ni63, Liquid "As Received"</b>													
Nickel-63	U	-5.43	+/-19.1	33.3	50.0	pCi/L			TXJ1	07/27/18	1817	1782215	4

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 901.1	
2	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified	
3	EPA 906.0 Modified	
4	DOE RESL Ni-1, Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Strontium Carrier	GFPC, Sr90, liquid "As Received"			71.6	(25%-125%)
Nickel Carrier	Liquid Scint Ni63, Liquid "As Received"			84	(25%-125%)

**Notes:**  
 Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

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## Certificate of Analysis

Report Date: July 30, 2018

Company : LaCrosseSolutions  
 Address : S4601 State Hwy 35  
  
 Genoa, Wisconsin 54632  
 Contact: Mr. Jason Q. Spaide  
 Project: LACBWR Site Restoration Project

Client Sample ID: MW-201BR-071118	Project: ENRG07001
Sample ID: 454574010	Client ID: ENRG070
Matrix: Ground Water	
Collect Date: 11-JUL-18 11:05	
Receive Date: 13-JUL-18	
Collector: Client	

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Rad Gamma Spec Analysis</b>													
Gammaspec, Gamma, Cs-137, Co-60, Eu-152, Eu-154 "As Received"													
Cesium-137	U	-2.16	+/-4.17	6.94	10.0	pCi/L			BSW1	07/16/18	1758	1782348	1
Cobalt-60	U	-0.30	+/-4.13	7.86		pCi/L							
Europium-152	U	-5.76	+/-10.6	18.3		pCi/L							
Europium-154	U	-9.3	+/-16.7	17.3		pCi/L							
<b>Rad Gas Flow Proportional Counting</b>													
GFPC, Sr90, liquid "As Received"													
Strontium-90	U	0.369	+/-0.996	1.79	2.00	pCi/L			LXB3	07/20/18	1149	1782510	2
<b>Rad Liquid Scintillation Analysis</b>													
LSC, Tritium Dist, Liquid "As Received"													
Tritium	U	-186	+/-261	492	700	pCi/L			MXH8	07/16/18	1415	1782193	3
<b>Liquid Scint Ni63, Liquid "As Received"</b>													
Nickel-63	U	-6.0	+/-18.7	32.7	50.0	pCi/L			TXJ1	07/27/18	1848	1782215	4

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 901.1	
2	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified	
3	EPA 906.0 Modified	
4	DOE RESL Ni-1, Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Strontium Carrier	GFPC, Sr90, liquid "As Received"			74	(25%-125%)
Nickel Carrier	Liquid Scint Ni63, Liquid "As Received"			85.5	(25%-125%)

**Notes:**  
 Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit



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## Certificate of Analysis

Report Date: July 30, 2018

Company : LaCrosseSolutions  
 Address : S4601 State Hwy 35  
  
 Genoa, Wisconsin 54632  
 Contact: Mr. Jason Q. Spaide  
 Project: LACBWR Site Restoration Project

Client Sample ID: MW-201A-071118	Project: ENRG07001
Sample ID: 454574011	Client ID: ENRG070
Matrix: Ground Water	
Collect Date: 11-JUL-18 11:35	
Receive Date: 13-JUL-18	
Collector: Client	

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Rad Gamma Spec Analysis</b>													
Gammaspec, Gamma, Cs-137, Co-60, Eu-152, Eu-154 "As Received"													
Cesium-137	U	-0.943	+/-3.09	5.42	10.0	pCi/L			BSW1	07/16/18	1758	1782348	1
Cobalt-60	U	-1.46	+/-3.31	6.00		pCi/L							
Europium-152	U	3.43	+/-9.43	16.2		pCi/L							
Europium-154	U	-2.71	+/-8.01	15.1		pCi/L							
<b>Rad Gas Flow Proportional Counting</b>													
GFPC, Sr90, liquid "As Received"													
Strontium-90	U	0.0963	+/-0.871	1.58	2.00	pCi/L			LXB3	07/19/18	1231	1782510	2
<b>Rad Liquid Scintillation Analysis</b>													
LSC, Tritium Dist, Liquid "As Received"													
Tritium	U	132	+/-287	497	700	pCi/L			MXH8	07/16/18	1436	1782193	3
Liquid Scint Ni63, Liquid "As Received"													
Nickel-63	U	0.389	+/-19.5	33.7	50.0	pCi/L			TXJ1	07/27/18	1919	1782215	4

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 901.1	
2	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified	
3	EPA 906.0 Modified	
4	DOE RESL Ni-1, Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Strontium Carrier	GFPC, Sr90, liquid "As Received"			85.9	(25%-125%)
Nickel Carrier	Liquid Scint Ni63, Liquid "As Received"			82.8	(25%-125%)

**Notes:**  
 Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Report Date: July 30, 2018

Company : LaCrosseSolutions  
 Address : S4601 State Hwy 35  
  
 Genoa, Wisconsin 54632  
 Contact: Mr. Jason Q. Spaide  
 Project: LACBWR Site Restoration Project

Client Sample ID: MW-203A-071118	Project: ENRG07001
Sample ID: 454574012	Client ID: ENRG070
Matrix: Ground Water	
Collect Date: 11-JUL-18 14:05	
Receive Date: 13-JUL-18	
Collector: Client	

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Rad Gamma Spec Analysis</b>													
Gammaspec, Gamma, Cs-137, Co-60, Eu-152, Eu-154 "As Received"													
Cesium-137	U	0.0155	+/-3.57	6.67	10.0	pCi/L			BSW1	07/16/18	1758	1782348	1
Cobalt-60	U	1.61	+/-4.15	8.72		pCi/L							
Europium-152	U	8.64	+/-11.2	17.6		pCi/L							
Europium-154	U	-1.73	+/-9.59	18.9		pCi/L							
<b>Rad Gas Flow Proportional Counting</b>													
GFPC, Sr90, liquid "As Received"													
Strontium-90	U	-0.143	+/-0.890	1.79	2.00	pCi/L			LXB3	07/19/18	1231	1782510	2
<b>Rad Liquid Scintillation Analysis</b>													
LSC, Tritium Dist, Liquid "As Received"													
Tritium		2360	+/-410	489	700	pCi/L			MXH8	07/16/18	1458	1782193	3
<b>Liquid Scint Ni63, Liquid "As Received"</b>													
Nickel-63	U	1.20	+/-18.6	32.1	50.0	pCi/L			TXJ1	07/27/18	1950	1782215	4

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 901.1	
2	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified	
3	EPA 906.0 Modified	
4	DOE RESL Ni-1, Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Strontium Carrier	GFPC, Sr90, liquid "As Received"			62.1	(25%-125%)
Nickel Carrier	Liquid Scint Ni63, Liquid "As Received"			87.5	(25%-125%)

**Notes:**  
 Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

# GEL LABORATORIES LLC

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## Certificate of Analysis

Report Date: July 30, 2018

Company : LaCrosseSolutions  
 Address : S4601 State Hwy 35  
  
 Genoa, Wisconsin 54632  
 Contact: Mr. Jason Q. Spaide  
 Project: LACBWR Site Restoration Project

Client Sample ID: MW-203B-071118	Project: ENRG07001
Sample ID: 454574013	Client ID: ENRG070
Matrix: Ground Water	
Collect Date: 11-JUL-18 14:25	
Receive Date: 13-JUL-18	
Collector: Client	

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Rad Gamma Spec Analysis</b>													
Gammaspec, Gamma, Cs-137, Co-60, Eu-152, Eu-154 "As Received"													
Cesium-137	U	-1.49	+/-3.36	5.14	10.0	pCi/L		BSW1	07/16/18	1759	1782348		1
Cobalt-60	U	1.24	+/-3.43	7.37		pCi/L							
Europium-152	U	0.0125	+/-9.58	18.0		pCi/L							
Europium-154	U	1.46	+/-7.80	17.0		pCi/L							
<b>Rad Gas Flow Proportional Counting</b>													
GFPC, Sr90, liquid "As Received"													
Strontium-90	U	1.23	+/-0.893	1.43	2.00	pCi/L		LXB3	07/19/18	1230	1782510		2
<b>Rad Liquid Scintillation Analysis</b>													
LSC, Tritium Dist, Liquid "As Received"													
Tritium	U	-167	+/-260	488	700	pCi/L		MXH8	07/16/18	1519	1782193		3
<b>Liquid Scint Ni63, Liquid "As Received"</b>													
Nickel-63	U	-3.72	+/-18.6	32.3	50.0	pCi/L		TXJ1	07/27/18	2022	1782215		4

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 901.1	
2	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified	
3	EPA 906.0 Modified	
4	DOE RESL Ni-1, Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Strontium Carrier	GFPC, Sr90, liquid "As Received"			97.9	(25%-125%)
Nickel Carrier	Liquid Scint Ni63, Liquid "As Received"			86.7	(25%-125%)

**Notes:**  
 Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

# GEL LABORATORIES LLC

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## Certificate of Analysis

Report Date: July 30, 2018

Company : LaCrosseSolutions  
 Address : S4601 State Hwy 35  
  
 Genoa, Wisconsin 54632  
 Contact: Mr. Jason Q. Spaide  
 Project: LACBWR Site Restoration Project

Client Sample ID: MW-204A-071218	Project: ENRG07001
Sample ID: 454574014	Client ID: ENRG070
Matrix: Ground Water	
Collect Date: 12-JUL-18 08:40	
Receive Date: 13-JUL-18	
Collector: Client	

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Rad Gamma Spec Analysis</b>													
Gammaspec, Gamma, Cs-137, Co-60, Eu-152, Eu-154 "As Received"													
Cesium-137	U	0.811	+/-3.66	6.53	10.0	pCi/L			BSW1	07/16/18	1759	1782348	1
Cobalt-60	U	-4.57	+/-5.31	6.87		pCi/L							
Europium-152	U	17.2	+/-10.3	22.0		pCi/L							
Europium-154	U	-8.19	+/-9.62	16.8		pCi/L							
<b>Rad Gas Flow Proportional Counting</b>													
GFPC, Sr90, liquid "As Received"													
Strontium-90	U	0.330	+/-0.738	1.34	2.00	pCi/L			LXB3	07/19/18	1230	1782510	2
<b>Rad Liquid Scintillation Analysis</b>													
LSC, Tritium Dist, Liquid "As Received"													
Tritium	U	-28.2	+/-267	483	700	pCi/L			MXH8	07/16/18	1540	1782193	3
<b>Liquid Scint Ni63, Liquid "As Received"</b>													
Nickel-63	U	0.183	+/-18.4	31.8	50.0	pCi/L			TXJ1	07/27/18	2053	1782215	4

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 901.1	
2	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified	
3	EPA 906.0 Modified	
4	DOE RESL Ni-1, Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Strontium Carrier	GFPC, Sr90, liquid "As Received"			93.1	(25%-125%)
Nickel Carrier	Liquid Scint Ni63, Liquid "As Received"			88.3	(25%-125%)

**Notes:**  
 Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

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## Certificate of Analysis

Report Date: July 30, 2018

Company : LaCrosseSolutions  
 Address : S4601 State Hwy 35  
  
 Genoa, Wisconsin 54632  
 Contact: Mr. Jason Q. Spaide  
 Project: LACBWR Site Restoration Project

Client Sample ID: MW-204B-071218	Project: ENRG07001
Sample ID: 454574015	Client ID: ENRG070
Matrix: Ground Water	
Collect Date: 12-JUL-18 09:00	
Receive Date: 13-JUL-18	
Collector: Client	

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Rad Gamma Spec Analysis</b>													
Gammaspec, Gamma, Cs-137, Co-60, Eu-152, Eu-154 "As Received"													
Cesium-137	U	-3.08	+/-3.81	6.65	10.0	pCi/L			BSW1	07/16/18	1759	1782348	1
Cobalt-60	U	-0.131	+/-4.73	9.44		pCi/L							
Europium-152	U	-4.88	+/-9.68	17.3		pCi/L							
Europium-154	U	0.515	+/-9.27	20.0		pCi/L							
<b>Rad Gas Flow Proportional Counting</b>													
GFPC, Sr90, liquid "As Received"													
Strontium-90	U	-0.487	+/-0.950	1.80	2.00	pCi/L			LXB3	07/19/18	1230	1782510	2
<b>Rad Liquid Scintillation Analysis</b>													
LSC, Tritium Dist, Liquid "As Received"													
Tritium	U	-238	+/-243	467	700	pCi/L			MXH8	07/16/18	1602	1782193	3
<b>Liquid Scint Ni63, Liquid "As Received"</b>													
Nickel-63	U	4.23	+/-19.8	34.1	50.0	pCi/L			TXJ1	07/27/18	2124	1782215	4

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 901.1	
2	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified	
3	EPA 906.0 Modified	
4	DOE RESL Ni-1, Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Strontium Carrier	GFPC, Sr90, liquid "As Received"			97.9	(25%-125%)
Nickel Carrier	Liquid Scint Ni63, Liquid "As Received"			82.4	(25%-125%)

**Notes:**  
 Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Report Date: July 30, 2018

Company : LaCrosseSolutions  
 Address : S4601 State Hwy 35  
  
 Genoa, Wisconsin 54632  
 Contact: Mr. Jason Q. Spaide  
 Project: LACBWR Site Restoration Project

Client Sample ID: MW-204A-D-071218	Project: ENRG07001
Sample ID: 454574016	Client ID: ENRG070
Matrix: Ground Water	
Collect Date: 12-JUL-18 08:40	
Receive Date: 13-JUL-18	
Collector: Client	

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Rad Gamma Spec Analysis</b>													
Gammaspec, Gamma, Cs-137, Co-60, Eu-152, Eu-154 "As Received"													
Cesium-137	U	-4.34	+/-3.91	5.95	10.0	pCi/L			BSW1	07/16/18	1800	1782348	1
Cobalt-60	U	2.08	+/-4.46	9.52		pCi/L							
Europium-152	U	1.96	+/-9.96	19.2		pCi/L							
Europium-154	U	3.77	+/-13.1	24.7		pCi/L							
<b>Rad Gas Flow Proportional Counting</b>													
GFPC, Sr90, liquid "As Received"													
Strontium-90	U	0.105	+/-1.06	1.96	2.00	pCi/L			LXB3	07/19/18	1231	1782510	2
<b>Rad Liquid Scintillation Analysis</b>													
LSC, Tritium Dist, Liquid "As Received"													
Tritium	U	-227	+/-258	494	700	pCi/L			MXH8	07/16/18	1623	1782193	3
<b>Liquid Scint Ni63, Liquid "As Received"</b>													
Nickel-63	U	-1.27	+/-19.8	34.2	50.0	pCi/L			TXJ1	07/27/18	2155	1782215	4

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 901.1	
2	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified	
3	EPA 906.0 Modified	
4	DOE RESL Ni-1, Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Strontium Carrier	GFPC, Sr90, liquid "As Received"			81.1	(25%-125%)
Nickel Carrier	Liquid Scint Ni63, Liquid "As Received"			81.6	(25%-125%)

**Notes:**  
 Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

# GEL LABORATORIES LLC

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## QC Summary

Report Date: July 30, 2018

Page 1 of 4

**LaCrosseSolutions**  
**S4601 State Hwy 35**  
**Genoa, Wisconsin**

**Contact: Mr. Jason Q. Spaide**

**Workorder: 454574**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Rad Gamma Spec</b>											
Batch	1782348										
QC1204069554 454574001 DUP											
Cesium-137	U	-3.12	U	-0.43	pCi/L	N/A		N/A	BSW1	07/16/18	19:32
	Uncertainty	+/-4.06		+/-3.70							
Cobalt-60	U	-0.0719	U	-1.8	pCi/L	N/A		N/A			
	Uncertainty	+/-4.01		+/-3.94							
Europium-152	U	0.598	U	0.735	pCi/L	N/A		N/A			
	Uncertainty	+/-10.4		+/-8.73							
Europium-154	U	-18.7	U	-6.64	pCi/L	N/A		N/A			
	Uncertainty	+/-19.5		+/-9.73							
QC1204069555 LCS											
Americium-241		1.10E+05		1.13E+05	pCi/L		103	(75%-125%)		07/16/18	18:00
	Uncertainty			+/-4070							
Cesium-137		41000		43500	pCi/L		106	(75%-125%)			
	Uncertainty			+/-839							
Cobalt-60		33000		34400	pCi/L		104	(75%-125%)			
	Uncertainty			+/-848							
Europium-152			U	285	pCi/L						
	Uncertainty			+/-395							
Europium-154			U	4.69	pCi/L						
	Uncertainty			+/-233							
QC1204069553 MB											
Cesium-137			U	-2.51	pCi/L					07/16/18	19:32
	Uncertainty			+/-4.50							
Cobalt-60			U	1.45	pCi/L						
	Uncertainty			+/-3.37							
Europium-152			U	-1.35	pCi/L						
	Uncertainty			+/-11.8							
Europium-154			U	-11.8	pCi/L						
	Uncertainty			+/-10.4							



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## QC Summary

Workorder: 454574

Page 2 of 4

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Rad Gas Flow</b>											
Batch 1782510											
QC1204069938	454574001	DUP									
Strontium-90	U	1.36	U	-0.974	pCi/L	N/A		N/A	LXB3	07/19/18	12:29
	Uncertainty	+/-0.947		+/-0.708							
QC1204069939	LCS										
Strontium-90	77.7			73.6	pCi/L		94.7	(75%-125%)		07/19/18	12:29
	Uncertainty			+/-4.26							
QC1204069937	MB										
Strontium-90			U	-0.90	pCi/L					07/19/18	12:31
	Uncertainty			+/-0.834							
<b>Rad Liquid Scintillation</b>											
Batch 1782177											
QC1204069175	454574003	DUP									
Tritium	U	-49.3	U	232	pCi/L	N/A		N/A	BXM4	07/16/18	13:09
	Uncertainty	+/-271		+/-299							
QC1204069177	LCS										
Tritium	2520			2210	pCi/L		87.8*	(90%-110%)		07/17/18	07:52
	Uncertainty			+/-463							
QC1204069174	MB										
Tritium			U	50.9	pCi/L					07/16/18	12:48
	Uncertainty			+/-280							
QC1204069176	454574003	MS									
Tritium	2520	U		2260	pCi/L		89.5	(80%-120%)		07/16/18	13:30
	Uncertainty	+/-271		+/-428							
Batch 1782193											
QC1204069209	454574001	DUP									
Tritium	U	281	U	54.3	pCi/L	N/A		N/A	AMXH8	07/16/18	17:06
	Uncertainty	+/-294		+/-279							
QC1204069211	LCS										
Tritium	2520			2350	pCi/L		93.2	(75%-125%)		07/16/18	17:49
	Uncertainty			+/-408							
QC1204069208	MB										
Tritium			U	-312	pCi/L					07/16/18	16:45
	Uncertainty			+/-246							

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## QC Summary

Workorder: 454574

Page 3 of 4

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Rad Liquid Scintillation</b>											
Batch 1782193											
QC1204069210 454574001 MS											
Tritium	5050	U	281	5160	pCi/L		102	(75%-125%)	MXH8	07/16/18	17:28
	Uncertainty		+/-294	+/-840							
Batch 1782215											
QC1204069260 454574001 DUP											
Nickel-63		U	14.2	12.8	pCi/L	N/A			N/A	TXJ1	07/27/18 22:58
	Uncertainty		+/-20.6	+/-19.7							
QC1204069261 LCS											
Nickel-63	1330			1430	pCi/L		107	(75%-125%)			07/27/18 23:29
	Uncertainty			+/-47.5							
QC1204069259 MB											
Nickel-63			U	-5.61	pCi/L						07/27/18 22:26
	Uncertainty			+/-19.3							

**Notes:**

Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

The Qualifiers in this report are defined as follows:

- \*\* Analyte is a Tracer compound
- < Result is less than value reported
- > Result is greater than value reported
- BD Results are either below the MDC or tracer recovery is low
- FA Failed analysis.
- H Analytical holding time was exceeded
- J Value is estimated
- K Analyte present. Reported value may be biased high. Actual value is expected to be lower.
- L Analyte present. Reported value may be biased low. Actual value is expected to be higher.
- M M if above MDC and less than LLD
- M REMP Result > MDC/CL and < RDL
- N/A RPD or %Recovery limits do not apply.
- NI See case narrative
- ND Analyte concentration is not detected above the detection limit
- NJ Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Q One or more quality control criteria have not been met. Refer to the applicable narrative or DER.
- R Sample results are rejected
- U Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.
- UI Gamma Spectroscopy--Uncertain identification

# GEL LABORATORIES LLC

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## QC Summary

Workorder: 454574

Page 4 of 4

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
UJ	Gamma Spectroscopy--Uncertain identification										
UL	Not considered detected. The associated number is the reported concentration, which may be inaccurate due to a low bias.										
X	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier										
Y	Other specific qualifiers were required to properly define the results. Consult case narrative.										
^	RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.										
h	Preparation or preservation holding time was exceeded										

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.

^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.

\* Indicates that a Quality Control parameter was not within specifications.

For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

**Radiochemistry  
Technical Case Narrative  
LaCrosseSolutions, LLC (ENRG)  
SDG #: 454574**

**Product:** Gammascpec, Gamma, Cs-137, Co-60, Eu-152, Eu-154

**Analytical Method:** EPA 901.1

**Analytical Procedure:** GL-RAD-A-013 REV# 27

**Analytical Batch:** 1782348

The following samples were analyzed using the above methods and analytical procedure(s).

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
454574001	MW-202AR-071018
454574002	MW-202B-071018
454574003	Well-7-071018
454574004	Well-5-071018
454574005	B11R-071018
454574006	B11-AR-071018
454574007	Well-3-071018
454574008	MW-200A-071118
454574009	MW-200B-071118
454574010	MW-201BR-071118
454574011	MW-201A-071118
454574012	MW-203A-071118
454574013	MW-203B-071118
454574014	MW-204A-071218
454574015	MW-204B-071218
454574016	MW-204A-D-071218
1204069553	Method Blank (MB)
1204069554	454574001(MW-202AR-071018) Sample Duplicate (DUP)
1204069555	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

**Data Summary:**

There are no exceptions, anomalies or deviations from the specified methods. All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable.

**Product:** GFPC, Sr90, liquid

**Analytical Method:** EPA 905.0 Modified/DOE RP501 Rev. 1 Modified

**Analytical Procedure:** GL-RAD-A-004 REV# 20

**Analytical Batch:** 1782510

The following samples were analyzed using the above methods and analytical procedure(s).

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
------------------------------	--

454574001	MW-202AR-071018
454574002	MW-202B-071018
454574003	Well-7-071018
454574004	Well-5-071018
454574005	B11R-071018
454574006	B11-AR-071018
454574007	Well-3-071018
454574008	MW-200A-071118
454574009	MW-200B-071118
454574010	MW-201BR-071118
454574011	MW-201A-071118
454574012	MW-203A-071118
454574013	MW-203B-071118
454574014	MW-204A-071218
454574015	MW-204B-071218
454574016	MW-204A-D-071218
1204069937	Method Blank (MB)
1204069938	454574001(MW-202AR-071018) Sample Duplicate (DUP)
1204069939	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

**Data Summary:**

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

**Technical Information**

**Recounts**

Samples 454574007 (Well-3-071018) and 454574010 (MW-201BR-071118) were recounted due to results more negative than the three sigma TPU. The second counts are reported.

**Product: LSC, Tritium Dist, Liquid**

**Analytical Method:** EPA 906.0

**Analytical Procedure:** GL-RAD-A-050 REV# 11

**Analytical Batch:** 1782177

The following samples were analyzed using the above methods and analytical procedure(s).

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
454574003	Well-7-071018
454574004	Well-5-071018
454574007	Well-3-071018
1204069174	Method Blank (MB)
1204069175	454574003(Well-7-071018) Sample Duplicate (DUP)
1204069176	454574003(Well-7-071018) Matrix Spike (MS)
1204069177	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

**Data Summary:**

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

**Quality Control (QC) Information**

**Laboratory Control Sample (LCS) Recovery**

The Laboratory Control Sample does not meet the drinking water recovery requirement. However, the matrix spike meets the requirement showing that the method was in control during the analysis.

Sample	Analyte	Value
1204069177 (LCS)	Tritium	87.8* (90%-110%)

**Technical Information**

**Recounts**

Sample 1204069177 (LCS) was recounted due to low recovery. The recount is reported.

**Product: LSC, Tritium Dist, Liquid**

**Analytical Method:** EPA 906.0 Modified

**Analytical Procedure:** GL-RAD-A-002 REV# 22

**Analytical Batch:** 1782193

The following samples were analyzed using the above methods and analytical procedure(s).

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
454574001	MW-202AR-071018
454574002	MW-202B-071018
454574005	B11R-071018
454574006	B11-AR-071018
454574008	MW-200A-071118
454574009	MW-200B-071118
454574010	MW-201BR-071118
454574011	MW-201A-071118
454574012	MW-203A-071118
454574013	MW-203B-071118
454574014	MW-204A-071218
454574015	MW-204B-071218
454574016	MW-204A-D-071218
1204069208	Method Blank (MB)
1204069209	454574001(MW-202AR-071018) Sample Duplicate (DUP)
1204069210	454574001(MW-202AR-071018) Matrix Spike (MS)
1204069211	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

**Data Summary:**

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

**Technical Information**

**Recounts**

Sample 454574012 (MW-203A-071118) was recounted to verify sample results. The recount results are similar to the original results. Original results are reported.

**Miscellaneous Information**

**Additional Comments**

The matrix spike, 1204069210 (MW-202AR-071018MS), aliquot was reduced to conserve sample volume.

**Product: Liquid Scint Ni63, Liquid**

**Analytical Method:** DOE RESL Ni-1, Modified

**Analytical Procedure:** GL-RAD-A-022 REV# 18

**Analytical Batch:** 1782215

The following samples were analyzed using the above methods and analytical procedure(s).

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
454574001	MW-202AR-071018
454574002	MW-202B-071018
454574003	Well-7-071018
454574004	Well-5-071018
454574005	B11R-071018
454574006	B11-AR-071018
454574007	Well-3-071018
454574008	MW-200A-071118
454574009	MW-200B-071118
454574010	MW-201BR-071118
454574011	MW-201A-071118
454574012	MW-203A-071118
454574013	MW-203B-071118
454574014	MW-204A-071218
454574015	MW-204B-071218
454574016	MW-204A-D-071218
1204069259	Method Blank (MB)
1204069260	454574001(MW-202AR-071018) Sample Duplicate (DUP)
1204069261	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

**Data Summary:**

There are no exceptions, anomalies or deviations from the specified methods. All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable.



**Certification Statement**

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

Page: 1 of 2  
 Project # 128924  
 GEL Quote #:  
 COC Number <sup>(1)</sup>: 2018-0712  
 PO Number: 622583



**Laboratories LLC**  
 Chemistry | Radiochemistry | Radiobiology | Specialty Analytics

GEL Laboratories, LLC  
 2040 Savage Road  
 Charleston, SC 29407  
 Phone: (843) 556-8171  
 Fax: (843) 766-1178

**Chain of Custody and Analytical Request**

GEL Work Order Number: 454574 GEL Project Manager:

Client Name: Lacrosse Solutions Phone # 860 817 3152

Sample Analysis Requested <sup>(5)</sup> (Fill in the number of containers for each test)

Project/Site Name: LACBWR GW Fax #

Should this sample be considered:	Total number of containers	NI	NI	NI	NI	NI	NI													
		← Preservative Type (6)																		

Address: 54601 State Hwy 35, Genoa, WI 54632

Collected By: M. van Noodennen Send Results To: J. Spaide

**Comments**  
 Note: extra sample is required for sample specific QC

Sample ID <i>* For composites - indicate start and stop date/time</i>	*Date Collected (mm-dd-yy)	*Time Collected (Military) (hhmm)	QC Code <sup>(2)</sup>	Field Filtered <sup>(3)</sup>	Sample Matrix <sup>(4)</sup>	Radiation Please supply isotopic info.	(7) Known or possible hazards	Total number of containers	H-3	5r-90	Co-60	Cs-137	Ni-63	Eu-152	Eu-154								
MW-202AR-071018	7-10-18	1412	N	N	GW	N	-	3	*	X	X	X	X	X	X								* Please expedite
MW-202B-071018	7-10-18	1307	N	N	GW	N	-	3	*	X	X	X	X	X	X								H-3 analysis
Well-7-071018	7-10-18	1255	N	N	DW	N	-	3	*	X	X	X	X	X	X								3-day TAT
Well-5-071018	7-10-18	1235	N	N	DW	N	-	3	*	X	X	X	X	X	X								
B11R-071018	7-10-18	1008	N	N	GW	N	-	3	*	X	X	X	X	X	X								
B11-AR-071018	7-10-18	0943	N	N	GW	N	-	3	*	X	X	X	X	X	X								
Well-3-071018	7-10-18	1345	N	N	DW	N	-	3	*	X	X	X	X	X	X								
MW-200A-071118	7-11-18	0907	N	N	GW	N	-	3	*	X	X	X	X	X	X								
MW-200B-071118	7-11-18	0845	N	N	GW	N	-	3	*	X	X	X	X	X	X								
MW-201BR-071118	7-11-18	1105	N	N	GW	N	-	3	*	X	X	X	X	X	X								

**Chain of Custody Signatures**

TAT Requested: Normal:  Rush:  Specify: \_\_\_\_\_ (Subject to Surcharge)

Relinquished/By (Signed)	Date	Time	Received by (signed)	Date	Time	Fax Results: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
	7.12.18	1035		7/13/18	0850	Select Deliverable: <input type="checkbox"/> C of A <input type="checkbox"/> QC Summary <input type="checkbox"/> Level 1 <input checked="" type="checkbox"/> Level 2 <input type="checkbox"/> Level 3 <input type="checkbox"/> Level 4
2			2			Additional Remarks:
3			3			For Lab Receiving Use Only: Custody Seal Intact? <input type="checkbox"/> Yes <input type="checkbox"/> No Cooler Temp: _____ °C

> For sample shipping and delivery details, see Sample Receipt & Review form (SRR.) Sample Collection Time Zone:  Eastern  Pacific  Central  Mountain  Other: \_\_\_\_\_

- Chain of Custody Number = Client Determined
- QC Codes: N = Normal Sample, TB = Trip Blank, FD = Field Duplicate, EB = Equipment Blank, MS = Matrix Spike Sample, MSD = Matrix Spike Duplicate Sample, G = Grab, C = Composite
- Field Filtered: For liquid matrices, indicate with a - Y - for yes the sample was field filtered or - N - for sample was not field filtered.
- Matrix Codes: DW=Drinking Water, GW=Groundwater, SW=Surface Water, WW=Waste Water, W=Water, ML=Misc Liquid, SO=Soil, SD=Sediment, SL=Sludge, SS=Solid Waste, O=Oil, F=Filter, P=Wipe, U=Urine, F=Fecal, N=Nasal
- Sample Analysis Requested: Analytical method requested (i.e. 8260B, 6010B/7470A) and number of containers provided for each (i.e. 8260B - 3, 6010B/7470A - 1).
- Preservative Type: HA = Hydrochloric Acid, NI = Nitric Acid, SH = Sodium Hydroxide, SA = Sulfuric Acid, AA = Ascorbic Acid, HX = Hexane, ST = Sodium Thiosulfate, If no preservative is added = leave field blank

7.) Are there any known or possible hazards associated with these samples?	<b>Characteristic Hazards</b> FL = Flammable/Ignitable CO = Corrosive RE = Reactive	<b>Listed Waste</b> LW = Listed Waste (F,K,P and U-listed wastes.) Waste code(s):	<b>Other</b> OT = Other / Unknown (i.e.: High/low pH, asbestos, beryllium, irritants, other misc. health hazards, etc.) Description:	Please provide any additional details below regarding handling and/or disposal concerns. (i.e.: Origin of sample(s), type of site collected from, odd matrices, etc.)
<b>RCRA Metals</b> As = Arsenic    Hg = Mercury Ba = Barium    Se = Selenium Cd = Cadmium    Ag = Silver Cr = Chromium    MR = Miscellaneous Pb = Lead        RCRA metals	<b>TSCA Regulated</b> PCB = Polychlorinated biphenyls			

Page: 2 of 2  
Project # 128924  
GEL Quote #:  
POC Number (1): 2018-0712  
PO Number: 62583



Laboratories LLC  
Chemistry | Radiochemistry | Radiobiology | Specialty Analytics  
Chain of Custody and Analytical Request

GEL Laboratories, LLC  
2040 Savage Road  
Charleston, SC 29407  
Phone: (843) 556-8171  
Fax: (843) 766-1178

GEL Work Order Number: GEL Project Manager:

Client Name: La Crosse Solutions Phone # 860 817 3152  
Sample Analysis Requested (5) (Fill in the number of containers for each test)

Project/Site Name: LACBWR GW Fax #  
Address: S 4601 State Hwy 35 Genoa, WI 54632  
Collected By: M. van Noordennen Send Results To: J. Sparde

Table with columns: Sample ID, Date Collected, Time Collected, QC Code, Field Filtered, Sample Matrix, Radioactive, (7) Known or possible hazards, Total number of containers, and Preservative Type (6). Includes handwritten entries for various sample IDs like MW-201A-071118.

Chain of Custody Signatures TAT Requested: Normal: X Rush: \* Specify: (Subject to Surcharge)

Table for Chain of Custody Signatures with columns: Relinquished By (Signed), Date, Time, Received by (signed), Date, Time. Includes handwritten signatures and dates.

For Lab Receiving Use Only: Custody Seal Intact? [ ] Yes [ ] No Cooler Temp: °C  
Sample Collection Time Zone: [ ] Eastern [ ] Pacific [X] Central [ ] Mountain [ ] Other:

- 1.) Chain of Custody Number = Client Determined
2.) QC Codes: N = Normal Sample, TB = Trip Blank, FD = Field Duplicate, EB = Equipment Blank. MS = Matrix Spike Sample, MSD = Matrix Spike Duplicate Sample, G = Grab, C = Composite
3.) Field Filtered: For liquid matrices, indicate with a - Y - for yes the sample was field filtered or - N - for sample was not field filtered.
4.) Matrix Codes: DW=Drinking Water, GW=Groundwater, SW=Surface Water, WW=Waste Water, W=Water, ML=Misc Liquid, SO=Soil, SD=Sediment, SL=Sludge, SS=Solid Waste, O=Oil, F=Filter, P=Wipe, U=Urine, F=Fecal, N=Nasal
5.) Sample Analysis Requested: Analytical method requested (i.e. 8260B, 6010B/7470A) and number of containers provided for each (i.e. 8260B - 3, 6010B/7470A - 1).
6.) Preservative Type: HA = Hydrochloric Acid, NI = Nitric Acid, SH = Sodium Hydroxide, SA = Sulfuric Acid, AA = Ascorbic Acid, HX = Hexane, ST = Sodium Thiosulfate, If no preservative is added = leave field blank

7.) Are there any known or possible hazards associated with these samples?
Characteristic Hazards: FL = Flammable/Ignitable, CO = Corrosive, RE = Reactive
Listed Waste: LW = Listed Waste (F, K, P and U-listed wastes.) Waste code(s):
Other: OT = Other / Unknown (i.e.: High/low pH, asbestos, beryllium, irritants, other misc. health hazards, etc.) Description:
Please provide any additional details below regarding handling and/or disposal concerns. (i.e.: Origin of sample(s), type of site collected from, odd matrices, etc.)

**SAMPLE RECEIPT & REVIEW FORM**

Client: <b>ENRG</b>		SDG/AR/COC/Work Order: <b>454574</b>		
Received By: <b>C. Tarplin</b>		Date Received: <b>July 13, 2018</b> <span style="float:right"><b>EK</b></span>		
Carrier and Tracking Number		Circle Applicable: <input type="checkbox"/> FedEx Express <input type="checkbox"/> FedEx Ground <input type="checkbox"/> UPS <input type="checkbox"/> Field Services <input type="checkbox"/> Courier <input type="checkbox"/> Other		
		<b>7726 9118 9989 (3)</b>		
Suspected Hazard Information	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	*If Net Counts > 100cpm on samples not marked "radioactive". contact the Radiation Safety Group for further investigation.		
Shipped as a DOT Hazardous?	<input checked="" type="checkbox"/>	Hazard Class Shipped: _____ UN#: _____		
COC/Samples marked or classified as radioactive?	<input checked="" type="checkbox"/>	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): <u>0</u> <b>(CPM)</b> mR/Hr Classified as: Rad 1    Rad 2    Rad 3		
Is package, COC, and/or Samples marked HAZ?	<input checked="" type="checkbox"/>	If yes, select Hazards below, and contact the GEL Safety Group. PCB's    Flammable    Foreign Soil    RCRA    Asbestos    Beryllium    Other: _____		
Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1 Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>			Circle Applicable: Seals broken    Damaged container    Leaking container    Other (describe)
2 Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>			
3 Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	<input checked="" type="checkbox"/>			Preservation Method: Wet Ice    Ice Packs    Dry ice <b>(None)</b> Other: _____ *all temperatures are recorded in Celsius <span style="float:right"><b>TEMP: 21c</b></span>
4 Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>			<b>Temperature Device Serial #:</b> _____ IR4-17 Secondary Temperature Device Serial # (If Applicable): _____
5 Sample containers intact and sealed?	<input checked="" type="checkbox"/>			Circle Applicable: Seals broken    Damaged container    Leaking container    Other (describe)
6 Samples requiring chemical preservation at proper pH?	<input checked="" type="checkbox"/>			Sample ID's and Containers Affected: _____ If Preservation added, Lot#: _____
7 Do any samples require Volatile Analysis?	<input checked="" type="checkbox"/>			If Yes, Are Encores or Soil Kits present? Yes ___ No ___ (If yes, take to VOA Freezer) Do VOA vials contain acid preservation? Yes ___ No ___ N/A ___ (If unknown, select No) <input checked="" type="checkbox"/> VOA vials free of headspace? Yes ___ No ___ N/A ___ Sample ID's and containers affected: _____
8 Samples received within holding time?	<input checked="" type="checkbox"/>			ID's and tests affected: _____
9 Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>			Sample ID's and containers affected: _____
10 Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>			Sample ID's affected: _____
11 Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>			Sample ID's affected: _____
12 Are sample containers identifiable as GEL provided?	<input checked="" type="checkbox"/>			
13 COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>			
Comments (Use Continuation Form if needed):				

PM (or PMA) review: Initials AST Date 7/16/18 Page 1 of 1

**List of current GEL Certifications as of 30 July 2018**

<b>State</b>	<b>Certification</b>
Alaska	17-018
Arkansas	88-0651
CLIA	42D0904046
California	2940
Colorado	SC00012
Connecticut	PH-0169
Delaware	SC00012
DoD ELAP/ ISO17025 A2LA	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330-15-00283, P330-15-00253
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC00012
Idaho Chemistry	SC00012
Idaho Radiochemistry	SC00012
Illinois NELAP	200029
Indiana	C-SC-01
Kansas NELAP	E-10332
Kentucky SDWA	90129
Kentucky Wastewater	90129
Louisiana NELAP	03046 (AI33904)
Louisiana SDWA	LA180011
Maryland	270
Massachusetts	M-SC012
Michigan	9976
Mississippi	SC00012
Nebraska	NE-OS-26-13
Nevada	SC000122018-1
New Hampshire NELAP	205415
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
North Dakota	R-158
Oklahoma	9904
Pennsylvania NELAP	68-00485
Puerto Rico	SC00012
S. Carolina Radiochem	10120002
South Carolina Chemistry	10120001
Tennessee	TN 02934
Texas NELAP	T104704235-18-13
Utah NELAP	SC000122018-26
Vermont	VT87156
Virginia NELAP	460202
Washington	C780
West Virginia	997404



September 11, 2018

Mr. Jason Q. Spaide  
LaCrosseSolutions  
S4601 State Hwy 35  
Genoa, Wisconsin 54632

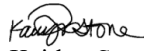
Re: LACBWR Site Restoration Project  
Work Order: 457516

Dear Mr. Spaide:

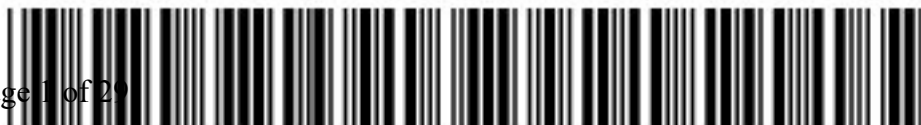
GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on August 22, 2018. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

Our policy is to provide high quality, personalized analytical services to enable you to meet your analytical needs on time every time. We trust that you will find everything in order and to your satisfaction. If you have any questions, please do not hesitate to call me at (843) 556-8171, ext. 4453.

Sincerely,

  
Kaitlyn Stone for  
Edith Kent  
Project Manager

Purchase Order: 672583  
Enclosures



## GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 – (843) 556-8171 – www.gel.com

### Certificate of Analysis Report for

ENRG070 LaCrosseSolutions, LLC (672583)

Client SDG: 457516 GEL Work Order: 457516

**The Qualifiers in this report are defined as follows:**

- \* A quality control analyte recovery is outside of specified acceptance criteria
- \*\* Analyte is a Tracer compound
- \*\* Analyte is a surrogate compound
- U Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.
- UI Gamma Spectroscopy—Uncertain identification

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the Certificate of Analysis.

The designation ND, if present, appears in the result column when the analyte concentration is not detected above the limit as defined in the 'U' qualifier above.

This data report has been prepared and reviewed in accordance with GEL Laboratories LLC standard operating procedures. Please direct any questions to your Project Manager, Edith Kent.

Reviewed by \_\_\_\_\_





# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Report Date: September 11, 2018

Company : LaCrosseSolutions  
 Address : S4601 State Hwy 35  
  
 Genoa, Wisconsin 54632  
 Contact: Mr. Jason Q. Spaide  
 Project: LACBWR Site Restoration Project

Client Sample ID: B11R-081418	Project: ENRG07001
Sample ID: 457516001	Client ID: ENRG070
Matrix: Ground Water	
Collect Date: 14-AUG-18 09:56	
Receive Date: 22-AUG-18	
Collector: Client	

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Rad Gamma Spec Analysis</b>													
Gammaspec, Gamma, Cs-137, Co-60, Eu-152, Eu-154 "As Received"													
Cesium-137	U	0.211	+/-3.10	5.63	10.0	pCi/L			MXR1	08/30/18	0718	1795796	1
Cobalt-60	U	1.62	+/-2.97	6.34		pCi/L							
Europium-152	U	2.03	+/-8.22	15.2		pCi/L							
Europium-154	U	-2.76	+/-9.24	16.8		pCi/L							
<b>Rad Gas Flow Proportional Counting</b>													
GFPC, Sr90, liquid "As Received"													
Strontium-90	U	-1.21	+/-0.903	1.90	2.00	pCi/L			KSD1	08/29/18	1110	1796306	2
<b>Rad Liquid Scintillation Analysis</b>													
LSC, Tritium Dist, Liquid "As Received"													
Tritium	U	-200	+/-277	525	700	pCi/L			BXM4	08/24/18	0329	1795966	3
<b>Liquid Scint Ni63, Liquid "As Received"</b>													
Nickel-63	U	9.57	+/-22.4	38.2	50.0	pCi/L			TXJ1	09/07/18	1227	1795997	4

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 901.1	
2	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified	
3	EPA 906.0 Modified	
4	DOE RESL Ni-1, Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Strontium Carrier	GFPC, Sr90, liquid "As Received"			87.6	(25%-125%)
Nickel Carrier	Liquid Scint Ni63, Liquid "As Received"			71.1	(25%-125%)

**Notes:**  
 Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Report Date: September 11, 2018

Company : LaCrosseSolutions  
 Address : S4601 State Hwy 35  
  
 Genoa, Wisconsin 54632  
 Contact: Mr. Jason Q. Spaide  
 Project: LACBWR Site Restoration Project

Client Sample ID: B11AR-081418	Project: ENRG07001
Sample ID: 457516002	Client ID: ENRG070
Matrix: Ground Water	
Collect Date: 14-AUG-18 09:45	
Receive Date: 22-AUG-18	
Collector: Client	

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Rad Gamma Spec Analysis</b>													
Gammaspec, Gamma, Cs-137, Co-60, Eu-152, Eu-154 "As Received"													
Cesium-137	U	0.0977	+/-3.00	5.87	10.0	pCi/L			MXR1	08/30/18	0718	1795796	1
Cobalt-60	U	0.568	+/-3.52	7.25		pCi/L							
Europium-152	U	0.253	+/-8.28	15.5		pCi/L							
Europium-154	U	11.2	+/-11.7	21.7		pCi/L							
<b>Rad Gas Flow Proportional Counting</b>													
GFPC, Sr90, liquid "As Received"													
Strontium-90	U	1.00	+/-1.14	1.91	2.00	pCi/L			KSD1	08/28/18	1607	1796306	2
<b>Rad Liquid Scintillation Analysis</b>													
LSC, Tritium Dist, Liquid "As Received"													
Tritium	U	32.9	+/-291	518	700	pCi/L			BXM4	08/24/18	0351	1795966	3
Liquid Scint Ni63, Liquid "As Received"													
Nickel-63	U	-5.34	+/-21.1	36.7	50.0	pCi/L			TXJ1	09/07/18	1259	1795997	4

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 901.1	
2	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified	
3	EPA 906.0 Modified	
4	DOE RESL Ni-1, Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Strontium Carrier	GFPC, Sr90, liquid "As Received"			59.2	(25%-125%)
Nickel Carrier	Liquid Scint Ni63, Liquid "As Received"			73.8	(25%-125%)

**Notes:**  
 Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Report Date: September 11, 2018

Company : LaCrosseSolutions  
 Address : S4601 State Hwy 35  
  
 Genoa, Wisconsin 54632  
 Contact: Mr. Jason Q. Spaide  
 Project: LACBWR Site Restoration Project

Client Sample ID: MW-200A-081418	Project: ENRG07001
Sample ID: 457516003	Client ID: ENRG070
Matrix: Ground Water	
Collect Date: 14-AUG-18 14:12	
Receive Date: 22-AUG-18	
Collector: Client	

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Rad Gamma Spec Analysis</b>													
Gammaspec, Gamma, Cs-137, Co-60, Eu-152, Eu-154 "As Received"													
Cesium-137	U	-1.84	+/-3.59	5.55	10.0	pCi/L			MXR1	08/30/18	0727	1795796	1
Cobalt-60	U	0.454	+/-3.54	6.92		pCi/L							
Europium-152	U	-3.59	+/-8.85	15.5		pCi/L							
Europium-154	U	2.81	+/-9.91	19.9		pCi/L							
<b>Rad Gas Flow Proportional Counting</b>													
GFPC, Sr90, liquid "As Received"													
Strontium-90	U	1.31	+/-1.11	1.78	2.00	pCi/L			KSD1	08/28/18	1607	1796306	2
<b>Rad Liquid Scintillation Analysis</b>													
LSC, Tritium Dist, Liquid "As Received"													
Tritium	U	-212	+/-274	521	700	pCi/L			BXM4	08/24/18	0412	1795966	3
Liquid Scint Ni63, Liquid "As Received"													
Nickel-63	U	-4.15	+/-21.4	37.3	50.0	pCi/L			TXJ1	09/07/18	1331	1795997	4

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 901.1	
2	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified	
3	EPA 906.0 Modified	
4	DOE RESL Ni-1, Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Strontium Carrier	GFPC, Sr90, liquid "As Received"			82.8	(25%-125%)
Nickel Carrier	Liquid Scint Ni63, Liquid "As Received"			72.7	(25%-125%)

**Notes:**  
 Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Report Date: September 11, 2018

Company : LaCrosseSolutions  
 Address : S4601 State Hwy 35  
  
 Genoa, Wisconsin 54632  
 Contact: Mr. Jason Q. Spaide  
 Project: LACBWR Site Restoration Project

Client Sample ID: MW-200B-081418	Project: ENRG07001
Sample ID: 457516004	Client ID: ENRG070
Matrix: Ground Water	
Collect Date: 14-AUG-18 13:50	
Receive Date: 22-AUG-18	
Collector: Client	

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Rad Gamma Spec Analysis</b>													
Gammaspec, Gamma, Cs-137, Co-60, Eu-152, Eu-154 "As Received"													
Cesium-137	U	1.55	+/-3.83	6.97	10.0	pCi/L			MXR1	08/30/18	0728	1795796	1
Cobalt-60	U	2.18	+/-3.20	6.78		pCi/L							
Europium-152	U	-1.37	+/-9.77	17.2		pCi/L							
Europium-154	U	-3.54	+/-8.58	15.4		pCi/L							
<b>Rad Gas Flow Proportional Counting</b>													
GFPC, Sr90, liquid "As Received"													
Strontium-90	U	0.677	+/-1.06	1.85	2.00	pCi/L			KSD1	08/28/18	1613	1796306	2
<b>Rad Liquid Scintillation Analysis</b>													
LSC, Tritium Dist, Liquid "As Received"													
Tritium	U	-77.6	+/-284	520	700	pCi/L			BXM4	08/24/18	0433	1795966	3
Liquid Scint Ni63, Liquid "As Received"													
Nickel-63	U	3.09	+/-21.3	36.6	50.0	pCi/L			TXJ1	09/07/18	1402	1795997	4

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 901.1	
2	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified	
3	EPA 906.0 Modified	
4	DOE RESL Ni-1, Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Strontium Carrier	GFPC, Sr90, liquid "As Received"			85.2	(25%-125%)
Nickel Carrier	Liquid Scint Ni63, Liquid "As Received"			74.6	(25%-125%)

**Notes:**

Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Report Date: September 11, 2018

Company : LaCrosseSolutions  
 Address : S4601 State Hwy 35  
  
 Genoa, Wisconsin 54632  
 Contact: Mr. Jason Q. Spaide  
 Project: LACBWR Site Restoration Project

Client Sample ID: MW-201A-081518	Project: ENRG07001
Sample ID: 457516005	Client ID: ENRG070
Matrix: Ground Water	
Collect Date: 15-AUG-18 08:25	
Receive Date: 22-AUG-18	
Collector: Client	

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Rad Gamma Spec Analysis</b>													
Gammaspec, Gamma, Cs-137, Co-60, Eu-152, Eu-154 "As Received"													
Cesium-137	U	1.77	+/-3.27	6.55	10.0	pCi/L			MXR1	08/30/18	0728	1795796	1
Cobalt-60	U	-0.572	+/-3.80	7.30		pCi/L							
Europium-152	U	3.64	+/-10.1	18.5		pCi/L							
Europium-154	U	2.79	+/-9.80	19.4		pCi/L							
<b>Rad Gas Flow Proportional Counting</b>													
GFPC, Sr90, liquid "As Received"													
Strontium-90	U	1.44	+/-1.08	1.67	2.00	pCi/L			KSD1	08/28/18	1607	1796306	2
<b>Rad Liquid Scintillation Analysis</b>													
LSC, Tritium Dist, Liquid "As Received"													
Tritium	U	24.4	+/-292	521	700	pCi/L			BXM4	08/24/18	0455	1795966	3
Liquid Scint Ni63, Liquid "As Received"													
Nickel-63	U	-8.59	+/-21.7	37.9	50.0	pCi/L			TXJ1	09/07/18	1434	1795997	4

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 901.1	
2	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified	
3	EPA 906.0 Modified	
4	DOE RESL Ni-1, Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Strontium Carrier	GFPC, Sr90, liquid "As Received"			73.4	(25%-125%)
Nickel Carrier	Liquid Scint Ni63, Liquid "As Received"			71.5	(25%-125%)

**Notes:**  
 Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Report Date: September 11, 2018

Company : LaCrosseSolutions  
 Address : S4601 State Hwy 35  
  
 Genoa, Wisconsin 54632  
 Contact: Mr. Jason Q. Spaide  
 Project: LACBWR Site Restoration Project

Client Sample ID: MW-201BR-081518	Project: ENRG07001
Sample ID: 457516006	Client ID: ENRG070
Matrix: Ground Water	
Collect Date: 15-AUG-18 08:05	
Receive Date: 22-AUG-18	
Collector: Client	

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Rad Gamma Spec Analysis</b>													
Gammaspec, Gamma, Cs-137, Co-60, Eu-152, Eu-154 "As Received"													
Cesium-137	U	-0.478	+/-3.02	5.38	10.0	pCi/L			MXR1	08/30/18	0729	1795796	1
Cobalt-60	U	-0.398	+/-2.54	4.89		pCi/L							
Europium-152	U	0.119	+/-7.42	13.8		pCi/L							
Europium-154	U	0.338	+/-8.03	15.7		pCi/L							
<b>Rad Gas Flow Proportional Counting</b>													
GFPC, Sr90, liquid "As Received"													
Strontium-90	U	0.730	+/-1.04	1.78	2.00	pCi/L			KSD1	08/28/18	1607	1796306	2
<b>Rad Liquid Scintillation Analysis</b>													
LSC, Tritium Dist, Liquid "As Received"													
Tritium	U	-151	+/-271	507	700	pCi/L			BXM4	08/24/18	0516	1795966	3
Liquid Scint Ni63, Liquid "As Received"													
Nickel-63	U	-3.9	+/-22.4	38.9	50.0	pCi/L			TXJ1	09/07/18	1506	1795997	4

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 901.1	
2	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified	
3	EPA 906.0 Modified	
4	DOE RESL Ni-1, Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Strontium Carrier	GFPC, Sr90, liquid "As Received"			80.5	(25%-125%)
Nickel Carrier	Liquid Scint Ni63, Liquid "As Received"			69.9	(25%-125%)

**Notes:**  
 Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Report Date: September 11, 2018

Company : LaCrosseSolutions  
 Address : S4601 State Hwy 35  
  
 Genoa, Wisconsin 54632  
 Contact: Mr. Jason Q. Spaide  
 Project: LACBWR Site Restoration Project

Client Sample ID: MW-202AR-081518	Project: ENRG07001
Sample ID: 457516007	Client ID: ENRG070
Matrix: Ground Water	
Collect Date: 15-AUG-18 10:09	
Receive Date: 22-AUG-18	
Collector: Client	

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Rad Gamma Spec Analysis</b>													
Gammaspec, Gamma, Cs-137, Co-60, Eu-152, Eu-154 "As Received"													
Cesium-137	U	-0.0899	+/-3.23	5.88	10.0	pCi/L			MXR1	08/30/18	0729	1795796	1
Cobalt-60	U	5.04	+/-3.91	5.46		pCi/L							
Europium-152	U	-6.29	+/-7.85	13.6		pCi/L							
Europium-154	U	-1.99	+/-9.72	18.4		pCi/L							
<b>Rad Gas Flow Proportional Counting</b>													
GFPC, Sr90, liquid "As Received"													
Strontium-90	U	1.49	+/-1.12	1.73	2.00	pCi/L			KSD1	08/28/18	1613	1796306	2
<b>Rad Liquid Scintillation Analysis</b>													
LSC, Tritium Dist, Liquid "As Received"													
Tritium		937	+/-356	526	700	pCi/L			BXM4	08/24/18	1213	1795966	3
Liquid Scint Ni63, Liquid "As Received"													
Nickel-63	U	20.4	+/-22.8	38.3	50.0	pCi/L			TXJ1	09/07/18	1537	1795997	4

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 901.1	
2	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified	
3	EPA 906.0 Modified	
4	DOE RESL Ni-1, Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Strontium Carrier	GFPC, Sr90, liquid "As Received"			73.4	(25%-125%)
Nickel Carrier	Liquid Scint Ni63, Liquid "As Received"			71.1	(25%-125%)

**Notes:**  
 Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit



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## Certificate of Analysis

Report Date: September 11, 2018

Company : LaCrosseSolutions  
 Address : S4601 State Hwy 35  
  
 Genoa, Wisconsin 54632  
 Contact: Mr. Jason Q. Spaide  
 Project: LACBWR Site Restoration Project

Client Sample ID: MW-202B-081518	Project: ENRG07001
Sample ID: 457516008	Client ID: ENRG070
Matrix: Ground Water	
Collect Date: 15-AUG-18 10:00	
Receive Date: 22-AUG-18	
Collector: Client	

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Rad Gamma Spec Analysis</b>													
Gammaspec, Gamma, Cs-137, Co-60, Eu-152, Eu-154 "As Received"													
Cesium-137	U	0.257	+/-4.08	6.64	10.0	pCi/L			MXR1	08/30/18	0739	1795796	1
Cobalt-60	U	2.41	+/-4.03	8.56		pCi/L							
Europium-152	U	-0.816	+/-8.71	15.9		pCi/L							
Europium-154	U	-5.41	+/-13.9	24.4		pCi/L							
<b>Rad Gas Flow Proportional Counting</b>													
GFPC, Sr90, liquid "As Received"													
Strontium-90	U	0.593	+/-0.985	1.73	2.00	pCi/L			KSD1	08/28/18	1607	1796306	2
<b>Rad Liquid Scintillation Analysis</b>													
LSC, Tritium Dist, Liquid "As Received"													
Tritium	U	-290	+/-272	528	700	pCi/L			BXM4	08/24/18	1234	1795966	3
<b>Liquid Scint Ni63, Liquid "As Received"</b>													
Nickel-63	U	6.63	+/-22.1	37.8	50.0	pCi/L			TXJ1	09/07/18	1609	1795997	4

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 901.1	
2	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified	
3	EPA 906.0 Modified	
4	DOE RESL Ni-1, Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Strontium Carrier	GFPC, Sr90, liquid "As Received"			75.7	(25%-125%)
Nickel Carrier	Liquid Scint Ni63, Liquid "As Received"			72.7	(25%-125%)

**Notes:**  
 Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

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## Certificate of Analysis

Report Date: September 11, 2018

Company : LaCrosseSolutions  
 Address : S4601 State Hwy 35  
  
 Genoa, Wisconsin 54632  
 Contact: Mr. Jason Q. Spaide  
 Project: LACBWR Site Restoration Project

Client Sample ID: MW-203A-081518	Project: ENRG07001
Sample ID: 457516009	Client ID: ENRG070
Matrix: Ground Water	
Collect Date: 15-AUG-18 15:10	
Receive Date: 22-AUG-18	
Collector: Client	

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Rad Gamma Spec Analysis</b>													
Gammaspec, Gamma, Cs-137, Co-60, Eu-152, Eu-154 "As Received"													
Cesium-137	U	0.608	+/-2.81	5.42	10.0	pCi/L			MXR1	08/30/18	0826	1795796	1
Cobalt-60	U	-2.12	+/-3.17	5.41		pCi/L							
Europium-152	U	-0.722	+/-8.09	15.1		pCi/L							
Europium-154	U	-6.58	+/-8.84	14.9		pCi/L							
<b>Rad Gas Flow Proportional Counting</b>													
GFPC, Sr90, liquid "As Received"													
Strontium-90	U	0.277	+/-1.02	1.86	2.00	pCi/L			KSD1	08/28/18	1607	1796306	2
<b>Rad Liquid Scintillation Analysis</b>													
LSC, Tritium Dist, Liquid "As Received"													
Tritium	U	315	+/-288	476	700	pCi/L			BXM4	08/24/18	1255	1795966	3
Liquid Scint Ni63, Liquid "As Received"													
Nickel-63	U	5.29	+/-21.0	36.0	50.0	pCi/L			TXJ1	09/07/18	1640	1795997	4

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 901.1	
2	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified	
3	EPA 906.0 Modified	
4	DOE RESL Ni-1, Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Strontium Carrier	GFPC, Sr90, liquid "As Received"			82.8	(25%-125%)
Nickel Carrier	Liquid Scint Ni63, Liquid "As Received"			75.4	(25%-125%)

**Notes:**  
 Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

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## Certificate of Analysis

Report Date: September 11, 2018

Company : LaCrosseSolutions  
 Address : S4601 State Hwy 35  
  
 Genoa, Wisconsin 54632  
 Contact: Mr. Jason Q. Spaide  
 Project: LACBWR Site Restoration Project

Client Sample ID: MW-203B-081518	Project: ENRG07001
Sample ID: 457516010	Client ID: ENRG070
Matrix: Ground Water	
Collect Date: 15-AUG-18 14:56	
Receive Date: 22-AUG-18	
Collector: Client	

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Rad Gamma Spec Analysis</b>													
Gammaspec, Gamma, Cs-137, Co-60, Eu-152, Eu-154 "As Received"													
Cesium-137	U	0.250	+/-4.67	5.15	10.0	pCi/L			MXR1	08/30/18	0827	1795796	1
Cobalt-60	U	0.562	+/-3.42	6.70		pCi/L							
Europium-152	UI	0.00	+/-16.5	15.6		pCi/L							
Europium-154	U	-1.02	+/-8.30	15.9		pCi/L							
<b>Rad Gas Flow Proportional Counting</b>													
GFPC, Sr90, liquid "As Received"													
Strontium-90	U	0.777	+/-1.05	1.81	2.00	pCi/L			KSD1	08/28/18	1607	1796306	2
<b>Rad Liquid Scintillation Analysis</b>													
LSC, Tritium Dist, Liquid "As Received"													
Tritium	U	206	+/-306	523	700	pCi/L			BXM4	08/24/18	1317	1795966	3
Liquid Scint Ni63, Liquid "As Received"													
Nickel-63	U	-16	+/-21.0	37.1	50.0	pCi/L			TXJ1	09/07/18	1712	1795997	4

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 901.1	
2	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified	
3	EPA 906.0 Modified	
4	DOE RESL Ni-1, Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Strontium Carrier	GFPC, Sr90, liquid "As Received"			78.1	(25%-125%)
Nickel Carrier	Liquid Scint Ni63, Liquid "As Received"			73	(25%-125%)

**Notes:**  
 Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

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2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Report Date: September 11, 2018

Company : LaCrosseSolutions  
 Address : S4601 State Hwy 35  
  
 Genoa, Wisconsin 54632  
 Contact: Mr. Jason Q. Spaide  
 Project: LACBWR Site Restoration Project

Client Sample ID: MW-204A-081418	Project: ENRG07001
Sample ID: 457516011	Client ID: ENRG070
Matrix: Ground Water	
Collect Date: 14-AUG-18 11:40	
Receive Date: 22-AUG-18	
Collector: Client	

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Rad Gamma Spec Analysis</b>													
Gammaspec, Gamma, Cs-137, Co-60, Eu-152, Eu-154 "As Received"													
Cesium-137	U	0.232	+/-2.31	4.40	10.0	pCi/L			MXR1	08/30/18	0941	1795796	1
Cobalt-60	U	-1.28	+/-2.26	4.13		pCi/L							
Europium-152	U	0.752	+/-7.00	12.0		pCi/L							
Europium-154	U	2.08	+/-6.82	14.5		pCi/L							
<b>Rad Gas Flow Proportional Counting</b>													
GFPC, Sr90, liquid "As Received"													
Strontium-90	U	0.436	+/-1.02	1.85	2.00	pCi/L			KSD1	08/28/18	1607	1796306	2
<b>Rad Liquid Scintillation Analysis</b>													
LSC, Tritium Dist, Liquid "As Received"													
Tritium	U	59.6	+/-296	523	700	pCi/L			BXM4	08/24/18	1338	1795966	3
Liquid Scint Ni63, Liquid "As Received"													
Nickel-63	U	-11.2	+/-21.1	37.1	50.0	pCi/L			TXJ1	09/07/18	1744	1795997	4

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 901.1	
2	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified	
3	EPA 906.0 Modified	
4	DOE RESL Ni-1, Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Strontium Carrier	GFPC, Sr90, liquid "As Received"			73.4	(25%-125%)
Nickel Carrier	Liquid Scint Ni63, Liquid "As Received"			73	(25%-125%)

**Notes:**  
 Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Report Date: September 11, 2018

Company : LaCrosseSolutions  
 Address : S4601 State Hwy 35  
  
 Genoa, Wisconsin 54632  
 Contact: Mr. Jason Q. Spaide  
 Project: LACBWR Site Restoration Project

Client Sample ID: MW-204B-081418	Project: ENRG07001
Sample ID: 457516012	Client ID: ENRG070
Matrix: Ground Water	
Collect Date: 14-AUG-18 11:47	
Receive Date: 22-AUG-18	
Collector: Client	

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Rad Gamma Spec Analysis</b>													
Gammaspec, Gamma, Cs-137, Co-60, Eu-152, Eu-154 "As Received"													
Cesium-137	U	-2.66	+/-3.37	5.58	10.0	pCi/L			MXR1	08/30/18	0941	1795796	1
Cobalt-60	U	-0.463	+/-3.43	6.64		pCi/L							
Europium-152	U	-4.67	+/-7.19	12.8		pCi/L							
Europium-154	U	-2.43	+/-7.80	15.0		pCi/L							
<b>Rad Gas Flow Proportional Counting</b>													
GFPC, Sr90, liquid "As Received"													
Strontium-90	U	1.16	+/-1.10	1.79	2.00	pCi/L			KSD1	08/28/18	1607	1796306	2
<b>Rad Liquid Scintillation Analysis</b>													
LSC, Tritium Dist, Liquid "As Received"													
Tritium	U	-76.4	+/-285	522	700	pCi/L			BXM4	08/24/18	1400	1795966	3
Liquid Scint Ni63, Liquid "As Received"													
Nickel-63	U	-3.82	+/-20.2	35.1	50.0	pCi/L			TXJ1	09/07/18	1815	1795997	4

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 901.1	
2	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified	
3	EPA 906.0 Modified	
4	DOE RESL Ni-1, Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Strontium Carrier	GFPC, Sr90, liquid "As Received"			80.5	(25%-125%)
Nickel Carrier	Liquid Scint Ni63, Liquid "As Received"			77.3	(25%-125%)

**Notes:**  
 Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

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## Certificate of Analysis

Report Date: September 11, 2018

Company : LaCrosseSolutions  
 Address : S4601 State Hwy 35  
  
 Genoa, Wisconsin 54632  
 Contact: Mr. Jason Q. Spaide  
 Project: LACBWR Site Restoration Project

Client Sample ID: Well-3-081518	Project: ENRG07001
Sample ID: 457516013	Client ID: ENRG070
Matrix: Ground Water	
Collect Date: 15-AUG-18 10:55	
Receive Date: 22-AUG-18	
Collector: Client	

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Rad Gamma Spec Analysis</b>													
Gammaspec, Gamma, Cs-137, Co-60, Eu-152, Eu-154 "As Received"													
Cesium-137	U	1.12	+/-3.78	7.13	10.0	pCi/L			MXR1	08/30/18	1010	1795796	1
Cobalt-60	U	4.12	+/-3.42	8.11		pCi/L							
Europium-152	U	-3.83	+/-10.3	18.1		pCi/L							
Europium-154	U	7.27	+/-12.8	26.4		pCi/L							
<b>Rad Gas Flow Proportional Counting</b>													
GFPC, Sr90, liquid "As Received"													
Strontium-90	U	-0.0845	+/-0.959	1.92	2.00	pCi/L			KSD1	08/28/18	1607	1796306	2
<b>Rad Liquid Scintillation Analysis</b>													
LSC, Tritium Dist, Liquid "As Received"													
Tritium	U	-347	+/-265	524	700	pCi/L			BXM4	08/24/18	1421	1795966	3
Liquid Scint Ni63, Liquid "As Received"													
Nickel-63	U	-9.41	+/-24.6	43.0	50.0	pCi/L			TXJ1	09/07/18	1847	1795997	4

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 901.1	
2	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified	
3	EPA 906.0 Modified	
4	DOE RESL Ni-1, Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Strontium Carrier	GFPC, Sr90, liquid "As Received"			61.5	(25%-125%)
Nickel Carrier	Liquid Scint Ni63, Liquid "As Received"			62.9	(25%-125%)

**Notes:**  
 Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

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## Certificate of Analysis

Report Date: September 11, 2018

Company : LaCrosseSolutions  
 Address : S4601 State Hwy 35  
  
 Genoa, Wisconsin 54632  
 Contact: Mr. Jason Q. Spaide  
 Project: LACBWR Site Restoration Project

Client Sample ID: Well-5-081518	Project: ENRG07001
Sample ID: 457516014	Client ID: ENRG070
Matrix: Ground Water	
Collect Date: 15-AUG-18 13:05	
Receive Date: 22-AUG-18	
Collector: Client	

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Rad Gamma Spec Analysis</b>													
Gammaspec, Gamma, Cs-137, Co-60, Eu-152, Eu-154 "As Received"													
Cesium-137	U	-3.26	+/-2.98	4.60	10.0	pCi/L			MXR1	08/30/18	1706	1795796	1
Cobalt-60	U	2.45	+/-3.99	8.52		pCi/L							
Europium-152	U	5.32	+/-8.88	17.1		pCi/L							
Europium-154	U	1.08	+/-9.05	18.7		pCi/L							
<b>Rad Gas Flow Proportional Counting</b>													
GFPC, Sr90, liquid "As Received"													
Strontium-90	U	0.691	+/-1.06	1.83	2.00	pCi/L			KSD1	08/28/18	1608	1796306	2
<b>Rad Liquid Scintillation Analysis</b>													
LSC, Tritium Dist, Liquid "As Received"													
Tritium	U	-97.8	+/-285	524	700	pCi/L			BXM4	08/24/18	1442	1795966	3
Liquid Scint Ni63, Liquid "As Received"													
Nickel-63	U	3.08	+/-22.1	38.1	50.0	pCi/L			TXJ1	09/07/18	1919	1795997	4

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 901.1	
2	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified	
3	EPA 906.0 Modified	
4	DOE RESL Ni-1, Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Strontium Carrier	GFPC, Sr90, liquid "As Received"			80.5	(25%-125%)
Nickel Carrier	Liquid Scint Ni63, Liquid "As Received"			71.1	(25%-125%)

**Notes:**  
 Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit



# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Report Date: September 11, 2018

Company : LaCrosseSolutions  
 Address : S4601 State Hwy 35  
  
 Genoa, Wisconsin 54632  
 Contact: Mr. Jason Q. Spaide  
 Project: LACBWR Site Restoration Project

Client Sample ID: Well-7-081518	Project: ENRG07001
Sample ID: 457516015	Client ID: ENRG070
Matrix: Ground Water	
Collect Date: 15-AUG-18 13:20	
Receive Date: 22-AUG-18	
Collector: Client	

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Rad Gamma Spec Analysis</b>													
Gammaspec, Gamma, Cs-137, Co-60, Eu-152, Eu-154 "As Received"													
Cesium-137	U	0.787	+/-4.09	5.64	10.0	pCi/L			MXR1	08/30/18	1707	1795796	1
Cobalt-60	U	0.585	+/-3.02	6.05		pCi/L							
Europium-152	U	9.63	+/-11.5	15.1		pCi/L							
Europium-154	U	-9.0	+/-10.1	16.8		pCi/L							
<b>Rad Gas Flow Proportional Counting</b>													
GFPC, Sr90, liquid "As Received"													
Strontium-90	U	0.184	+/-0.860	1.61	2.00	pCi/L			KSD1	08/30/18	0854	1796306	2
<b>Rad Liquid Scintillation Analysis</b>													
LSC, Tritium Dist, Liquid "As Received"													
Tritium	U	10.2	+/-289	518	700	pCi/L			BXM4	08/24/18	1504	1795966	3
Liquid Scint Ni63, Liquid "As Received"													
Nickel-63	U	0.0239	+/-20.9	36.0	50.0	pCi/L			TXJ1	09/07/18	1950	1795997	4

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 901.1	
2	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified	
3	EPA 906.0 Modified	
4	DOE RESL Ni-1, Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Strontium Carrier	GFPC, Sr90, liquid "As Received"			56.8	(25%-125%)
Nickel Carrier	Liquid Scint Ni63, Liquid "As Received"			75.4	(25%-125%)

**Notes:**  
 Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Report Date: September 11, 2018

Company : LaCrosseSolutions  
 Address : S4601 State Hwy 35  
  
 Genoa, Wisconsin 54632  
 Contact: Mr. Jason Q. Spaide  
 Project: LACBWR Site Restoration Project

Client Sample ID: MW-204A-D-081418	Project: ENRG07001
Sample ID: 457516016	Client ID: ENRG070
Matrix: Ground Water	
Collect Date: 14-AUG-18 11:40	
Receive Date: 22-AUG-18	
Collector: Client	

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Rad Gamma Spec Analysis</b>													
Gammaspec, Gamma, Cs-137, Co-60, Eu-152, Eu-154 "As Received"													
Cesium-137	U	0.430	+/-2.99	5.83	10.0	pCi/L			MXR1	08/30/18	1707	1795796	1
Cobalt-60	U	1.03	+/-3.07	6.34		pCi/L							
Europium-152	U	-5.5	+/-8.86	14.9		pCi/L							
Europium-154	U	7.52	+/-9.29	20.1		pCi/L							
<b>Rad Gas Flow Proportional Counting</b>													
GFPC, Sr90, liquid "As Received"													
Strontium-90	U	-0.0389	+/-1.02	1.93	2.00	pCi/L			KSD1	08/29/18	1110	1796306	2
<b>Rad Liquid Scintillation Analysis</b>													
LSC, Tritium Dist, Liquid "As Received"													
Tritium	U	248	+/-313	529	700	pCi/L			BXM4	08/24/18	1525	1795966	3
Liquid Scint Ni63, Liquid "As Received"													
Nickel-63	U	-0.57	+/-20.4	35.2	50.0	pCi/L			TXJ1	09/07/18	2022	1795997	4

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 901.1	
2	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified	
3	EPA 906.0 Modified	
4	DOE RESL Ni-1, Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Strontium Carrier	GFPC, Sr90, liquid "As Received"			73.4	(25%-125%)
Nickel Carrier	Liquid Scint Ni63, Liquid "As Received"			77	(25%-125%)

**Notes:**  
 Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

# GEL LABORATORIES LLC

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## QC Summary

Report Date: September 11, 2018

Page 1 of 3

**LaCrosseSolutions**  
**S4601 State Hwy 35**  
**Genoa, Wisconsin**

**Contact: Mr. Jason Q. Spaide**

**Workorder: 457516**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Rad Gamma Spec</b>											
Batch	1795796										
QC1204099304	457516001	DUP									
Cesium-137	U	0.211	U	-0.862	pCi/L	N/A		N/A	MXR1	08/30/18	17:08
	Uncertainty	+/-3.10		+/-4.62							
Cobalt-60	U	1.62	U	-2.28	pCi/L	N/A		N/A			
	Uncertainty	+/-2.97		+/-3.39							
Europium-152	U	2.03	U	3.84	pCi/L	N/A		N/A			
	Uncertainty	+/-8.22		+/-9.23							
Europium-154	U	-2.76	U	5.79	pCi/L	N/A		N/A			
	Uncertainty	+/-9.24		+/-10.7							
QC1204099305	LCS										
Americium-241	1.10E+05			1.19E+05	pCi/L		109	(75%-125%)		08/30/18	16:49
	Uncertainty			+/-2970							
Cesium-137	40900			42600	pCi/L		104	(75%-125%)			
	Uncertainty			+/-853							
Cobalt-60	32500			33600	pCi/L		103	(75%-125%)			
	Uncertainty			+/-905							
Europium-152			U	161	pCi/L						
	Uncertainty			+/-379							
Europium-154			U	80.1	pCi/L						
	Uncertainty			+/-203							
QC1204099303	MB										
Cesium-137			U	2.23	pCi/L					08/30/18	17:08
	Uncertainty			+/-3.55							
Cobalt-60			U	3.04	pCi/L						
	Uncertainty			+/-2.71							
Europium-152			U	0.688	pCi/L						
	Uncertainty			+/-9.90							
Europium-154			U	3.94	pCi/L						
	Uncertainty			+/-7.96							

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## QC Summary

Workorder: 457516

Page 2 of 3

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Rad Gas Flow</b>											
Batch	1796306										
QC1204100530	457516001	DUP									
Strontium-90	U	-1.21	U	-0.356	pCi/L	N/A			N/A	KSD1	08/28/18 16:07
	Uncertainty	+/-0.903		+/-0.906							
QC1204100531	LCS										
Strontium-90	77.5			82.8	pCi/L		107	(75%-125%)			08/28/18 16:07
	Uncertainty			+/-4.63							
QC1204100529	MB										
Strontium-90			U	1.66	pCi/L						08/28/18 16:07
	Uncertainty			+/-1.25							
<b>Rad Liquid Scintillation</b>											
Batch	1795966										
QC1204099751	457516001	DUP									
Tritium	U	-200	U	-220	pCi/L	N/A			N/A	BXM4	08/24/18 16:08
	Uncertainty	+/-277		+/-279							
QC1204099753	LCS										
Tritium	2510			2170	pCi/L		86.5	(75%-125%)			08/24/18 16:51
	Uncertainty			+/-424							
QC1204099750	MB										
Tritium			U	-256	pCi/L						08/24/18 15:46
	Uncertainty			+/-273							
QC1204099752	457516001	MS									
Tritium	5020	U	-200	4880	pCi/L		97.2	(75%-125%)			08/24/18 16:29
	Uncertainty		+/-277	+/-878							
Batch	1795997										
QC1204099783	457516001	DUP									
Nickel-63	U	9.57	U	-7.14	pCi/L	N/A			N/A	TXJ1	09/07/18 21:25
	Uncertainty	+/-22.4		+/-21.6							
QC1204099784	LCS										
Nickel-63	1330			1380	pCi/L		104	(75%-125%)			09/07/18 21:57
	Uncertainty			+/-47.1							
QC1204099782	MB										
Nickel-63			U	-8.04	pCi/L						09/07/18 20:53
	Uncertainty			+/-20.4							

**Notes:**

Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).  
 The Qualifiers in this report are defined as follows:

# GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

## QC Summary

Workorder: 457516

Page 3 of 3

Parname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
**	Analyte is a Tracer compound										
<	Result is less than value reported										
>	Result is greater than value reported										
BD	Results are either below the MDC or tracer recovery is low										
FA	Failed analysis.										
H	Analytical holding time was exceeded										
J	Value is estimated										
K	Analyte present. Reported value may be biased high. Actual value is expected to be lower.										
L	Analyte present. Reported value may be biased low. Actual value is expected to be higher.										
M	M if above MDC and less than LLD										
M	REMP Result > MDC/CL and < RDL										
N/A	RPD or %Recovery limits do not apply.										
N1	See case narrative										
ND	Analyte concentration is not detected above the detection limit										
NJ	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier										
Q	One or more quality control criteria have not been met. Refer to the applicable narrative or DER.										
R	Sample results are rejected										
U	Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.										
UI	Gamma Spectroscopy--Uncertain identification										
UJ	Gamma Spectroscopy--Uncertain identification										
UL	Not considered detected. The associated number is the reported concentration, which may be inaccurate due to a low bias.										
X	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier										
Y	Other specific qualifiers were required to properly define the results. Consult case narrative.										
^	RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.										
h	Preparation or preservation holding time was exceeded										

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.

^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.

\* Indicates that a Quality Control parameter was not within specifications.

For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

**Radiochemistry  
 Technical Case Narrative  
 LaCrosseSolutions, LLC (ENRG)  
 SDG #: 457516**

**Product:** Gammaspec, Gamma, Cs-137, Co-60, Eu-152, Eu-154

**Analytical Method:** EPA 901.1

**Analytical Procedure:** GL-RAD-A-013 REV# 27

**Analytical Batch:** 1795796

The following samples were analyzed using the above methods and analytical procedure(s).

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
457516001	B11R-081418
457516002	B11AR-081418
457516003	MW-200A-081418
457516004	MW-200B-081418
457516005	MW-201A-081518
457516006	MW-201BR-081518
457516007	MW-202AR-081518
457516008	MW-202B-081518
457516009	MW-203A-081518
457516010	MW-203B-081518
457516011	MW-204A-081418
457516012	MW-204B-081418
457516013	Well-3-081518
457516014	Well-5-081518
457516015	Well-7-081518
457516016	MW-204A-D-081418
1204099303	Method Blank (MB)
1204099304	457516001(B11R-081418) Sample Duplicate (DUP)
1204099305	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

**Data Summary:**

There are no exceptions, anomalies or deviations from the specified methods. All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable.

**Qualifier Information**

<b>Qualifier</b>	<b>Reason</b>	<b>Analyte</b>	<b>Sample</b>	<b>Client Sample</b>
UI	Results are considered a false positive due to low abundance.	Europium-152	457516010	MW-203B-081518

**Product:** GFPC, Sr90, liquid

**Analytical Method:** EPA 905.0 Modified/DOE RP501 Rev. 1 Modified

**Analytical Procedure:** GL-RAD-A-004 REV# 20

**Analytical Batch:** 1796306

The following samples were analyzed using the above methods and analytical procedure(s).

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
457516001	B11R-081418
457516002	B11AR-081418
457516003	MW-200A-081418
457516004	MW-200B-081418
457516005	MW-201A-081518
457516006	MW-201BR-081518
457516007	MW-202AR-081518
457516008	MW-202B-081518
457516009	MW-203A-081518
457516010	MW-203B-081518
457516011	MW-204A-081418
457516012	MW-204B-081418
457516013	Well-3-081518
457516014	Well-5-081518
457516015	Well-7-081518
457516016	MW-204A-D-081418
1204100529	Method Blank (MB)
1204100530	457516001(B11R-081418) Sample Duplicate (DUP)
1204100531	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

**Data Summary:**

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

**Technical Information**

**Recounts**

Sample 457516001 (B11R-081418) was recounted due to results more negative than the three sigma TPU. The second count is reported. Samples 457516015 (Well-7-081518) and 457516016 (MW-204A-D-081418) were recounted due to a suspected false positive. The recounts are reported.

**Product:** LSC, Tritium Dist, Liquid

**Analytical Method:** EPA 906.0 Modified

**Analytical Procedure:** GL-RAD-A-002 REV# 22

**Analytical Batch:** 1795966



The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
457516001	B11R-081418
457516002	B11AR-081418
457516003	MW-200A-081418
457516004	MW-200B-081418
457516005	MW-201A-081518
457516006	MW-201BR-081518
457516007	MW-202AR-081518
457516008	MW-202B-081518
457516009	MW-203A-081518
457516010	MW-203B-081518
457516011	MW-204A-081418
457516012	MW-204B-081418
457516013	Well-3-081518
457516014	Well-5-081518
457516015	Well-7-081518
457516016	MW-204A-D-081418
1204099750	Method Blank (MB)
1204099751	457516001(B11R-081418) Sample Duplicate (DUP)
1204099752	457516001(B11R-081418) Matrix Spike (MS)
1204099753	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

#### **Data Summary:**

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

#### **Technical Information**

##### **Recounts**

Sample 457516007 (MW-202AR-081518) was recounted to verify sample results. The recount results are similar to the original results. Original results are reported.

#### **Miscellaneous Information**

##### **Additional Comments**

The matrix spike, 1204099752 (B11R-081418MS), aliquot was reduced to conserve sample volume.

#### **Product: Liquid Scint Ni63, Liquid**

**Analytical Method:** DOE RESL Ni-1, Modified

**Analytical Procedure:** GL-RAD-A-022 REV# 18

**Analytical Batch:** 1795997

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
457516001	B11R-081418

457516002	B11AR-081418
457516003	MW-200A-081418
457516004	MW-200B-081418
457516005	MW-201A-081518
457516006	MW-201BR-081518
457516007	MW-202AR-081518
457516008	MW-202B-081518
457516009	MW-203A-081518
457516010	MW-203B-081518
457516011	MW-204A-081418
457516012	MW-204B-081418
457516013	Well-3-081518
457516014	Well-5-081518
457516015	Well-7-081518
457516016	MW-204A-D-081418
1204099782	Method Blank (MB)
1204099783	457516001(B11R-081418) Sample Duplicate (DUP)
1204099784	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

**Data Summary:**

There are no exceptions, anomalies or deviations from the specified methods. All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable.

**Certification Statement**

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.



Page: 2 of 2  
Project # \_\_\_\_\_  
GEL Quote #: \_\_\_\_\_  
POC Number (1): \_\_\_\_\_  
PO Number: 672583



Laboratories LLC  
Chemistry | Radiochemistry | Radiobioassay | Specialty Analytics  
Chain of Custody and Analytical Request

GEL Laboratories, LLC  
2040 Savage Road  
Charleston, SC 29407  
Phone: (843) 556-8171  
Fax: (843) 766-1178

GEL Work Order Number: \_\_\_\_\_ GEL Project Manager: \_\_\_\_\_

Client Name: Energy Solutions		Phone # 860-817-3152		Sample Analysis Requested (5) (Fill in the number of containers for each test)												
Project/Site Name: LACBWR		Fax #		Should this sample be considered:	Total number of containers											Preservative Type (6)
Address: Genoa, WI																
Collected By: S. Kaney/A. Drick		Send Results To: mvan Noordemen@haleydrick.com		Radioactive Please supply isotopic info.	(7) Known or possible hazards											Comments Note: extra sample is required for sample specific QC
Sample ID	*Date Collected (mm-dd-yy)	*Time Collected (Military) (hhmm)	QC Code (2)			Field Filtered (3)	Sample Matrix (4)									
* For composites - indicate start and stop date/time																
MW-204A-081418	08/14/18	1140	N	N	GW	N	No	3	X	X	X	X	X	X		
MW-204B-081418	08/14/18	1140	N	N	GW	N	No	3	X	X	X	X	X	X		
Well-3-081518	08/15/18	1055	N	N	DW	N	No	3	X	X	X	X	X	X		
Well-5-081518	08/15/18	1305	N	N	DW	N	No	3	X	X	X	X	X	X		
Well-7-081518	08/15/18	1320	N	N	DW	N	No	3	X	X	X	X	X	X		
MW-204A-D-081418	08/14/18	1140	FD	N	GW	N	No	3	X	X	X	X	X	X		

Chain of Custody Signatures						TAT Requested: Normal: <input checked="" type="checkbox"/> Rush: <input checked="" type="checkbox"/> Specify: _____ (Subject to Surcharge)					
Relinquished By (Signed)	Date	Time	Received by (signed)	Date	Time	Fax Results: <input type="checkbox"/> Yes <input type="checkbox"/> No					
<i>[Signature]</i>	8/16/18	1200	FEDEX	8/22/18	900	Select Deliverable: <input type="checkbox"/> C of A <input type="checkbox"/> QC Summary <input type="checkbox"/> level 1 <input type="checkbox"/> Level 2 <input type="checkbox"/> Level 3 <input checked="" type="checkbox"/> Level 4					
Additional Remarks: ** Rush 3-day TAT for Tritium Results						For Lab Receiving Use Only: Custody Seal Intact? <input type="checkbox"/> Yes <input type="checkbox"/> No Cooler Temp: _____ °C					

> For sample shipping and delivery details, see Sample Receipt & Review form (SRR.) Sample Collection Time Zone:  Eastern  Pacific  Central  Mountain  Other: \_\_\_\_\_

- Chain of Custody Number = Client Determined
- QC Codes: N = Normal Sample, TB = Trip Blank, FD = Field Duplicate, EB = Equipment Blank, MS = Matrix Spike Sample, MSD = Matrix Spike Duplicate Sample, G = Grab, C = Composite
- Field Filtered: For liquid matrices, indicate with a - Y - for yes the sample was field filtered or - N - for sample was not field filtered.
- Matrix Codes: DW=Drinking Water, GW=Groundwater, SW=Surface Water, WW=Waste Water, W=Water, ML=Misc Liquid, SO=Soil, SD=Sediment, SL=Sludge, SS=Solid Waste, O=Oil, F=Filter, P=Wipe, U=Urine, F=Fecal, N=Nasal
- Sample Analysis Requested: Analytical method requested (i.e. 8260B, 6010B/7470A) and number of containers provided for each (i.e. 8260B - 3, 6010B/7470A - 1).
- Preservative Type: HA = Hydrochloric Acid, NI = Nitric Acid, SH = Sodium Hydroxide, SA = Sulfuric Acid, AA = Ascorbic Acid, HX = Hexane, ST = Sodium Thiosulfate, If no preservative is added = leave field blank

\* Per Edie, 2 - 1L nitrics were collected instead of 3. Can reuse Gamma volume if needed.

7.) Are there any known or possible hazards associated with these samples?	<b>Characteristic Hazards</b> FL = Flammable/Ignitable CO = Corrosive RE = Reactive	<b>Listed Waste</b> LW = Listed Waste (F, K, P and U-listed wastes.) Waste code(s):	<b>Other</b> OT = Other / Unknown (i.e.: High/low pH, asbestos, beryllium, irritants, other misc. health hazards, etc.) Description:	Please provide any additional details below regarding handling and/or disposal concerns. (i.e. Origin of sample(s), type of site collected from, odd matrices, etc.)
<b>RCRA Metals</b> As = Arsenic    Hg = Mercury Ba = Barium    Se = Selenium Cd = Cadmium   Ag = Silver Cr = Chromium   MR = Miscellaneous Pb = Lead        RCRA metals	<b>TSCA Regulated</b> PCB = Polychlorinated biphenyls			



**List of current GEL Certifications as of 11 September 2018**

<b>State</b>	<b>Certification</b>
Alaska	17-018
Arkansas	88-0651
CLIA	42D0904046
California	2940
Colorado	SC00012
Connecticut	PH-0169
DoD ELAP/ ISO17025 A2LA	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330-15-00283, P330-15-00253
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC00012
Idaho Chemistry	SC00012
Idaho Radiochemistry	SC00012
Illinois NELAP	200029
Indiana	C-SC-01
Kansas NELAP	E-10332
Kentucky SDWA	90129
Kentucky Wastewater	90129
Louisiana NELAP	03046 (AI33904)
Louisiana SDWA	LA180011
Maryland	270
Massachusetts	M-SC012
Michigan	9976
Mississippi	SC00012
Nebraska	NE-OS-26-13
Nevada	SC000122018-1
New Hampshire NELAP	205415
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
North Dakota	R-158
Oklahoma	9904
Pennsylvania NELAP	68-00485
Puerto Rico	SC00012
S. Carolina Radiochem	10120002
South Carolina Chemistry	10120001
Tennessee	TN 02934
Texas NELAP	T104704235-18-13
Utah NELAP	SC000122018-26
Vermont	VT87156
Virginia NELAP	460202
Washington	C780



October 08, 2018

Mr. Jason Q. Spaide  
LaCrosseSolutions  
S4601 State Hwy 35  
Genoa, Wisconsin 54632

Re: LACBWR Site Restoration Project  
Work Order: 459322

Dear Mr. Spaide:

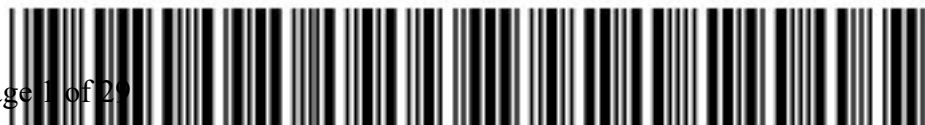
GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on September 18, 2018. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

Our policy is to provide high quality, personalized analytical services to enable you to meet your analytical needs on time every time. We trust that you will find everything in order and to your satisfaction. If you have any questions, please do not hesitate to call me at (843) 556-8171, ext. 4453.

Sincerely,

Edith Kent  
Project Manager

Purchase Order: 672583  
Enclosures





## GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 – (843) 556-8171 – www.gel.com

### Certificate of Analysis Report for

ENRG070 LaCrosseSolutions, LLC (672583)

Client SDG: 459322 GEL Work Order: 459322

**The Qualifiers in this report are defined as follows:**

- \* A quality control analyte recovery is outside of specified acceptance criteria
- \*\* Analyte is a Tracer compound
- \*\* Analyte is a surrogate compound
- U Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the Certificate of Analysis.

The designation ND, if present, appears in the result column when the analyte concentration is not detected above the limit as defined in the 'U' qualifier above.

This data report has been prepared and reviewed in accordance with GEL Laboratories LLC standard operating procedures. Please direct any questions to your Project Manager, Edith Kent.



Reviewed by \_\_\_\_\_

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Report Date: October 8, 2018

Company : LaCrosseSolutions  
 Address : S4601 State Hwy 35  
  
 Genoa, Wisconsin 54632  
 Contact: Mr. Jason Q. Spaide  
 Project: LACBWR Site Restoration Project

Client Sample ID: Well-3-091018	Project: ENRG07001
Sample ID: 459322001	Client ID: ENRG070
Matrix: Ground Water	
Collect Date: 10-SEP-18 15:15	
Receive Date: 18-SEP-18	
Collector: Client	

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Rad Gamma Spec Analysis</b>													
Gammaspec, Gamma, Cs-137, Co-60, Eu-152, Eu-154 "As Received"													
Cesium-137	U	3.86	+/-7.02	6.58	10.0	pCi/L			MXR1	10/03/18	1249	1803042	1
Cobalt-60	U	4.15	+/-5.37	7.91		pCi/L							
Europium-152	U	8.81	+/-10.8	20.7		pCi/L							
Europium-154	U	-0.876	+/-9.33	18.2		pCi/L							
<b>Rad Gas Flow Proportional Counting</b>													
GFPC, Sr90, liquid "As Received"													
Strontium-90	U	1.42	+/-1.22	1.97	2.00	pCi/L			LXB3	10/03/18	1659	1805182	2
<b>Rad Liquid Scintillation Analysis</b>													
LSC, Tritium Dist, Liquid "As Received"													
Tritium	U	245	+/-317	539	700	pCi/L			GXR1	09/20/18	0759	1802825	3
Liquid Scint Ni63, Liquid "As Received"													
Nickel-63	U	8.01	+/-21.7	37.3	50.0	pCi/L			TXJ1	10/06/18	0004	1803449	4

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 901.1	
2	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified	
3	EPA 906.0 Modified	
4	DOE RESL Ni-1, Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Strontium Carrier	GFPC, Sr90, liquid "As Received"			82.8	(25%-125%)
Nickel Carrier	Liquid Scint Ni63, Liquid "As Received"			68.8	(25%-125%)

**Notes:**  
 Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

# GEL LABORATORIES LLC

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## Certificate of Analysis

Report Date: October 8, 2018

Company : LaCrosseSolutions  
 Address : S4601 State Hwy 35  
  
 Genoa, Wisconsin 54632  
 Contact: Mr. Jason Q. Spaide  
 Project: LACBWR Site Restoration Project

Client Sample ID: Well-5-091118	Project: ENRG07001
Sample ID: 459322002	Client ID: ENRG070
Matrix: Ground Water	
Collect Date: 11-SEP-18 12:40	
Receive Date: 18-SEP-18	
Collector: Client	

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Rad Gamma Spec Analysis</b>													
Gammaspec, Gamma, Cs-137, Co-60, Eu-152, Eu-154 "As Received"													
Cesium-137	U	-0.56	+/-3.12	5.67	10.0	pCi/L			MXR1	10/03/18	1314	1803042	1
Cobalt-60	U	0.489	+/-2.62	5.63		pCi/L							
Europium-152	U	0.201	+/-7.98	15.1		pCi/L							
Europium-154	U	-11.9	+/-12.5	18.4		pCi/L							
<b>Rad Gas Flow Proportional Counting</b>													
GFPC, Sr90, liquid "As Received"													
Strontium-90	U	0.00966	+/-0.768	1.50	2.00	pCi/L			LXB3	10/03/18	1659	1805182	2
<b>Rad Liquid Scintillation Analysis</b>													
LSC, Tritium Dist, Liquid "As Received"													
Tritium	U	-62.9	+/-181	396	700	pCi/L			GXR1	09/19/18	1448	1802825	3
Liquid Scint Ni63, Liquid "As Received"													
Nickel-63	U	15.1	+/-21.7	36.8	50.0	pCi/L			TXJ1	10/06/18	0020	1803449	4

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 901.1	
2	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified	
3	EPA 906.0 Modified	
4	DOE RESL Ni-1, Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Strontium Carrier	GFPC, Sr90, liquid "As Received"			82.8	(25%-125%)
Nickel Carrier	Liquid Scint Ni63, Liquid "As Received"			69.9	(25%-125%)

**Notes:**  
 Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Report Date: October 8, 2018

Company : LaCrosseSolutions  
 Address : S4601 State Hwy 35  
  
 Genoa, Wisconsin 54632  
 Contact: Mr. Jason Q. Spaide  
 Project: LACBWR Site Restoration Project

Client Sample ID: Well-7-091118	Project: ENRG07001
Sample ID: 459322003	Client ID: ENRG070
Matrix: Ground Water	
Collect Date: 11-SEP-18 12:55	
Receive Date: 18-SEP-18	
Collector: Client	

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Rad Gamma Spec Analysis</b>													
Gammaspec, Gamma, Cs-137, Co-60, Eu-152, Eu-154 "As Received"													
Cesium-137	U	3.49	+/-3.98	6.91	10.0	pCi/L			MXR1	10/03/18	1314	1803042	1
Cobalt-60	U	-3.02	+/-3.24	5.26		pCi/L							
Europium-152	U	1.65	+/-9.34	17.8		pCi/L							
Europium-154	U	3.66	+/-10.6	22.4		pCi/L							
<b>Rad Gas Flow Proportional Counting</b>													
GFPC, Sr90, liquid "As Received"													
Strontium-90	U	0.454	+/-0.685	1.19	2.00	pCi/L			LXB3	10/04/18	0640	1805182	2
<b>Rad Liquid Scintillation Analysis</b>													
LSC, Tritium Dist, Liquid "As Received"													
Tritium	U	-45.5	+/-189	402	700	pCi/L			GXR1	09/19/18	1505	1802825	3
<b>Liquid Scint Ni63, Liquid "As Received"</b>													
Nickel-63	U	8.65	+/-20.5	35.3	50.0	pCi/L			TXJ1	10/06/18	0037	1803449	4

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 901.1	
2	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified	
3	EPA 906.0 Modified	
4	DOE RESL Ni-1, Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Strontium Carrier	GFPC, Sr90, liquid "As Received"			87.6	(25%-125%)
Nickel Carrier	Liquid Scint Ni63, Liquid "As Received"			72.7	(25%-125%)

**Notes:**  
 Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

# GEL LABORATORIES LLC

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## Certificate of Analysis

Report Date: October 8, 2018

Company : LaCrosseSolutions  
 Address : S4601 State Hwy 35  
  
 Genoa, Wisconsin 54632  
 Contact: Mr. Jason Q. Spaide  
 Project: LACBWR Site Restoration Project

Client Sample ID: B11R-091018	Project: ENRG07001
Sample ID: 459322004	Client ID: ENRG070
Matrix: Ground Water	
Collect Date: 10-SEP-18 09:25	
Receive Date: 18-SEP-18	
Collector: Client	

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Rad Gamma Spec Analysis</b>													
<b>Gammascpec, Gamma, Cs-137, Co-60, Eu-152, Eu-154 "As Received"</b>													
Cesium-137	U	-2.06	+/-3.92	6.56	10.0	pCi/L			MXR1	10/03/18	1315	1803042	1
Cobalt-60	U	1.80	+/-4.44	9.07		pCi/L							
Europium-152	U	-9.32	+/-9.22	15.3		pCi/L							
Europium-154	U	-1.5	+/-9.72	18.7		pCi/L							
<b>Rad Gas Flow Proportional Counting</b>													
<b>GFPC, Sr90, liquid "As Received"</b>													
Strontium-90	U	-0.858	+/-0.615	1.50	2.00	pCi/L			LXB3	10/03/18	1659	1805182	2
<b>Rad Liquid Scintillation Analysis</b>													
<b>LSC, Tritium Dist, Liquid "As Received"</b>													
Tritium	U	-19.6	+/-192	397	700	pCi/L			GXR1	09/19/18	1523	1802825	3
<b>Liquid Scint Ni63, Liquid "As Received"</b>													
Nickel-63	U	-2.07	+/-20.7	36.4	50.0	pCi/L			TXJ1	10/06/18	0053	1803449	4

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 901.1	
2	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified	
3	EPA 906.0 Modified	
4	DOE RESL Ni-1, Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Strontium Carrier	GFPC, Sr90, liquid "As Received"			89.9	(25%-125%)
Nickel Carrier	Liquid Scint Ni63, Liquid "As Received"			70.7	(25%-125%)

**Notes:**  
 Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Report Date: October 8, 2018

Company : LaCrosseSolutions  
 Address : S4601 State Hwy 35  
  
 Genoa, Wisconsin 54632  
 Contact: Mr. Jason Q. Spaide  
 Project: LACBWR Site Restoration Project

Client Sample ID: B11AR-091018	Project: ENRG07001
Sample ID: 459322005	Client ID: ENRG070
Matrix: Ground Water	
Collect Date: 10-SEP-18 09:35	
Receive Date: 18-SEP-18	
Collector: Client	

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Rad Gamma Spec Analysis</b>													
Gammaspec, Gamma, Cs-137, Co-60, Eu-152, Eu-154 "As Received"													
Cesium-137	U	-0.389	+/-3.98	7.29	10.0	pCi/L			MXR1	10/03/18	1315	1803042	1
Cobalt-60	U	-1.52	+/-3.90	7.18		pCi/L							
Europium-152	U	-0.069	+/-9.74	18.5		pCi/L							
Europium-154	U	-1.69	+/-14.8	23.6		pCi/L							
<b>Rad Gas Flow Proportional Counting</b>													
GFPC, Sr90, liquid "As Received"													
Strontium-90	U	0.254	+/-0.813	1.50	2.00	pCi/L			LXB3	10/03/18	1659	1805182	2
<b>Rad Liquid Scintillation Analysis</b>													
LSC, Tritium Dist, Liquid "As Received"													
Tritium	U	75.1	+/-206	384	700	pCi/L			GXR1	09/19/18	1540	1802825	3
Liquid Scint Ni63, Liquid "As Received"													
Nickel-63	U	10.5	+/-20.6	35.2	50.0	pCi/L			TXJ1	10/06/18	0109	1803449	4

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 901.1	
2	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified	
3	EPA 906.0 Modified	
4	DOE RESL Ni-1, Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Strontium Carrier	GFPC, Sr90, liquid "As Received"			87.6	(25%-125%)
Nickel Carrier	Liquid Scint Ni63, Liquid "As Received"			73	(25%-125%)

**Notes:**  
 Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Report Date: October 8, 2018

Company : LaCrosseSolutions  
 Address : S4601 State Hwy 35  
  
 Genoa, Wisconsin 54632  
 Contact: Mr. Jason Q. Spaide  
 Project: LACBWR Site Restoration Project

Client Sample ID: MW-200A-091018	Project: ENRG07001
Sample ID: 459322006	Client ID: ENRG070
Matrix: Ground Water	
Collect Date: 10-SEP-18 13:08	
Receive Date: 18-SEP-18	
Collector: Client	

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Rad Gamma Spec Analysis</b>													
Gammaspec, Gamma, Cs-137, Co-60, Eu-152, Eu-154 "As Received"													
Cesium-137	U	2.61	+/-3.31	6.83	10.0	pCi/L			MXR1	10/03/18	2054	1803042	1
Cobalt-60	U	1.34	+/-3.01	6.44		pCi/L							
Europium-152	U	-6.15	+/-8.94	15.2		pCi/L							
Europium-154	U	5.38	+/-9.98	20.8		pCi/L							
<b>Rad Gas Flow Proportional Counting</b>													
GFPC, Sr90, liquid "As Received"													
Strontium-90	U	-0.417	+/-0.690	1.43	2.00	pCi/L			LXB3	10/04/18	0811	1805182	2
<b>Rad Liquid Scintillation Analysis</b>													
LSC, Tritium Dist, Liquid "As Received"													
Tritium	U	-19.1	+/-191	396	700	pCi/L			GXR1	09/19/18	1558	1802825	3
<b>Liquid Scint Ni63, Liquid "As Received"</b>													
Nickel-63	U	-0.71	+/-20.1	35.2	50.0	pCi/L			TXJ1	10/06/18	0126	1803449	4

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 901.1	
2	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified	
3	EPA 906.0 Modified	
4	DOE RESL Ni-1, Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Strontium Carrier	GFPC, Sr90, liquid "As Received"			89.9	(25%-125%)
Nickel Carrier	Liquid Scint Ni63, Liquid "As Received"			73	(25%-125%)

**Notes:**  
 Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit



# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Report Date: October 8, 2018

Company : LaCrosseSolutions  
 Address : S4601 State Hwy 35  
 Genoa, Wisconsin 54632  
 Contact: Mr. Jason Q. Spaide  
 Project: LACBWR Site Restoration Project

Client Sample ID: MW-200B-091018      Project: ENRG07001  
 Sample ID: 459322007      Client ID: ENRG070  
 Matrix: Ground Water  
 Collect Date: 10-SEP-18 13:25  
 Receive Date: 18-SEP-18  
 Collector: Client

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Rad Gamma Spec Analysis</b>													
Gammaspec, Gamma, Cs-137, Co-60, Eu-152, Eu-154 "As Received"													
Cesium-137	U	0.519	+/-3.63	6.48	10.0	pCi/L			MXR1	10/03/18	2055	1803042	1
Cobalt-60	U	-2.32	+/-2.70	4.32		pCi/L							
Europium-152	U	9.35	+/-9.79	18.6		pCi/L							
Europium-154	U	4.31	+/-8.74	18.1		pCi/L							
<b>Rad Gas Flow Proportional Counting</b>													
GFPC, Sr90, liquid "As Received"													
Strontium-90	U	0.940	+/-0.957	1.58	2.00	pCi/L			LXB3	10/03/18	1659	1805182	2
<b>Rad Liquid Scintillation Analysis</b>													
LSC, Tritium Dist, Liquid "As Received"													
Tritium	U	81.2	+/-197	365	700	pCi/L			GXR1	09/19/18	1615	1802825	3
Liquid Scint Ni63, Liquid "As Received"													
Nickel-63	U	3.18	+/-21.0	36.5	50.0	pCi/L			TXJ1	10/06/18	0142	1803449	4

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 901.1	
2	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified	
3	EPA 906.0 Modified	
4	DOE RESL Ni-1, Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Strontium Carrier	GFPC, Sr90, liquid "As Received"			89.9	(25%-125%)
Nickel Carrier	Liquid Scint Ni63, Liquid "As Received"			70.7	(25%-125%)

**Notes:**  
 Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor      Lc/LC: Critical Level  
 DL: Detection Limit      PF: Prep Factor  
 MDA: Minimum Detectable Activity      RL: Reporting Limit  
 MDC: Minimum Detectable Concentration      SQL: Sample Quantitation Limit

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Report Date: October 8, 2018

Company : LaCrosseSolutions  
 Address : S4601 State Hwy 35  
  
 Genoa, Wisconsin 54632  
 Contact: Mr. Jason Q. Spaide  
 Project: LACBWR Site Restoration Project

Client Sample ID: MW-201A-091118	Project: ENRG07001
Sample ID: 459322008	Client ID: ENRG070
Matrix: Ground Water	
Collect Date: 11-SEP-18 09:10	
Receive Date: 18-SEP-18	
Collector: Client	

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Rad Gamma Spec Analysis</b>													
Gammaspec, Gamma, Cs-137, Co-60, Eu-152, Eu-154 "As Received"													
Cesium-137	U	2.76	+/-2.87	5.69	10.0	pCi/L			MXR1	10/03/18	2055	1803042	1
Cobalt-60	U	-0.983	+/-3.41	5.53		pCi/L							
Europium-152	U	-2.42	+/-7.83	14.0		pCi/L							
Europium-154	U	2.67	+/-7.94	16.1		pCi/L							
<b>Rad Gas Flow Proportional Counting</b>													
GFPC, Sr90, liquid "As Received"													
Strontium-90	U	0.432	+/-0.715	1.25	2.00	pCi/L			LXB3	10/04/18	0640	1805182	2
<b>Rad Liquid Scintillation Analysis</b>													
LSC, Tritium Dist, Liquid "As Received"													
Tritium	U	326	+/-265	411	700	pCi/L			GXR1	09/19/18	1633	1802825	3
Liquid Scint Ni63, Liquid "As Received"													
Nickel-63	U	5.17	+/-20.6	35.7	50.0	pCi/L			TXJ1	10/06/18	0158	1803449	4

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 901.1	
2	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified	
3	EPA 906.0 Modified	
4	DOE RESL Ni-1, Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Strontium Carrier	GFPC, Sr90, liquid "As Received"			92.3	(25%-125%)
Nickel Carrier	Liquid Scint Ni63, Liquid "As Received"			71.9	(25%-125%)

**Notes:**  
 Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Report Date: October 8, 2018

Company : LaCrosseSolutions  
 Address : S4601 State Hwy 35  
  
 Genoa, Wisconsin 54632  
 Contact: Mr. Jason Q. Spaide  
 Project: LACBWR Site Restoration Project

Client Sample ID: MW-201BR-091118	Project: ENRG07001
Sample ID: 459322009	Client ID: ENRG070
Matrix: Ground Water	
Collect Date: 11-SEP-18 08:58	
Receive Date: 18-SEP-18	
Collector: Client	

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Rad Gamma Spec Analysis</b>													
<b>Gammascpec, Gamma, Cs-137, Co-60, Eu-152, Eu-154 "As Received"</b>													
Cesium-137	U	3.27	+/-4.03	4.55	10.0	pCi/L			MXR1	10/03/18	2055	1803042	1
Cobalt-60	U	2.13	+/-2.93	6.30		pCi/L							
Europium-152	U	-1.78	+/-7.58	13.8		pCi/L							
Europium-154	U	-20.1	+/-11.8	14.4		pCi/L							
<b>Rad Gas Flow Proportional Counting</b>													
<b>GFPC, Sr90, liquid "As Received"</b>													
Strontium-90	U	-0.91	+/-0.609	1.51	2.00	pCi/L			LXB3	10/03/18	1659	1805182	2
<b>Rad Liquid Scintillation Analysis</b>													
<b>LSC, Tritium Dist, Liquid "As Received"</b>													
Tritium	U	28.4	+/-201	395	700	pCi/L			GXR1	09/19/18	1650	1802825	3
<b>Liquid Scint Ni63, Liquid "As Received"</b>													
Nickel-63	U	7.70	+/-20.1	34.5	50.0	pCi/L			TXJ1	10/06/18	0214	1803449	4

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 901.1	
2	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified	
3	EPA 906.0 Modified	
4	DOE RESL Ni-1, Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Strontium Carrier	GFPC, Sr90, liquid "As Received"			87.6	(25%-125%)
Nickel Carrier	Liquid Scint Ni63, Liquid "As Received"			74.2	(25%-125%)

**Notes:**  
 Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Report Date: October 8, 2018

Company : LaCrosseSolutions  
 Address : S4601 State Hwy 35  
  
 Genoa, Wisconsin 54632  
 Contact: Mr. Jason Q. Spaide  
 Project: LACBWR Site Restoration Project

Client Sample ID: MW-202AR-091118	Project: ENRG07001
Sample ID: 459322010	Client ID: ENRG070
Matrix: Ground Water	
Collect Date: 11-SEP-18 11:08	
Receive Date: 18-SEP-18	
Collector: Client	

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Rad Gamma Spec Analysis</b>													
Gammaspec, Gamma, Cs-137, Co-60, Eu-152, Eu-154 "As Received"													
Cesium-137	U	-0.0297	+/-3.98	5.77	10.0	pCi/L			MXR1	10/03/18	2056	1803042	1
Cobalt-60	U	1.42	+/-3.34	6.96		pCi/L							
Europium-152	U	-3.91	+/-7.95	14.1		pCi/L							
Europium-154	U	-0.293	+/-7.24	14.6		pCi/L							
<b>Rad Gas Flow Proportional Counting</b>													
GFPC, Sr90, liquid "As Received"													
Strontium-90	U	0.000448	+/-0.784	1.50	2.00	pCi/L			LXB3	10/03/18	1659	1805182	2
<b>Rad Liquid Scintillation Analysis</b>													
LSC, Tritium Dist, Liquid "As Received"													
Tritium		1040	+/-374	522	700	pCi/L			GXR1	09/20/18	0815	1802825	3
Liquid Scint Ni63, Liquid "As Received"													
Nickel-63	U	15.0	+/-20.0	33.8	50.0	pCi/L			TXJ1	10/06/18	0231	1803449	4

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 901.1	
2	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified	
3	EPA 906.0 Modified	
4	DOE RESL Ni-1, Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Strontium Carrier	GFPC, Sr90, liquid "As Received"			94.7	(25%-125%)
Nickel Carrier	Liquid Scint Ni63, Liquid "As Received"			76.6	(25%-125%)

**Notes:**  
 Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

# GEL LABORATORIES LLC

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## Certificate of Analysis

Report Date: October 8, 2018

Company : LaCrosseSolutions  
 Address : S4601 State Hwy 35  
  
 Genoa, Wisconsin 54632  
 Contact: Mr. Jason Q. Spaide  
 Project: LACBWR Site Restoration Project

Client Sample ID: MW-202B-091118	Project: ENRG07001
Sample ID: 459322011	Client ID: ENRG070
Matrix: Ground Water	
Collect Date: 11-SEP-18 11:10	
Receive Date: 18-SEP-18	
Collector: Client	

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Rad Gamma Spec Analysis</b>													
Gammaspec, Gamma, Cs-137, Co-60, Eu-152, Eu-154 "As Received"													
Cesium-137	U	0.799	+/-3.04	5.75	10.0	pCi/L			MXR1	10/03/18	2056	1803042	1
Cobalt-60	U	2.40	+/-2.04	5.15		pCi/L							
Europium-152	U	-2.25	+/-8.17	14.9		pCi/L							
Europium-154	U	-1.34	+/-8.82	16.9		pCi/L							
<b>Rad Gas Flow Proportional Counting</b>													
GFPC, Sr90, liquid "As Received"													
Strontium-90	U	0.697	+/-0.789	1.32	2.00	pCi/L			LXB3	10/04/18	0640	1805182	2
<b>Rad Liquid Scintillation Analysis</b>													
LSC, Tritium Dist, Liquid "As Received"													
Tritium	U	163	+/-230	399	700	pCi/L			GXR1	09/19/18	1726	1802825	3
Liquid Scint Ni63, Liquid "As Received"													
Nickel-63	U	10.4	+/-19.4	33.2	50.0	pCi/L			TXJ1	10/06/18	0247	1803449	4

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 901.1	
2	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified	
3	EPA 906.0 Modified	
4	DOE RESL Ni-1, Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Strontium Carrier	GFPC, Sr90, liquid "As Received"			85.2	(25%-125%)
Nickel Carrier	Liquid Scint Ni63, Liquid "As Received"			77.3	(25%-125%)

**Notes:**  
 Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Report Date: October 8, 2018

Company : LaCrosseSolutions  
 Address : S4601 State Hwy 35  
  
 Genoa, Wisconsin 54632  
 Contact: Mr. Jason Q. Spaide  
 Project: LACBWR Site Restoration Project

Client Sample ID: MW-203A-091118	Project: ENRG07001
Sample ID: 459322012	Client ID: ENRG070
Matrix: Ground Water	
Collect Date: 11-SEP-18 14:50	
Receive Date: 18-SEP-18	
Collector: Client	

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Rad Gamma Spec Analysis</b>													
Gammaspec, Gamma, Cs-137, Co-60, Eu-152, Eu-154 "As Received"													
Cesium-137	U	1.55	+/-2.82	5.70	10.0	pCi/L			MXR1	10/03/18	2056	1803042	1
Cobalt-60	U	-8.83	+/-4.83	6.77		pCi/L							
Europium-152	U	-2.67	+/-7.92	14.5		pCi/L							
Europium-154	U	-9.55	+/-8.30	12.7		pCi/L							
<b>Rad Gas Flow Proportional Counting</b>													
GFPC, Sr90, liquid "As Received"													
Strontium-90	U	-0.104	+/-0.515	1.06	2.00	pCi/L			LXB3	10/03/18	1659	1805182	2
<b>Rad Liquid Scintillation Analysis</b>													
LSC, Tritium Dist, Liquid "As Received"													
Tritium		616	+/-347	533	700	pCi/L			GXR1	09/20/18	0832	1802825	3
Liquid Scint Ni63, Liquid "As Received"													
Nickel-63	U	-5.21	+/-19.9	35.3	50.0	pCi/L			TXJ1	10/06/18	0418	1803449	4

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 901.1	
2	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified	
3	EPA 906.0 Modified	
4	DOE RESL Ni-1, Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Strontium Carrier	GFPC, Sr90, liquid "As Received"			109	(25%-125%)
Nickel Carrier	Liquid Scint Ni63, Liquid "As Received"			72.7	(25%-125%)

**Notes:**  
 Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

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## Certificate of Analysis

Report Date: October 8, 2018

Company : LaCrosseSolutions  
 Address : S4601 State Hwy 35  
  
 Genoa, Wisconsin 54632  
 Contact: Mr. Jason Q. Spaide  
 Project: LACBWR Site Restoration Project

Client Sample ID: MW-203B-091118	Project: ENRG07001
Sample ID: 459322013	Client ID: ENRG070
Matrix: Ground Water	
Collect Date: 11-SEP-18 14:38	
Receive Date: 18-SEP-18	
Collector: Client	

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Rad Gamma Spec Analysis</b>													
<b>Gammascpec, Gamma, Cs-137, Co-60, Eu-152, Eu-154 "As Received"</b>													
Cesium-137	U	1.05	+/-4.36	7.97	10.0	pCi/L			MXR1	10/03/18	2057	1803042	1
Cobalt-60	U	-2.29	+/-4.06	6.92		pCi/L							
Europium-152	U	-3.67	+/-8.87	15.7		pCi/L							
Europium-154	U	-6.8	+/-12.8	22.0		pCi/L							
<b>Rad Gas Flow Proportional Counting</b>													
<b>GFPC, Sr90, liquid "As Received"</b>													
Strontium-90	U	0.819	+/-0.755	1.23	2.00	pCi/L			LXB3	10/03/18	1659	1805182	2
<b>Rad Liquid Scintillation Analysis</b>													
<b>LSC, Tritium Dist, Liquid "As Received"</b>													
Tritium	U	324	+/-261	404	700	pCi/L			GXR1	09/19/18	1801	1802825	3
<b>Liquid Scint Ni63, Liquid "As Received"</b>													
Nickel-63	U	21.7	+/-21.9	36.5	50.0	pCi/L			TXJ1	10/06/18	0434	1803449	4

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 901.1	
2	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified	
3	EPA 906.0 Modified	
4	DOE RESL Ni-1, Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Strontium Carrier	GFPC, Sr90, liquid "As Received"			114	(25%-125%)
Nickel Carrier	Liquid Scint Ni63, Liquid "As Received"			69.9	(25%-125%)

**Notes:**  
 Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit



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## Certificate of Analysis

Report Date: October 8, 2018

Company : LaCrosseSolutions  
 Address : S4601 State Hwy 35  
  
 Genoa, Wisconsin 54632  
 Contact: Mr. Jason Q. Spaide  
 Project: LACBWR Site Restoration Project

Client Sample ID: MW-204A-091218	Project: ENRG07001
Sample ID: 459322014	Client ID: ENRG070
Matrix: Ground Water	
Collect Date: 12-SEP-18 10:00	
Receive Date: 18-SEP-18	
Collector: Client	

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Rad Gamma Spec Analysis</b>													
Gammaspec, Gamma, Cs-137, Co-60, Eu-152, Eu-154 "As Received"													
Cesium-137	U	1.27	+/-3.11	5.88	10.0	pCi/L			MXR1	10/03/18	2057	1803042	1
Cobalt-60	U	-0.936	+/-3.55	6.44		pCi/L							
Europium-152	U	1.55	+/-7.74	14.3		pCi/L							
Europium-154	U	-3.41	+/-9.13	16.4		pCi/L							
<b>Rad Gas Flow Proportional Counting</b>													
GFPC, Sr90, liquid "As Received"													
Strontium-90	U	-0.166	+/-0.521	1.07	2.00	pCi/L			LXB3	10/03/18	1659	1805182	2
<b>Rad Liquid Scintillation Analysis</b>													
LSC, Tritium Dist, Liquid "As Received"													
Tritium	U	-45.6	+/-189	402	700	pCi/L			GXR1	09/19/18	1818	1802825	3
Liquid Scint Ni63, Liquid "As Received"													
Nickel-63	U	32.2	+/-21.8	35.7	50.0	pCi/L			TXJ1	10/06/18	0450	1803449	4

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 901.1	
2	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified	
3	EPA 906.0 Modified	
4	DOE RESL Ni-1, Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Strontium Carrier	GFPC, Sr90, liquid "As Received"			118	(25%-125%)
Nickel Carrier	Liquid Scint Ni63, Liquid "As Received"			71.9	(25%-125%)

**Notes:**  
 Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Report Date: October 8, 2018

Company : LaCrosseSolutions  
 Address : S4601 State Hwy 35  
  
 Genoa, Wisconsin 54632  
 Contact: Mr. Jason Q. Spaide  
 Project: LACBWR Site Restoration Project

Client Sample ID: MW-204B-091218	Project: ENRG07001
Sample ID: 459322015	Client ID: ENRG070
Matrix: Ground Water	
Collect Date: 12-SEP-18 10:12	
Receive Date: 18-SEP-18	
Collector: Client	

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Rad Gamma Spec Analysis</b>													
<b>Gammascpec, Gamma, Cs-137, Co-60, Eu-152, Eu-154 "As Received"</b>													
Cesium-137	U	-1.57	+/-3.63	5.46	10.0	pCi/L			MXR1	10/03/18	2057	1803042	1
Cobalt-60	U	0.464	+/-2.73	5.78		pCi/L							
Europium-152	U	2.10	+/-8.74	16.6		pCi/L							
Europium-154	U	3.23	+/-13.1	19.4		pCi/L							
<b>Rad Gas Flow Proportional Counting</b>													
<b>GFPC, Sr90, liquid "As Received"</b>													
Strontium-90	U	0.0301	+/-0.490	0.971	2.00	pCi/L			LXB3	10/03/18	1700	1805182	2
<b>Rad Liquid Scintillation Analysis</b>													
<b>LSC, Tritium Dist, Liquid "As Received"</b>													
Tritium	U	-7.34	+/-180	369	700	pCi/L			GXR1	09/19/18	1836	1802825	3
<b>Liquid Scint Ni63, Liquid "As Received"</b>													
Nickel-63	U	2.55	+/-19.6	34.2	50.0	pCi/L			TXJ1	10/06/18	0506	1803449	4

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 901.1	
2	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified	
3	EPA 906.0 Modified	
4	DOE RESL Ni-1, Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Strontium Carrier	GFPC, Sr90, liquid "As Received"			109	(25%-125%)
Nickel Carrier	Liquid Scint Ni63, Liquid "As Received"			75.4	(25%-125%)

**Notes:**  
 Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

# GEL LABORATORIES LLC

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## Certificate of Analysis

Report Date: October 8, 2018

Company : LaCrosseSolutions  
 Address : S4601 State Hwy 35  
  
 Genoa, Wisconsin 54632  
 Contact: Mr. Jason Q. Spaide  
 Project: LACBWR Site Restoration Project

Client Sample ID: MW-200A-D-091018	Project: ENRG07001
Sample ID: 459322016	Client ID: ENRG070
Matrix: Ground Water	
Collect Date: 10-SEP-18 13:08	
Receive Date: 18-SEP-18	
Collector: Client	

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Rad Gamma Spec Analysis</b>													
<b>Gammascpec, Gamma, Cs-137, Co-60, Eu-152, Eu-154 "As Received"</b>													
Cesium-137	U	-0.517	+/-3.27	5.73	10.0	pCi/L			MXR1	10/04/18	0559	1803042	1
Cobalt-60	U	-0.94	+/-4.23	6.61		pCi/L							
Europium-152	U	1.23	+/-8.30	15.4		pCi/L							
Europium-154	U	5.07	+/-8.13	17.4		pCi/L							
<b>Rad Gas Flow Proportional Counting</b>													
<b>GFPC, Sr90, liquid "As Received"</b>													
Strontium-90	U	0.229	+/-0.712	1.31	2.00	pCi/L			LXB3	10/03/18	1700	1805182	2
<b>Rad Liquid Scintillation Analysis</b>													
<b>LSC, Tritium Dist, Liquid "As Received"</b>													
Tritium	U	73.7	+/-208	389	700	pCi/L			GXR1	09/19/18	1853	1802825	3
<b>Liquid Scint Ni63, Liquid "As Received"</b>													
Nickel-63	U	14.0	+/-20.9	35.4	50.0	pCi/L			TXJ1	10/06/18	0523	1803449	4

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 901.1	
2	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified	
3	EPA 906.0 Modified	
4	DOE RESL Ni-1, Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Strontium Carrier	GFPC, Sr90, liquid "As Received"			94.7	(25%-125%)
Nickel Carrier	Liquid Scint Ni63, Liquid "As Received"			72.3	(25%-125%)

**Notes:**  
 Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

# GEL LABORATORIES LLC

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## QC Summary

Report Date: October 8, 2018

Page 1 of 3

**LaCrosseSolutions**  
**S4601 State Hwy 35**  
**Genoa, Wisconsin**  
**Contact: Mr. Jason Q. Spaide**

**Workorder: 459322**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Rad Gamma Spec</b>											
Batch	1803042										
QC1204114898 459353027 DUP											
Cesium-137	UI	0.00	U	-2.81	pCi/L	N/A		N/A	MXR1	10/04/18	08:04
	Uncertainty	+/-3.54		+/-2.56							
Cobalt-60	U	-1.17	U	-0.134	pCi/L	N/A		N/A			
	Uncertainty	+/-2.15		+/-2.49							
Europium-152	U	0.655	U	9.42	pCi/L	N/A		N/A			
	Uncertainty	+/-5.62		+/-6.85							
Europium-154	U	2.70	U	-2.08	pCi/L	N/A		N/A			
	Uncertainty	+/-4.76		+/-5.90							
QC1204114899 LCS											
Americium-241		34300		37800	pCi/L		110	(75%-125%)		10/04/18	06:02
	Uncertainty			+/-1390							
Cesium-137		12700		13400	pCi/L		105	(75%-125%)			
	Uncertainty			+/-351							
Cobalt-60		10000		10500	pCi/L		105	(75%-125%)			
	Uncertainty			+/-368							
Europium-152			U	55.9	pCi/L						
	Uncertainty			+/-176							
Europium-154			U	13.8	pCi/L						
	Uncertainty			+/-125							
QC1204114897 MB											
Cesium-137			U	2.33	pCi/L					10/04/18	06:02
	Uncertainty			+/-2.52							
Cobalt-60			U	-1.5	pCi/L						
	Uncertainty			+/-1.90							
Europium-152			U	1.05	pCi/L						
	Uncertainty			+/-6.80							
Europium-154			U	-0.816	pCi/L						
	Uncertainty			+/-6.12							

# GEL LABORATORIES LLC

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## QC Summary

Workorder: 459322

Page 2 of 3

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Rad Gas Flow</b>											
Batch	1805182										
QC1204119677	459322005	DUP									
Strontium-90	U	0.254	U	-0.0791	pCi/L	N/A		N/A	LXB3	10/03/18	17:05
	Uncertainty	+/-0.813		+/-0.827							
QC1204119678	LCS										
Strontium-90	77.3			69.7	pCi/L		90.1	(75%-125%)		10/03/18	17:05
	Uncertainty			+/-3.95							
QC1204119676	MB										
Strontium-90			U	-0.349	pCi/L					10/03/18	17:05
	Uncertainty			+/-0.763							
<b>Rad Liquid Scintillation</b>											
Batch	1802825										
QC1204114464	459322001	DUP									
Tritium	U	245	U	7.90	pCi/L	N/A		N/A	GXR1	09/20/18	08:48
	Uncertainty	+/-317		+/-291							
QC1204114466	LCS										
Tritium	2500			2280	pCi/L		91.2	(75%-125%)		09/19/18	20:04
	Uncertainty			+/-488							
QC1204114463	MB										
Tritium			U	-46	pCi/L					09/19/18	19:11
	Uncertainty			+/-189							
QC1204114465	459322001	MS									
Tritium	2500	U	245	2430	pCi/L		97.3	(75%-125%)		09/19/18	19:46
	Uncertainty		+/-317	+/-507							
Batch	1803449										
QC1204115981	459322001	DUP									
Nickel-63	U	8.01	U	-2.59	pCi/L	N/A		N/A	TXJ1	10/06/18	05:55
	Uncertainty	+/-21.7		+/-19.6							
QC1204115982	LCS										
Nickel-63	886			908	pCi/L		102	(75%-125%)		10/06/18	06:11
	Uncertainty			+/-45.5							
QC1204115980	MB										
Nickel-63			U	0.577	pCi/L					10/06/18	05:39
	Uncertainty			+/-20.3							

**Notes:**

Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).  
 The Qualifiers in this report are defined as follows:

# GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

## QC Summary

Workorder: 459322

Page 3 of 3

Parname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
**	Analyte is a Tracer compound										
<	Result is less than value reported										
>	Result is greater than value reported										
BD	Results are either below the MDC or tracer recovery is low										
FA	Failed analysis.										
H	Analytical holding time was exceeded										
J	Value is estimated										
K	Analyte present. Reported value may be biased high. Actual value is expected to be lower.										
L	Analyte present. Reported value may be biased low. Actual value is expected to be higher.										
M	M if above MDC and less than LLD										
M	REMP Result > MDC/CL and < RDL										
N/A	RPD or %Recovery limits do not apply.										
N1	See case narrative										
ND	Analyte concentration is not detected above the detection limit										
NJ	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier										
Q	One or more quality control criteria have not been met. Refer to the applicable narrative or DER.										
R	Sample results are rejected										
U	Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.										
UI	Gamma Spectroscopy--Uncertain identification										
UJ	Gamma Spectroscopy--Uncertain identification										
UL	Not considered detected. The associated number is the reported concentration, which may be inaccurate due to a low bias.										
X	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier										
Y	Other specific qualifiers were required to properly define the results. Consult case narrative.										
^	RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.										
h	Preparation or preservation holding time was exceeded										

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.

^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.

\* Indicates that a Quality Control parameter was not within specifications.

For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

**Radiochemistry  
Technical Case Narrative  
LaCrosseSolutions, LLC (ENRG)  
SDG #: 459322**

**Product:** Gammaspec, Gamma, Cs-137, Co-60, Eu-152, Eu-154

**Analytical Method:** EPA 901.1

**Analytical Procedure:** GL-RAD-A-013 REV# 27

**Analytical Batch:** 1803042

The following samples were analyzed using the above methods and analytical procedure(s).

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
459322001	Well-3-091018
459322002	Well-5-091118
459322003	Well-7-091118
459322004	B11R-091018
459322005	B11AR-091018
459322006	MW-200A-091018
459322007	MW-200B-091018
459322008	MW-201A-091118
459322009	MW-201BR-091118
459322010	MW-202AR-091118
459322011	MW-202B-091118
459322012	MW-203A-091118
459322013	MW-203B-091118
459322014	MW-204A-091218
459322015	MW-204B-091218
459322016	MW-200A-D-091018
1204114897	Method Blank (MB)
1204114898	459353027(NonSDG) Sample Duplicate (DUP)
1204114899	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

**Data Summary:**

There are no exceptions, anomalies or deviations from the specified methods. All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable.

**Product:** GFPC, Sr90, liquid

**Analytical Method:** EPA 905.0 Modified/DOE RP501 Rev. 1 Modified

**Analytical Procedure:** GL-RAD-A-004 REV# 20

**Analytical Batch:** 1805182

The following samples were analyzed using the above methods and analytical procedure(s).

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
------------------------------	--

459322001	Well-3-091018
459322002	Well-5-091118
459322003	Well-7-091118
459322004	B11R-091018
459322005	B11AR-091018
459322006	MW-200A-091018
459322007	MW-200B-091018
459322008	MW-201A-091118
459322009	MW-201BR-091118
459322010	MW-202AR-091118
459322011	MW-202B-091118
459322012	MW-203A-091118
459322013	MW-203B-091118
459322014	MW-204A-091218
459322015	MW-204B-091218
459322016	MW-200A-D-091018
1204119676	Method Blank (MB)
1204119677	459322005(B11AR-091018) Sample Duplicate (DUP)
1204119678	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

**Data Summary:**

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

**Technical Information**

**Recounts**

Samples 459322003 (Well-7-091118), 459322008 (MW-201A-091118) and 459322011 (MW-202B-091118) were recounted due to results more negative than the three sigma TPU. The second counts are reported. Sample 459322006 (MW-200A-091018) was recounted due to a suspected false positive. The recount is reported.

**Product: LSC, Tritium Dist, Liquid**

**Analytical Method:** EPA 906.0 Modified

**Analytical Procedure:** GL-RAD-A-002 REV# 22

**Analytical Batch:** 1802825

The following samples were analyzed using the above methods and analytical procedure(s).

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
459322001	Well-3-091018
459322002	Well-5-091118
459322003	Well-7-091118
459322004	B11R-091018
459322005	B11AR-091018
459322006	MW-200A-091018
459322007	MW-200B-091018
459322008	MW-201A-091118
459322009	MW-201BR-091118



459322010	MW-202AR-091118
459322011	MW-202B-091118
459322012	MW-203A-091118
459322013	MW-203B-091118
459322014	MW-204A-091218
459322015	MW-204B-091218
459322016	MW-200A-D-091018
1204114463	Method Blank (MB)
1204114464	459322001(Well-3-091018) Sample Duplicate (DUP)
1204114465	459322001(Well-3-091018) Matrix Spike (MS)
1204114466	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

**Data Summary:**

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

**Technical Information**

**Recounts**

Samples 1204114464 (Well-3-091018DUP), 459322001 (Well-3-091018), 459322010 (MW-202AR-091118) and 459322012 (MW-203A-091118) were recounted to verify sample results. Recounts are reported.

**Product: Liquid Scint Ni63, Liquid**

**Analytical Method:** DOE RESL Ni-1, Modified

**Analytical Procedure:** GL-RAD-A-022 REV# 18

**Analytical Batch:** 1803449

The following samples were analyzed using the above methods and analytical procedure(s).

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
459322001	Well-3-091018
459322002	Well-5-091118
459322003	Well-7-091118
459322004	B11R-091018
459322005	B11AR-091018
459322006	MW-200A-091018
459322007	MW-200B-091018
459322008	MW-201A-091118
459322009	MW-201BR-091118
459322010	MW-202AR-091118
459322011	MW-202B-091118
459322012	MW-203A-091118
459322013	MW-203B-091118
459322014	MW-204A-091218
459322015	MW-204B-091218
459322016	MW-200A-D-091018
1204115980	Method Blank (MB)
1204115981	459322001(Well-3-091018) Sample Duplicate (DUP)

The samples in this SDG were analyzed on an "as received" basis.

**Data Summary:**

There are no exceptions, anomalies or deviations from the specified methods. All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable.

**Certification Statement**

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

Page: 1 of 2  
Project # \_\_\_\_\_  
GEL Quote #: \_\_\_\_\_  
COC Number (1): \_\_\_\_\_  
PO Number: 672583



Laboratories LLC  
Chemistry | Radiochemistry | Radiobiology | Specialty Analytics  
Chain of Custody and Analytical Request

GEL Laboratories, LLC  
2040 Savage Road  
Charleston, SC 29407  
Phone: (843) 556-8171  
Fax: (843) 766-1178  
459322

GEL Work Order Number: \_\_\_\_\_ GEL Project Manager: \_\_\_\_\_

Client Name: Energy Solutions Phone # 860 877 3152  
Project/Site Name: LACBWR Fax # \_\_\_\_\_  
Address: Genoa, WI

Sample Analysis Requested (5) (Fill in the number of containers for each test)

Collected By: SK/AO Send Results To: mwannordemer@haleyaldrich.com

Sample ID <i>* For composites - indicate start and stop date/time</i>	*Date Collected (mm-dd-yy)	*Time Collected (Military) (hhmm)	QC Code (2)	Field Filtered (3)	Sample Matrix (4)	Radioactive Please supply isotopic info.	(7) Known or possible hazards	Total number of containers	Sample Analysis Requested (5)						Preservative Type (6)	Comments Note: extra sample is required for sample specific QC	
									H-3	51-90	60-60	65-13	N-63	64-152			64-154
Well-3-091018	9/10/18	1515	N	N	DW	N	N	3	X	X	X	X	X	X	X		
Well-5-091118	9/11/18	1240	N	N	DW	N	N	3	X	X	X	X	X	X	X		
Well-7-091118	9/11/18	1255	N	N	DW	N	N	3	X	X	X	X	X	X	X		
BIIR-091018	9/10/18	0925	N	N	GW	N	N	3	X	X	X	X	X	X	X		
BIAR-091018	9/10/18	0935	N	N	GW	N	N	3	X	X	X	X	X	X	X		
MW-200A-091018	9/10/18	1308	N	N	GW	N	N	3	X	X	X	X	X	X	X		
MW-200B-091018	9/10/18	1325	N	N	GW	N	N	3	X	X	X	X	X	X	X		
MW-201A-091118	9/11/18	0910	N	N	GW	N	N	3	X	X	X	X	X	X	X		
MW-201BR-091118	9/11/18	0858	N	N	GW	N	N	3	X	X	X	X	X	X	X		
MW-202AR-091118	9/11/18	1108	N	N	GW	N	N	3	X	X	X	X	X	X	X		

Chain of Custody Signatures			TAT Requested: Normal: <input checked="" type="checkbox"/> Rush: <input checked="" type="checkbox"/> Specify: _____ (Subject to Surcharge)		
Relinquished By (Signed)	Date	Time	Received by (signed)	Date	Time
1 <i>SK</i>	9/12/18	1400	1 Fed Ex	9/10/18	9:15
2			2 R. Allen	9/10/18	9:15
3			3		

Fax Results: [ ] Yes [ ] No  
Select Deliverable: [ ] C of A [ ] QC Summary [ ] Level 1 [ ] Level 2 [ ] Level 3 [ ] Level 4  
Additional Remarks:  
For Lab Receiving Use Only: Custody Seal Intact? [ ] Yes [ ] No Cooler Temp: \_\_\_\_\_ °C

> For sample shipping and delivery details, see Sample Receipt & Review form (SRR.) Sample Collection Time Zone: [ ] Eastern [ ] Pacific [ ] Central [ ] Mountain [ ] Other:

- Chain of Custody Number = Client Determined
- QC Codes: N = Normal Sample, TB = Trip Blank, FD = Field Duplicate, EB = Equipment Blank, MS = Matrix Spike Sample, MSD = Matrix Spike Duplicate Sample, G = Grab, C = Composite
- Field Filtered: For liquid matrices, indicate with a - Y - for yes the sample was field filtered or - N - for sample was not field filtered.
- Matrix Codes: DW=Drinking Water, GW=Groundwater, SW=Surface Water, WW=Waste Water, W=Water, ML=Misc Liquid, SO=Soil, SD=Sediment, SL=Sludge, SS=Solid Waste, O=Oil, F=Filter, P=Wipe, U=Urine, F=Fecal, N=Nasal
- Sample Analysis Requested: Analytical method requested (i.e. 8260B, 6010B/7470A) and number of containers provided for each (i.e. 8260B - 3, 6010B/7470A - 1).
- Preservative Type: HA = Hydrochloric Acid, NI = Nitric Acid, SH = Sodium Hydroxide, SA = Sulfuric Acid, AA = Ascorbic Acid, HX = Hexane, ST = Sodium Thiosulfate, If no preservative is added = leave field blank

*fresh TAT 2-day for Tritium Results*

7.) Are there any known or possible hazards associated with these samples?  
**RCRA Metals**  
As = Arsenic Hg= Mercury  
Ba = Barium Se= Selenium  
Cd = Cadmium Ag= Silver  
Cr = Chromium MR= Miscellaneous  
Pb = Lead RCRA metals

**Characteristic Hazards**  
FL = Flammable/Ignitable  
CO = Corrosive  
RE = Reactive  
**TSCA Regulated**  
PCB = Polychlorinated biphenyls

**Listed Waste**  
LW= Listed Waste  
(F, K, P and U-listed wastes.)  
Waste code(s): \_\_\_\_\_

**Other**  
OT= Other / Unknown  
(i.e.: High/low pH, asbestos, beryllium, irritants, other misc. health hazards, etc.)  
Description: \_\_\_\_\_

Please provide any additional details below regarding handling and/or disposal concerns. (i.e. Origin of sample(s), type of site collected from, odd matrices, etc.)

Page: 2 of 2  
Project # \_\_\_\_\_  
GEL Quote #: \_\_\_\_\_  
COC Number (1): \_\_\_\_\_  
PO Number: 672583



GEL Laboratories, LLC  
2040 Savage Road  
Charleston, SC 29407  
Phone: (843) 556-8171  
Fax: (843) 766-1178  
459322

GEL Work Order Number: \_\_\_\_\_ GEL Project Manager: \_\_\_\_\_

Client Name: Energy Solutions Phone # 860 817 3152

Project/Site Name: LAEBWR Fax # \_\_\_\_\_

Address: Genoa, WI

Collected By: JKL/AO Send Results To: mwanwardenner@haleyandson.com

Sample Analysis Requested (5) (Fill in the number of containers for each test)

Sample ID <i>* For composites - indicate start and stop date/time</i>	*Date Collected (mm-dd-yy)	*Time Collected (Military) (hhmm)	QC Code (2)	Field Filtered (3)	Sample Matrix (4)	Radioactive Please supply isotopic info.	(7) Known or possible hazards	Total number of containers	Sample Analysis Requested (5)						Preservative Type (6)	Comments Note: extra sample is required for sample specific QC
									H-3	Sr-90	Co-60	Cs-137	Ni-63	Eu-152		
MW-202B-091118	9/11/18	1110	N	N	GW	N	N	3	X	X	X	X	X	X		
MW-203A-091118	9/11/18	1450	N	N	GW	N	N	3	X	X	X	X	X	X		
MW-203B-091118	9/11/18	1438	N	N	GW	N	N	3	X	X	X	X	X	X		
MW-204A-091218	9/12/18	1000	N	N	GW	N	N	3	X	X	X	X	X	X		
MW-204B-091218	9/12/18	1012	N	N	GW	N	N	3	X	X	X	X	X	X		
MW-200A-D-091018	9/10/18	1308	FD	N	GW	N	N	3	X	X	X	X	X	X		

Chain of Custody Signatures

TAT Requested: Normal:  Rush:  Specify: \_\_\_\_\_ (Subject to Surcharge)

Relinquished By (Signed)	Date	Time	Received by (signed)	Date	Time
1 [Signature]	9/10/18	1400	1 FedEx	9/19/18	9:15
2			2 [Signature]		
3			3		

Fax Results:  Yes  No  
Select Deliverable:  C of A  QC Summary  level 1  Level 2  Level 3  Level 4  
Additional Remarks:  
For Lab Receiving Use Only: Custody Seal Intact?  Yes  No Cooler Temp: \_\_\_\_\_ °C

> For sample shipping and delivery details, see Sample Receipt & Review form (SRR.) Sample Collection Time Zone:  Eastern  Pacific  Central  Mountain  Other: \_\_\_\_\_

- 1.) Chain of Custody Number = Client Determined
- 2.) QC Codes: N = Normal Sample, TB = Trip Blank, FD = Field Duplicate, EB = Equipment Blank, MS = Matrix Spike Sample, MSD = Matrix Spike Duplicate Sample, G = Grab, C = Composite
- 3.) Field Filtered: For liquid matrices, indicate with a - Y - for yes the sample was field filtered or - N - for sample was not field filtered.
- 4.) Matrix Codes: DW=Drinking Water, GW=Groundwater, SW=Surface Water, WW=Waste Water, W=Water, ML=Misc Liquid, SO=Soil, SD=Sediment, SL=Sludge, SS=Solid Waste, O=Oil, F=Filter, P=Wipe, U=Urine, F=Faecal, N=Nasal
- 5.) Sample Analysis Requested: Analytical method requested (i.e. 8260B, 6010B/7470A) and number of containers provided for each (i.e. 8260B - 3, 6010B/7470A - 1).
- 6.) Preservative Type: HA = Hydrochloric Acid, NI = Nitric Acid, SH = Sodium Hydroxide, SA = Sulfuric Acid, AA = Ascorbic Acid, HX = Hexane, ST = Sodium Thiosulfate, If no preservative is added = leave field blank

\*\* Rush TAT 2-day for Tritium results

Are there any known or possible hazards associated with these samples?	Characteristic Hazards FL = Flammable/Ignitable CO = Corrosive RE = Reactive	Listed Waste LW = Listed Waste (F,K,P and U-listed wastes.) Waste code(s):	Other OT = Other / Unknown (i.e.: High/low pH, asbestos, beryllium, irritants, other misc. health hazards, etc.) Description:	Please provide any additional details below regarding handling and/or disposal concerns. (i.e. Origin of sample(s), type of site collected from, odd matrices, etc.)
RCRA Metals As = Arsenic Hg = Mercury Ba = Barium Se = Selenium Cd = Cadmium Ag = Silver Cr = Chromium MR = Miscellaneous Pb = Lead RCRA metals	TSCA Regulated PCB = Polychlorinated biphenyls			



**List of current GEL Certifications as of 08 October 2018**

<b>State</b>	<b>Certification</b>
Alaska	17-018
Arkansas	88-0651
CLIA	42D0904046
California	2940
Colorado	SC00012
Connecticut	PH-0169
DoD ELAP/ ISO17025 A2LA	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330-15-00283, P330-15-00253
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC00012
Idaho Chemistry	SC00012
Idaho Radiochemistry	SC00012
Illinois NELAP	200029
Indiana	C-SC-01
Kansas NELAP	E-10332
Kentucky SDWA	90129
Kentucky Wastewater	90129
Louisiana NELAP	03046 (AI33904)
Louisiana SDWA	LA180011
Maryland	270
Massachusetts	M-SC012
Michigan	9976
Mississippi	SC00012
Nebraska	NE-OS-26-13
Nevada	SC000122018-1
New Hampshire NELAP	205415
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
North Dakota	R-158
Oklahoma	9904
Pennsylvania NELAP	68-00485
Puerto Rico	SC00012
S. Carolina Radiochem	10120002
South Carolina Chemistry	10120001
Tennessee	TN 02934
Texas NELAP	T104704235-18-13
Utah NELAP	SC000122018-27
Vermont	VT87156
Virginia NELAP	460202
Washington	C780

## **APPENDIX D**

### **Communications Plan**



LC-2018-0069

MEMORANDUM

7 July 2018

TO: Dairyland Power Corporation  
Lane Peters, Manager Genoa Site

FROM: LaCrosseSolutions, LLC  
Joseph Nowak, Director

SUBJECT: Communications Plan for the LACBWR Dye Study

As you are aware, LaCrosseSolutions has been monitoring a tritium release that has impacted shallow groundwater in the vicinity of monitoring wells MW-203A/B and MW-202A/B with the highest detections reported at MW-203A slightly above the United States Environmental Protection Agency (USEPA) Maximum Contaminant Level (MCL) of 20,000 picocuries per liter (pCi/L). The source of the tritium was mitigated and subsequent data immediately showed decreasing trends with the detections well below the MCL. At no time was any tritium detected above background levels in any of the potable supply wells.

In an effort to characterize the extent of tritium in groundwater, our consultant, Haley & Aldrich, Inc. completed a groundwater model and is also planning to perform a limited dye study so that the model may be calibrated. On June 28, 2018, the Wisconsin Department of Natural Resources (WDNR) granted approval to use up to one pound of Rhodamine WT (RWT) dye to complete the study. The dye will be introduced into the former excavated Reactor Plant/Generator Plant Area (RPGPA) sump. We will then monitor the downgradient wells and report the data to both Dairyland Power Corporations (DPC) and WDNR. A copy of the approval letter was provided to DPC on July 3, 2018. A copy of our Site Investigation Work Plan, that includes the Dye Study work plan, was provided to you on May 22, 2018.

Rhodamine WT (RWT) is a common dye used to assess groundwater. It is considered non-toxic and is commonly used in cosmetics and other household products. However, as it is being introduced directly to the sump area and to groundwater, as a precaution, LaCrosseSolutions will continue to provide potable water for DPC, until such time that it can be documented that no RWT is detected above the site-specific WDNR criteria of 0.1 microgram per liter (ug/L) in the supply wells. This value is not a promulgated criterion; however, to be protective, WDNR set this criterion for the LaCrosse Boiling Water Reactor (LACBWR) Site as part of their approval process.

We anticipate that the dye study will take less than two months to complete; however, in coordination with WDNR, we will continue to monitor DPC Genoa 3 supply wells #5 and #7 for a minimum of six months after the study is completed. We respectfully request that you communicate our plans with your staff and ensure that the potable water faucets are removed from commission until we complete this study. We have also provided the attached FAQ sheet for you to share with your staff.

If you have any questions or would like to discuss our investigation, please feel free to contact me at 573-880-8070 or [janowak@energysolutions.com](mailto:janowak@energysolutions.com).





## **DYE STUDY FREQUENTLY ASKED QUESTIONS (FAQs) LACROSSE BOILING WATER REACTOR**

### **1) *Why is LACBWR performing this study?***

We are conducting the dye tracer study to validate or confirm our conceptual site model. By adding the dyes at a specific location and then tracking their flow pathway in the groundwater, we will be able to better understand how fast the water travels and the direction. We do not anticipate discharging dyes to the Mississippi River; however, it is possible. Therefore, we will not be surprised if some colors show up near the storm water outfalls. We also do not anticipate dye reaching the deep supply wells.

### **2) *If the water safe to drink?***

Yes. To date, all samples collected report no tritium in wells #5 or #7, and we do not expect that the dye (RWT) will be detected. However, as a conservative assumption, we will provide bottled water until our dye study is completed. It is safe to use water in the lavatories to flush water and for washing.

### **3) *Can it hurt me (family, kids, pets)? Will the fish be safe to eat?***

The dyes are safe; they are approved by WDNR and USEPA. In fact, a similar green dye is the same material used during St. Patrick's Day to turn the rivers in Chicago green. They do not harm wildlife and are also very common in food colorings and cosmetics (i.e. they will not impact fish or other wildlife in the area).

### **4) *How long will the dye last?***

Dyes last up to several years within the soils and groundwater; however, they break down in sunlight. If dyes reach the Mississippi River, they will likely only be visible for a short duration.

### **5) *Can we get information on the dye?***

Yes, if you would like more details, please send us your contact information and we are happy to mail or e-mail additional information on the dyes used for this study. DPC also has copies of the Investigation Work Plans and Safety Data Sheets on the dye we will be using.

### **6) *When is the dye study over?***

The study will be completed once the dyes are no longer being measured in groundwater monitoring wells or if LACBWR obtains enough data on the groundwater flow. We expect this study to last approximately 4 to 6 weeks. We will continue to monitor supply wells for at least 6 months after we terminate the study.

## **APPENDIX E**

### **Dye Application and Work Plan**



HALEY & ALDRICH, INC.  
75 Washington Avenue  
Suite 1A  
Portland, ME 04101  
207.482.4600

15 March 2018  
File No. 128924-004

Tim Zeichert  
Project Manager  
Wisconsin Department of Natural Resources  
Regional Remediation and Redevelopment Environmental Program  
101 S. Webster Street  
Madison, WI 53703

Subject: Request to Perform Infiltration/Injection at the LaCrosse Boiling Water Reactor  
4601 State Hwy 35  
Genoa, Wisconsin 54632

Dear Mr. Zeichert:

Haley & Aldrich, Inc. (Haley & Aldrich) is submitting this request on behalf of EnergySolutions to the Regional Remediation and Redevelopment (RR) Environmental Program to request permission to perform a limited Dye Tracer Test at the LaCrosse Boiling Water Reactor (LACBWR or Site). The cover letter and fee associated with the request and the Wisconsin Pollutant Discharge Elimination System (WPDES) permit are submitted concurrently with this letter. We are submitting these directly to the RR EPA person to expedite the process per discussions with Mr. Dave Rozeboom.

A dye tracer study will be completed to supplement existing groundwater modeling data and to verify the conceptual site model. The purpose of this study is to evaluate if the Reactor Plant, Generator Plant Access (RPGPA) sump is the source for tritium recently detected in groundwater.

To conduct this study, one of the following dyes will be introduced (i.e. injected) into an existing excavation along the west side of the reactor building where the sump was previously removed:

- Fluorescein (fluorescent yellow/green);
- Rhodamine WT (fluorescent red);
- Eosine (fluorescent red); or
- Sulforhodamine (fluorescent pink).

A background evaluation will first be conducted to be able to select the dye. If no dyes are detected in the background evaluation, then Haley & Aldrich will select Eosine, as when it is diluted, it has a peach-like color that will have less of a visual impact, should it discharge to the Mississippi River.

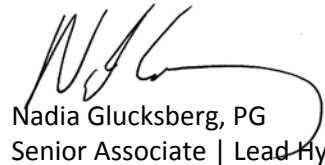
Carbon packets will be installed in up to eight monitoring wells/locations prior to introducing the dye. Once introduced, the sample packets will be replaced weekly and submitted under chain of custody to

Ozarks Underground Laboratory of Protem, Missouri for analysis. These data will then be used to evaluate groundwater flow paths and velocity.

The dye tracer study is anticipated to begin immediately after permit approval with a one-time dye introduction of up to 0.5 pounds of dye into the former sump, flushed by up to 200 gallons of potable, non-chlorinated water. Groundwater and surface water will then be monitored for up to 2 months, or until data are sufficient to better understand groundwater flow paths. Attachment 1 describes the study in more detail and includes the Safety Data Sheets for each of the dyes being considered for this study.

If you have any questions, please do not hesitate to contact Nadia Glucksberg at (207) 482-4623 or Joseph Nowak at (608) 689-4210.

Sincerely yours,  
HALEY & ALDRICH, INC.

A handwritten signature in black ink, appearing to read 'N. Glucksberg', with a large, sweeping flourish underneath.

Nadia Glucksberg, PG  
Senior Associate | Lead Hydrogeologist

Attachments:

- Attachment 1 – Cover Sheet and Fee including form 4400-237
- Attachment 2 - Dye Tracer Study
- Attachment 3 – WPDES General Permit Application

Attachment A



HALEY & ALDRICH, INC.  
75 Washington Avenue  
Suite 1A  
Portland, ME 04101  
207.482.4600

15 March 2018  
File No. 128924-004

Tim Zeichert  
Project Manager  
Wisconsin Department of Natural Resources  
Regional Remediation and Redevelopment Environmental Program  
101 S. Webster Street  
Madison, WI 53703

Subject: Cover Letter and Fee for Request to Perform Infiltration/Injection

Dear Mr. Zeichert:

Haley & Aldrich, Inc. (Haley & Aldrich) is submitting this cover letter and the requested fee of \$700 to the Regional Remediation and Redevelopment (RR) Environmental Program Associate (EPA) to request permission to perform an injection test at LaCrosse Boiling Water Reactor (LACBWR).

<b>Site Information</b>	
Site Name	LaCrosse Boiling Water Reactor (LACBWR)
Address	S4651 State Road 35, Genoa, Wisconsin 54632
<b>Responsible Party Contact Information</b>	
Owner Name	EnergySolutions; Joseph A. Nowak
Address	4601 State Highway 35, Genoa, WI 54632
Phone Number	608-689-4210
Email Address	janowak@energysolutions.com
<b>Environmental Consultant Contact Information</b>	
Name & Company	Nadia Glucksberg, PG, LEP Haley & Aldrich, Inc.
Address	75 Washington Avenue Suite 1A Portland, ME 04101
Phone Number	(207) 482-4623
Email Address	nglucksberg@haleyaldrich.com

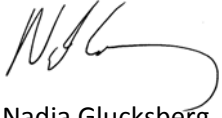
Should you have any questions, please do not hesitate to contact Nadia Glucksberg at (207) 482-4623 or Joseph Nowak at (608) 689-4210.

Wisconsin Department of Natural Resources

15 March 2018

Page 2

Sincerely yours,  
HALEY & ALDRICH, INC.

A handwritten signature in black ink, appearing to read 'N. Glucksberg', with a large, sweeping flourish at the end.

Nadia Glucksberg, PG, LEP  
Program Manager

C:\Users\rbansal\Documents\Projects\LaCrosse\Attachment A1 - HAI-Cover Sheet\_DF.docx

**Notice:** Use this form to request a written response (on agency letterhead) from the Department of Natural Resources (DNR) regarding technical assistance, a post-closure change to a site, a specialized agreement or liability clarification for Property with known or suspected environmental contamination. A fee will be required as is authorized by s. 292.55, Wis. Stats., and NR 749, Wis. Adm. Code., unless noted in the instructions below. Personal information collected will be used for administrative purposes and may be provided to requesters to the extent

### Definitions

**"Property"** refers to the subject Property that is perceived to have been or has been impacted by the discharge of hazardous substances.

**"Liability Clarification"** refers to a written determination by the Department provided in response to a request made on this form. The response clarifies whether a person is or may become liable for the environmental contamination of a Property, as provided in s. 292.55, Wis. Stats.

**"Technical Assistance"** refers to the Department's assistance or comments on the planning and implementation of an environmental investigation or environmental cleanup on a Property in response to a request made on this form as provided in s. 292.55, Wis. Stats.

**"Post-closure modification"** refers to changes to Property boundaries and/or continuing obligations for Properties or sites that received closure letters for which continuing obligations have been applied or where contamination remains. Many, but not all, of these sites are included on the GIS Registry layer of RR Sites Map to provide public notice of residual contamination and continuing obligations.

### Select the Correct Form

This form should be used to request the following from the DNR:

- Technical Assistance
- Liability Clarification
- Post-Closure Modifications
- Specialized Agreements (tax cancellation, negotiated agreements, etc.)

**Do not use this form if one of the following applies:**

- Request for an off-site liability exemption or clarification for Property that has been or is perceived to be contaminated by one or more hazardous substances that originated on another Property containing the source of the contamination. Use DNR's Off-Site Liability Exemption and Liability Clarification Application Form 4400-201.
- Submittal of an Environmental Assessment for the Lender Liability Exemption, s 292.21, Wis. Stats., if no response or review by DNR is requested. Use the Lender Liability Exemption Environmental Assessment Tracking Form 4400-196.
- Request for an exemption to develop on a historic fill site or licensed landfill. Use DNR's Form 4400-226 or 4400-226A.
- Request for closure for Property where the investigation and cleanup actions are completed. Use DNR's Case Closure - GIS Registry Form 4400-202.

All forms, publications and additional information are available on the Internet at: [dnr.wi.gov/topic/Brownfields/Pubs.html](http://dnr.wi.gov/topic/Brownfields/Pubs.html).

### Instructions

1. Complete sections 1, 2, 6 and 7 for all requests. Be sure to provide adequate and complete information.
2. Select the type of assistance requested: Section 3 for technical assistance or post-closure modifications, Section 4 for a written determination or clarification of environmental liabilities; or Section 5 for a specialized agreement.
3. Include the fee payment that is listed in Section 3, 4, or 5, unless you are a "Voluntary Party" enrolled in the Voluntary Party Liability Exemption Program and the questions in Section 2 direct otherwise. Information on to whom and where to send the fee is found in Section 8 of this form.

4. Send the completed request, supporting materials and the fee to the appropriate DNR regional office where the Property is located.

See the map on the last page of this form. A paper copy of the signed form and all reports and supporting materials shall be sent with an electronic copy of the form and supporting materials on a compact disk. For electronic document submittal requirements see: <http://dnr.wi.gov/files/PDF/pubs/rr/RR690.pdf>

The time required for DNR's determination varies depending on the complexity of the site, and the clarity and completeness of the request and supporting documentation.



## Technical Assistance, Environmental Liability

Form 4400-237 (R 9/15)

Page 0 of 8

### Section 1. Contact and Recipient Information

#### Requester Information

This is the person requesting technical assistance or a post-closure modification review, that his or her liability be clarified or a specialized agreement and is identified as the requester in Section 7. DNR will address its response letter to this person.

Last Name Nowak	First Joseph	MI A	Organization/ Business Name EnergySolutions
Mailing Address 4601 State Hwy 35			City Genoa
			State WI
			ZIP Code 54632
Phone # (include area code) (608) 689-4210	Fax # (include area code)	Email janowak@energysolutions.com	

The requester listed above: (select all that apply)

- |  |  |
|--|--|
| <input type="checkbox"/> Is currently the owner  | <input type="checkbox"/> Is considering selling the Property   |
| <input type="checkbox"/> Is renting or leasing the Property  | <input type="checkbox"/> Is considering acquiring the Property |
| <input type="checkbox"/> Is a lender with a mortgagee interest in the Property                               |  |
| <input checked="" type="checkbox"/> Other. Explain the status of the Property with respect to the applicant: |  |

Director Lacrosse Solutions; Dairyland Power Cooperative owns the property and it is leased by EnergySolutions.

#### Contact Information (to be contacted with questions about this request) Select if same as requester

Contact Last Name Glucksberg	First Nadia	MI S	Organization/ Business Name Haley & Aldrich, Inc.
Mailing Address 75 Washington Ave, Suite 1A			City Portland
			State ME
			ZIP Code 04042
Phone # (include area code) (207) 482-4623	Fax # (include area code)	Email nglucksberg@haleyaldrich.com	

#### Environmental Consultant (if applicable)

Contact Last Name Glucksberg	First Nadia	MI S	Organization/ Business Name Haley & Aldrich, Inc.
Mailing Address 75 Washington Ave, Suite 1A			City Portland
			State ME
			ZIP Code 04042
Phone # (include area code) (207) 482-4623	Fax # (include area code)	Email nglucksberg@haleyaldrich.com	

#### Attorney (if applicable)

Contact Last Name	First	MI	Organization/ Business Name
Mailing Address			City
			State
			ZIP Code
Phone # (include area code)	Fax # (include area code)	Email	

#### Property Owner (if different from requester)

Contact Last Name Peters	First Lane	MI	Organization/ Business Name Dairyland Power Cooperative
Mailing Address S4561 State Road 35			City Genoa
			State WI
			ZIP Code 54632
Phone # (include area code) (608) 689-4316	Fax # (include area code)	Email lane.peters@dairylandpower.com	

## Technical Assistance, Environmental Liability

Form 4400-237 (R 9/15)

Page 0 of 8

Section 2. Property Information			
Property Name <b>LaCrosse Boiling Water Reactor</b>			FID No. (if known)
BRRTS No. (if known)		Parcel Identification Number	
Street Address <b>S4651 State Road 35</b>		City <b>Genoa</b>	State <b>WI</b>
ZIP Code <b>54632</b>			
County <b>Vernon</b>	Municipality where the Property is located <input checked="" type="radio"/> City <input type="radio"/> Town <input type="radio"/> Village of <b>Genoa</b>	Property is composed of: <input type="radio"/> Single tax parcel <input type="radio"/> Multiple tax parcels	Property Size Acres

1. Is a response needed by a specific date? (e.g., Property closing date) Note: Most requests are completed within 60 days. Please plan accordingly.

No  Yes

Date requested by: 03/30/2018

Reason: **We need to initiate the study in order to understand the flowpath. This will allow an assessment of potential remedial alternatives.**

2. Is the "Requester" enrolled as a Voluntary Party in the Voluntary Party Liability Exemption (VPLE) program?

- No. Include the fee that is required for your request in Section 3, 4 or 5.  
 Yes. Do not include a separate fee. This request will be billed separately through the VPLE Program.

**Fill out the information in Section 3, 4 or 5 which corresponds with the type of request:  
 Section 3. Technical Assistance or Post-Closure Modifications;  
 Section 4. Liability Clarification; or Section 5. Specialized Agreement.**

### Section 3. Request for Technical Assistance or Post-Closure Modification

Select the type of technical assistance requested: [Numbers in brackets are for WI DNR Use]

- No Further Action Letter (NFA) (Immediate Actions) - NR 708.09, [183] - Include a fee of \$350. Use for a written response to an immediate action after a discharge of a hazardous substance occurs. Generally, these are for a one-time spill event.
- Review of Site Investigation Work Plan - NR 716.09, [135] - Include a fee of \$700.
- Review of Site Investigation Report - NR 716.15, [137] - Include a fee of \$1050.
- Approval of a Site-Specific Soil Cleanup Standard - NR 720.10 or 12, [67] - Include a fee of \$1050.
- Review of a Remedial Action Options Report - NR 722.13, [143] - Include a fee of \$1050.
- Review of a Remedial Action Design Report - NR 724.09, [148] - Include a fee of \$1050.
- Review of a Remedial Action Documentation Report - NR 724.15, [152] - Include a fee of \$350
- Review of a Long-term Monitoring Plan - NR 724.17, [25] - Include a fee of \$425.
- Review of an Operation and Maintenance Plan - NR 724.13, [192] - Include a fee of \$425.

Other Technical Assistance - s. 292.55, Wis. Stats. [97] (For request to build on an abandoned landfill use Form 4400-226)

- Schedule a Technical Assistance Meeting - Include a fee of \$700.
- Hazardous Waste Determination - Include a fee of \$700.
- Other Technical Assistance - Include a fee of \$700. Explain your request in an attachment.

Post-Closure Modifications - NR 727, [181]

- Post-Closure Modifications: Modification to Property boundaries and/or continuing obligations of a closed site or Property; sites may be on the GIS Registry. This also includes removal of a site or Property from the GIS Registry. Include a fee of \$1050, and:
  - Include a fee of \$300 for sites with residual soil contamination; and
  - Include a fee of \$350 for sites with residual groundwater contamination, monitoring wells or for vapor intrusion continuing

Attach a description of the changes you are proposing, and documentation as to why the changes are needed (if the change to a Property, site or continuing obligation will result in revised maps, maintenance plans or photographs, those documents

## Technical Assistance, Environmental Liability

Form 4400-237 (R 9/15)

Page 0 of 8

- Skip Sections 4 and 5 if the technical assistance you are requesting is listed above and complete Sections 6 and 7 of this form.

### Section 4. Request for Liability Clarification

Select the type of liability clarification requested. Use the available space given or attach information, explanations, or specific questions that you need answered in DNR's reply. Complete Sections 6 and 7 of this form. [Numbers in brackets are for DNR Use]

- "Lender" liability exemption clarification - s. 292.21, Wis. Stats. [686]

❖ Include a fee of \$700.

Provide the following documentation:

- (1) ownership status of the real Property, and/or the personal Property and fixtures;
- (2) an environmental assessment, in accordance with s. 292.21, Wis. Stats.;
- (3) the date the environmental assessment was conducted by the lender;
- (4) the date of the Property acquisition; for foreclosure actions, include a copy of the signed and dated court order confirming the

sheriff's sale.

- (5) documentation showing how the Property was acquired and the steps followed under the appropriate state statutes.

- (6) a copy of the Property deed with the correct legal description; and,

- (7) the Lender Liability Exemption Environmental Assessment Tracking Form (Form 4400-196).

- (8) If no sampling was done, please provide reasoning as to why it was not conducted. Include this either in the accompanying environmental assessment or as an attachment to this form, and cite language in s. 292.21(1)(c)2., h.-i., Wis. Stats.:

h. The collection and analysis of representative samples of soil or other materials in the ground that are suspected of being contaminated based on observations made during a visual inspection of the real Property or based on aerial photographs, or other information available to the lender, including stained or discolored soil or other materials in the ground and including soil or materials in the ground in areas with dead or distressed vegetation. The collection and analysis shall identify contaminants in the soil or other materials in the ground and shall quantify concentrations.

i. The collection and analysis of representative samples of unknown wastes or potentially hazardous substances found on the real Property and the determination of concentrations of hazardous waste and hazardous substances found in tanks, drums or other containers or in piles or lagoons on the real Property.

- "Representative" liability exemption clarification (e.g. trustees, receivers, etc.) - s. 292.21, Wis. Stats. [686]

❖ Include a fee of \$700.

Provide the following documentation:

- (1) ownership status of the Property;
- (2) the date of Property acquisition by the representative;
- (3) the means by which the Property was acquired;
- (4) documentation that the representative has no beneficial interest in any entity that owns, possesses, or controls the Property;
- (5) documentation that the representative has not caused any discharge of a hazardous substance on the Property; and
- (6) a copy of the Property deed with the correct legal description.

- Clarification of local governmental unit (LGU) liability exemption at sites with: (select all that apply)

- hazardous substances spills - s. 292.11(9)(e), Wis. Stats. [649];
- Perceived environmental contamination - [649];
- hazardous waste - s. 292.24 (2), Wis. Stats. [649]; and/or
- solid waste - s. 292.23 (2), Wis. Stats. [649].

❖ Include a fee of \$700, a summary of the environmental liability clarification being requested, and the following:

- (1) clear supporting documentation showing the acquisition method used, and the steps followed under the appropriate state statute(s).
- (2) current and proposed ownership status of the Property;
- (3) date and means by which the Property was acquired by the LGU, where applicable;
- (4) a map and the ¼, ¼ section location of the Property;
- (5) summary of current uses of the Property;
- (6) intended or potential use(s) of the Property;
- (7) descriptions of other investigations that have taken place on the Property; and
- (8) (for solid waste clarifications) a summary of the license history of the facility.

## Technical Assistance, Environmental Liability

Form 4400-237 (R 9/15)

Page 0 of 8

### Section 4. Request for Liability Clarification (cont.)

Lease liability clarification - s. 292.55, Wis. Stats. [646]

❖ Include a fee of \$700 for a single Property, or \$1400 for multiple Properties and the information listed below:

- (1) a copy of the proposed lease;
- (2) the name of the current owner of the Property and the person who will lease the Property;
- (3) a description of the lease holder's association with any persons who have possession, control, or caused a discharge of a hazardous substance on the Property;
- (4) map(s) showing the Property location and any suspected or known sources of contamination detected on the Property;
- (5) a description of the intended use of the Property by the lease holder, with reference to the maps to indicate which areas will be used. Explain how the use will not interfere with any future investigation or cleanup at the Property; and
- (6) all reports or investigations (e.g. Phase I and Phase II Environmental Assessments and/or Site Investigation Reports conducted under s. NR 716, Wis. Adm. Code) that identify areas of the Property where a discharge has occurred.

General or other environmental liability clarification - s. 292.55, Wis. Stats. [682] - Explain your request below.

❖ Include a fee of \$700 and an adequate summary of relevant environmental work to date.

No Action Required (NAR) - NR 716.05, [682]

❖ Include a fee of \$700.

Use where an environmental discharge has or has not occurred, and applicant wants a DNR determination that no further assessment or clean-up work is required. Usually this is requested after a Phase I and Phase II environmental assessment has been conducted; the assessment reports should be submitted with this form. This is not a closure letter.

Clarify the liability associated with a "closed" Property - s. 292.55, Wis. Stats. [682]

❖ Include a fee of \$700.

- Include a copy of any closure documents if a state agency other than DNR approved the closure.

Use this space or attach additional sheets to provide necessary information, explanations or specific questions to be answered by the DNR.

## Technical Assistance, Environmental Liability

Form 4400-237 (R 9/15)

Page 0 of 8

### Section 5. Request for a Specialized Agreement

Select the type of agreement needed. Include the appropriate draft agreements and supporting materials. Complete Sections 6 and 7 of this form. More information and model draft agreements are available at: [dnr.wi.gov/topic/Brownfields/lqu.html#tabx4](http://dnr.wi.gov/topic/Brownfields/lqu.html#tabx4).

Tax cancellation agreement - s. 75.105(2)(d), Wis. Stats. [654]

❖ Include a fee of \$700, and the information listed below:

- (1) Phase I and II Environmental Site Assessment Reports,
- (2) a copy of the Property deed with the correct legal description; and,
- (3) a draft 75.105 agreement based on the DNR's model ([dnr.wi.gov/topic/brownfields/documents/mod75-105agrmt.pdf](http://dnr.wi.gov/topic/brownfields/documents/mod75-105agrmt.pdf)).

Agreement for assignment of tax foreclosure judgement - s.75.106, Wis. Stats. [666]

❖ Include a fee of \$700, and the information listed below:

- (1) Phase I and II Environmental Site Assessment Reports,
- (2) a copy of the Property deed with the correct legal description; and,
- (3) a draft 75.105 agreement based on the DNR's model ([dnr.wi.gov/topic/brownfields/documents/mod75-106agrmt.pdf](http://dnr.wi.gov/topic/brownfields/documents/mod75-106agrmt.pdf)).

Negotiated agreement - Enforceable contract for non-emergency remediation - s. 292.11(7)(d) and (e), Wis. Stats. [630]

❖ Include a fee of \$1400, and the information listed below:

- (1) a draft schedule for remediation; and,
- (2) the name, mailing address, phone and email for each party to the agreement.

### Section 6. Other Information Submitted

Identify all materials that are included with this request.

Include one copy of any document from any state agency files that you want the Department to review as part of this request. The person submitting this request is responsible for contacting other state agencies to obtain appropriate reports or information.

Phase I Environmental Site Assessment Report - Date: \_\_\_\_\_

Phase II Environmental Site Assessment Report - Date: \_\_\_\_\_

Legal Description of Property (required for all liability requests and specialized agreements)

Map of the Property (required for all liability requests and specialized agreements)

Analytical results of the following sampled media: Select all that apply and include date of collection.

Groundwater     Soil     Sediment     Other medium - Describe: \_\_\_\_\_

Date of Collection: \_\_\_\_\_

A copy of the closure letter and submittal materials

Draft tax cancellation agreement

Draft agreement for assignment of tax foreclosure judgment

Other report(s) or information - Describe: Infiltration and injection request cover letter and work plan

For Property with newly identified discharges of hazardous substances only: Has a notification of a discharge of a hazardous substance been sent to the DNR as required by s. NR 706.05(1)(b), Wis. Adm. Code?

Yes - Date (if known): 03/14/2018

No

Note: The Notification for Hazardous Substance Discharge (non-emergency) form is available at: [dnr.wi.gov/files/PDF/forms/4400/4400-225.pdf](http://dnr.wi.gov/files/PDF/forms/4400/4400-225.pdf).

# Technical Assistance, Environmental Liability

Form 4400-237 (R 9/15)

Page 0 of 8

## Section 7. Certification by the Person who completed this form

I am the person submitting this request (requester)

I prepared this request  
for: Joseph Nowak  
Requester Name

I certify that I am familiar with the information submitted on this request, and that the information on and included with this request is true, accurate and complete to the best of my knowledge. I also certify I have the legal authority and the applicant's permission to make this request.

\_\_\_\_\_  
Signature

3/15/2018

\_\_\_\_\_  
Date Signed

Environmental Consultant; Program Manager

207-482-6423

\_\_\_\_\_  
Title

\_\_\_\_\_  
Telephone Number (include area code)

*Handwritten mark*



# Technical Assistance, Environmental Liability

Form 4400-237 (R 9/15)

Page 0 of 8

## Section 8. DNR Contacts and Addresses for Request Submittals

Send or deliver one paper copy and one electronic copy on a compact disk of the completed request, supporting materials, and fee to the region where the property is located to the address below. Contact a [DNR regional brownfields specialist](#) with any questions about this form or a specific situation involving a contaminated property. For electronic document submittal requirements see: <http://dnr.wi.gov/files/PDF/pubs/r/RR690.pdf>.

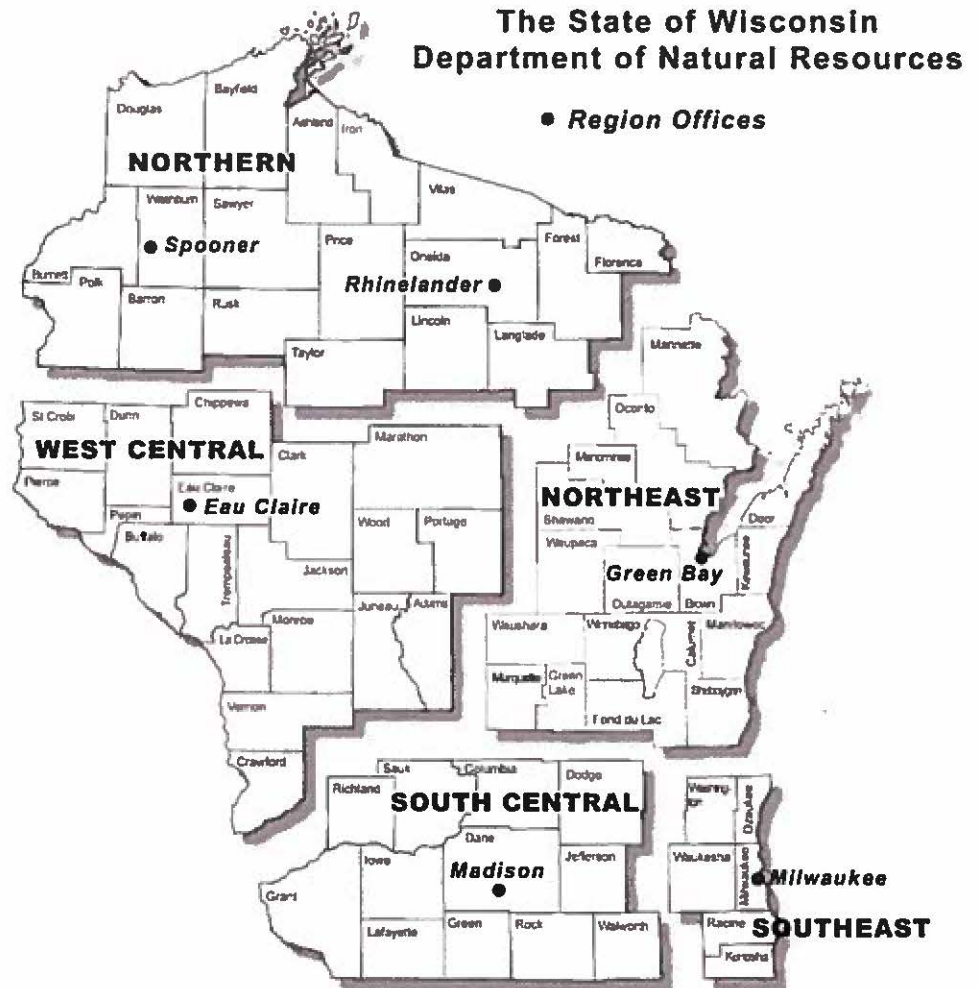
**DNR NORTHERN REGION**  
 Attn: RR Program Assistant  
 Department of Natural Resources  
 223 E Steinfest Rd Antigo, WI 54409

**DNR NORTHEAST REGION**  
 Attn: RR Program Assistant  
 Department of Natural Resources  
 2984 Shawano Avenue  
 Green Bay WI 54313

**DNR SOUTH CENTRAL REGION**  
 Attn: RR Program Assistant  
 Department of Natural Resources  
 3911 Fish Hatchery Road  
 Fitchburg WI 53711

**DNR SOUTHEAST REGION**  
 Attn: RR Program Assistant  
 Department of Natural Resources  
 2300 North Martin Luther King Drive  
 Milwaukee WI 53212

**DNR WEST CENTRAL REGION**  
 Attn: RR Program Assistant  
 Department of Natural Resources  
 1300 Clairemont Ave.  
 Eau Claire WI 54702



*Note: These are the Remediation and Redevelopment Program's designated regions. Other DNR program regional boundaries may be different.*

DNR Use Only			
Date Received	Date Assigned	BRRTS Activity Code	BRRTS No. (if used)
DNR Reviewer		Comments	
Fee Enclosed? <input type="radio"/> Yes <input type="radio"/> No	Fee Amount \$	Date Additional Information Requested	Date Requested for DNR Response Letter
Date Approved	Final Determination		

Attachment B



# **Dye Tracer Study**

## **LaCrosse Boiling Water Reactor**

### **Genoa, Wisconsin**

#### **SCOPE OF WORK**

A dye tracer study will be completed at the LaCrosse Boiling Water Reactor (LACBWR) site to supplement existing groundwater modeling data and to verify the conceptual site model. Specifically, this study will be performed to monitor the groundwater flow direction and rate in the shallow aquifer in the areas from the reactor building to the Mississippi River.

The purpose of this study is to confirm if the Reactor Plant, Generator Plant Access (RPGPA) sump is the source for tritium detected in monitoring wells MW-202A and MW-203A. These data will also be used to calibrate the groundwater model with respect to the groundwater velocity as well as the potential flux of tritium towards the Mississippi River. The location of the sump and the site's groundwater monitoring wells are shown on Figure 1.

#### **DYE TRACER STUDY PROCEDURES**

The dye tracer study will be completed to assess the groundwater flow direction and velocity, specifically in the areas between the reactor building and the Mississippi River. This study will supplement the groundwater modeling effort to further refine the existing conceptual site model.

To first establish that there are no background dyes present, carbon packets were placed in three of the wells onsite on March 8, 2018. The carbon packets contain granular activated carbon placed in a cloth bag. (Additional description of these packets is presented in Appendix A). The carbon packets will be removed after being submerged for a minimum of seven days, dried to remove residual tritium, and submitted to the laboratory to evaluate background conditions and support dye selection.

To monitor the extent the dye travels in the subsurface, carbon packets will then be installed in up to eight monitoring wells/locations, split between shallow- and deep-screened wells, as shown on Figure 2. Prior to introducing the dye to the aquifer, new packets will be installed and replaced at least weekly for approximately four weeks.

To introduce the dye into the aquifer, up to 0.5 pounds of dye will be introduced into the existing excavation along the west side of the reactor building where the sump was previously removed. If the excavation still contains standing water, the dye will be added directly to the water and the study will commence. If the excavation is dry, the dye will be added to the soils at the base of the excavation and flushed with a minimum of 200 gallons of potable, unchlorinated water.

The selected dye will be one of the following:

- Fluorescein (fluorescent yellow/green)
- Rhodamine WT (fluorescent red)
- Eosine (fluorescent red)
- Sulforhodamine (fluorescent pink)

If no dyes are detected in the background evaluation, then Haley & Aldrich will select Eosine, as when it is diluted, it has a peach-like color that will have less of a visual impact, should it discharge to the Mississippi River. Safety Data Sheets for each are provided in Appendix B.

The carbon packets will absorb the dye in the groundwater. When the packets are removed from the wells, they will be dried onsite to remove any residual tritium. Once surveyed and free-released by the Radiation Protection group, they will be sent to Ozarks Underground laboratory (OUL) of Protem, Missouri, and analyzed for the type of dye as well as the concentration present within the packet via fluorescence technology. If the groundwater is visibly stained, then there is no need for the lab analysis, and new packets will be installed in down gradient locations.

The dye will be introduced to the aquifer by Haley & Aldrich personnel experienced in both handling dyes and working at nuclear power stations.

### **SCHEDULE AND COORDINATION**

The dye tracer study will begin in March 2018 with a duration of approximately 4-6 weeks. Haley & Aldrich will work with LACBWR personnel for site access requirements and ensure these activities do not interfere with ongoing site demolition and decommissioning work.

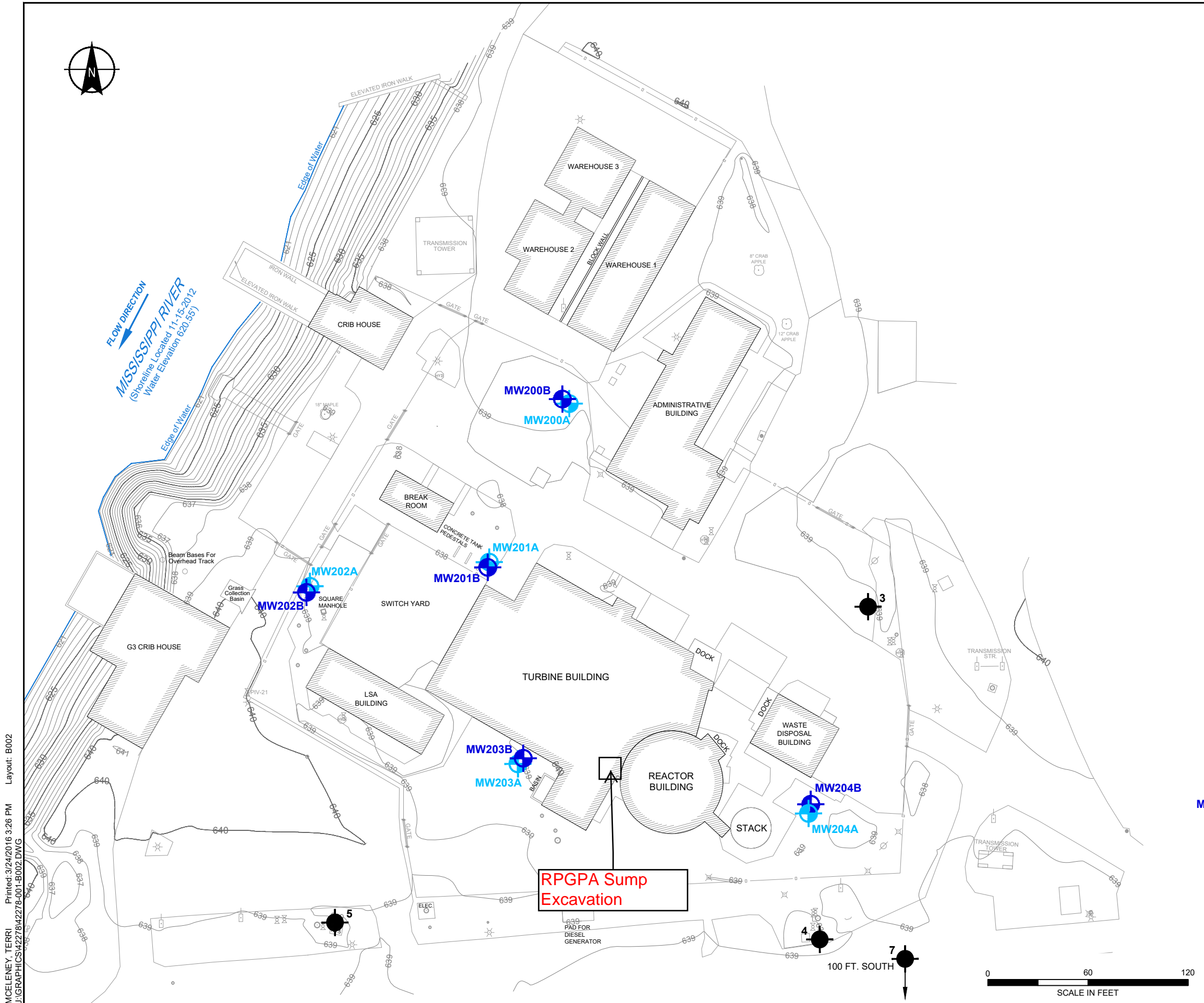
### **STUDY COMPLETION**

This study will be considered complete once the leading edge of the dye has reached the targeted wells. Additional samples may be collected but will not be required to meet the intentions of this study. It is anticipated that this will take four to six weeks (based on current tritium concentrations) but this time will be confirmed during the study.

It is also possible that some dye may become visible along the shore line. Because of this potential, a FAQ sheet has been developed (Appendix C) to support LACBWR public outreach. Please note that the dyes are non-toxic and photosensitive, therefore they will not be persistent in the Mississippi River.

At the conclusion of this Study, Haley & Aldrich will document the results in coordination with the groundwater modeling report to support the Site Conceptual Model with respect to the presence and migration of tritium in groundwater.

## FIGURES



- LEGEND**
- MW200A DESIGNATION AND APPROXIMATE LOCATION OF MONITORING WELL IN SHALLOW AQUIFER
  - MW200B DESIGNATION AND APPROXIMATE LOCATION OF MONITORING WELL IN DEEP AQUIFER
  - 3 DESIGNATION AND APPROXIMATE LOCATION OF DOMESTIC WELL
  - MINOR ELEVATION CONTOUR LINE
  - MAJOR ELEVATION CONTOUR LINE
  - ⊙ LIGHT POLE
  - TRANSMISSION LINE STRUCTURE
  - GP GUY/STUB POLE
  - ) ANCHOR
  - ⊞ ELECTRIC PEDESTAL
  - ⊗ SECURITY CAMERA ON PEDESTAL
  - ⊙ MAN HOLE
  - ⊕ STORM INLET
  - ⊗ HYDRANT
  - ⊗ WATER VALVE
  - CHAIN-LINK FENCE

- NOTES**
1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
  2. BASE PLAN CREATED FROM PLAN TITLED "TOPOGRAPHIC/SITE SURVEY, DAIRYLAND POWER COOPERATIVE, LACBWR, GENOA, WISCONSIN", DATE 26 NOVEMBER 2012, BY LAMPMAN & ASSOCIATES, OF DE SOTO, WISCONSIN.
  3. DOMESTIC WELL LOCATIONS DIGITIZED FROM PLAN TITLED "LACBWR SITE GROUNDWATER WELLS, GENOA, WI", DRAWING 14052187.A, DATED 20 MAY 2014, PREPARED BY ENERGYSOLUTIONS AND SHOULD BE CONSIDERED APPROXIMATE.

MWB11A  
MWB11B

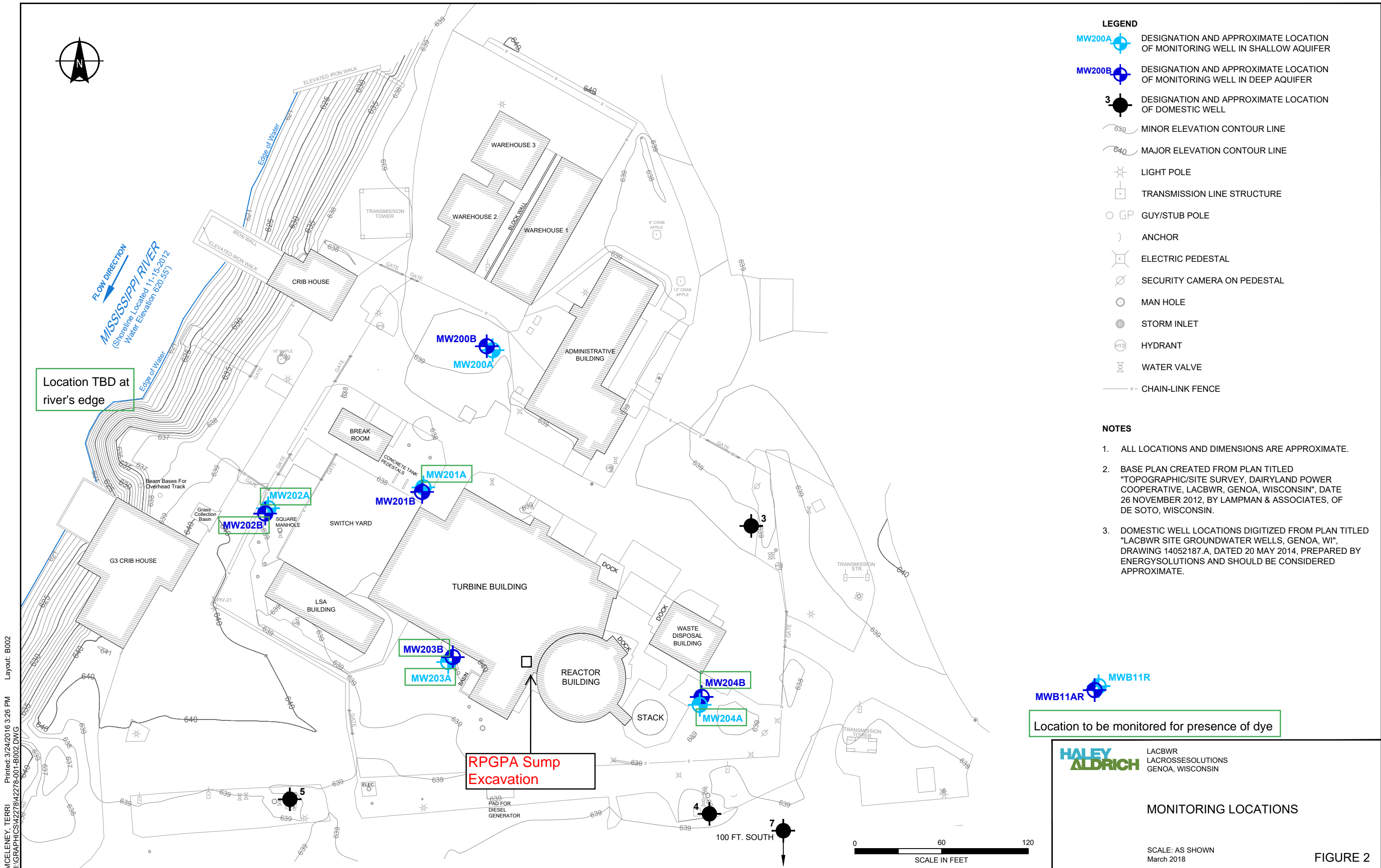
**HALEY ALDRICH**  
LACBWR  
LACROSSESOLUTIONS  
GENOA, WISCONSIN

**SITE CONDITIONS**

SCALE: AS SHOWN  
March 2018

**FIGURE 1**

MCELENEY, TERRI  
J:\GRAPHICS\42278\001-B002.DWG  
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Layout: B002



MCELENEY, TERRI  
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 Printed: 3/24/2016 3:26 PM  
 Layout: B002

Location TBD at river's edge

MWB11A  
MWB11R  
Location to be monitored for presence of dye

RPGPA Sump  
Excavation

FLOW DIRECTION  
MISSISSIPPI RIVER  
(Shoreline Located 11-15-2012  
Water Elevation 620.55')

**APPENDIX A – SAMPLE PACKET INFORMATION**



## **DYE TRACING FIELD PROCEDURES**

### **INTRODUCTION**

This document provides an overview of recommended procedures for the dye tracing field study planned at the LACBWR Power Stations. Field procedures included in this document are intended as guidance, and not firm requirements. Placement of samplers and other sampling procedures require adjustment to field conditions. Personnel at the Ozark Underground Laboratory, Inc. (OUL) are available to provide additional assistance for implementation of field procedures specific to specialized field conditions.

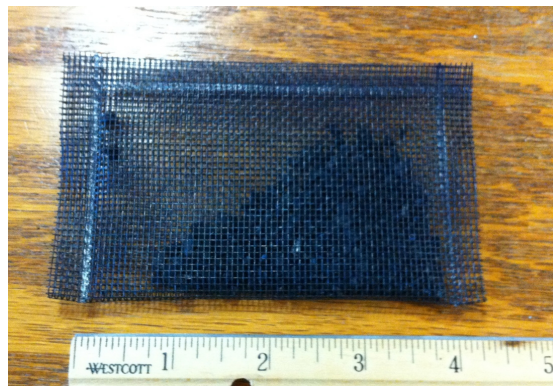
### **FIELD PROCEDURES**

#### **Types of Samples**

Types of samples that are scheduled to be collected for fluorescent tracer dye analysis in this study are charcoal samplers (also called activated carbon or charcoal packets).

#### Charcoal Packets

The charcoal samplers are packets of fiberglass screening partially filled with 4.25 grams of activated coconut charcoal. The most commonly used charcoal samplers are about 4 inches long by 2 inches wide.



These packets will be used at all sampling stations. If necessary, smaller packets are available for use in smaller diameter wells (such as 1-inch diameter piezometers) or in wells with

November 2012

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pumps. These packets are referred to as “torpedo packets”. Please contact the OUL if the standard packets do not work at the designated sampling stations

### Sampling Supplies

Routine sampling supplies are provided by the OUL. These supplies have been subjected to strict quality control testing. Charcoal packets and Whirl-pak® bags will be provided in routine shipments. Sample packaging, labeling, and shipping are discussed later in this document.



### Placement of Charcoal Samplers

Charcoal samplers are placed so as to be exposed to as much water as possible. Water should flow through the packet. Attachment of the packets often uses plastic-coated twist tie wire or cable “zip” ties. Other types of anchoring wire can be used.



November 2012

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Charcoal packets can be lowered into monitoring wells for sampling purposes. In general, if the well is screened, samplers should be placed approximately in the middle of the saturated screened interval. Due to the typically lower volume of water that flows through a well, only one charcoal sampler should be used per well. However, multiple packets can be placed in a single well at different depths to test different depth horizons when desirable. More than one independently anchored packet can be deployed in storm sewers, drains or sumps if packets may possibly be lost due to turbulent water flow or other field conditions. More than one packet may also be used if duplicate sample analysis is desired. Standard laboratory protocol will only analyze one of the packets with the second being archived, unless otherwise indicated on the chain of custody (COC).

Charcoal packets can be attached to a weighted string. ***Do not use colored cord or string*** since some of them are colored with fluorescent dyes. Nylon fishing line should not be used since it can be readily cut by a sharp projection in the well. Weights can consist of a small section of metal pipe or other hardware to keep the charcoal packet in place at the desired depth within the well. All weights should be cleaned prior to use; the cleaning approach should comply with decontamination procedures in use at the project site. Weighted strings should be dedicated to a particular well, storm drain, or sump for the duration of the study.

Weighted plastic bailers can also be used for anchoring charcoal packets in place in wells without pumps. These bailers should be dedicated to a particular well. Charcoal packets can be tied to the top of the bailer with twist tie wire or a cable “zip” tie. The bailer is then lowered to the desired depth, secured at the surface in the surface well completion, and left in place during the sampling period.

Attachment of the charcoal packet can be performed in any manner that secures the packet for retrieval. A way that we have found that works well is summarized in the following 6 steps:

1. Clip a 12 to 16 inch length of twist tie wire from the spool with the cutter.

November 2012

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2. Fold the twist tie wire in half (to double its thickness), then tie it once onto the top of the bailer.



3. Holding the charcoal packet flat in your hand, shake approximately half of the charcoal into each end, then twist the packet in the middle to create a "bow tie".



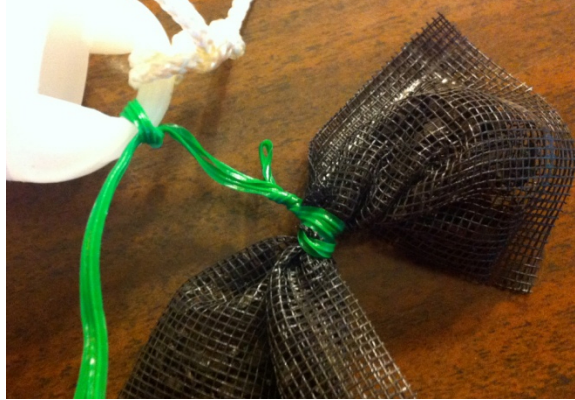
4. Wrap the twisted middle of the charcoal packet twice around one end of the doubled twist tie wire.



November 2012

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5. Then twist the end of the twist tire wire back against the middle of the twist tie wire to secure the packet. Two twists will secure the packet.



6. Once the 1/8 inch nylon cord is also secured to the top of the bailer, it is ready to be deployed into the well.



When retrieving and replacing the charcoal packet, the twist tie wire can be re-used several times until it is worn. Cable “zip” ties can also be used. However, be careful not to cut the charcoal packet when cutting it free from the bailer or weighted cord.

### **Optional Preparation of Charcoal Samplers**

Charcoal packets routinely contain some fine powder (charcoal dust) that washes off rapidly when they are placed in water. *While not usually necessary*, the following optional preparation step is suggested if the fine charcoal powder is problematic.

Charcoal packets can be triple rinsed with distilled, demineralized, or reagent water known to be free of tracer dyes. Do not use chlorinated tap water. The rinsing is typically done by soaking. With this approach, packets are covered in water and soaked for at least 10 minutes. The packets are then removed from the water and excess water is shaken off the packets. The

November 2012

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packets are again covered in water and again soaked for at least 10 minutes. After this soaking they are removed from the water and excess water is shaken off the packets. The packets are then placed in a third gallon of water and the procedure is again repeated. Rinsed packets are placed in plastic bags and are placed at sampling stations within three days. Packets can also be rinsed in jets of water for about one minute; this requires more water and is sometimes difficult to do in the field with water known to be free of tracer dyes.

### Collection and Replacement of Charcoal Samplers

Samplers are routinely collected and replaced at each of the sampling stations. The frequency of sampler collection and replacement is determined by the nature of the study. Collections at one week intervals are common, but shorter or longer collection frequencies are acceptable and sometimes more appropriate.

The sampling interval in wells at sites with groundwater plumes of organic or other compounds that can sorb to activated charcoal should generally be no longer than one to two weeks. Contaminants in the water can sometimes use up sorption sites on the charcoal that would otherwise adsorb the dye. This is especially important if the dye might pass in a relatively short duration pulse.

Upon retrieval, charcoal packets should be shaken to remove excess water. Next, the packet (or packets) are placed in the provided Whirl-Pak® bag. The bag is labeled on the outside with a black permanent felt type marker pen, such as a Sharpie®. *Use only pens that have black ink*; colored inks may contain fluorescent dyes. The notations include station name or number and the date and time of collection. Labels must not be inserted inside the sample bags. New charcoal samplers are routinely placed when used charcoal packets are collected.

Collected samplers are kept refrigerated and in the dark to minimize algal growth on the charcoal prior to analysis work. It is the understanding of the OUL that charcoal packets will be thoroughly dried to remove all water (and therefore tritium) prior to shipment. Extreme care should be taken not to cross-contaminate the samples during sample handling and drying. Following drying, the charcoal packets will no longer need to be refrigerated and can be shipped to the OUL in a box or other appropriate package.

### Sample Handling and Packaging

Collected charcoal packets are to be placed in the provided Whirl-pak® bags. If two samples are collected in one location, both should be placed in the sample Whirl-pak® bag. If one of the two samplers is preferred for analysis, fold that packet in half inside the bag.

November 2012

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The perforated strip on the top of the bag is removed and discarded. After the packet is placed inside, The yellow wire top of the Whirl-pak® bags should be rolled down and the tips folded over to secure the bag.



Label the outside of the bag only. Information can be directly written onto the bag with a black Sharpie® marker, or a label can be attached. The photograph illustrates an example of a labeled charcoal packet ready for shipment. This label was printed on regular paper and attached with a single strip of 2-inch clear packing tape. Labels can also be printed on adhesive labels.

### Sample Shipment

It is recommended that samples are shipped routinely. If wet, samplers can be kept in a sample refrigerator or in coolers with ice packs. Once the packets are dried, it is recommended that the samplers be kept at moderate to cool room temperature and out of the sunlight. Dried samplers do not require refrigerated shipment or shipment by express courier, unless desired to meet project schedule requirements.

Each shipment of charcoal samplers ***must be accompanied by a sample custody document.*** The OUL provides a sheet (which bears the title "*Samples for Fluorescence Analysis*") that can be used if desired. These sheets can be augmented by a client's chain-of-custody forms or any other relevant documentation if required by the client. OUL's custody document works well for charcoal samplers because it allows for both the placement date and time as well as the collection date and time. Many other standard chain-of-custody documents do not allow for these types of samples.

Attachment 1 includes a copy of OUL's Sample Collection Data Sheet. An MS Word version of this document is available to type in sample names, if desired.

November 2012

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Please write legibly on the custody documents and *use black ink*. Check the accuracy of the sample sheet against the samples prior to shipment to identify and correct errors that may delay the analysis of your samples following receipt at the laboratory.

### Questions

Staff members of the OUL can be reached at 417-785-4289 or via cell phone to answer any questions. E-mail questions can be sent to Shiloh Beeman ([Shiloh@ozarkundergroundlab.com](mailto:Shiloh@ozarkundergroundlab.com)).

**ATTACHMENT 1**  
**Sample Collection Data Sheet**





**APPENDIX B – DYE SAFETY DATA SHEETS**



SAFETY DATA SHEET (SDS)  
REVISION DATE: 03/03/2016

# HUE CORPORATION

*Color your everything, may your Hue come true*

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## SECTION I. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

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### PRODUCT IDENTIFIER:

PRODUCT NAME ..... **HUE EOSINE EX CONC**  
 PRODUCT NUMBER ..... 1-C6-087-XPC  
 COLOR INDEX NAME ..... ACID RED 087  
 COLOR INDEX NO ..... 45380  
 C. A. S. # ..... 17372-87-1  
 CHEMICAL FAMILY..... XANTHENE DYE

### INTENDED USE OF THE PRODUCT:

FELT TIP, MARKER INKS, WATER BASED COATINGS AND SPECIALTY INKS, PRINTING ON NYLON, SILK AND WOOL.

### NAME, ADDRESS AND TELEPHONE OF RESPONSIBLE PARTY:

HUE CORPORATION	TELEPHONE	714-389-3130
P.O. BOX 509	FAX	714-389-9731
TUSTIN, CA 92781	EMAIL	<a href="mailto:SUPPORT@HUECORPORATION.COM">SUPPORT@HUECORPORATION.COM</a>

### EMERGENCY TELEPHONE NUMBER:

CHEMTREC (USA)	1-800-424-9300
CHEMTREC (OUTSIDE USA)	1-703-527-3887

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## SECTION 2. HAZARD(S) IDENTIFICATION

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### CLASSIFICATION OF THE SUBSTANCE OR MIXTURE:

GHS-US  
 ACUTE TOX. - INHALATION (CATEGORY 5)  
 EYE DAM./IRRITATION (CATEGORY 2B)  
 SKIN CORR./IRRITATION (CATEGORY 3)

### GHS LABELING:

HAZARD PICTOGRAMS (GHS-US): NO SYMBOL

SIGNAL WORD WARNING

HAZARD STATEMENT(S)	H333 - MAY BE HARMFUL IF INHALED H320 - CAUSES EYE IRRITATION H316 - CAUSES MILD SKIN IRRITATION
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PRECAUTIONARY STATEMENTS	P305 + 351 + P338 - IF IN EYES: RINSE CAUTIOUSLY WITH WATER FOR
--------------------------	---

SEVERAL MINUTES. REMOVE CONTACT LENSES IF PRESENT AND EASY TO DO. CONTINUE RINSING.

P337 + P313 - IF EYE IRRITATION OCCURS/PERSISTS:  
GET MEDICAL ADVICE AND ATTENTION.

P261 - AVOID BREATHING DUST/FUMES/GAS/MIST/VAPORS/SPRAY

P264 - WASH FACE THOROUGHLY AFTER HANDLING.

P322 + P313 - IF SKIN IRRITATION OCCURS: GET MEDICAL ADVICE/  
ATTENTION.

P304 + P312 - IF INHALED: CALL A POISON CENTER/DOCTOR/PHYSICIAN  
IF YOU FEEL UNWELL

P501 - DISPOSE OF CONTENTS/ CONTAINER IN ACCORDANCE WITH  
LOCAL/ REGIONAL/ NATIONAL INTERNATIONAL REGULATIONS.

OTHER HAZARDS  
UNKNOWN ACUTE TOXICITY

NO DATA AVAILABLE  
NO DATA AVAILABLE

---

### SECTION 3. COMPOSITION / INFORMATION ON INGREDIENTS

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DESCRIPTION OF MIXTURE: PROPRIETARY MIXTURE OF DYES.

SUBSTANCE:

NAME	C.A.S.#	WEIGHT 100%	GHS-US CLASSIFICATION
ACID RED 087	17372-87-1	100%	ACUTE TOX. - INHALATION (CATEGORY 5) EYE DAM./IRRITATION (CATEGORY 2B) SKIN CORR./IRRITATION (CATEGORY 3)

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### SECTION 4. FIRST AID MEASURES

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FIRST AID MEASURES GENERAL:

INHALATION: REMOVE TO FRESH AIR. IF BREATHING IS DIFFICULT, GIVE OXYGEN AND GET IMMEDIATE MEDICAL ATTENTION.

SKIN: WASH WITH MILD SOAP AND WATER. IF IRRITATION OCCURS GET MEDICAL ATTENTION. IF CLOTHING IS CONTAMINATED, RE-MOVE AND WASH BEFORE REUSE.

EYES: FLUSH EYES WITH WATER FOR AT LEAST 15 MINUTES, HOLDING EYELIDS APART FOR THOROUGH IRRIGATION. GET IMMEDIATE MEDICAL ATTENTION.

INGESTION: INDUCE VOMITING - SEEK IMMEDIATE MEDICAL ATTENTION.

MOST IMPORTANT SYMPTOMS AND EFFECTS, ACUTE AND DELAYED:

THIS PRODUCT IS NOT HAZARDOUS AS DEFINED BY HAZARDOUS COMMUNICATION STANDARD. HOWEVER, AS WITH ALL CHEMICAL; HANDLE WITH CARE, AVOID EYE AND SKIN CONTACT, AVOID INHALATION OF DUSTS OR VAPORS. WASH THOROUGHLY AFTER HANDLING. KEEP CONTAINERS CLOSED.

---

### SECTION 5. FIRE-FIGHTING MEASURES

---

EXTINGUISHING MEDIA:

WATER, DRY CHEMICAL, CARBON DIOXIDE, FOAM.

SPECIAL HAZARDS ARISING FROM SUBSTANCE OR MEDIA:

FIREFIGHTERS SHOULD BE EQUIPPED WITH SELF-CONTAINED BREATHING APPARATUS TO GUARD AGAINST POTENTIALLY TOXIC AND IRRITATING FUMES. AVOID DUSTING. DUST CAN FORM EXPLOSIVE MIXTURES WITH AIR.

PROTECTION/ADVICE FOR FIREFIGHTER(S):

BE EQUIPPED WITH SELF-CONTAINED BREATHING APPARATUS AND PROTECTIVE CLOTHING.

---

## SECTION 6. ACCIDENTAL RELEASE MEASURES

---

PERSONAL PRECAUTIONS:

REMOVE PERSONS FROM DANGER AREA.

ENVIROMENTAL PRECAUTIONS:

AVOID ANY UNCONTROLLED RELEASE OF MATERIAL. DO NOT EMPTY INTO DRAINS OR THE AQUATIC ENVIRONMENT.

EMERGENCY PROCEDURES:

NO ADDITIONAL INFORMATION

METHODS AND MATERIALS FOR CONTAMINENT AND CLEANING UP:

WHERE SPILLS ARE POSSIBLE, A COMPREHENSIVE SPILL RESPONSE PLAN SHOULD BE DEVELOPED AND IMPLEMENTED. AVOID ANY UNCONTROLLED RELEASE OF MATERIAL.

UTILIZE RECOMMENDED PROTECTIVE CLOTHING AND EQUIPMENT (SEE SECTION 8). SPILLS SHOULD BE SWEEPED UP USING AN ABSORBENT DUST CONTROL PRODUCT AND PLACED IN CONTAINERS. SPILL AREA CAN BE WASHED WITH WATER. COLLECT WATER FOR APPROVED DISPOSAL. IN THE EVENT OF UNCONTROLLED RELEASE OF THIS MATERIAL, THE USER SHOULD DETERMINE IF THE RELEASE IS REPORTABLE UNDER APPLICABLE LAWS AND REGULATIONS.

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## SECTION 7. HANDLING AND STORAGE

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PRECAUTIONS FOR SAFE HANDLING:

HANDLE WITH CARE. AVOID OVER EXPOSURE. USE NIOSH/OSHA APPROVED RESPIRATOR, WORK GLOVES, AND CLOTHING. WASH AFTER HANDLING. SENSITIVE INDIVIDUALS MAY EXPERIENCE RESPIRATORY ALLERGIES. MAY CAUSE SKIN IRRITATION. USE WITH LOCAL VENTILATION.

CONDITIONS FOR SAFE STORAGE, INCLUDING ANY INCOMPATIBILITIES:

USE PROCESS ENCLOSURES, LOCAL EXHAUST VENTILATION OR OTHER ENGINEERING CONTROLS TO KEEP AIRBORNE LEVELS BELOW RECOMMENDED EXPOSURE LIMITS.

KEEP AWAY FROM HEAT. KEEP AWAY FROM SOURCES OF IGNITION.

KEEP AWAY FROM STRONG OXIDIZING AND REDUSING AGENTS.

## SPECIFIC END USES:

FELT TIP, MARKER INKS, WATER BASED COATINGS AND SPECIALTY INKS, PRINTING ON NYLON, SILK AND WOOL.

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 SECTION 8. EXPOSURE CONTROLS /PERSONAL PROTECTION
 

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## CONTROL PARAMETERS:

INGREDIENTS WITH LIMIT VALUES THAT REQUIRE MONITORING AT THE WORKPLACE - NOT REQUIRED

## EXPOSURE CONTROLS:

APPROPRIATE ENGINEERING CONTROLS - THE USUAL PRECAUTIONARY MEASURES ARE TO BE ADHERED TO WHEN HANDLING CHEMICALS.

## PERSONAL PROTECTIVE EQUIPMENT:



HAND PROTECTION  
EYE PROTECTION  
SKIN AND BODY

WEAR IMPERMEABLE RUBBER OR PLASTIC GLOVES  
TIGHTLY SEALED SAFETY GOGGLES OR FULL FACE SIDE SHIELDS.  
APRON, COVERALLS AND NON-LEATHER SOLED WORK SHOES.  
WASH DYE CONTAMINATED CLOTHES AND SKIN WITH MILD SOAP AND DETERGENTS.

RESPIRATORY  
HYGIENE MEASURES

WEAR OSHA/NIOSH APPROVED DUST MASK/RESPIRATOR  
HANDLE IN ACCORDANCE WITH GOOD INDUSTRIAL HYGIENE AND SAFETY PRACTICES. WASH HANDS AFTER HANDLING MATERIAL.

OTHER PROTECTION

DELUGE SAFETY SHOWER AND EYE WASH STATION SHOULD BE LOCATED NEAR WORK AREA.

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 SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES
 

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## INFORMATION ON BASIC PHYSICAL AND CHEMICAL PROPERTIES :

APPEARANCE, COLOR, ODOR	POWDER, NO ODOR
pH	7.0 - 8.5
MELTING POINT/FREEZING POINT	ND
INITIAL BOILING POINT/BOILING RANGE	0.00
FLASHPOINT	NOT APPLICABLE
EVAPORATION RATE	NO DATA
FLAMMABILITY (SOLID,GAS)	NORMALLY STABLE, NOT COMBUSTIBLE NOR FLAMMABLE
UPPER EXPLOSIVE LIMITS	NA
LOWER EXPLOSIVE LIMITS	NA
VAPOR PRESSURE	NA
VAPOR DENSITY	NA
RELATIVE DENSITY	NA

SOLUBILITY IN WATER	SOLUBLE
PARTITION COEFFICIENT N-OCTANOL/WATER	NO DATA
AUTO-IGNITION TEMPERATURE	NO DATA
DECOMPOSITION TEMPERATURE	NO DATA
VISCOSITY, DYNAMIC	NO DATA
VISCOSITY, CINEMATIC	NO DATA
EXPLOSIVE PROPERTIES	N/A
OXIDIZING PROPERTIES	NA
OTHER INFORMATION	NA

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#### SECTION 10. STABILITY AND REACTIVITY

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CHEMICAL STABILITY	STABLE UNDER NORMAL STORAGE AND HANDLING CONDITIONS.
CONDITIONS TO AVOID	OXIDIZING & REDUCING AGENTS MAY DESTROY COLOR.
INCOMPATIBLE MATERIALS	OXIDIZING & REDUCING AGENTS MAY DESTROY COLOR.
HAZARDOUS DECOMPOSITION PRODUCTS	CO, CO <sub>2</sub> , OXIDES OF NITROGEN AND OTHER POTENTIALLY TOXIC FUMES.

---

#### SECTION 11. TOXICOLOGICAL INFORMATION

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##### TOXICOLOGICAL EFFECTS :

ORAL (ANIMAL)	GREATER THAN 2000 MG/KG - RAT
DERMAL (ANIMAL)	NO DATA AVAILABLE
EFFECTS TO EYES (ANIMAL)	NO DATA AVAILABLE
SKIN IRRITATION (ANIMAL)	NO DATA AVAILABLE
SKIN CORROSION/IRRITATION	NOT CLASSIFIED
SERIOUS EYE DAMAGE/IRRITATION	CAUSES SERIOUS EYE IRRITATION
RESPIRATORY OR SKIN SENSITIZATION	NOT CLASSIFIED
GERM CELL MUTAGENICITY	NOT CLASSIFIED
CARCINOGENICITY	NOT CLASSIFIED
REPRODUCTIVE TOXICITY	NOT CLASSIFIED
SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE)	MAY CAUSE DROWSINESS OR DIZZINESS.
ASPIRATION HAZARD	NOT CLASSIFIED
INHALATION	MAY CAUSE DROWSINESS OR DIZZINESS.
EYE CONTACT	CAUSES SERIOUS EYE IRRITATION.
INGESTION	INGESTION MAY CAUSE NAUSEA, VOMITING AND DIARRHEA

---

#### SECTION 12. ECOLOGICAL INFORMATION

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TOXICITY	NA
PERSISTENCE AND DEGRADABILITY	NA
BIOACCUMULATIVE POTENTIAL	NA
MOBILITY IN SOIL	NA
OTHER ADVERSE EFFECTS	NA

---

#### SECTION 13. DISPOSAL CONSIDERATION

---



TSCA STATUS IN COMPLIANCE  
 E C CLASSIFICATION (67/548/EEC - 88/379/EEC) N/A  
 EINECS NUMBER  
 REACH CLASSIFICATION  
 R PHRASES  
 ADDITIONAL REGULATORY INFORMATION CONTAINS:  
 <11PPM BENZENE, (CAS#71-43-2)  
 <11PPM TOLUENE, (CAS#108-88-3)  
 <11PPM XYLENES, (CAS#1330-20-7)

-----  
 SECTION 16. OTHER INFORMATION  
 -----

INDICATION OF CHANGES:

NA

OTHER INFORMATION:

NA

GHS FULL TEXT PHRASES:

MAY BE HARMFUL IF INHALED H333  
 CAUSES EYE IRRITATION H320  
 CASUES MILD SKIN IRRITATION H316

	HEALTH	FLAMMABILITY	REACTIVITY	PERSONAL PROT
H. M. I. S. CLASSIFICATION:	1	0	0	D

HMIS CODE: 4 - SEVERE HAZARD, 3 - SERIOUS HAZARD, 2 - MODERATE HAZARD, 1 - SLIGHT HAZARD, 0 - MINIMAL HAZARD

SAFETY DATA SHEET (SDS)  
 REVISION DATE: 03/03/2016

-----  
 ALL INFORMATION AND DATA APPEARING ON THIS SDS ARE BELIEVED TO BE RELIABLE AND ACCURATE.  
 HOWEVER, IT IS THE USER' S RESPONSIBILITY TO DETERMINE THE SAFETY, TOXICITY, AND SUITABILITY  
 FOR USE OF THE PRODUCT DESCRIBED. SINCE THE ACTUAL USE BY OTHERS IS BEYOND OUR CONTROL,  
 NO GUARANTEE, EXPRESSED OR IMPLIED, IS MADE BY HUE CORPORATION.  
 USER ASSUMES ALL RISK AND RESPONSIBILITY.  
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SAFETY DATA SHEET (SDS)  
REVISION DATE: 03/03/2016

# HUE CORPORATION

*Color your everything, may your Hue come true*

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## SECTION I. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

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### PRODUCT IDENTIFIER:

PRODUCT NAME ..... **HUE URANINE CONC** (Also known as Fluorescein)  
 PRODUCT NUMBER ..... 1-C8-073PC  
 COLOR INDEX NAME ..... ACID YELLOW 073  
 COLOR INDEX NO ..... 45350  
 C. A. S. # ..... 518-47-8  
 CHEMICAL FAMILY..... XANTHENE

### INTENDED USE OF THE PRODUCT:

FELT TIP, MARKER INKS, WATER BASED COATINGS AND LEAK DETECTION

### NAME, ADDRESS AND TELEPHONE OF RESPONSIBLE PARTY:

HUE CORPORATION	TELEPHONE	714-389-3130
P.O. BOX 509	FAX	714-389-9731
TUSTIN, CA 92781	EMAIL	<a href="mailto:SUPPORT@HUECORPORATION.COM">SUPPORT@HUECORPORATION.COM</a>

### EMERGENCY TELEPHONE NUMBER:

CHEMTREC (USA)	1-800-424-9300
CHEMTREC (OUTSIDE USA)	1-703-527-3887

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## SECTION 2. HAZARD(S) IDENTIFICATION

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### CLASSIFICATION OF THE SUBSTANCE OR MIXTURE:

GHS-US  
 ACUTE TOX. - INHALATION (CATEGORY 5)  
 EYE DAM./IRRITATION (CATEGORY 2B)  
 SKIN CORR./IRRITATION (CATEGORY 3)

### GHS LABELING:

HAZARD PICTOGRAMS (GHS-US): NO SYMBOL

SIGNAL WORD WARNING

HAZARD STATEMENT(S)	H333 - MAY BE HARMFUL IF INHALED H320 - CAUSES EYE IRRITATION H316 - CAUSES MILD SKIN IRRITATION
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PRECAUTIONARY STATEMENTS	P305 + 351 + P338 - IF IN EYES: RINSE CAUTIOUSLY WITH WATER FOR SEVERAL MINUTES. REMOVE CONTACT LENSES IF PRESENT AND EASY
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TO DO. CONTINUE RINSING.  
 P337 + P313 - IF EYE IRRITATION OCCURS/PERSISTS:  
 GET MEDICAL ADVICE AND ATTENTION.  
 P261 - AVOID BREATHING DUST/FUMES/GAS/MIST/VAPORS/SPRAY  
 P264 - WASH FACE THOROUGHLY AFTER HANDLING.  
 P322 + P313 - IF SKIN IRRITATION OCCURS: GET MEDICAL ADVICE/  
 ATTENTION.  
 P304 + 312 - IF INHALED: CALL A POISON CENTER/DOCTOR/PHYSICIAN  
 IF YOU FEEL UNWELL

OTHER HAZARDS NO DATA AVAILABLE  
 UNKNOWN ACUTE TOXICITY NO DATA AVAILABLE

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### SECTION 3. COMPOSITION / INFORMATION ON INGREDIENTS

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DESCRIPTION OF MIXTURE: PROPRIETARY MIXTURE OF DYES.

SUBSTANCE:

NAME	C.A.S.#	WEIGHT 100%	GHS-US CLASSIFICATION
ACID YELLOW 073	518-47-8	100%	ACUTE TOX. - INHALATION (CATEGORY 5) EYE DAM./IRRITATION (CATEGORY 2B) SKIN CORR./IRRITATION (CATEGORY 3)

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### SECTION 4. FIRST AID MEASURES

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FIRST AID MEASURES GENERAL:

INHALATION: REMOVE TO FRESH AIR. IF BREATHING IS DIFFICULT, GIVE OXYGEN AND GET IMMEDIATE MEDICAL ATTENTION.

SKIN: WASH WITH MILD SOAP AND WATER. IF IRRITATION OCCURS GET MEDICAL ATTENTION. IF CLOTHING IS CONTAMINATED, RE-MOVE AND WASH BEFORE REUSE.

EYES: FLUSH EYES WITH WATER FOR AT LEAST 15 MINUTES, HOLDING EYELIDS APART FOR THOROUGH IRRIGATION. GET IMMEDIATE MEDICAL ATTENTION.

INGESTION: INDUCE VOMITING - SEEK IMMEDIATE MEDICAL ATTENTION.

MOST IMPORTANT SYMPTOMS AND EFFECTS, ACUTE AND DELAYED:

THIS PRODUCT IS NOT HAZARDOUS AS DEFINED BY HAZARDOUS COMMUNICATION STANDARD. HOWEVER, AS WITH ALL CHEMICAL; HANDLE WITH CARE, AVOID EYE AND SKIN CONTACT, AVOID INHALATION OF DUSTS OR VAPORS. WASH THOROUGHLY AFTER HANDLING. KEEP CONTAINERS CLOSED.

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### SECTION 5. FIRE-FIGHTING MEASURES

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EXTINGUISHING MEDIA:

WATER, DRY CHEMICAL, CARBON DIOXIDE, FOAM.

SPECIAL HAZARDS ARISING FROM SUBSTANCE OR MEDIA:

FIREFIGHTERS SHOULD BE EQUIPPED WITH SELF-CONTAINED BREATHING APPARATUS TO GUARD AGAINST POTENTIALLY TOXIC AND IRRITATING FUMES. AVOID DUSTING. DUST CAN FORM EXPLOSIVE MIXTURES WITH AIR.

PROTECTION/ADVICE FOR FIREFIGHTER(S):

BE EQUIPPED WITH SELF-CONTAINED BREATHING APPARATUS AND PROTECTIVE CLOTHING.

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SECTION 6. ACCIDENTAL RELEASE MEASURES

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PERSONAL PRECAUTIONS:

REMOVE PERSONS FROM DANGER AREA.

ENVIRONMENTAL PRECAUTIONS:

AVOID ANY UNCONTROLLED RELEASE OF MATERIAL. DO NOT EMPTY INTO DRAINS OR THE AQUATIC ENVIRONMENT.

EMERGENCY PROCEDURES:

NO ADDITIONAL INFORMATION

METHODS AND MATERIALS FOR CONTAMINANT AND CLEANING UP:

WHERE SPILLS ARE POSSIBLE, A COMPREHENSIVE SPILL RESPONSE PLAN SHOULD BE DEVELOPED AND IMPLEMENTED. AVOID ANY UNCONTROLLED RELEASE OF MATERIAL.

UTILIZE RECOMMENDED PROTECTIVE CLOTHING AND EQUIPMENT (SEE SECTION 8). SPILLS SHOULD BE SWEEPED UP USING AN ABSORBENT DUST CONTROL PRODUCT AND PLACED IN CONTAINERS. SPILL AREA CAN BE WASHED WITH WATER. COLLECT WATER FOR APPROVED DISPOSAL. IN THE EVENT OF UNCONTROLLED RELEASE OF THIS MATERIAL, THE USER SHOULD DETERMINE IF THE RELEASE IS REPORTABLE UNDER APPLICABLE LAWS AND REGULATIONS.

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SECTION 7. HANDLING AND STORAGE

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PRECAUTIONS FOR SAFE HANDLING:

HANDLE WITH CARE. AVOID OVER EXPOSURE. USE NIOSH/OSHA APPROVED RESPIRATOR, WORK GLOVES, AND CLOTHING. WASH AFTER HANDLING. SENSITIVE INDIVIDUALS MAY EXPERIENCE RESPIRATORY ALLERGIES. MAY CAUSE SKIN IRRITATION. USE WITH LOCAL VENTILATION.

CONDITIONS FOR SAFE STORAGE, INCLUDING ANY INCOMPATIBILITIES:

USE PROCESS ENCLOSURES, LOCAL EXHAUST VENTILATION OR OTHER ENGINEERING CONTROLS TO KEEP AIRBORNE LEVELS BELOW RECOMMENDED EXPOSURE LIMITS.

KEEP AWAY FROM HEAT. KEEP AWAY FROM SOURCES OF IGNITION.

KEEP AWAY FROM STRONG OXIDIZING AND REDUCING AGENTS.

SPECIFIC END USES:

FELT TIP, MARKER INKS, WATER BASED COATINGS AND LEAK DETECTION

## SECTION 8. EXPOSURE CONTROLS /PERSONAL PROTECTION

CONTROL PARAMETERS:

INGREDIENTS WITH LIMIT VALUES THAT REQUIRE MONITORING AT THE WORKPLACE - NOT REQUIRED

EXPOSURE CONTROLS:

APPROPRIATE ENGINEERING CONTROLS - THE USUAL PRECAUTIONARY MEASURES ARE TO BE ADHERED TO WHEN HANDLING CHEMICALS.

PERSONAL PROTECTIVE EQUIPMENT:



HAND PROTECTION  
EYE PROTECTION  
SKIN AND BODY

WEAR IMPERMEABLE RUBBER OR PLASTIC GLOVES  
TIGHTLY SEALED SAFETY GOGGLES OR FULL FACE SIDE SHIELDS.  
APRON, COVERALLS AND NON-LEATHER SOLED WORK SHOES.  
WASH DYE CONTAMINATED CLOTHES AND SKIN WITH MILD SOAP AND DETERGENTS.

RESPIRATORY  
HYGIENE MEASURES

WEAR OSHA/NIOSH APPROVED DUST MASK/RESPIRATOR  
HANDLE IN ACCORDANCE WITH GOOD INDUSTRIAL HYGIENE AND SAFETY PRACTICES. WASH HANDS AFTER HANDLING MATERIAL.

OTHER PROTECTION

DELUGE SAFETY SHOWER AND EYE WASH STATION SHOULD BE LOCATED NEAR WORK AREA.

## SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

INFORMATION ON BASIC PHYSICAL AND CHEMICAL PROPERTIES :

APPEARANCE, COLOR, ODOR	YELLOW POWDER, NO ODOR
pH	8.0 - 9.0
MELTING POINT/FREEZING POINT	ND
INITIAL BOILING POINT/BOILING RANGE	0.00
FLASHPOINT	NORMALLY STABLE, NOT COMBUSTIBLE NOR FLAMMABLE
EVAPORATION RATE	NO DATA
FLAMMABILITY (SOLID,GAS)	NORMALLY STABLE, NOT COMBUSTIBLE NOR FLAMMABLE
UPPER EXPLOSIVE LIMITS	NA
LOWER EXPLOSIVE LIMITS	NA
VAPOR PRESSURE	NA
VAPOR DENSITY	NA
RELATIVE DENSITY	NA
SOLUBILITY IN WATER	SOLUBLE
PARTITION COEFFICIENT N-OCTANOL/WATER	NO DATA

AUTO-IGNITION TEMPERATURE	NO DATA
DECOMPOSITION TEMPERATURE	NO DATA
VISCOSITY, DYNAMIC	NO DATA
VISCOSITY, CINEMATIC	NO DATA
EXPLOSIVE PROPERTIES	N/A
OXIDIZING PROPERTIES	NA
OTHER INFORMATION	NA

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SECTION 10. STABILITY AND REACTIVITY

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CHEMICAL STABILITY	STABLE UNDER NORMAL STORAGE AND HANDLING CONDITIONS.
CONDITIONS TO AVOID	OXIDIZING & REDUCING AGENTS MAY DESTROY COLOR.
INCOMPATIBLE MATERIALS	OXIDIZING & REDUCING AGENTS MAY DESTROY COLOR.
HAZARDOUS DECOMPOSITION PRODUCTS	CO, CO <sub>2</sub> , OXIDES OF NITROGEN AND OTHER POTENTIALLY TOXIC FUMES.

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SECTION 11. TOXICOLOGICAL INFORMATION

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TOXICOLOGICAL EFFECTS :

ORAL (ANIMAL)	GREATER THAN 7,000 MG/KG - RAT	
DERMAL (ANIMAL)	NA	
EFFECTS TO EYES (ANIMAL)	EYES - RABBIT, NOT IRRITATING	
SKIN IRRITATION (ANIMAL)	SKIN - RABBIT, SLIGHT IRRITANT	
SKIN CORROSION/IRRITATION	NOT CLASSIFIED	
SERIOUS EYE DAMAGE/IRRITATION	CAUSES EYE IRRITATION	
RESPIRATORY OR SKIN SENSITIZATION	NOT CLASSIFIED	
GERM CELL MUTAGENICITY	NOT CLASSIFIED	
CARCINOGENICITY	NOT CLASSIFIED	
REPRODUCTIVE TOXICITY	NOT CLASSIFIED	
SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE)	MAY CAUSE DROWSINESS OR DIZZINESS.	
ASPIRATION HAZARD	NOT CLASSIFIED	
INHALATION	MAY CAUSE DROWSINESS OR DIZZINESS.	
EYE CONTACT	CAUSES SERIOUS EYE IRRITATION.	
INGESTION	INGESTION MAY CAUSE NAUSEA, VOMITING AND DIARRHEA	

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SECTION 12. ECOLOGICAL INFORMATION

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TOXICITY	NA	
PERSISTENCE AND DEGRADABILITY	NA	
BIOACCUMULATIVE POTENTIAL	NA	
MOBILITY IN SOIL	LC-50 (LETHAL CONCENTRATION) UG = MICROGRAMS/LITER CHANNEL CATFISH - 2,267,000 UG/LITER RAINBOW TROUT - 1,372,000 UG/LITER BLUEGILL - 3,433,000 UG/LITER	
OTHER ADVERSE EFFECTS	NA	

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SECTION 13. DISPOSAL CONSIDERATION

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TSCA STATUS IN COMPLIANCE  
 E C CLASSIFICATION (67/548/EEC - 88/379/EEC) N/A  
 EINECS NUMBER  
 REACH CLASSIFICATION  
 R PHRASES  
 ADDITIONAL REGULATORY INFORMATION

-----  
 SECTION 16. OTHER INFORMATION  
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INDICATION OF CHANGES:

NA

OTHER INFORMATION:

NA

GHS FULL TEXT PHRASES:

MAY BE HARMFUL IF INHALED	H333
CAUSES EYE IRRITATION	H320
CASUES MILD SKIN IRRITATION	H316

	HEALTH	FLAMMABILITY	REACTIVITY	PERSONAL PROT
H. M. I. S. CLASSIFICATION:	1	0	0	D
HMIS CODE: 4 - SEVERE HAZARD, 3 - SERIOUS HAZARD, 2 - MODERATE HAZARD, 1 - SLIGHT HAZARD, 0 - MINIMAL HAZARD				

SAFETY DATA SHEET (SDS)  
 REVISION DATE: 03/03/2016

-----  
 ALL INFORMATION AND DATA APPEARING ON THIS SDS ARE BELIEVED TO BE RELIABLE AND ACCURATE.  
 HOWEVER, IT IS THE USER' S RESPONSIBILITY TO DETERMINE THE SAFETY, TOXICITY, AND SUITABILITY  
 FOR USE OF THE PRODUCT DESCRIBED. SINCE THE ACTUAL USE BY OTHERS IS BEYOND OUR CONTROL,  
 NO GUARANTEE, EXPRESSED OR IMPLIED, IS MADE BY HUE CORPORATION.  
 USER ASSUMES ALL RISK AND RESPONSIBILITY.  
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## Safety Data Sheet

### INTRACID RHODAMINE WT LIQUID

Safety Data Sheet dated: 5/13/2015 - version 1

Date of first edition: 5/13/2015

## 1. IDENTIFICATION

### Product identifier

Mixture identification:

Trade name: INTRACID RHODAMINE WT LIQUID

### Other means of identification:

Trade code: A45171566

### Recommended use of the chemical and restrictions on use

Recommended use: Industrial color additive

Restrictions on use: Not Determined

### Name, address, and telephone number of the chemical manufacturer, importer, or other responsible party

Sensient Colors LLC

2515 N. Jefferson

63106 St. Louis, MO (USA)

Phone: 1 800-325-8110

Emergency Number(CHEMTREC): 1-800-424-9300

## 2. HAZARD(S) IDENTIFICATION

The identity of the individual components of this product is proprietary information and is considered a trade secret pursuant to 29 CFR 1910.1200

Hazardous components as defined in the OSHA Hazard Communication Standard: components with a HEALTH hazard (carcinogens, toxic or highly toxic agents, reproductive toxins, irritants, corrosives, sensitizers, hepatotoxins, nephrotoxins, neurotoxins, etc..) and/or a PHYSICAL hazard (a combustible liquid, a compressed gas, explosive, flammable, an organic peroxide, an oxidizer, pyrophoric, unstable (reactive) or water-reactive, etc.)



### Classification of the chemical

Skin Irrit. 2 Causes skin irritation.

Eye Irrit. 2B Causes eye irritation

### Label elements

#### Symbols:



Warning

Code	Description
------	-------------

H315	Causes skin irritation.
------	-------------------------

H320	Causes eye irritation
------	-----------------------

Code	Description
------	-------------

P264	Wash ... Thoroughly after handling.
------	-------------------------------------

P280	Wear protective gloves/protective clothing/eye protection/face protection.
------	--

P302+P352	IF ON SKIN: Wash with plenty of water/...
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P305+P351+P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
----------------	--

P321	Specific treatment (see ... On this label).
------	---

P332+P313	If skin irritation occurs: Get medical advice/attention.
-----------	--

P337+P313	If eye irritation persists: Get medical advice/attention.
-----------	---



P362+P364 Take off contaminated clothing and wash it before reuse.

**Ingredient(s) with unknown acute toxicity:**

None

**Hazards not otherwise classified identified during the classification process:**

None

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**3. COMPOSITION/INFORMATION ON INGREDIENTS**

**Substances**

Not Determined

**Mixtures**

Hazardous components within the meaning of 29 CFR 1910.1200 and related classification:

**List of components**

Qty	Name	Ident. Numb.	Classification	Registration Number
10-12.5 %	RHODAMINE LIQUID	CAS:65392-81-6 EC:265-730-6	Skin Irrit. 2, H315; Eye Irrit. 2B, H320	
10-12.5 %	RHODAMINE LIQUID	CAS:75701-30-3 EC:278-292-6	Skin Irrit. 2, H315; Eye Irrit. 2B, H320	
1-3 %	TRIMELLITIC ACID	CAS:528-44-9 EC:208-432-3	Skin Irrit. 2, H315; Eye Irrit. 2A, H319; STOT SE 3, H335	

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**4. FIRST AID MEASURES**

**Description of first aid measures**

In case of skin contact:

- Immediately take off all contaminated clothing and shoes.
- Immediately remove any contaminated clothing, shoes or stockings.
- After contact with skin, wash immediately with soap and plenty of water.

In case of eye contact:

- Wash immediately and thoroughly with running water, keeping eyelids regularly raised, for at least 15 minutes. Cold water may be used. Check for and remove any contact lenses at once. OBTAIN A MEDICAL EXAMINATION.
- Protect the eyes with a sterile gauze or a clean, dry handkerchief.

In case of ingestion:

- Do not induce vomiting, get medical attention showing the MSDS and label hazardous.

In case of inhalation:

- Remove casualty to fresh air and keep warm and at rest.

**Most important symptoms/effects, acute and delayed**

- Eye irritation
- Eye damages
- Skin Irritation
- Erythema

**Indication of any immediate medical attention and special treatment needed**

In case of accident or unwellness, seek medical advice immediately (show directions for use or safety data sheet if possible).

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**5. FIRE-FIGHTING MEASURES**

**Extinguishing media**

Suitable extinguishing media:

- Water, CO2, foam, chemical powders, according to the materials involved in the fire.
- In case of fire, use foam, dry chemical, CO2.

**Unsuitable extinguishing media:**

None in particular.

**Specific hazards arising from the chemical**

- Do not inhale explosion and combustion gases.
- Burning produces heavy smoke.
- Hazardous combustion products: Not Determined
- Explosive properties: Not Determined
- Oxidising properties: Not Determined

**Special protective equipment and precautions for fire-fighters**

- Use suitable breathing apparatus .
- Collect contaminated fire extinguishing water separately. This must not be discharged into drains.
- Move undamaged containers from immediate hazard area if it can be done safely.

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**6. ACCIDENTAL RELEASE MEASURES**

## Personal precautions, protective equipment and emergency procedures

- Wear personal protection equipment.
- Remove persons to safety.
- See protective measures under point 7 and 8.

## Methods and material for containment and cleaning up

- Suitable material for taking up: dry and inert absorbing material (e.g. vermiculite, sand, earth).
  - Wash with plenty of water.
- 

## 7. HANDLING AND STORAGE

### Precautions for safe handling

- Avoid contact with skin and eyes, inhalation of vapours and mists.
- Don't use empty container before they have been cleaned.
- Before making transfer operations, assure that there aren't any incompatible material residuals in the containers.
- Contaminated clothing should be changed before entering eating areas.
- Do not eat or drink while working.
- See also section 8 for recommended protective equipment.

### Conditions for safe storage, including any incompatibilities

- Storage temperature: Not Determined
  - Incompatible materials:
    - None in particular.
  - Instructions as regards storage premises:
    - Adequately ventilated premises.
- 

## 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

### Control parameters

No Data Available

Appropriate engineering controls: Not Determined

### Individual protection measures

Eye/face protection:

Use close fitting safety goggles, don't use eye lens.

Skin protection:

Use clothing that provides comprehensive protection to the skin, e.g. cotton, rubber, PVC or viton.

Hand protection:

Use protective gloves that provide comprehensive protection, e.g. P.V.C., neoprene or rubber.

Respiratory protection:

Not Determined

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## 9. PHYSICAL AND CHEMICAL PROPERTIES

### Information on basic physical and chemical properties

- Physical State Liquid
- Appearance: Liquid,
- Odour: Not Determined
- Odour threshold: Not Determined
- pH: 10.50
- Melting point/ range: Not Determined
- Boiling point/ range: Not Determined
- Flash point: > 100°C / 212°F
- Evaporation rate: Not Determined
- Upper/lower flammability or explosive limits: Not Determined
- Vapour density: Not Determined
- Vapour pressure: Not Determined
- Density: Not Determined
- Water solubility: Not Determined
- Lipid solubility: Not Determined
- Partition coefficient (n-octanol/water): Not Determined
- Auto-ignition temperature: Not Determined
- Decomposition temperature: Not Determined
- Viscosity: Not Determined
- Explosive properties: Not Determined
- Oxidising properties: Not Determined
- Flammability (Solid, Gas): Not Determined

## Other information

Substance group relevant properties: Not Determined

Miscibility: Not Determined

Fat Solubility: Not Determined

Conductivity: Not Determined

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## 10. STABILITY AND REACTIVITY

### Reactivity

Stable under normal conditions.

### Chemical stability

Data not Available.

### Possibility of hazardous reactions

Burning produces carbon monoxide and/or carbon dioxide.

### Conditions to avoid

Stable under normal conditions of temperature and pressure.

### Incompatible materials

Avoid strong oxidizing agents, peroxides, acids, alkali metals.

### Hazardous decomposition products

Burning produces carbon monoxide and/or carbon dioxide.

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## 11. TOXICOLOGICAL INFORMATION

### Information on toxicological effects

Toxicological information of the product: No Data Available

### Substance(s) listed on the IARC Monographs:

None

### Substance(s) listed as OSHA Carcinogen(s):

None

### Substance(s) listed as NIOSH Carcinogen(s):

None

### Substance(s) listed on the NTP report on Carcinogens:

None

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## 12. ECOLOGICAL INFORMATION

### Toxicity

Adopt good working practices, so that the product is not released into the environment.

Eco-toxicity:

### List of Eco-Toxicological properties of the product

No Data Available

### Persistence and degradability

Not Determined

### Bioaccumulative potential

Not Determined

### Mobility in soil

Not Determined

### Other adverse effects

Not Determined

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## 13. DISPOSAL CONSIDERATIONS

### Waste treatment methods

Recover if possible. In so doing, comply with the local and national regulations currently in force.

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## 14. TRANSPORT INFORMATION

### UN number

ADR-UN number: N/A

DOT-UN Number: N/A

IATA-Un number: N/A

IMDG-Un number: N/A

**UN proper shipping name**

ADR-Shipping Name: N/A  
DOT Proper Shipping Name: N/A  
IATA-Technical name: N/A  
IMDG-Technical name: N/A

**Transport hazard class(es)**

ADR-Class: N/A  
DOT Hazard Class: N/A  
IATA-Class: N/A  
IMDG-Class: N/A

**Packing group**

ADR-Packing Group: N/A  
Exempted for ADR: N/A  
IATA-Packing group: N/A  
IMDG-Packing group: N/A

**Environmental hazards**

Marine pollutant: No  
Environmental Pollutant: Not Determined

**Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code**

Not Determined

**Special precautions**

Department of Transportation (DOT):

DOT-Special Provision(s): N/A  
DOT Label(s): N/A  
DOT Symbol: N/A  
DOT Cargo Aircraft: N/A  
DOT Passenger Aircraft: N/A  
DOT/TDG Bulk: N/A  
DOT Non-Bulk: N/A

Road and Rail (ADR-RID):

ADR-Label: N/A  
ADR-Upper number: N/A  
ADR Tunnel Restriction Code: N/A

Air (IATA):

IATA-Passenger Aircraft: N/A  
IATA-Cargo Aircraft: N/A  
IATA-Label: N/A  
IATA-Sub Risk: N/A  
IATA-Erg: N/A  
IATA-Special Provisioning: N/A

Sea (IMDG):

IMDG-Stowage Code: N/A  
IMDG-Stowage Note: N/A  
IMDG-Sub Risk: N/A  
IMDG-Special Provisioning: N/A  
IMDG-Page: N/A  
IMDG-Label: N/A  
IMDG-EMS: N/A  
IMDG-MFAG: N/A

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**15. REGULATORY INFORMATION****USA - Federal regulations****TSCA - Toxic Substances Control Act****TSCA inventory:**

All the components are listed on the TSCA inventory

**TSCA listed substances:**

RHODAMINE LIQUID	is listed in TSCA Section 8b
RHODAMINE LIQUID	is listed in TSCA Section 8b
TRIMELLITIC ACID	is listed in TSCA Section 8b, Section 5

**SARA - Superfund Amendments and Reauthorization Act**

**Section 302 - Extremely Hazardous Substances:**

no substances listed

**Section 304 - Hazardous substances:**

no substances listed

**Section 313 - Toxic chemical list:**

no substances listed

**CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act**

**Substance(s) listed under CERCLA:**

no substances listed

**CAA - Clean Air Act**

**CAA listed substances:**

no substances listed

**CWA - Clean Water Act**

**CWA listed substances:**

no substances listed

**USA - State specific regulations**

**California Proposition 65**

**Substance(s) listed under California Proposition 65:**

no substances listed

**Massachusetts Right to know**

**Substance(s) listed under Massachusetts Right to know:**

no substances listed

**Pennsylvania Right to know**

**Substance(s) listed under Pennsylvania Right to know:**

no substances listed

**New Jersey Right to know**

**Substance(s) listed under New Jersey Right to know:**

no substances listed

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**16. OTHER INFORMATION**

<b>Code</b>	<b>Description</b>
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H320	Causes eye irritation
H335	May cause respiratory irritation.

Safety Data Sheet dated: 5/13/2015 - version 1

The information contained herein is based on our state of knowledge at the above-specified date. It refers solely to the product indicated and constitutes no guarantee of particular quality. The information relates only to the specific material and may not be valid for such material used in combination with any other material or in any process.

This document was prepared by a competent person who has received appropriate training.

It is the duty of the user to ensure that this information is appropriate and complete with respect to the specific use intended.

This MSDS cancels and replaces any preceding release.

**Legend to abbreviations and acronyms used in the safety data sheet:**

- ADR: European Agreement concerning the International Carriage of Dangerous Goods by Road.
- RID: Regulation Concerning the International Transport of Dangerous Goods by Rail
- IMDG: International Maritime Code for Dangerous Goods
- IATA: International Air Transport Association
- IATA-DGR: Dangerous Goods Regulation by the "International Air Transport Association" (IATA)
- ICAO: International Civil Aviation Organization
- ICAO-TI: Technical Instructions by the "International Civil Aviation Organization" (ICAO)

GHS: Globally Harmonized System of Classification and Labeling of Chemicals  
CLP: Classification, Labeling, Packaging  
EINECS: European Inventory of Existing Commercial Chemical Substances  
INCI: International Nomenclature of Cosmetic Ingredients  
CAS: Chemical Abstracts Service (division of the American Chemical Society)  
GefStoffVO: Ordinance on Hazardous Substances, Germany  
LC50: Lethal concentration, for 50 percent of test population  
LD50: Lethal dose, for 50 percent of test population  
DNEL: Derived No Effect Level  
PNEC: Predicted No Effect Concentration  
TLV: Threshold Limiting Value  
TWATLV: Threshold Limiting Value for the Time Weighted Average 8 hour day.(ACGIH Standard)  
STEL: Short Term Exposure limit  
STOT: Specific Target Organ Toxicity  
WGK: German Water Hazard Class  
KSt: Explosion coefficient  
y for the damage.



SAFETY DATA SHEET (SDS)  
REVISION DATE: 03/25/2015

# HUE CORPORATION

*Color your everything, may your Hue come true*

## SECTION I. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

### PRODUCT IDENTIFIER:

PRODUCT NAME ..... **HUE RHODAMINE A PSA 2** (Sulforhodamine B)  
 PRODUCT NUMBER ..... 1-C6-052PSA2  
 COLOR INDEX NAME ..... ACID RED 052  
 C. A. S. # ..... 3520-42-1  
 CHEMICAL FAMILY..... XANTHENE

### INTENDED USE OF THE PRODUCT:

INKS, COATINGS.

### NAME, ADDRESS AND TELEPHONE OF RESPONSIBLE PARTY:

HUE CORPORATION	TELEPHONE	714-389-3130
P.O. BOX 509	FAX	714-389-9731
TUSTIN, CA 92781	EMAIL	<a href="mailto:SUPPORT@HUECORPORATION.COM">SUPPORT@HUECORPORATION.COM</a>

### EMERGENCY TELEPHONE NUMBER:

CHEMTREC (USA)	1-800-424-9300
CHEMTREC (OUTSIDE USA)	1-703-527-3887

## SECTION 2. HAZARD(S) IDENTIFICATION

### CLASSIFICATION OF THE SUBSTANCE OR MIXTURE:

GHS-US  
 ACUTE TOX. - INHALATION (CATEGORY 5)  
 EYE DAM./IRRITATION (CATEGORY 2B)  
 SKIN CORR./IRRITATION (CATEGORY 3)  
 ACUTE TOX. - ORAL (CATEGORY 4)

### GHS LABELING:

HAZARD PICTOGRAMS (GHS-US):



SIGNAL WORD

WARNING

HAZARD STATEMENT(S)

H302 - HARMFUL IF SWALLOWED  
 H320 - CAUSES EYE IRRITATION  
 H316 - CAUSES MILD SKIN IRRITATION

H333 - MAY BE HARMFUL IF INHALED

PRECAUTIONARY STATEMENTS P301 + P304 + P312 - IF SWALLOWED OR INHALED: CALL A POISON CENTER/ DOCTOR/PHYSICIAN IF YOU FEEL UNWELL.  
 P330 - RINSE MOUTH  
 P264 - WASH FACE THOROUGHLY AFTER HANDLING.  
 P270 - DO NOT EAT, DRINK OR SMOKE WHEN USING THIS PRODUCT  
 P305 + 351 + P338 - IF IN EYES: RINSE CAUTIOUSLY WITH WATER FOR SEVERAL MINUTES. REMOVE CONTACT LENSES IF PRESENT AND EASY TO DO. CONTINUE RINSING.  
 P280 - WEAR PROTECTIVE GLOVES/ EYE PROTECTION/ FACE PROTECTION  
 P337 + P332 + P313 - IF EYE OR SKIN IRRITATION OCCURS/PERSISTS: GET MEDICAL ADVICE/ATTENTION  
 P501 - DISPOSE OF CONTENTS/ CONTAINER IN ACCORDANCE WITH LOCAL/ REGIONAL/ NATIONAL INTERNATIONAL REGULATIONS.

OTHER HAZARDS NO DATA AVAILABLE  
 UNKNOWN ACUTE TOXICITY NO DATA AVAILABLE

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SECTION 3. COMPOSITION / INFORMATION ON INGREDIENTS

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SUBSTANCE:

NAME	C.A.S.#	WEIGHT 100%	GHS-US CLASSIFICATION
ACID RED 052	3520-42-1	100%	ACUTE TOX. - INHALATION 5 EYE DAM./IRRITATION 2B SKIN CORR./IRRITATION 3 ACUTE TOX. - ORAL 4

HAZARDOUS INGREDIENTS:

CHEMICAL DESIGNATION	C.A.S.#	WEIGHT 100%	GHS-US CLASSIFICATION
NO HAZARDOUS COMPONENTS FOUND UNDER APPLICABLE REGULATIONS	NONE	NONE	-

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SECTION 4. FIRST AID MEASURES

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FIRST AID MEASURES GENERAL:

INHALATION: REMOVE TO FRESH AIR. IF BREATHING IS DIFFICULT, GIVE OXYGEN AND GET IMMEDIATE MEDICAL ATTENTION.

SKIN: WASH WITH MILD SOAP AND WATER. IF IRRITATION OCCURS GET MEDICAL ATTENTION. IF CLOTHING IS CONTAMINATED, RE-MOVE AND WASH BEFORE REUSE.

EYES: FLUSH EYES WITH WATER FOR AT LEAST 15 MINUTES, HOLDING EYELIDS APART FOR THOROUGH IRRIGATION. GET IMMEDIATE MEDICAL ATTENTION.

INGESTION: INDUCE VOMITING - SEEK IMMEDIATE MEDICAL ATTENTION.



MOST IMPORTANT SYMPTOMS AND EFFECTS, ACUTE AND DELAYED:

THIS PRODUCT IS EINICS LISTED: 222-529-8

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#### SECTION 5. FIRE-FIGHTING MEASURES

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EXTINGUISHING MEDIA:

WATER, DRY CHEMICAL, CARBON DIOXIDE, FOAM.

SPECIAL HAZARDS ARISING FROM SUBSTANCE OR MEDIA:

FIREFIGHTERS SHOULD BE EQUIPPED WITH SELF-CONTAINED BREATHING APPARATUS TO GUARD AGAINST POTENTIALLY TOXIC AND IRRITATING FUMES. AVOID DUSTING. DUST CAN FORM EXPLOSIVE MIXTURES WITH AIR.

PROTECTION/ADVICE FOR FIREFIGHTER(S):

BE EQUIPPED WITH SELF-CONTAINED BREATHING APPARATUS AND PROTECTIVE CLOTHING.

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#### SECTION 6. ACCIDENTAL RELEASE MEASURES

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PERSONAL PRECAUTIONS:

REMOVE PERSONS FROM DANGER AREA.

ENVIROMENTAL PRECAUTIONS:

AVOID ANY UNCONTROLLED RELEASE OF MATERIAL. DO NOT EMPTY INTO DRAINS OR THE AQUATIC ENVIRONMENT.

EMERGENCY PROCEDURES:

AVOID ANY UNCONTROLLED RELEASE OF MATERIAL.

METHODS AND MATERIALS FOR CONTAMINENT AND CLEANING UP:

WHERE SPILLS ARE POSSIBLE, A COMPREHENSIVE SPILL RESPONSE PLAN SHOULD BE DEVELOPED AND IMPLEMENTED. AVOID ANY UNCONTROLLED RELEASE OF MATERIAL.

UTILIZE RECOMMENDED PROTECTIVE CLOTHING AND EQUIPMENT (SEE SECTION 8).

SPILLS SHOULD BE SWEEPED UP USING AN ABSORBENT DUST CONTROL PRODUCT AND PLACED IN CONTAINERS. SPILL AREA CAN BE WASHED WITH WATER. COLLECT WATER FOR APPROVED DISPOSAL. IN THE EVENT OF UNCONTROLLED RELEASE OF THIS MATERIAL, THE USER SHOULD DETERMINE IF THE RELEASE IS REPORTABLE UNDER APPLICABLE LAWS AND REGULATIONS.

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#### SECTION 7. HANDLING AND STORAGE

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PRECAUTIONS FOR SAFE HANDLING:

ACID RED 52 HAS BEEN FOUND TO BE MUTAGENIC IN HAMSTER CELL TESTS IN VITRO. THE RELEVANCE TO HUMANS IS NOT KNOWN. MAY CAUSE SKIN SENSITIZATION OR OTHER ALLERGIC

RESPONSES. AVOID OVEREXPOSURE.

CONDITIONS FOR SAFE STORAGE, INCLUDING ANY INCOMPATIBILITIES:

HANDLE WITH CARE. AVOID OVER EXPOSURE. USE NIOSH/OSHA APPROVED RESPIRATOR, WORK GLOVES, AND CLOTHING. WASH AFTER HANDLING. SENSITIVE INDIVIDUALS MAY EXPERIENCE RESPIRATORY ALLERGIES. MAY CAUSE SKIN IRRITATION. USE WITH LOCAL VENTILATION.

USE PROCESS ENCLOSURES, LOCAL EXHAUST VENTILATION OR OTHER ENGINEERING CONTROLS TO KEEP AIRBORNE LEVELS BELOW RECOMMENDED EXPOSURE LIMITS.

KEEP AWAY FROM HEAT. KEEP AWAY FROM SOURCES OF IGNITION.

KEEP AWAY FROM STRONG OXIDIZING AND REDUCING AGENTS.

SPECIFIC END USES:

HOUSEHOLD ITEMS, MARKER INKS, WATER BASED COATINGS AND SPECIALTY INKS.

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## SECTION 8. EXPOSURE CONTROLS /PERSONAL PROTECTION

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CONTROL PARAMETERS:

INGREDIENTS WITH LIMIT VALUES THAT REQUIRE MONITORING AT THE WORKPLACE - NOT REQUIRED

EXPOSURE CONTROLS:

APPROPRIATE ENGINEERING CONTROLS - THE USUAL PRECAUTIONARY MEASURES ARE TO BE ADHERED TO WHEN HANDLING CHEMICALS.

PERSONAL PROTECTIVE EQUIPMENT:



HAND PROTECTION  
EYE PROTECTION  
SKIN AND BODY

WEAR IMPERMEABLE RUBBER OR PLASTIC GLOVES  
TIGHTLY SEALED SAFETY GOGGLES OR FULL FACE SIDE SHIELDS.  
APRON, COVERALLS AND NON-LEATHER SOLED WORK SHOES.  
WASH DYE CONTAMINATED CLOTHES AND SKIN WITH MILD SOAP AND DETERGENTS.

RESPIRATORY  
HYGIENE MEASURES

WEAR OSHA/NIOSH APPROVED DUST MASK/RESPIRATOR  
HANDLE IN ACCORDANCE WITH GOOD INDUSTRIAL HYGIENE AND SAFETY PRACTICES. WASH HANDS AFTER HANDLING MATERIAL.

OTHER PROTECTION

DELUGE SAFETY SHOWER AND EYE WASH STATION SHOULD BE LOCATED NEAR WORK AREA.

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## SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

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## INFORMATION ON BASIC PHYSICAL AND CHEMICAL PROPERTIES :

APPEARANCE, COLOR, ODOR	GREENISH RED POWDER, NO ODOR
pH	NA
MELTING POINT/FREEZING POINT	NA
INITIAL BOILING POINT/BOILING RANGE	0.00
FLASHPOINT	NORMALLY STABLE, NOT COMBUSTIBLE NOR FLAMMABLE.
EVAPORATION RATE	NO DATA
FLAMMABILITY (SOLID,GAS)	NORMALLY STABLE, NOT COMBUSTIBLE NOR FLAMMABLE.
UPPER EXPLOSIVE LIMITS	NA
LOWER EXPLOSIVE LIMITS	NA
VAPOR PRESSURE	NA
VAPOR DENSITY	NA
RELATIVE DENSITY	NA
SOLUBILITY IN WATER	SOLUBLE
PARTITION COEFFICIENT N-OCTANOL/WATER	NO DATA
AUTO-IGNITION TEMPERATURE	NO DATA
DECOMPOSITION TEMPERATURE	NO DATA
VISCOSITY, DYNAMIC	NO DATA
VISCOSITY, CINEMATIC	NO DATA
EXPLOSIVE PROPERTIES	N/A
OXIDIZING PROPERTIES	NA
OTHER INFORMATION	NA

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SECTION 10. STABILITY AND REACTIVITY  
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CHEMICAL STABILITY	STABLE UNDER NORMAL STORAGE AND HANDLING CONDITIONS.
CONDITIONS TO AVOID	OXIDIZING & REDUCING AGENTS MAY DESTROY COLOR.
INCOMPATIBLE MATERIALS	OXIDIZING & REDUCING AGENTS MAY DESTROY COLOR.
HAZARDOUS DECOMPOSITION PRODUCTS - CO, CO <sub>2</sub> , OXIDES OF NITROGEN AND OTHER POTENTIALLY TOXIC FUMES.	

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SECTION 11. TOXICOLOGICAL INFORMATION  
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## TOXICOLOGICAL EFFECTS :

ORAL (ANIMAL)	GREATER THAN 5,000 MG/KG - RAT	
DERMAL (ANIMAL)	NA	
EFFECTS TO EYES (ANIMAL)	NOT IRRITATING	
SKIN IRRITATION (ANIMAL)	SLIGHTLY IRRITATING	
SKIN CORROSION/IRRITATION	NOT CLASSIFIED	
SERIOUS EYE DAMAGE/IRRITATION	CAUSES EYE IRRITATION	
RESPIRATORY OR SKIN SENSITIZATION	NOT CLASSIFIED	
GERM CELL MUTAGENICITY	NOT CLASSIFIED	
CARCINOGENICITY	NOT CLASSIFIED	
REPRODUCTIVE TOXICITY	NOT CLASSIFIED	
SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE)	MAY CAUSE DROWSINESS OR DIZZINESS.	
ASPIRATION HAZARD	NOT CLASSIFIED	
INHALATION	MAY CAUSE DROWSINESS OR DIZZINESS.	
EYE CONTACT	CAUSES EYE IRRITATION.	
INGESTION	INGESTION MAY CAUSE NAUSEA, VOMITING AND DIARRHEA	

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 SECTION 12. ECOLOGICAL INFORMATION
 

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TOXICITY	LC/50 = 1000 MG/L [96 HR] [BLUE GILL]
PERSISTENCE AND DEGRADABILITY	NA
BIOACCUMULATIVE POTENTIAL	NA
MOBILITY IN SOIL	NA
OTHER ADVERSE EFFECTS	NA

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 SECTION 13. DISPOSAL CONSIDERATION
 

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## WASTE DISPOSAL RECOMMENDATION :

EMPTY BAGS THOROUGHLY. CARRY OUT THE PROPER RECYLING, REUSAGE OR DISPOSAL.  
 PLEASE REFER TO THE RELEVANT EU REGULATIONS, IN PARTICULAR THE GUIDELINES/DECISIONS OF  
 THE COUNCIL REGARDING HANDLING OF WASTES (E.G. 75/442/EEC, 91/689/EEC, 94/67/EC, 94/904/EC)  
 AS IMPLEMENTED IN NATIONAL REGULATIONS.

## REGIONAL RECOMMENDATION :

BURY OR INCINERATE ACCORDANCE WITH FEDERAL, STATE AND LOCAL REGULATIONS.

CONTAINERS SHOULD NOT BE REUSED WITHOUT PROFESSIONAL CLEANING AND RECONDITIONING.  
 OBSERVE ALL LABELED SAFEGUARDS UNTIL CLEANED, RECONDITIONED OR DESTROYED.

PLEASE REFER TO SECTION 8 (EXPOSURE CONTROLS /PERSONAL PROTECTION) OF THIS SDS.

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 SECTION 14. TRANSPORTATION INFORMATION
 

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UN NUMBER	NONE
UN PROPER SHIPPING NAME	NONE

## DEPARTMENT OF TRANSPORTATION (DOT) :

TRANSPORT HAZARD CLASS(ES)

## HAZARD LABLES (DOT) :

PACKING GROUP (DOT)	NA
DOT SPECIAL PROVISIONS	NA

## ADDITIONAL INFORMATION:

OVERLAND TRANSPORT	NONE
TRANSPORT BY SEA	NONE
AIR TRANSPORT	NONE
DOT QUANTITY LIMITATIONS PASSENGER AIRCRAFT	NA
DOT QUANTITY LIMITATIONS CARGO AIRCRAFT	NA

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 SECTION 15. REGULATORY INFORMATION
 

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## US FEDERAL REGULATIONS:

TSCA STATUS: THIS SUBSTANCE IS LISTED ON UNITED STATES TSCA (TOXIC SUBSTANCE CONTROL ACT) INVENTORY.

## US STATE REGULATIONS:

NONE

## CHEMICAL IDENTITY:

3520-42-1	TSCA	DSL	NDSL	EINECS	ELINCS	ENCS	CHINA	KECL	PICCS	AICS
	X	-	-	-	-	-	-	-	-	-

TSCA STATUS	IN COMPLIANCE
E C CLASSIFICATION	(67/548/EEC - 88/379/EEC) N/A
EINECS NUMBER	
REACH CLASSIFICATION	
R PHRASES	

## ADDITIONAL REGULATORY INFORMATION:

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SECTION 16. OTHER INFORMATION  
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## INDICATION OF CHANGES:

NA

## OTHER INFORMATION:

NA

## GHS FULL TEXT PHRASES:

MAY BE HARMFUL IF INHALED	H333
CAUSES EYE IRRITATION	H320
CASUES MILD SKIN IRRITATION	H316
HARMFUL IF SWALLOWED	H302

	HEALTH	FLAMMABILITY	REACTIVITY	PERSONAL PROT
H. M. I. S. CLASSIFICATION:	1	0	0	D
HMIS CODE: 4 - SEVERE HAZARD, 3 - SERIOUS HAZARD, 2 - MODERATE HAZARD, 1 - SLIGHT HAZARD, 0 - MINIMAL HAZARD				

SAFETY DATA SHEET (SDS)  
REVISION DATE: 03/25/2015

-----  
ALL INFORMATION AND DATA APPEARING ON THIS SDS ARE BELIEVED TO BE RELIABLE AND ACCURATE. HOWEVER, IT IS THE USER' S RESPONSIBILITY TO DETERMINE THE SAFETY, TOXICITY, AND SUITABILITY FOR USE OF THE PRODUCT DESCRIBED. SINCE THE ACTUAL USE BY OTHERS IS BEYOND OUR CONTROL, NO GUARANTEE, EXPRESSED OR IMPLIED, IS MADE BY HUE CORPORATION.  
USER ASSUMES ALL RISK AND RESPONSIBILITY.  
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## APPENDIX C – DYE FAQ SHEET

## **DYE STUDY QUESTIONS & ANSWERS LACROSSE BOILING WATER REACTOR**

The following questions provide a framework should members of the public or LACBWR staff ask questions on the dye tracer test. They have been drafted to be used as a guide. If anyone would like more detailed answers or information, they are always welcome to call \_\_\_\_\_.

**1) *What is the color in the river from?***

We added some dyes in mid March to be able to better understand groundwater flow directions, especially how shallow groundwater moves across the site towards the river.

**2) *Can it hurt me (family, kids, pets)? Will the fish be safe to eat?***

The dyes are safe. They are approved by WI DNR and US EPA. In fact the green dye is the same material used at St. Patrick's Day to turn the rivers in Chicago green. They do not harm wildlife, and are also very common in food colorings, so they are safe to ingest (i.e. they will not impact fish or other wildlife from the area).

**3) *Why is the plant doing this?***

Nuclear plants have deep foundations and filled areas (from construction), as well as underground utilities and sumps. We are conducting the dye tracer study to validate or confirm our conceptual site model. By adding the dyes at specific locations and then tracking their progress, we will be able to better understand groundwater flow within the plant. We do not anticipate discharging dyes to the Mississippi River; however, it is possible and therefore we will not be surprised if some colors show up near the storm water outfalls.

**4) *How long will the dyes last?***

Dyes last up to a year within the soils and groundwater, however they break down in sunlight. If dyes reach the Mississippi River, they will likely only be visible for a week or so. The dyes may only be visible for a day or less if there are currents to dilute them.

**5) *Can we get information on the dyes?***

Yes, if you would like more details, please send us your contact information and we are happy to mail or e-mail additional information on the dyes used for this study.

**6) *When is the survey over?***

The survey will be completed once the dyes are no longer being measured in groundwater monitoring wells or if LACBWR obtains enough data on the groundwater flow. We expect this study to last approximately 4-6 weeks.

**7) *Is it safe to swim in the river when we can see colors at the outfalls and near the shoreline?***

Yes. The dyes are non-toxic and are safe for the environment. They are commonly used to check stream and groundwater paths and accepted by both the WI DNR and US EPA.

**8) *What do the different colors mean?***

Because we can 'see' different colors when we analyze the water, we can add different colors at different places. If you see more than one color it means that storm water and/or groundwater is interacting with the river or the storm water outfalls. This helps us better understand the site's water balance/interactions.

## Attachment C



# GENERAL PERMIT REQUEST FOR COVERAGE

## Short Duration Discharge General Permit

WPDES Permit No. WI-0059137-4

State of Wisconsin  
 Department of Natural Resources  
 Rev. 1/2015

For Department Use Only: Date Received
--

FID #:
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**Notice:** Pursuant to chs. NR 200 and 205, Wis. Adm. Code, this application is required to request coverage under General WPDES Permit No. WI-0059137-4 for short duration discharges to surface waters or groundwater. Failure to complete this form in its entirety will result in the form being returned. Personal information collected will be used for administrative purposes and may be provided to requesters to the extent required by Wisconsin's Open Records Law, ss. 19.31 through 19.39, Wis. Stats. The Department may request additional information to assess the eligibility of your proposed discharge for coverage under a WPDES permit.


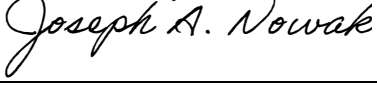
SECTION I: FACILITY LOCATION INFORMATION (source of proposed discharge)	
Facility Name La Crosse Boiling Water Reactor	Facility Contact Name and Title Joseph Nowak: EnergySolutions: Director LaCrosse Solutions
Facility Address - Street 4601 State Hwy 35	Facility Contact Phone Number (608) 689-4210
City, State, Zip Code Genoa, Wisconsin 54632	
County, Township, Range, Section, ¼ Section Vernon, PLSS: 3213N07W	Facility Contact E-mail Address janowak@energysolutions.com

SECTION II: MAILING ADDRESS INFORMATION (Parent Company/Owner - if different from above)	
Parent Company/Owner Dairyland Power Cooperative	Parent Company/Owner Contact Name and Title Lane Peters
Mailing Address - P.O. Box, Street, or Route S4561 State Road 35	Parent Company/Owner Contact Phone Number (608) 689-4316
City, State, Zip Code Genoa, Washington 54632	Parent Company/Owner Contact Fax Number
	Parent Company/Owner Contact E-mail Address lane.peters@dairylandpower.com

<p>more than 90 days?</p> <p><input checked="" type="checkbox"/> No. Continue on to the next question.</p> <p><input type="checkbox"/> Yes. <i>Discharges that occur over a period greater than 90 days are not eligible for the Short Duration Discharge General Permit. Contact the Department to determine the type of permit that is appropriate for your discharge.</i></p>	<b>Ineligible</b>
<p>2. Will the discharge occur more than once during any 12-month period or in consecutive years?</p> <p><input checked="" type="checkbox"/> No. Continue on to the next question.</p> <p><input type="checkbox"/> Yes <i>Discharges that occur more than once during any 12-month period or in consecutive years are not eligible for the Short Duration Discharge General Permit. Contact the Department to determine the type of permit that is appropriate for your discharge.</i></p>	
<p>3. Will the discharge contain domestic wastewater?</p> <p><input checked="" type="checkbox"/> No. Continue on to the next page.</p> <p><input type="checkbox"/> Yes <i>Discharges that contain domestic wastewater are not eligible for the Short Duration Discharge General Permit. Contact the Department to determine the type of permit that is appropriate for your discharge.</i></p>	



<p>X _____ irrigation, septic systems and associated drain fields, ditches, absorption ponds, and land spreading.)  _____</p> <p>water? (How far will the discharge travel through a storm sewer, pipe or drainage ditch before reaching the surface water?) <i>Check one of the following.</i></p> <p><input type="checkbox"/> Less than 1000 feet, <input type="checkbox"/> Between 1000 and 5000 feet, <input type="checkbox"/> Greater than 5000 feet</p> <p>Will the proposed discharge contribute a pollutant of concern to an impaired surface water body (see page 2 of the fact sheet for the general permit for more information)?</p> <p><input type="checkbox"/> Yes. List the pollutant of concern _____</p> <p><input type="checkbox"/> No</p> <p><input type="checkbox"/> <b>Sanitary Sewer</b> (This means a discharge to a municipal wastewater treatment system. A septic system is <u>not</u> considered a sanitary sewer.)</p> <p><i>Discharge to the sanitary sewer does not require a WPDES discharge permit.</i></p>	
<p>2. Have any other WPDES permits been issued to your facility that authorize the discharge of other wastewaters to Wisconsin surface or ground waters?</p> <p><input checked="" type="checkbox"/> Yes. List the number of the separate permit: WPDES Permit No. WI- <u>S067857-04</u></p> <p><input type="checkbox"/> No</p>	
<p>3. <b>Site Map:</b> Attach a site map, such as a USGS topographic map, aerial photo or street map, showing the location of the facility, its relation to the nearest public roadway, discharge outfalls to surface and ground waters, receiving waters, and other pertinent features. A site diagram at a more detailed scale is useful if the map is too crowded.</p>	

<b>SECTION VI: SIGNATORY REQUIREMENTS</b>	
Signature of person completing the form, attesting to the accuracy and completeness of the statements made. 	Date Signed <b>3/15/18</b>
Typed or Printed Name and Title Nadia Glucksberg, Environmental Consultant	Phone Number <b>207-482-4673</b>
<b>I hereby certify that I am the owner or authorized representative (as specified in ch. NR 205.07(1)(g), Wis. Adm Code) of the facility which is the subject of this permit application. I certify that the information contained in this form and attachments is to the best of my knowledge, true, accurate and complete.</b>	
Signature of Authorized Representative 	Date Signed <b>3/15/2018</b>
Typed or Printed Name and Title Joseph A. Nowak, Director LaCrosse Solutions	Phone Number <b>608-689-4210</b>

Mail completed request for coverage to the Wastewater Permit Coordinator of the nearest Wisconsin Department of Natural Resources regional office (see <http://dnr.wi.gov/Contact/SSbyRegion.html> ).

## ATTACHMENT 1. DISCHARGE TO SURFACE WATERS

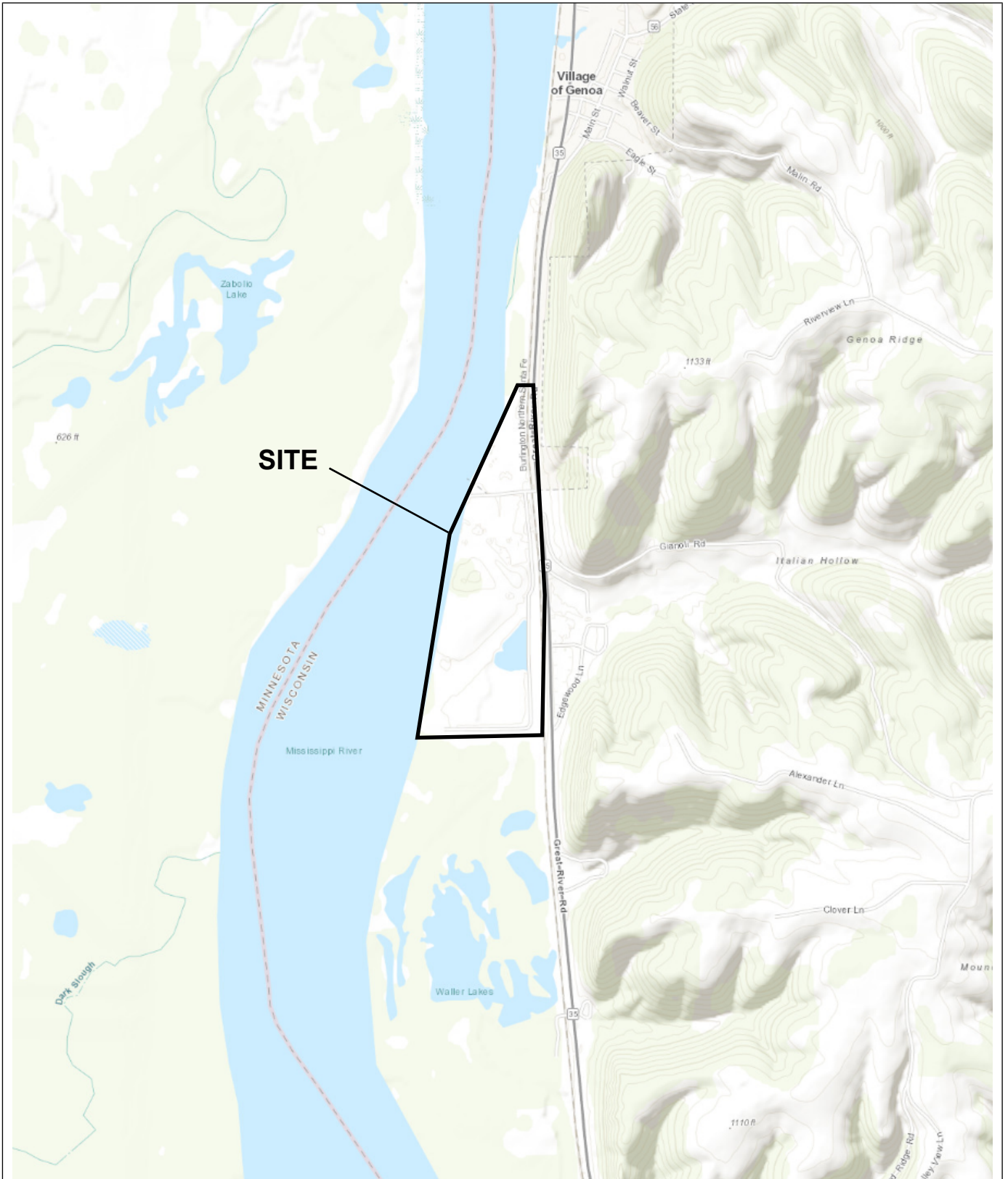
Antimony	1,1,1-Trichloroethane	Hexachloroethane
Arsenic	1,1,2-Trichloroethane	Isophorone
Beryllium	Trichloroethylene	N-Nitrosodi- <i>n</i> -butylamine
Cadmium	Vinyl Chloride	N-Nitrosodiethylamine
Chromium, Hexavalent		N-Nitrosodimethylamine
Chromium, Total	2-Chlorophenol	N-Nitrosodiphenylamine
Copper	3-Chlorophenol	N-Nitrosodi- <i>n</i> -propylamine
Cyanide, Total	4-Chlorophenol	N-Nitrosopyrrolidine
Cyanide, Amenable	3-Methyl-6-chlorophenol	Naphthalene
Lead	2,3-Dichlorophenol	Nitrobenzene
Mercury	2,4-Dichlorophenol	Pentachlorobenzene
Nickel	2,5-Dichlorophenol	1,2,4,5-Tetrachlorobenzene
Selenium	2,6-Dichlorophenol	1,2,4-Trichlorobenzene
Silver	3,4-Dichlorophenol	
Thallium	2,4-Dimethylphenol	Anthracene
Zinc	2,4-Dinitrophenol	Benzo( <i>a</i> )anthracene
Hardness (Total as CaCO <sub>3</sub> )	2,5-Dinitrophenol	Benzo( <i>a</i> )pyrene
Phenols, Total	2-Methyl-4-chlorophenol	Benzo( <i>b</i> )fluoranthene
	3-Methyl-4-chlorophenol ( <i>para</i> -chloro- <i>meta</i> -cresol)	Benzo( <i>ghi</i> )perylene
Acrolein		Benzo( <i>k</i> )fluoranthene
Acrylonitrile	2-Methyl-4,6-dinitrophenol (4,6-dinitro- <i>ortho</i> -cresol)	Chrysene
Benzene		Dibenzo( <i>a,h</i> )anthracene
Bromodichloromethane (dichlorobromomethane)	2-Nitrophenol	Fluoranthene
	4-Nitrophenol	Fluorene
Bromoform	Pentachlorophenol	Indeno(1,2,3- <i>cd</i> )pyrene
Carbon tetrachloride	Phenol	Phenanthrene
Chlorobenzene	2,3,4,6-Tetrachlorophenol	Pyrene
Chlorodibromomethane (dibromochloromethane)	2,4,5-Trichlorophenol	
	2,4,6-Trichlorophenol	Aldrin
Chloroethane		<i>alpha</i> -BHC ( -hexachlorocyclohexane)
Chloroform	Acenaphthene	<i>beta</i> -BHC ( -hexachlorocyclohexane)
Chloromethane (methyl chloride)	Acenaphthylene	<i>delta</i> -BHC ( -hexachlorocyclohexane)
1,2-Dichlorobenzene	Benzidine	<i>gamma</i> -BHC ( -hexachlorocyclohexane, Lindane)
1,3-Dichlorobenzene	Bis(2-chloroethoxy) methane	
1,4-Dichlorobenzene	Bis(2-chloroethyl) ether	Chlordane
1,1-Dichloroethane	Bis(2-chloroisopropyl) ether	4,4'-DDT
1,2-Dichloroethane	Bis(2-ethylhexyl) phthalate	4,4'-DDE
1,1-Dichloroethylene	4-Bromophenyl-phenyl ether	4,4'-DDD
<i>cis</i> -1,2 Dichloroethylene	Butyl benzyl phthalate	Dieldrin
<i>trans</i> -1,2-Dichloroethylene	2-Chloronaphthalene	<i>alpha</i> -Endosulfan
1,2-Dichloropropane	4-Chlorophenyl-phenyl ether	<i>beta</i> -Endosulfan
1,3-Dichloropropane	3,3'-Dichlorobenzidine	Endosulfan sulfate
1,1-Dichloropropylene	Diethyl phthalate	Endrin
<i>cis</i> -1,3-Dichloropropylene	Dimethyl phthalate	Endrin aldehyde
<i>trans</i> -1,3-Dichloropropylene	Di- <i>n</i> -butyl phthalate	Heptachlor
2,3-Dichloropropylene	2,4-Dinitrotoluene	Heptachlor epoxide
Ethylbenzene	2,6-Dinitrotoluene	Toxaphene
Methyl bromide (bromomethane)	Di- <i>n</i> -octyl phthalate	Chlorpyrifos
Methylene chloride (dichloromethane)	1,2-Diphenylhydrazine	Parathion, (ethyl)
1,1,2,2-Tetrachloroethane	Hexachlorobenzene	Parathion, (methyl)
Tetrachloroethylene	Hexachlorobutadiene	PCB-1016
Toluene	Hexachlorocyclopentadiene	PCB-1221

**ATTACHMENT 1 (continued). DISCHARGE TO SURFACE WATERS**

PCB-1232	Asbestos	Kelthane
PCB-1242	Acetaldehyde	Kepone
PCB-1248	Allyl alcohol	Malathion
PCB-1254	Allyl chloride	Mercaptodimethur
PCB-1260	Amyl acetate	Methoxychlor
	Aniline	Methyl mercaptan
2,3,7,8-Tetrachlorodibenzo- <i>p</i> -dioxin (2,3,7,8-TCDD)	Benzonitrile	Methyl methacrylate
2,3,7,8-Tetrachlorodibenzofuran (2,3,7,8-TCDF)	Benzyl chloride	Methyl parathion
	Butyl acetate	Mevinphos
	Butylamine	Mexacarbate
Bromide	Captan	Monoethyl amine
Color	Carbaryl	Monomethyl amine
Fecal Coliform	Carbofuran	Naled
Fluoride	Carbon disulfide	Napthenic acid
	Chlorpyrifos	Nitrotoluene
	Coumaphos	Parathion
Radioactivity, <i>alpha</i> , Total	Cresol	Phenolsulfanate
Radioactivity, <i>beta</i> , Total	Crotonaldehyde	Phosgene
Radioactivity, Radium, Total	Cyclohexane	Propargite
Radioactivity, Radium 226	2,4-D (2,4-Dichlorophenoxy acetic acid)	Propylene oxide
	Diazinon	Pyrethrins
Sulfate (as SO <sub>4</sub> <sup>-2</sup> )	Dicamba	Quinoline
Sulfide (as S)	Dichlobenil	Resorcinol
Sulfite (as SO <sub>3</sub> <sup>-2</sup> )	Dichlone	Strychnine
Surfactants	2,2-Dichloropropionic acid	Styrene
	Dichlorvos	2,4,5-T (2,4,5-Trichlorophenoxy acetic acid)
Aluminum	Diethyl amine	TDE (Tetrachlorodiphenylethane)
Barium	Dimethyl amine	2,4,5-TP [2-(2,4,5-Trichlorophenoxy) propanoic acid]
Boron	Dintrobenzene	Trichlorofan
Cobalt	Diquat	Triethanolamine dodecyl-benzene-sulfonate
Iron	Disulfoton	Triethylamine
Magnesium	Diuron	Trimethylamine
Manganese	Epichlorohydrin	Uranium
Molybdenum	Ethion	Vanadium
Strontium	Ethylene diamine	Vinyl acetate
Tin	Ethylene dibromide	Xylene
Titanium	Formaldehyde	Xylenol
	Furfural	Zirconium
Chemical Oxygen Demand (COD)	Guthion	
Chlorides	Isoprene	
Chlorine, Total Residual	Isopropanolamine	
Nitrogen (all forms including NO <sub>2</sub> <sup>-</sup> , NO <sub>3</sub> <sup>-</sup> , NH <sub>3</sub> and TKN)	Dodecylbenzenesulfonate	

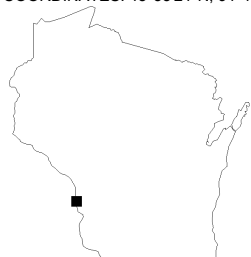
## ATTACHMENT 2. DISCHARGE TO GROUNDWATER

Acetochlor	Dibutyl phthalate	Metolachlor ethane sulfonic acid + oxanilic acid (Metolachlor – ESA + OXA)
Acetochlor ethane sulfonic acid + oxanilic acid (Acetochlor – ESA + OXA)	Dicamba	Metribuzin
Acetone	1,2-Dichlorobenzene	Molybdenum
Alachlor	1,3-Dichlorobenzene	Monochlorobenzene
Alachlor ethane sulfonic acid (Alachlor – ESA)	1,4-Dichlorobenzene	Naphthalene
Aldicarb	Dichlorodifluoromethane	Nickel
Alkalinity	1,1-Dichloroethane	Nitrate + Nitrite (as N)
Aluminum	1,2-Dichloroethane	Nitrite (as N)
Ammonia (as N)	1,1-Dichloroethene	Nitrogen, total
Anthracene	1,2-Dichloroethene (cis/trans)	N-Nitrosodiphenylamine
Antimony	2,4-Dichlorophenoxyacetic Acid (2,4-D)	Organic carbon, total (TOC)
Arsenic	1,2-Dichloropropane	Organic halogen, total (TOX)
Asbestos	1,3-Dichloropropene (cis/trans)	Organic nitrogen (as N)
Atrazine	Di (2-ethylhexyl) phthalate	Pentachlorophenol (PCP)
Bacteria, Total Coliform	Dimethenamid/Dimethenamid-P	Perchlorate
Barium	Dimethoate	Phenol
Bentazon	2,4-Dinitrotoluene	Picloram
Benzene	2,6-Dinitrotoluene	Polychlorinated biphenyls (PCBs)
Benzo(a)pyrene	Dinitrotoluene, Total Residues	Potassium
Benzo(b)fluoranthene	Dinoseb	Prometon
Beryllium	1,4-Dioxane	Propazine
Boron	Dioxin (2,3,7,8-TCDD)	Pyrene
Bromodichloromethane	Dissolved solids, total (TDS)	Pyridine
Bromoform	Endrin	Selenium
Bromomethane	EPTC	Silver
Butylate	Ethylbenzene	Simazine
Cadmium	Ethyl ether	Sodium
Calcium	Ethylene glycol	Specific conductance (field)
Carbaryl	Fluoranthene	Styrene
Carbofuran	Fluorene	Sulfate
Carbon disulfide	Fluorotrichloromethane	Tertiary Butyl Alcohol (TBA)
Carbon tetrachloride	Foaming agents (Methylene-Blue Active Substances)	1,1,1,2-Tetrachloroethane
Chemical oxygen demand (COD)	Formaldehyde	1,1,2,2-Tetrachloroethane
Chloramben	Hardness, total	Tetrachloroethylene
Chlordane	Heptachlor	Tetrahydrofuran
Chloride	Heptachlor epoxide	Thallium
Chlorodifluoromethane	Hexachlorobenzene	Toluene
Chloroethane	n-Hexane	Toxaphene
Chloroform	Hydrogen sulfide	1,2,4-Trichlorobenzene
Chlorpyrifos	Iron	1,1,1-Trichloroethane
Chloromethane	Lead	1,1,2-Trichloroethane
Chromium (total)	Lindane	Trichloroethene (TCE)
Chrysene	Magnesium	2,4,5-Trichlorophenoxy-propionic acid (2,4,5-TP)
Cobalt	Manganese	1,2,3-Trichloropropane
Color	Mercury	Trifluralin
Copper	Methanol	Trimethylbenzenes (1,2,4- and 1,3,5-combined)
Cyanazine	Methoxychlor	Vanadium
Cyanide, free	Methylene chloride	Vinyl chloride
Dacthal	Methyl ethyl ketone (MEK)	Xylene
Dibromochloromethane	Methyl isobutyl ketone (MIBK)	Zinc
1,2-Dibromo-3-chloropropane (DBCP)	Methyl tert-butyl ether (MTBE)	
1,2-Dibromoethane (EDB)	Metolachlor/s-Metolachlor	



MAP SOURCE: ESRI

SITE COORDINATES: 43°33'21"N, 91°13'52"W



**HALEY  
ALDRICH**

LACBWR  
LACROSSE SOLUTIONS  
GENOA, WISCONSIN

## PROJECT LOCUS

APPROXIMATE SCALE: 1 IN = 2000 FT  
DECEMBER 2017

**FIGURE 1**

## **APPENDIX F**

### **Dye Laboratory Data**



## Certificate of Analysis

**Date of certificate:** March 20, 2018

**Client:** Haley & Aldrich

100 Corporate Place, Suite 105

Rocky Hill, CT 06067

**Project name/location:** LACBWR, Genoa, WI

**Client project #:** 128924-004

**Contact person:** Miles van Noordennen (mvannoordennen@haleyaldrich.com)

**Samples collected by:** M. van Noordennen

**Date samples shipped:** March 16, 2018

**Date samples rec'd at OUL:** March 19, 2018

**Date analyzed by OUL:** March 20, 2018

**Included with certificate of analysis:** Table of results  
and copy of sample collection data sheet

**Results for background charcoal samplers analyzed for the presence of fluorescein, eosine, rhodamine WT (RWT) and sulforhodamine B (SRB) dyes.**

Peak wavelengths are reported in nanometers (nm); dye concentrations are reported in parts per billion (ppb).

OUL Number	Station Number	Date/Time Placed	Date/Time Collected	Fluorescein Results		Eosine Results		RWT Results		SRB Results	
				Peak (nm)	Conc. (ppb)	Peak (nm)	Conc. (ppb)	Peak (nm)	Conc. (ppb)	Peak (nm)	Conc. (ppb)
C9110	MW-202B	3/8/18 1151	3/16/18 0755	ND		ND		ND		ND	
C9111	MW-203A	3/8/18 1137	3/16/18 0745	516.4	0.964	ND		ND		ND	
C9112	MW-203B	3/8/18 1142	3/16/18 0740	ND		ND		ND		ND	

**Note:** Dye concentrations are based upon standards used at the OUL. The standard concentrations are based upon the as sold weight of the dye that the OUL uses.

If the client is not using OUL dyes, the client should provide the OUL with a sample of the dye to compare to the OUL dyes.

**Footnotes:**

ND = No dye detected

**Thomas J. Aley, PHG and RG**





## Certificate of Analysis

**Date of certificate:** July 13, 2018

**Client:** Haley & Aldrich

100 Corporate Place, Suite 105

Rocky Hill, CT 06067

**Project name/location:** LACBWR, Genoa, WI

**Client project #:** 128924-004

**Contact person:** Miles van Noordennen

(mvannoordennen@haleyaldrich.com)

**Samples collected by:** M. van Noordennen

**Date samples shipped:** July 11, 2018

**Date samples rec'd at OUL:** July 12, 2018

**Date analyzed by OUL:** July 13, 2018

**Included with certificate of analysis:**

Table of results and copy of sample collection data sheet

**Results for week 0 water samples analyzed for the presence of rhodamine WT (RWT) dye.**

Peak wavelengths are reported in nanometers (nm); dye concentrations are reported in parts per billion (ppb).

OUL Number	Station Number	Date/Time Collected	RWT Results	
			Peak (nm)	Conc. (ppb)
D0943	Well-3-071018	7/10/18 1345	ND	
D0944	Well-5-071018	7/10/18 1235	ND	
D0945	Well-7-071018	7/10/18 1255	ND	

**Note:** Dye concentrations are based upon standards used at the OUL. The standard concentrations are based upon the as sold weight of the dye that the OUL uses. If the client is not using OUL dyes, the client should provide the OUL with a sample of the dye to compare to the OUL dyes.

**Footnotes:**

ND = No dye detected

**Thomas J. Aley, PHG and RG**





**OZARK UNDERGROUND LABORATORY, INC.**

1572 Aley Lane Protem, MO 65733 (417) 785-4289 fax (417) 785-4290 email: contact@ozarkundergroundlab.com

**SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS**

Project LACBWR Gw Week No: 0 Samples Collected By: M. van Noorden  
 Samples Shipped By: M. van Noorden Samples Received By: KC/OUL  
 Date Samples Shipped: 7-11-18 Date Samples Received: 7/12/2018 Time Samples Received: 1500 Return Cooler? Yes  No   
 Bill to: Haley + Aldrich Send Results to: M. van Noorden  
 Analyze for:  Fluorescein  Eosine  Rhodamine WT  Other \_\_\_\_\_ Ship cooler to: M. van Noorden - Genoa, WI location

OUL use only		<i>Please indicate stations where dye was visible in the field for field technician use - use black ink only</i>						OUL use only	
# CHAR REC'D	LAB NUMBER	STATION NUMBER	STATION NAME	PLACED		COLLECTED		# WATER REC'D	
				DATE	TIME	DATE	TIME		
0	D0943		well-3-071018	—	—	7-10-18	1345	1	
0	D0944		well-5-071018	—	—	7-10-18	1235	1	
0	D0945		well-7-071018	—	—	7-10-18	1255	1	

COMMENTS \_\_\_\_\_

This sheet filled out by OUL staff? Yes No Charts for samples on this page proofed by OUL: CA  
 OUL Project No. 1714 Date Analyzed: 7/13/2018 Analyzed By: KC/OUL

## Certificate of Analysis

**Date of certificate:** July 25, 2018

**Client:** Haley & Aldrich

100 Corporate Place, Suite 105

Rocky Hill, CT 06067

**Project name/location:** LACBWR, Genoa, WI

**Client project #:** 128924-004

**Contact people:** Miles van Noordennen

(mvannoordennen@haleyaldrich.com)

Nadia Glucksberg (Nglucksberg.haleyaldrich.com)

**Samples collected by:** S. Kaney

**Date samples shipped:** July 19, 2018

**Date samples rec'd at OUL:** July 20, 2018

**Date analyzed by OUL:** July 24, 2018

**Included with certificate of analysis:**

Table of results and copies of sample collection data sheet

**Results for charcoal and water samples analyzed for the presence of rhodamine WT (RWT) dye.**

Peak wavelengths are reported in nanometers (nm); dye concentrations are reported in parts per billion (ppb).

All results are for charcoal unless otherwise indicated.

OUL Number	Station Number	Date/Time Placed	Date/Time Collected	RWT Results	
				Peak (nm)	Conc. (ppb)
D1073	202-AR	7/12/18 1137	7/19/18 1055	ND	
D1074	202-B	7/12/18 1204	7/19/18 1045	ND	
D1075	201-A	7/12/18 1215	7/19/18 1033	ND	
D1076	203-A	7/12/18 1227	7/19/18 1107	ND	
D1077	203-B	7/12/18 1244	7/19/18 1116	ND	
D1078	204-B	7/12/18 1301	7/19/18 1130	ND	
D1079	204-A	7/12/18 1308	7/19/18 1140	ND	
D1080	Laboratory control charcoal blank				
D1081	River	7/12/18 1337	7/19/18 1014	ND	
D1082	Well-3	<b>Water</b>	7/19/18 1248	ND	
D1083	Well-5	<b>Water</b>	7/19/18 1400	ND	
D1084	Well-7	<b>Water</b>	7/19/18 1410	ND	

**Note:** Dye concentrations are based upon standards used at the OUL. The standard concentrations are based upon the as sold weight of the dye that the OUL uses. If the client is not using OUL dyes, the client should provide the OUL with a sample of the dye to compare to the OUL dyes.

**Footnotes:**

ND = No dye detected

**Thomas J. Aley, PHG and RG**



F:\docs\COA\HaleyAldrich\HaleyAldrich\_LACBWR\_03



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**SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS**

Project LACBWR-GW Week No: 1 Samples Collected By: S. Kaney  
 Samples Shipped By: S. Kaney Samples Received By: C. Oley / OUL  
 Date Samples Shipped: 7/19/18 Date Samples Received: 7-20-18 Time Samples Received: 1200 Return Cooler? Yes  No   
 Bill to: Haley & Aldrich Send Results to: mvannoordennen@haleyaldrich.com  
 Analyze for:  Fluorescein  Eosine  Rhodamine WT  Other \_\_\_\_\_ Ship cooler to: \_\_\_\_\_

OUL use only		Please indicate stations where dye was visible in the field for field technician use - use black ink only						OUL use only	
# CHAR REC'D	LAB NUMBER	STATION NUMBER	STATION NAME	PLACED		COLLECTED		# WATER REC'D	
				DATE	TIME	DATE	TIME		
1	D1073	202-AR		7/12/18	1137	7/19/18	1055	0	
1	D1074	202-B		7/12/18	1204	7/19/18	1045	0	
1	D1075	201-A		7/12/18	1215	7/19/18	1033	0	
1	D1076	203-A		7/12/18	1227	7/19/18	1107	0	
1	D1077	203-B		7/12/18	1244	7/19/18	1116	0	
1	D1078	204-B		7/19/18	1301	7/19/18	1130	0	
1	D1079	204-A		7/12/18	1308	7/19/18	1140	0	
1	D1081	River		7/12/18	1337	7/19/18	1014	0	
0		Well 3		7/19/18	1248	-	-	1	
0		Well-5		7/19/18	1400	-	-	1	
0		Well-7		7/19/18	1410	-	-	1	

COMMENTS D1080 = OUL charcoal blank

This sheet filled out by OUL staff? Yes \_\_\_\_\_ No X Charts for samples on this page proofed by OUL: CO  
 OUL Project No. 1714 Date Analyzed: 7/24/18 Analyzed By: MR/OUL

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**SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS**

Project LACBWR-6W Week No: 1 Samples Collected By: S. Laney  
 Samples Shipped By: S. Laney Samples Received By: C. Alley / OUL  
 Date Samples Shipped: 7/19/18 Date Samples Received: 7-20-18 Time Samples Received: 1200 Return Cooler? Yes  No   
 Bill to: Haley & Aldrich Send Results to: mlannoordennen@haleyaldrich.com  
 Analyze for:  Fluorescein  Eosine  Rhodamine WT  Other \_\_\_\_\_ Ship cooler to: \_\_\_\_\_

OUL use only		<i>Please indicate stations where dye was visible in the field</i>						OUL use only
# CHAR REC'D	LAB NUMBER	STATION NUMBER	STATION NAME	PLACED		COLLECTED		# WATER REC'D
				DATE	TIME	DATE	TIME	
1		202-AR		7/12/18	1137	7/19/18	1055	0
1		202-B		7/12/18	1204	7/19/18	1045	0
1		201-AB		7/12/18	1215	7/19/18	1033	0
1		203-A		7/12/18	1227	7/19/18	1107	0
1		203-B		7/12/18	1244	7/19/18	1116	0
1		201-B		7/10/18	1301	7/19/18	1130	0
1		204-A		7/12/18	1308	7/19/18	1140	0
1		River		7/12/18	1337	7/19/18	1014	0
0	D1082	Well 3		7/19/18	1248	-	-	1
0	D1083	Well-5		7/19/18	1400	-	-	1
0	D1084	Well-7		7/19/18	1410	-	-	1

COMMENTS \_\_\_\_\_

This sheet filled out by OUL staff? Yes  No  Charts for samples on this page proofed by OUL: CA  
 OUL Project No. 1714 Date Analyzed: 7/24/18 Analyzed By: MR/OUL



## Certificate of Analysis

**Date of certificate:** August 2, 2018

**Client:** Haley & Aldrich

100 Corporate Place, Suite 105

Rocky Hill, CT 06067

**Project name/location:** LACBWR, Genoa, WI

**Client project #:** 128924-004

**Contact people:** Miles van Noordennen

(mvannoordennen@haleyaldrich.com)

Nadia Glucksberg (Nglucksberg.haleyaldrich.com)

**Samples collected by:** S. Kaney

**Date samples shipped:** July 26, 2018

**Date samples rec'd at OUL:** July 27, 2018

**Date analyzed by OUL:** August 2, 2018

**Included with certificate of analysis:**

Table of results, copies of sample collection data sheet and discrepancy sheet

**Results for charcoal and water samples analyzed for the presence of rhodamine WT (RWT) dye.**

Peak wavelengths are reported in nanometers (nm); dye concentrations are reported in parts per billion (ppb).

All results are for charcoal unless otherwise indicated.

OUL Number	Station Number	Date/Time Placed	Date/Time Collected	RWT Results	
				Peak (nm)	Conc. (ppb)
D1213	River	7/19/18 1020	7/26/18 0950	ND	
D1214	201-A	7/19/18 1041	7/26/18 1015	ND	
D1215	202-B	7/19/18 1053	7/26/18 1024	ND	
D1216	202-AR	7/19/18 1102	7/26/18 1032	ND	
D1217	203-A	7/19/18 1114	7/26/18 1048	568.6	54.4
D1218	203-B	7/19/18 1124	7/26/18 1058	ND	
D1219	204-B	7/19/18 1136	7/26/18 1110	ND	
D1220	Laboratory control charcoal blank				
D1221	204-A	7/19/18 1145	7/26/18 1118	ND	
D1222	Well-3	<b>Water</b>	7/26/18 1155	ND	
D1223	Well-5	<b>Water</b>	7/26/18 1215	ND	
D1224	Well-7	<b>Water</b>	7/26/18 1226	ND	

**Note:** Dye concentrations are based upon standards used at the OUL. The standard concentrations are based upon the as sold weight of the dye that the OUL uses. If the client is not using OUL dyes, the client should provide the OUL with a sample of the dye to compare to the OUL dyes.

**Footnotes:**

ND = No dye detected

**Thomas J. Aley, PHG and RG**





**OZARK UNDERGROUND LABORATORY, INC.**

1572 Aley Lane Protem, MO 65733 (417) 785-4289 fax (417) 785-4290 email: contact@ozarkundergroundlab.com

**SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS**

Project LACBWR-GW Week No: 2 Samples Collected By: J. Kaney  
 Samples Shipped By: J. Kaney Samples Received By: C. Aley / OUL  
 Date Samples Shipped: 7/26/18 Date Samples Received: 7-27-18 Time Samples Received: 1330 Return Cooler? Yes  No   
 Bill to: Haley's Aidrich Send Results to: mvanwardennen@haleyaidrich.com  
 Analyze for:  Fluorescein  Eosine  Rhodamine WT  Other \_\_\_\_\_ Ship cooler to: \_\_\_\_\_

OUL use only		Please indicate stations where dye was visible in the field for field technician use - use black ink only						OUL use only	
# CHAR REC'D	LAB NUMBER	STATION NUMBER	STATION NAME	PLACED		COLLECTED		# WATER REC'D	
				DATE	TIME	DATE	TIME		
1	D1213	River		7/19/18	1020	7/26/18	950	0	
1	D1214	201-A		7/19/18	1041	7/26/18	1015	0	
1	D1215	202-B		7/19/18	1053	7/26/18	1024	0	
1	D1216	202-AR		7/19/18	1102	7/26/18	1032	0	
1	D1217	203-A		7/19/18	1114	7/26/18	1048	0	
1	D1218	203-B		7/19/18	1124	7/26/18	1058	0	
1	D1219	204-B		7/19/18	1136	7/26/18	1110	0	
1	D1221	204-A		7/19/18	1145	7/26/18	1118	0	
0		well-3		7/26/18	1155	-	-	1	
0		well-5		7/26/18	1215	-	-	1	
0		well-7		7/26/18	1226	-	-	1	

COMMENTS D1220 = OUL charcoal blank

This sheet filled out by OUL staff? Yes  No

Charts for samples on this page proofed by OUL: CA

OUL Project No. 1714 Date Analyzed: 8/2/18

Analyzed By: Lisa Gilcrease

**OZARK UNDERGROUND LABORATORY, INC.**

1572 Aley Lane Protem, MO 65733 (417) 785-4289 fax (417) 785-4290 email: contact@ozarkundergroundlab.com

**SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS**

Project LALBWR-GW Week No: 2 Samples Collected By: J. Kaney  
 Samples Shipped By: J. Kaney Samples Received By: C. Aley 10/10  
 Date Samples Shipped: 7/26/18 Date Samples Received: 7-27-18 Time Samples Received: 1330 Return Cooler? Yes  No   
 Bill to: Haley & Aldrich Send Results to: mvanorden@haleyaldrich.com  
 Analyze for:  Fluorescein  Eosine  Rhodamine WT  Other \_\_\_\_\_ Ship cooler to: \_\_\_\_\_

OUL use only		Please indicate stations where dye was visible in the field for field technician use - use black ink only						OUL use only
# CHAR REC'D	LAB NUMBER <i>water</i>	STATION NUMBER	STATION NAME	PLACED		COLLECTED		# WATER REC'D
				DATE	TIME	DATE	TIME	
1		River		7/19/18	1020	7/26/18	950	0
1		201-A		7/19/18	1041	7/26/18	1015	0
1		202-B		7/19/18	1053	7/26/18	1024	0
1		202-AR		7/19/18	1102	7/26/18	1032	0
1		203-A		7/19/18	1114	7/26/18	1048	0
1		203-B		7/19/18	1124	7/26/18	1058	0
1		204-B		7/19/18	1136	7/26/18	1110	0
1		204-A		7/19/18	1145	7/26/18	1118	0
0	D1222	well-3		7/26/18	1155	-	-	1
0	D1223	well-5		7/26/18	1215	-	-	1
0	D1224	well-7		7/26/18	1226	-	-	1

COMMENTS \_\_\_\_\_

This sheet filled out by OUL staff? Yes  No  Charts for samples on this page proofed by OUL: Ca  
 OUL Project No. 1714 Date Analyzed: 8-2-18 Analyzed By: Lisa Gilcrease





## Certificate of Analysis

**Date of certificate:** August 8, 2018

**Client:** Haley & Aldrich

100 Corporate Place, Suite 105

Rocky Hill, CT 06067

**Project name/location:** LACBWR, Genoa, WI

**Client project #:** 128924-004

**Contact people:** Miles van Noordennen

(mvannoordennen@haleyaldrich.com)

Nadia Glucksberg (Nglucksberg.haleyaldrich.com)

**Samples collected by:** S. Kaney

**Date samples shipped:** August 2, 2018

**Date samples rec'd at OUL:**

August 6, 2018

**Date analyzed by OUL:** August 8, 2018

**Included with certificate of analysis:**

Table of results, copies of sample collection data sheet

**Results for charcoal and water samples analyzed for the presence of rhodamine WT (RWT) dye.**

Peak wavelengths are reported in nanometers (nm); dye concentrations are reported in parts per billion (ppb).

All results are for charcoal unless otherwise indicated.

OUL Number	Station Number	Date/Time Placed	Date/Time Collected	RWT Results	
				Peak (nm)	Conc. (ppb)
D1289	River	7/26/18 0956	8/2/18 0842	ND	
D1290	MW-201A	7/26/18 1018	8/2/18 0908	ND	
D1291	MW-202B	7/26/18 1029	8/2/18 0918	ND	
D1292	202-AR	7/26/18 1037	8/2/18 0925	ND	
D1293	203-A	7/26/18 1055	8/2/18 0935	568.1	529
D1294	203-B	7/26/18 1104	8/2/18 0941	ND	
D1295	204-B	7/26/18 1116	8/2/18 0952	ND	
D1296	204-A	7/26/18 1123	8/2/18 0958	ND	
D1297	Well-3	<b>Water</b>	8/2/18 1035	ND	
D1298	Well-5	<b>Water</b>	8/2/18 1247	ND	
D1299	Well-7	<b>Water</b>	8/2/18 1300	ND	
D1300	Laboratory control water blank				

**Note:** Dye concentrations are based upon standards used at the OUL. The standard concentrations are based upon the as sold weight of the dye that the OUL uses. If the client is not using OUL dyes, the client should provide the OUL with a sample of the dye to compare to the OUL dyes.

**Footnotes:**

ND = No dye detected

**Thomas J. Aley, PHG and RG**



**OZARK UNDERGROUND LABORATORY, INC.**

1572 Aley Lane Protem, MO 65733 (417) 785-4289 fax (417) 785-4290 email: contact@ozarkundergroundlab.com

**SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS**

Project LACBWR-GW Week No: 3 Samples Collected By: S. Kaney  
 Samples Shipped By: S. Kaney Samples Received By: M. Riedinger - OUL  
 Date Samples Shipped: 8/2/18 Date Samples Received: 8/6/18 Time Samples Received: 1300 Return Cooler? Yes  No   
 Bill to: Halley & Aldrich Send Results to: mvannordennen@halleyaldrich.com  
 Analyze for:  Fluorescein  Eosine  Rhodamine WT  Other \_\_\_\_\_ Ship cooler to: \_\_\_\_\_

OUL use only		Please indicate stations where dye was visible in the field for field technician use - use black ink only						OUL use only
# CHAR REC'D	LAB NUMBER	STATION NUMBER	STATION NAME	PLACED		COLLECTED		# WATER REC'D
				DATE	TIME	DATE	TIME	
	<u>Charcoal</u>							
1	D1289	River		7/26/18	0956	8/2/18	08:42	0
1	D1290	MW-201A		7/26/18	1018	8/2/18	0908	0
1	D1291	MW-202B		7/26/18	1029	8/2/18	0918	0
1	D1292	202-AR		7/26/18	1037	8/2/18	0925	0
1	D1293	203-A		7/26/18	1055	8/2/18	0935	0
1	D1294	203-B		7/26/18	1104	8/2/18	0941	0
1	D1295	204-B		7/26/18	1116	8/2/18	0952	0
1	D1296	204-A		7/26/18	1123	8/2/18	0958	0
0		well-3		8/2/18	1035	-	-	1
0		well-5		8/2/18	1247	-	-	1
0		well-7		8/2/18	1300	-	-	1

COMMENTS \_\_\_\_\_

This sheet filled out by OUL staff? Yes  No  Charts for samples on this page proofed by OUL: CA  
 OUL Project No. 1714 Date Analyzed: 8/8/18 Analyzed By: MR/oul



**OZARK UNDERGROUND LABORATORY, INC.**

1572 Aley Lane Protom, MO 65733 (417) 785-4289 fax (417) 785-4290 email: contact@ozarkundergroundlab.com

**SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS**

Project LACBWR-GW Week No: 3 Samples Collected By: S. Kaney  
 Samples Shipped By: S. Kaney Samples Received By: M. Ridinger - OUL  
 Date Samples Shipped: 8/2/18 Date Samples Received: 8/6/18 Time Samples Received: 1300 Return Cooler? Yes  No   
 Bill to: Halley & Aldrich Send Results to: mvannoordenen@halleyaldrich.com  
 Analyze for:  Fluorescein  Eosine  Rhodamine WT  Other \_\_\_\_\_ Ship cooler to: \_\_\_\_\_

OUL use only		<i>Please indicate stations where dye was visible in the field for field technician use - use black ink only</i>						OUL use only
# CHAR REC'D	LAB NUMBER <i>Water</i>	STATION NUMBER	STATION NAME	PLACED		COLLECTED		# WATER REC'D
				DATE	TIME	DATE	TIME	
1		River		7/26/18	0956	8/2/18	08:42	0
1		MW-201A		7/26/18	1018	8/2/18	0908	0
1		MW-202B		7/26/18	1029	8/2/18	0918	2
1		202-AR		7/26/18	1037	8/2/18	0925	0
1		203-A		7/26/18	1055	8/2/18	0935	0
1		203-B		7/26/18	1104	8/2/18	0941	0
1		204-B		7/26/18	1116	8/2/18	0952	0
1		204-A		7/26/18	1123	8/2/18	0958	0
0	D1297	well-3		8/2/18	1035	-	-	1
0	D1298	well-5		8/2/18	1247	-	-	1
0	D1299	well-7		8/2/18	1300	-	-	1

COMMENTS D1300 = OUL water blank

This sheet filled out by OUL staff? Yes \_\_\_ No X Charts for samples on this page proofed by OUL: ca  
 OUL Project No. 1714 Date Analyzed: 8-8-18 Analyzed By: MR/OU

## Certificate of Analysis

**Date of certificate:** August 16, 2018

**Client:** Haley & Aldrich  
100 Corporate Place, Suite 105  
Rocky Hill, CT 06067

**Project name/location:** LACBWR, Genoa, WI

**Client project #:** 128924-004

**Contact people:** Miles van Noordennen  
(mvannoordennen@haleyaldrich.com)  
Nadia Glucksberg (Nglucksberg.haleyaldrich.com)

**Samples collected by:** S. Kaney

**Date samples shipped:** August 9, 2018

**Date samples rec'd at OUL:**  
August 13, 2018

**Date analyzed by OUL:** August 15, 2018

**Included with certificate of analysis:**

Table of results, copies of sample collection data sheet

**Results for charcoal and water samples analyzed for the presence of rhodamine WT (RWT) dye.**

Peak wavelengths are reported in nanometers (nm); dye concentrations are reported in parts per billion (ppb).

All results are for charcoal unless otherwise indicated.

OUL Number	Station Number	Date/Time Placed	Date/Time Collected	RWT Results	
				Peak (nm)	Conc. (ppb)
D1422	River	8/2/18 0852	8/9/18 0823	ND	
D1423	201-A	8/2/18 0913	8/9/18 0838	ND	
D1424	202-B	8/2/18 0923	8/9/18 0846	ND	
D1425	202-AR	8/2/18 0930	8/9/18 0853	ND	
D1426	203-A	8/2/18 0940	8/9/18 0903	567.2	84.1
D1427	203-B	8/2/18 0947	8/9/18 0908	ND	
D1428	204-B	8/2/18 0957	8/9/18 0918	ND	
D1429	204-A	8/2/18 1003	8/9/18 0953	ND	
D1430	Well-5	<b>Water</b>	8/9/18 0932	ND	
D1431	Well-7	<b>Water</b>	8/9/18 0943	ND	
D1432	Well-3	<b>Water</b>	8/9/18 1022	ND	

**Note:** Dye concentrations are based upon standards used at the OUL. The standard concentrations are based upon the as sold weight of the dye that the OUL uses. If the client is not using OUL dyes, the client should provide the OUL with a sample of the dye to compare to the OUL dyes.

**Footnotes:**

ND = No dye detected

**Thomas J. Aley, PHG and RG**





**OZARK UNDERGROUND LABORATORY, INC.**

1572 Aley Lane Protom, MO 65733 (417) 785-4289 fax (417) 785-4290 email: contact@ozarkundergroundlab.com

**SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS**

Project ACBWR - Dye Test Week No: 4 Samples Collected By: S. Kanoy  
 Samples Shipped By: S. Kanoy Samples Received By: Amber Constat/ou  
 Date Samples Shipped: 8/9/18 Date Samples Received: 8/13/18 Time Samples Received: 1330 Return Cooler? Yes  No   
 Bill to: Haley & Aldrich Send Results to: mvanosdeenen@haleyaldrich.com  
 Analyze for:  Fluorescein  Eosine  Rhodamine WT  Other \_\_\_\_\_ Ship-cooler-to: \_\_\_\_\_

OUL use only		<i>Please indicate stations where dye was visible in the field for field technician use - use black ink only</i>						OUL use only
# CHAR REC'D	LAB NUMBER	STATION NUMBER	STATION NAME	PLACED		COLLECTED		# WATER REC'D
				DATE	TIME	DATE	TIME	
1	D1422	River		8/2/18	0852	8/9/18	0823	0
1	D1423	201A		8/2/18	0913	8/9/18	0838	0
1	D1424	202-B		8/2/18	0923	8/9/18	0846	0
1	D1425	202-AR		8/2/18	0930	8/9/18	0853	0
1	D1426	203-A		8/2/18	0940	8/9/18	0903	0
1	D1427	203-B		8/2/18	0947	8/9/18	0908	0
1	D1428	204-B		8/2/18	0957	8/9/18	0918	0
1	D1429	204-A		8/2/18	1003	8/9/18	0953	0
0		well-5		-	-	8/9/18	0932	1
0		well-7		-	-	8/9/18	0943	1
0		well-3		-	-	8/9/18	0953 <sup>1022</sup>	1

COMMENTS \_\_\_\_\_

This sheet filled out by OUL staff? Yes  No  Charts for samples on this page proofed by OUL: la  
 OUL Project No. 1714 Date Analyzed: 8-15-18 Analyzed By: Lisa Gilcrease

Page 1 of 1 AC/OUL u



**OZARK UNDERGROUND LABORATORY, INC.**

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**SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS**

Project ACBWSL - Dye Test Week No: 4 Samples Collected By: S. Kanary  
 Samples Shipped By: S. Kanary Samples Received By: Amber Constantine/ou  
 Date Samples Shipped: 8/9/18 Date Samples Received: 8/13/18 Time Samples Received: 1330 Return Cooler? Yes  No   
 Bill to: Haley & Aldrich Send Results to: mvanandeen@haleyaldrich.com  
 Analyze for:  Fluorescein  Eosine  Rhodamine WT  Other \_\_\_\_\_ Ship-cooler-to: \_\_\_\_\_

OUL use only		<i>Please indicate stations where dye was visible in the field for field technician use - use black ink only</i>						OUL use only	
# CHAR REC'D	LAB NUMBER	STATION NUMBER	STATION NAME	PLACED		COLLECTED		# WATER REC'D	
				DATE	TIME	DATE	TIME		
1	<del>None</del>	River		8/2/18	0852	8/9/18	0823	0	
1		201A		8/2/18	0913	8/9/18	0838	0	
1		202-B		8/2/18	0923	8/9/18	0846	0	
1		202-AR		8/2/18	0930	8/9/18	0853	0	
1		203-A		8/2/18	0940	8/9/18	0903	0	
1		203-B		8/2/18	0947	8/9/18	0908	0	
1		204-B		8/2/18	0957	8/9/18	0918	0	
1		204-A		8/2/18	1003	8/9/18	0953	0	
0	D1430	well-5		-	-	8/9/18	0932	1	
0	D1431	well-7		-	-	8/9/18	0943	1	
0	D1432	well-3		-	-	8/9/18	<del>0952</del> 1022	1	

COMMENTS \_\_\_\_\_

This sheet filled out by OUL staff? Yes  No  Charts for samples on this page proofed by OUL: CA  
 OUL Project No. 1714 Date Analyzed: 8-15-18 Analyzed By: Lisa Gilcrease

Page 1 of 1 AC/ouL 2

## Certificate of Analysis

**Date of certificate:** August 22, 2018

**Client:** Haley & Aldrich

100 Corporate Place, Suite 105

Rocky Hill, CT 06067

**Project name/location:** LACBWR, Genoa, WI

**Client project #:** 128924-004

**Contact people:** Miles van Noordennen

(mvannoordennen@haleyaldrich.com)

Nadia Glucksberg (Nglucksberg.haleyaldrich.com)

**Samples collected by:** S. Kaney

**Date samples shipped:** August 16, 2018

**Date samples rec'd at OUL:**

August 20, 2018

**Date analyzed by OUL:** August 22, 2018

**Included with certificate of analysis:**

Table of results, copies of sample collection data sheet

**Results for charcoal and water samples analyzed for the presence of rhodamine WT (RWT) dye.**

Peak wavelengths are reported in nanometers (nm); dye concentrations are reported in parts per billion (ppb).

All results are for charcoal unless otherwise indicated.

OUL Number	Station Number	Date/Time Placed	Date/Time Collected	RWT Results	
				Peak (nm)	Conc. (ppb)
D1462	River	8/9/18 0831	8/16/18 0748	ND	
D1463	201-A	8/9/18 0844	8/16/18 0807	ND	
D1464	202-B	8/9/18 0852	8/16/18 0815	ND	
D1465	202-AR	8/9/18 0856	8/16/18 0821	ND	
D1466	203-A	8/9/18 0908	8/16/18 0830	566.0	12.3
D1467	203-B	8/9/18 0914	8/16/18 0836	ND	
D1468	204-B	8/9/18 0922	8/16/18 0847	ND	
D1469	204-A	8/9/18 0957	8/16/18 0852	ND	
D1470	Well-3	<b>Water</b>	8/15/18 1055	ND	
D1471	Well-5	<b>Water</b>	8/15/18 1305	ND	
D1472	Well-7	<b>Water</b>	8/15/18 1320	ND	

**Note:** Dye concentrations are based upon standards used at the OUL. The standard concentrations are based upon the as sold weight of the dye that the OUL uses. If the client is not using OUL dyes, the client should provide the OUL with a sample of the dye to compare to the OUL dyes.

**Footnotes:**

ND = No dye detected

**Thomas J. Aley, PHG and RG**





**OZARK UNDERGROUND LABORATORY, INC.**

1572 Aley Lane Protom, MO 65733 (417) 785-4289 fax (417) 785-4290 email: contact@ozarkundergroundlab.com

**SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS**

Project LARBUS - Dye Test Week No: 5 Samples Collected By: S. Kanary  
 Samples Shipped By: S. Kanary Samples Received By: C. Aley/OUL  
 Date Samples Shipped: 8/16/18 Date Samples Received: 8-20-18 Time Samples Received: 1300 Return Cooler? Yes  No   
 Bill to: Haley & Aldrich Send Results to: mvaanwardennen@haleyaldrich.com  
 Analyze for:  Fluorescein  Eosine  Rhodamine WT  Other \_\_\_\_\_ Ship cooler to: \_\_\_\_\_

OUL use only		<i>Please indicate stations where dye was visible in the field</i>						OUL use only
# CHAR REC'D	LAB NUMBER	STATION NUMBER	STATION NAME	PLACED		COLLECTED		# WATER REC'D
				DATE	TIME	DATE	TIME	
1	D1462	River		8/9/18	0831	8/16/18	0748 <sup>PM</sup>	0
1	D1463	201-A		8/9/18	0844	8/16/18	0807	0
1	D1464	202-B		8/9/18	0852	8/16/18	0815	0
1	D1465	202-AP		8/9/18	0856	8/16/18	0821	0
1	D1466	203-A		8/9/18	0908	8/16/18	0830	0
1	D1467	203-B		8/9/18	0914	8/16/18	0836	0
1	D1468	204-B		8/9/18	0922	8/16/18	0847	0
1	D1469	204-A		8/9/18	0957	8/16/18	0852	0
0		well-3		8/15/18	1055	-	-	1
0		well-5		8/15/18	1305	-	-	1
0		well-7		8/15/18	1320	-	-	1

COMMENTS \*Small bugs in packet upon retrieval from River.

This sheet filled out by OUL staff? Yes  No  Charts for samples on this page proofed by OUL: CR  
 OUL Project No. 1714 Date Analyzed: 8-22-18 Analyzed By: MA/OUL

8/17/18 915

**OZARK UNDERGROUND LABORATORY, INC.**

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**SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS**

Project LAR Buel - Dye Test Week No: 5 Samples Collected By: S. Kanary  
 Samples Shipped By: S. Kanary Samples Received By: C. Aley / OUL  
 Date Samples Shipped: 8/16/18 Date Samples Received: 8-20-18 Time Samples Received: 1300 Return Cooler? Yes  No   
 Bill to: Halley & Aldrich Send Results to: mvaehnnardennen@halleyaldrich.com  
 Analyze for:  Fluorescein  Eosine  Rhodamine WT  Other Ship cooler to: \_\_\_\_\_

OUL use only			<i>Please indicate stations where dye was visible in the field for field technician use - use black ink only</i>				OUL use only	
# CHAR REC'D	LAB NUMBER	STATION NUMBER	STATION NAME	PLACED		COLLECTED		# WATER REC'D
				DATE	TIME	DATE	TIME	
1		River		8/9/18	0831	8/16/18	0748*	0
1		201-A		8/9/18	0844	8/16/18	0807	0
1		202-B		8/9/18	0852	8/16/18	0815	0
1		202-AP		8/9/18	0856	8/16/18	0821	0
1		203-A		8/9/18	0908	8/16/18	0830	0
1		203-B		8/9/18	0914	8/16/18	0836	0
1		204-B		8/9/18	0922	8/16/18	0847	0
1		204-A		8/9/18	0957	8/16/18	0852	0
0	D1470	well-3		8/15/18	1055	-	-	1
0	D1471	well-5		8/15/18	1305	-	-	1
0	D1472	well-7		8/15/18	1320	-	-	1

COMMENTS \*small bugs in packet upon retrieval from River.

This sheet filled out by OUL staff? Yes  No  Charts for samples on this page proofed by OUL: CA  
 OUL Project No. 1714 Date Analyzed: 8/22/18 Analyzed By: MR/OUL

8/17/18 9N



## Certificate of Analysis

**Date of certificate:** September 19, 2018

**Client:** Haley & Aldrich

100 Corporate Place, Suite 105

Rocky Hill, CT 06067

**Project name/location:** LACBWR, Genoa, WI

**Client project #:** 128924-004

**Contact people:** Miles van Noordennen

(mvannoordennen@haleyaldrich.com)

Nadia Glucksberg (Nglucksberg.haleyaldrich.com)

**Samples collected by:** S. Kaney

**Date samples shipped:**

September 12, 2018

**Date samples rec'd at OUL:**

September 13, 2018

**Date analyzed by OUL:**

September 18, 2018

**Included with certificate of analysis:**

Table of results, copies of sample collection data sheet

**Results for charcoal and water samples analyzed for the presence of rhodamine WT (RWT) dye.**

Peak wavelengths are reported in nanometers (nm); dye concentrations are reported in parts per billion (ppb).

All results are for charcoal unless otherwise indicated.

OUL Number	Station Number	Date/Time Placed	Date/Time Collected	RWT Results	
				Peak (nm)	Conc. (ppb)
D1888	River	8/16/18 0756	9/12/18 1136	ND	
D1889	201-A	8/16/18 0812	9/11/18 0800	ND	
D1890	202-B	8/16/18 0820	9/11/18 0955	ND	
D1891	202-AR	8/16/18 0825	9/11/18 0959	ND	
D1892	203-A	8/16/18 0834	9/11/18 1330	567.6	543
D1893	203-B	8/16/18 0843	9/11/18 1335	ND	
D1894	204-B	8/16/18 0850	9/12/18 0902	ND	
D1895	204-A	8/16/18 0856	9/12/18 0906	ND	
D1896	Well-3	<b>Water</b>	9/10/18 1515	ND	
D1897	Well-5	<b>Water</b>	9/11/18 1240	ND	
D1898	Well-7	<b>Water</b>	9/11/18 1255	ND	

**Note:** Dye concentrations are based upon standards used at the OUL. The standard concentrations are based upon the as sold weight of the dye that the OUL uses. If the client is not using OUL dyes, the client should provide the OUL with a sample of the dye to compare to the OUL dyes.

**Footnotes:**

ND = No dye detected

**Thomas J. Aley, PHG and RG**



## OZARK UNDERGROUND LABORATORY, INC.

1572 Aley Lane Protem, MO 65733 (417) 785-4289 fax (417) 785-4290 email: contact@ozarkundergroundlab.com

### SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project: ACBWSL - @Dye Test Week No: 6-9 Samples Collected By: S. Kenev  
 Samples Shipped By: S. Kenev Samples Received By: M. Ridinger OUL  
 Date Samples Shipped: 9/12/18 Date Samples Received: 9/13/18 Time Samples Received: 9:30 Return Cooler? Yes  No   
 Bill to: Haley & Aldrich Send Results to: mvannorden@haleyaldrich.com  
 Analyze for:  Fluorescein  Eosine  Rhodamine WT  Other \_\_\_\_\_ Ship cooler to: \_\_\_\_\_

OUL use only		<i>Please indicate stations where dye was visible in the field for field technician use - use black ink only</i>							OUL use only
# CHAR REC'D	LAB NUMBER <i>Charcoal</i>	STATION NUMBER	STATION NAME	PLACED		COLLECTED		# WATER REC'D	
				DATE	TIME	DATE	TIME		
1	D1888	River		8/16/18	0756	9/12/18	1136	0	
1	D1889	201-A		8/16/18	0812	9/11/18	0800	0	
1	D1890	202-B		8/16/18	0820	9/11/18	0955	0	
1	D1891	202-AR		8/16/18	0825	9/11/18	0959		
1	D1892	203-A		8/16/18	0834	9/11/18	1330	0	
1	D1893	203-B		8/16/18	0843	9/11/18	1335	0	
1	D1894	204-B		8/16/18	0850	9/12/18	0908	0	
1	D1895	204-A		8/16/18	0856	9/12/18	0906	0	
0		well-3		-	-	9/10/18	1515	1	
0		well-5		-	-	9/11/18	1240	1	
0		well-7		-	-	9/11/18	1255	1	

COMMENTS \_\_\_\_\_

This sheet filled out by OUL staff? Yes  No  Charts for samples on this page proofed by OUL: AC/OUL  
 OUL Project No. 1714 Date Analyzed: 9/18/2018 Analyzed By: KC/OUL



**OZARK UNDERGROUND LABORATORY, INC.**

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**SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS**

Project AC Busb - @ Dye Test Week No: 6-9 Samples Collected By: S. Kaney  
 Samples Shipped By: S. Kaney Samples Received By: M. Ridinger OUL  
 Date Samples Shipped: 9/12/18 Date Samples Received: 9/13/18 Time Samples Received: 9:230 Return Cooler? Yes  No   
 Bill to: Haley & Aldrich Send Results to: mvannwarden@haleyaldrich.com  
 Analyze for:  Fluorescein  Eosine  Rhodamine WT  Other \_\_\_\_\_ Ship cooler to: \_\_\_\_\_

OUL use only		Please indicate stations where dye was visible in the field for field technician use - use black ink only						OUL use only
# CHAR REC'D	LAB NUMBER Water	STATION NUMBER	STATION NAME	PLACED		COLLECTED		# WATER REC'D
				DATE	TIME	DATE	TIME	
1		River		8/16/18	0756	9/12/18	1136	0
1		201-A		8/16/18	0812	9/11/18	0800	0
1		202-B		8/16/18	0820	9/11/18	0955	0
1		202-AR		8/16/18	0825	9/11/18	0959	
1		203-A		8/16/18	0834	9/11/18	1330	0
1		203-B		8/16/18	0843	9/11/18	1335	0
1		204-B		8/16/18	0850	9/12/18	0909	0
1		204-A		8/16/18	0856	9/12/18	0906	0
0	D1896	well-3		-	-	9/10/18	1515	1
0	D1897	well-5		-	-	9/11/18	1240	1
0	D1898	well-7		-	-	9/11/18	1255	1

COMMENTS \_\_\_\_\_

This sheet filled out by OUL staff? Yes  No  Charts for samples on this page proofed by OUL: AC/OUL  
 OUL Project No. 1714 Date Analyzed: 9/18/2018 Analyzed By: KC/OUL

## Certificate of Analysis

**Date of certificate:** October 18, 2018

**Client:** Haley & Aldrich

100 Corporate Place, Suite 105

Rocky Hill, CT 06067

**Project name/location:** LACBWR, Genoa, WI

**Client project #:** 128924-004

**Contact people:** Miles van Noordennen

(mvannoordennen@haleyaldrich.com)

Nadia Glucksberg (Nglucksberg.haleyaldrich.com)

**Samples collected by:** S. Kaney

**Date samples shipped:**

October 12, 2018

**Date samples rec'd at OUL:**

October 15, 2018

**Date analyzed by OUL:**

October 17, 2018

**Included with certificate of analysis:**

Table of results, copies of sample collection data sheet

**Results for charcoal and water samples analyzed for the presence of rhodamine WT (RWT) dye.**

Peak wavelengths are reported in nanometers (nm); dye concentrations are reported in parts per billion (ppb).

All results are for charcoal unless otherwise indicated.

OUL Number	Station Number	Date/Time Placed	Date/Time Collected	RWT Results	
				Peak (nm)	Conc. (ppb)
D2473	201-A	9/11/18 0939	10/10/18 1035	ND	
D2474	202-B	9/11/18 1144	10/10/18 1335	ND	
D2475	202-AR	9/11/18 1147	10/10/18 1337	ND	
D2476	203-A	9/11/18 1520	10/10/18 0829	567.2	940
D2477	203-B	9/11/18 1524	10/10/18 0833	ND	
D2478	204-A	9/12/18 1055	10/9/18 1312	ND	
D2479	204-B	9/12/18 1058	10/9/18 1308	ND	
D2480	Laboratory control charcoal blank				
D2481	Well-3	<b>Water</b>	10/10/18 1600	ND	
D2482	Well-5	<b>Water</b>	10/10/18 1235	ND	
D2483	Well-7	<b>Water</b>	10/10/18 1245	ND	

**Note:** Dye concentrations are based upon standards used at the OUL. The standard concentrations are based upon the as sold weight of the dye that the OUL uses. If the client is not using OUL dyes, the client should provide the OUL with a sample of the dye to compare to the OUL dyes.

**Footnotes:**

ND = No dye detected

**Thomas J. Aley, PHG and RG**





**OZARK UNDERGROUND LABORATORY, INC.**

1572 Aley Lane Protom, MO 65733 (417) 785-4289 fax (417) 785-4290 email: contact@ozarkundergroundlab.com

**SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS**

Project LAC Bus - Dye Test Week No: 10-13 Samples Collected By: S. Kaney  
 Samples Shipped By: S. Kaney Samples Received By: C. Aley / OUK  
 Date Samples Shipped: 10/11/18 Date Samples Received: 10-15-18 Time Samples Received: 1400 Return Cooler? Yes  No   
 Bill to: Haley & Aldrich Send Results to: mvannorden@haleyaldrich.com  
 Analyze for:  Fluorescein  Eosine  Rhodamine WT  Other \_\_\_\_\_ Ship cooler to: \_\_\_\_\_

OUL use only		<i>Please indicate stations where dye was visible in the field for field technician use - use black ink only</i>						OUL use only	
# CHAR REC'D	LAB NUMBER	STATION NUMBER	STATION NAME	PLACED		COLLECTED		# WATER REC'D	
				DATE	TIME	DATE	TIME		
1	D2473	201-A		9/11/18	0939	10/10/18	1035	0	
1	D2474	202-B		9/11/18	1144	10/10/18	1335	0	
1	D2475	202-AR		9/11/18	1147	10/10/18	1337	0	
1	D2476	203-A		9/11/18	1520	10/10/18	0829	0	
1	D2477	203-B		9/11/18	1524	10/10/18	0833	0	
1	D2478	204-A		9/12/18	1055	10/9/18	1312	0	
1	D2479	204-B		9/12/18	1058	10/9/18	1308	0	
0	—	River		9/12/18	1143	—	—	0	
0		well-3		—	—	10/10/18	1600	1	
0		well-5		—	—	10/10/18	1235	1	
0		well-7		—	—	10/10/18	1245	1	

COMMENTS: Unable to recover packet - was not shipped.  
Oul Charcoal Blank - D2480

This sheet filled out by OUL staff? Yes \_\_\_ No X Charts for samples on this page proofed by OUL: CR  
 OUL Project No. 1714 Date Analyzed: 10/17/18 Analyzed By: MR/OUL

**OZARK UNDERGROUND LABORATORY, INC.**

1572 Aley Lane Protom, MO 65733 (417) 785-4289 fax (417) 785-4290 email: contact@ozarkundergroundlab.com

**SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS**

Project LAC Busb - Dye Test Week No: 10-13 Samples Collected By: S. Laney  
 Samples Shipped By: S. Laney Samples Received By: C. Aley (OUL)  
 Date Samples Shipped: 10/11/18 Date Samples Received: 10-15-18 Time Samples Received: 1400 Return Cooler? Yes  No   
 Bill to: Haley & Aldrich Send Results to: mwann@ordennon@haleyaldrich.com  
 Analyze for:  Fluorescein  Eosine  Rhodamine WT  Other \_\_\_\_\_ Ship cooler to: \_\_\_\_\_

OUL use only		<i>Please indicate stations where dye was visible in the field for field technician use - use black ink only</i>						OUL use only
# CHAR REC'D	LAB NUMBER <i>Water</i>	STATION NUMBER	STATION NAME	PLACED		COLLECTED		# WATER REC'D
				DATE	TIME	DATE	TIME	
1		201-A		9/11/18	0939	10/10/18	1035	0
1		202-B		9/11/18	1144	10/10/18	1335	0
1		202-A2		9/11/18	1147	10/10/18	1337	0
1		203-A		9/11/18	1520	10/10/18	0829	0
1		203-B		9/11/18	1524	10/10/18	0833	0
1		204-A		9/12/18	1055	10/9/18	1312	0
1		204-B		9/12/18	1058	10/9/18	1308	0
0	—	River		9/12/18	1143	—	—	0
0	D2481	well-3		—	—	10/10/18	1600	1
0	D2482	well-5		—	—	10/10/18	1235	1
0	D2483	well-7		—	—	10/10/18	1245	1

COMMENTS: Unable to recover packet - was not shipped.

This sheet filled out by OUL staff? Yes  No  Charts for samples on this page proofed by OUL: CA  
 OUL Project No. 1714 Date Analyzed: 10/17/18 Analyzed By: WRE/ouf

## **APPENDIX G**

### **Groundwater Modeling Report**

## APPENDIX G

### GROUNDWATER MODEL OVERVIEW

#### LACROSSE BOILING WATER REACTOR, GENOA WISCONSIN

#### INTRODUCTION AND OBJECTIVE

A numerical model was constructed with the following purposes:

- To determine overall site groundwater flow pathways and velocities at the site, using existing hydraulic head data and boring logs
- To estimate the effect of nearby domestic pumping wells on gradients and groundwater flow paths. Three domestic pumping wells are present within the sites boundaries and may influence shallow groundwater flow.
- To estimate the contaminant transport and travel times from the release of tritium impacted water to the Mississippi River, approximately 300 feet downgradient, using the flow model and the results of a tracer test performed with dye.
- To assess possible tritium release size and concentration, and the concentration of tritium in groundwater as it would enter the Mississippi River.

#### METHODS

- Analytical calculations are used; the Darcy flux and contaminant velocity are estimated to guide the numerical modeling assumptions and compare with the results.
- Numerical groundwater flow modeling with MODFLOW (Groundwater Vistas) is used to estimate the contaminant transport. The MT3D package was used to simulate contaminant flow, no degradation is assumed, and releases are based on initial conditions. The version used was MODFLOW2005
- The MODFLOW model was calibrated with hydraulic heads observed across the site to establish a base flow system used in the transport modeling. The MODFLOW model was calibrated with data assuming it was at a steady state condition. The first timestep of the model was steady state, with subsequent timesteps used for estimating contaminant transport velocity.
- The MT3D model was compared with the concentrations observed in the tracer test and from the tritium release. The tracer test was used to further understand contaminant velocity at the site, and the tritium release data was used to estimate a possible source volume and concentration of tritium in the initial release. MT3D was run using the results of the steady state and the transient MODFLOW model, with an initial condition of a steady state flow field.

#### ASSUMPTIONS

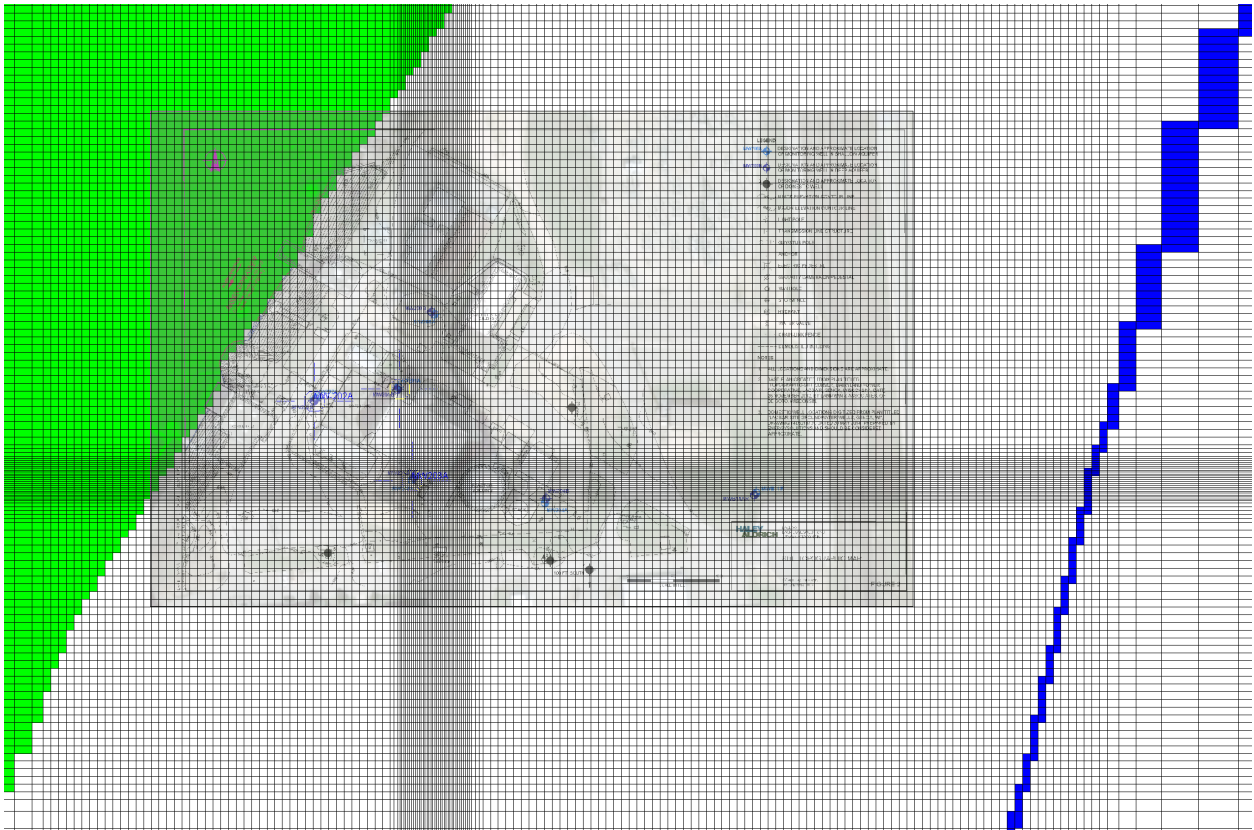
Assumptions for the model are based on previously completed hydrogeologic investigations onsite and the conceptual site model. Because of the limited calibration information (only a few hydraulic head points, and limited concentrations observed in monitoring wells), and limited knowledge of the original release and groundwater flow during the original release, a simplified conceptual model of the geology was used. A review of available boring logs, well completion details, and available hydrogeologic information were used to make the following assumptions:

- Hydraulic conductivity generally increases with depth. This is consistent with drillers logs from the domestic wells (simple soil descriptions), and hydraulic conductivity testing in the H&A well clusters.
- The Numerical model is divided up into six layers: shallow, a thin confining unit, two intermediate layers, and two deep layers.
  - Hydraulic conductivity in the shallow layers is 350 ft/d (estimated from slug testing in shallow HA wells).



**APPENDIX G**  
**GROUNDWATER MODEL OVERVIEW**  
**LACROSSE BOILING WATER REACTOR, GENOA WISCONSIN**

- Confining layer of silt or clay approximately 1 ft thick or less is encountered between 20 to 25 ft bgs based on boring logs. There is uncertainty if this layer is continuous across the site, so it is modeled as a finer sand, with a K of 35 ft/d.
- The intermediate layers have a K of 450 ft/d (estimated from slug testing in deep HA wells).
- Deep layers are modeled with a hydraulic conductivity of 1000 ft/d (estimated from drillers' logs).
- Anisotropy of 5 to 1 (horizontal to vertical).



*Figure 1: Screenshot of the contaminant transport model, with the river and upgradient boundary conditions, and the model grid*

- Groundwater gradient across the site is approximately 0.002 ft/ft, with groundwater flow towards the river, roughly due West. This is a conservative estimate made from the hydraulic head observations.
- Effective porosity used in the MT3D transport model is 0.25, and is a typical value and is used for sands which underlay the site. There is no assumed retardation or breakdown of tritium, which is conservative (for worst-case, which is higher concentrations reaching the river). Similarly, dispersivity and diffusion parameters of 0 are assumed, which will yield the greatest concentration when reaching the river.
- The releases of tritium and the tracer are to the shallow aquifer only, based on the excavations and works that released the tritium. The timing of the tritium release was assumed to be mid-November of 2017.

## APPENDIX G

### GROUNDWATER MODEL OVERVIEW

#### LACROSSE BOILING WATER REACTOR, GENOA WISCONSIN

- The three domestic supply wells are operating intermittently. According to boring logs and information from owners, the three wells have pumping rates of 120, 150, and 300 GPM, and screens open from 120 ft bgs to the water table. There is uncertainty to the actual well construction with the filter pack due to the logs being incomplete. The shortest flow path to the well pump will be through the well pack, so it is conservative from a contaminant transport perspective to assume the filter pack extends to the shallow groundwater. On average the wells are on less than 20% of the time, based on the total flows. To be conservative with the well capture zones, we assume they are operating at maximum flow, 100% of the time, which is conservative for assessing their capture of tritium.
- The release volume and extent are not precisely known, but it is on the order of 300 ft from the Mississippi River. The release will be estimated from the MT3D modeling.

#### ANALYTICAL CALCULATIONS

- The groundwater flow velocity and Darcy flux can be estimated from the gradient, effective porosity, and hydraulic conductivity (K).
  - Gradient = 0.002 ft/ft
  - K = 350 ft/d
  - Resulting Flux = 0.7 ft/d
- Dividing by porosity yields 2.8 ft/d for the groundwater flow velocity. Assuming no retardation (consistent with tritium), the contaminant transport velocity will be the groundwater flow velocity. Therefore, groundwater from the release could travel to the Mississippi River on the order of 100 days from the release.

#### MODFLOW MODEL

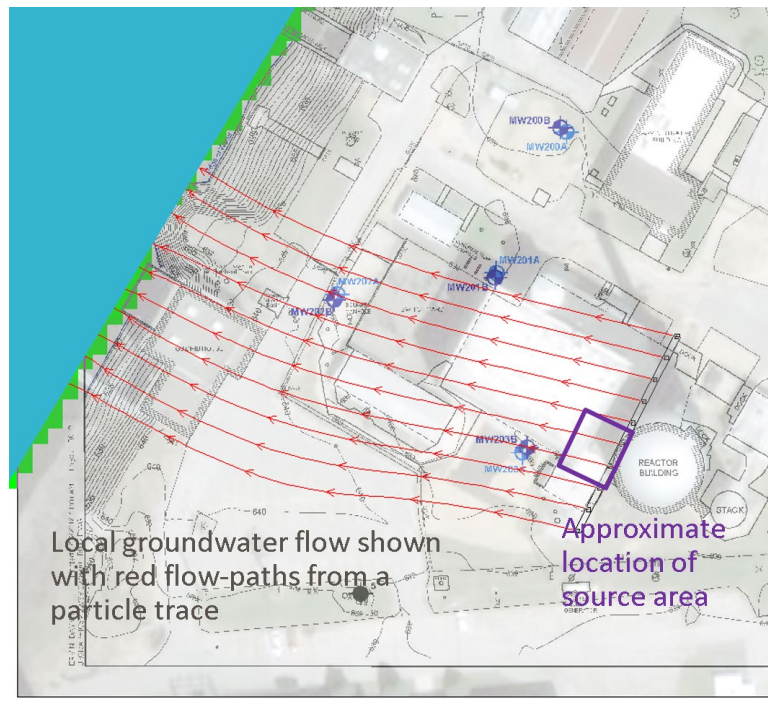
- Model is run in steady state mode first, to calibrate to the steady state water level data. Transport modeling was run in transient mode with 100 timesteps, each representing one day of transport.
- Grid spacing of 10 ft is used, total number of grid cells was 206724.
- Particles were released in the shallow layer to show groundwater flow paths and estimate initial travel times, to confirm the analytical modeling results and estimate travel times.
- The three domestic supply wells showed no influence on any particles released in the shallow aquifers. The more transmissive deeper units and long well screens make the capture zones of the domestic wells limited to the deeper units in the steady state model runs.

#### TRACER TEST MODEL

- The tracer test was modeled by releasing a slug of tracer in an approximately 15 ft x 15 ft grid in the shallow layer. This is consistent with the size of the open pit where the tracer was mixed.
- The tracer test model was performed several months after the initial tritium release, and the groundwater head and river stage were different. The pit in which the tracer was mixed was not identical to the initial tritium release, and therefore the dye test was used as a confirmation, to understand the groundwater flow system.
- Based on the initial concentration of dye, volume of flush water administered, and existing standing water in the sump excavation, the tracer concentration entering the groundwater was estimated at approximately 20,000 ug/L. Based on the results observed at MW-203A, this matches the timing and magnitude predicted or estimated by the groundwater model. MW203A was the only well to observe any tracer concentrations at the site.

**APPENDIX G**  
**GROUNDWATER MODEL OVERVIEW**  
**LACROSSE BOILING WATER REACTOR, GENOA WISCONSIN**

- The tracer test confirms that the groundwater velocities in the MODFLOW model can imitate the contaminant transport flow paths observed at the site.

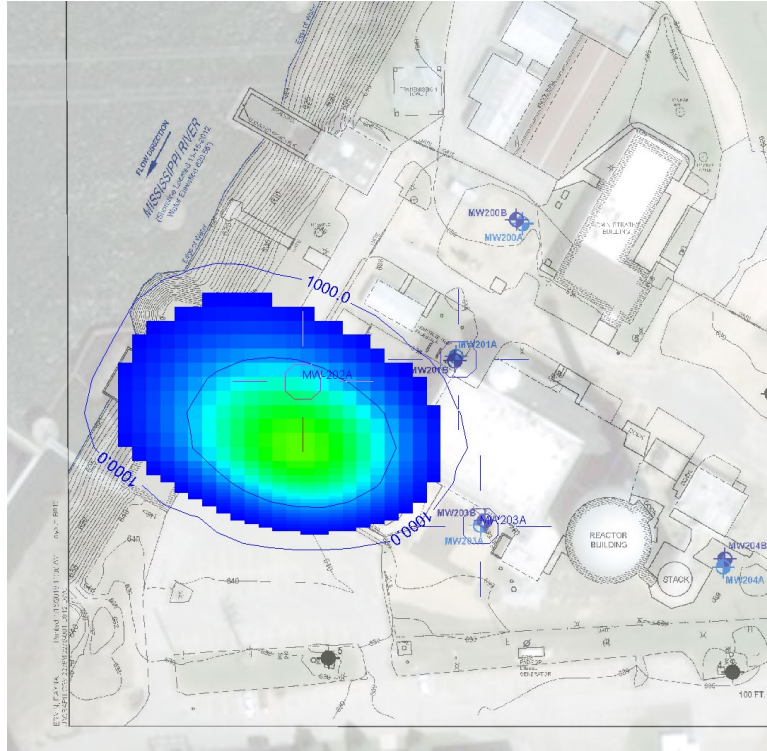


*Figure 2: Groundwater flow paths as predicted by the MODFLOW model, from the approximate release area to the Mississippi River downgradient boundary condition.*

**TRITIUM RELEASE MODEL**

- The tritium concentrations observed in the shallow monitoring wells were used to estimate an initial release volume and concentration, and therefore be able to estimate the potential maximum concentration possible in groundwater.
- An initial release date of 15 November 2017 was assumed based on elevated tritium concentrations detected in groundwater samples collected in early December and assessing prior activities completed onsite, including operation of the Torit system, and samples collected from the condensate that had collected below the ventilation.
- To match the approximate arrival times and magnitudes of tritium to wells MW-201A and MW-202A, the amount of tritium impacted water and concentration of tritium required are approximately 46,000 gallons of 60,000 pCi/L. Based on the tritium release parameters and dilution volume from site rain fall (and possible snow melt) over this time, these calculations support the model results.

**APPENDIX G**  
**GROUNDWATER MODEL OVERVIEW**  
**LACROSSE BOILING WATER REACTOR, GENOA WISCONSIN**



*Figure 3: The resulting plume of tritium in groundwater at 85 days after release, as predicted by the MODFLOW and MT3D models*

- A less desirable concentration match for well MW-203A was found with these values, and the amount of tritium in the well was overestimated by approximately 35%. This is considered conservative, as the lower concentrations are probably due to preferential flow paths. No match for both wells could be found with the assumptions stated, so an over-estimate of concentration in the upgradient well is a conservative assumption.
- Note: there is some uncertainty inherent in numerical modeling of this kind due to non-uniqueness. A different combination of release areas, volumes, concentrations and times could yield results like this estimate. More complex flowpaths, seasonal and other changes in water table and flow could affect the groundwater flow across the releases. The simplified model approach was taken to be conservative for the initial release of tritium, and its possible strength as it enters the river.
- The pumping wells showed no signs of capturing the tritium release in the numerical model under any model run.
- The tritium release occurred during the winter months (November 2017), where the stormwater was collected in the former sump and excavated to an elevation that was approximately 10 feet below the water table. The dye tracer test was approved in late June 2018, more than six months later, and after the former sump area had been filled with sediment to approximately three feet below the water table. These changes in site conditions may have contributed to the uncertainty of the model results.



**APPENDIX G**  
**GROUNDWATER MODEL OVERVIEW**  
**LACROSSE BOILING WATER REACTOR, GENOA WISCONSIN**  
**RESULTS**

- The capture zone of all three wells pumping simultaneously at steady state does not encompass the reactor building or the release area. The influence of the three pumping wells is small, as the hydraulic conductivities of the deeper units are higher.
- Groundwater flow velocity in the shallow unit is estimated to be on the order of 2.8 ft/d, this is consistent across observations from the tracer study, estimated tritium release date and concentrations in wells, and the numerical and analytical modeling. Resulting transport time to the Mississippi is on the order of 100 days.
- The tracer test observations were close to those predicted by the numerical model, confirming the general groundwater flow direction and velocity.
- The model was able to match the tritium concentrations in downgradient monitoring wells MW-201A and MW-202A with an initial release of approximately 46,000 gallons of 60,000 pCi/L impacted water back calculated and verified using the dye tracer calibration test. While these results did not translate as closely for MW-203A, we believe that is due to other preferential flow paths between the sump and MW-203A, or potential impacts from the underlying piles.
- The maximum concentration in the center of the plume as it was reaching the Mississippi River was approximately 10,500 pCi/L. This has resulted in approximately 2 µg of tritium to be released to the river from the initial release through October 2018.
- No dye has been detected in the river.
- Domestic supply pumping wells showed no sign of capturing tritium under any modeling.
- No tritium or dyes have been detected in the supply pumping wells.