MICHIGAN DEPARTMENT OF
ENVIRONMENT, GREAT LAKES, AND ENERGY

How to Interpret a Lab Report

2020 Small Systems Training

Required Information

- The date, place, and time of sampling, and the name of the person who collected the sample.
- The name of the client and the WSSN or pool number if applicable.
- Identification of the sample as to whether it was a routine distribution system sample, check sample, raw or process water sample or other special purpose sample; or equivalent for a pool sample.
- The date and time of analysis.
- The name of the laboratory and the Michigan 4-digit laboratory identification number.
- The person responsible for performing analysis.
- The analytical technique/method used.
- The results of the analysis.
- A title (i.e. Test Report, Laboratory Results…etc.).
- The units of measurement.
- The date the report was issued.
- Amended reports must indicate "amended" with the date of re-issue and the date the report was originally issued.
- The signature or electronic equivalent of the person responsible for the report.
- If necessary, a footnote stating any deviation from the regulation (i.e. Sample analyzed beyond the holding time results are not valid for compliance purposes, Sample was received with less than the required 100 mL, results are not valid for compliance purposes…etc.).

Analyte/Parameter

- Substance or sample being analyzed

TESTING INFORMATION					REGULATORY INFORMATION		
Analyte Name	[redacted]lt	Units	RL	Date Tested	MCL/AL	Method	CAS #
Calcium	64	mg/L	0.6	02/21/2020		200.7	7440-70-2
Chloride	29	mg/L	4	02/20/2020		SM 4500-Cl E	7647-14-5
Fluoride	Not detected	mg/L	0.1	02/20/2020	4.0	10-109-12-2-A	16984-48-8
Hardness as CaCO3	246	mg/L	2	02/24/2020		SM 2340 C	HARD-00-C
Iron	Not detected	mg/L	0.1	02/21/2020		200.7	7439-89-6
Magnesium	21	mg/L	0.1	02/21/2020		200.7	7439-95-4
Nitrate as N	1.0	mg/L	0.4	02/19/2020	10	EPA 353.2	14797-55-8
Nitrite as N	Not detected	mg/L	0.05	02/19/2020	1	EPA 353.2	14797-65-0

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ANALYTICAL RESULTS

Workorder: 351255 [redacted] 12/13/18

Lab ID: **3512550001** Date Received: 12/13/2018 Matrix: Drinking Water (Potable)

Sample ID: Well 14, TP114 Date Collected: 12/12/2018

Sample Desc: WSSN [redacted], Grab PO:

Parameters	[redacted]ter	Result	Units	Reporting Limit	Dilution Factor	Result Qualifier Min	Result Qualifier Max	Analyzed	By
Radiochemistry									
Analysis Desc: SM 7110 B									
Gross Alpha		-1.0 ± 2.0	pCi/L	3.0	1			1/3/2019 16:38	SUB
Analysis Desc: SM 7500-Ra B+D									
Radium 226 (Ra-226)		0.01 ± 0.09	pCi/L	1.0	1			1/4/2019 12:42	SUB
Radium 226 + Radium 228		0.43 ± 0.42	pCi/L	1.0	1			1/4/2019 12:42	SUB
Radium 228 (Ra-228)		0.42 ± 0.41	pCi/L	1.0	1			1/4/2019 12:42	SUB

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Results

- Analytical Results

TESTING INFORMATION					REGULATORY INFORMATION		
Analyte Name	Result	[redacted]RL		Date Tested	MCL/AL	Method	CAS #
Calcium	64	mg/L	0.6	02/21/2020		200.7	7440-70-2
Chloride	29	mg/L	4	02/20/2020		SM 4500-Cl E	7647-14-5
Fluoride	Not detected	mg/L	0.1	02/20/2020	4.0	10-109-12-2-A	16984-48-8
Hardness as CaCO3	246	mg/L	2	02/24/2020		SM 2340 C	HARD-00-C
Iron	Not detected	mg/L	0.1	02/21/2020		200.7	7439-89-6
Magnesium	21	mg/L	0.1	02/21/2020		200.7	7439-95-4
Nitrate as N	1.0	mg/L	0.4	02/19/2020	10	EPA 353.2	14797-55-8
Nitrite as N	Not detected	mg/L	0.05	02/19/2020	1	EPA 353.2	14797-65-0

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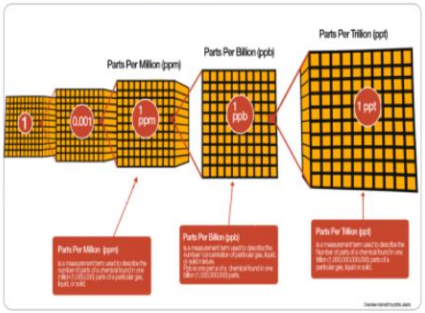
Radium 226 + Radium 228		0.43 ± 0.42	pCi/L	1.0	1			1/4/2019 12:42	SUB
Radium 228 (Ra-228)		0.42 ± 0.41	pCi/L	1.0	1			1/4/2019 12:42	SUB

Units

- pCi/L
- ng/L (ppt)
- ug/L (ppb)
- mg/L (ppm)



Reporting Limit

- RL/RDL/LOD (lowest reportable limit)
  - Results below are "non-detect"
- Higher than MDL (method detection limit)

TESTING INFORMATION					REGULATORY INFORMATION		
Analyte Name	Result	Units	RL	[redacted]	MCL/AL	Method	CAS #
Calcium	64	mg/L	0.6	02/21/2020		200.7	7440-70-2
Chloride	29	mg/L	4	02/20/2020		SM 4500-Cl E	7647-14-5
Fluoride	Not detected	mg/L	0.1	02/20/2020	4.0	10-109-12-2-A	16984-48-8
Hardness as CaCO3	246	mg/L	2	02/24/2020		SM 2340 C	HARD-00-C
Iron	Not detected	mg/L	0.1	02/21/2020		200.7	7439-89-6
Magnesium	21	mg/L	0.1	02/21/2020		200.7	7439-95-4
Nitrate as N	1.0	mg/L	0.4	02/19/2020	10	EPA 353.2	14797-55-8
Nitrite as N	Not detected	mg/L	0.05	02/19/2020	1	EPA 353.2	14797-65-0

Dilution Factor

- Indicates if sample has been diluted or not

ANALYTICAL RESULTS

Workorder: 351255 [redacted] 12/13/18

Lab ID: **3512550001** Date Received: 12/13/2018 Matrix: Drinking Water (Potable)

Sample ID: Well 14, TP114 Date Collected: 12/12/2018

Sample Desc: WSSN: [redacted], Grab PO:

Parameters	Qualifier	Result	Units	Reporting Limit	Dilution Factor	Analyzed	By
Radiochemistry							
Analysis Desc: SM 7110 B							
Gross Alpha		-1.0 ± 2.0	pCi/L	3.0	1	1/3/2019 16:38	SUB
Analysis Desc: SM 7500-Ra B+D							
Radium 226 (Ra-226)		0.01 ± 0.09	pCi/L	1.0	1	1/4/2019 12:42	SUB
Radium 226 + Radium 228		0.43 ± 0.42	pCi/L	1.0	1	1/4/2019 12:42	SUB
Radium 228 (Ra-228)		0.42 ± 0.41	pCi/L	1.0	1	1/4/2019 12:42	SUB

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MCL/AL

- Maximum Contaminant Level
  - Amount allowed in water under SDWA
- Action Level
  - Amount, if above, triggers an action

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TESTING INFORMATION					REGULATORY INFORMATION		
Analyte Name	**Result**	**Units**	**RL**	**Date Tested**	**MCL/AL**		**CAS #**
Calcium	64	mg/L	0.6	02/21/2020		200.7	7440-70-2
Chloride	29	mg/L	4	02/20/2020		SM 4500-Cl E	7647-14-5
Fluoride	Not detected	mg/L	0.1	02/20/2020	4.0	10-109-12-2-A	16984-48-8
Hardness as CaCO3	246	mg/L	2	02/24/2020		SM 2340 C	HARD-00-C
Iron	Not detected	mg/L	0.1	02/21/2020		200.7	7439-89-6
Magnesium	21	mg/L	0.1	02/21/2020		200.7	7439-95-4
Nitrate as N	1.0	mg/L	0.4	02/19/2020	10	EPA 353.2	14797-55-8
Nitrite as N	Not detected	mg/L	0.05	02/19/2020	1	EPA 353.2	14797-65-0

TESTING INFORMATION					REGULATORY INFORMATION		
Analyte Name	**Result**	**Units**	**RL**	**Date Tested**	**MCL/AL**		**CAS #**
Lead	Not detected	mg/L	0.001	03/27/2020	0.015	EPA 200.8	7439-92-1

The analyses performed by the EGLE Drinking Water Laboratory were conducted using methods approved by the U.S. Environmental Protection Agency in

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Method

- Which approved method was used to test the analyte
  - EPA Methods
  - Standard Methods
  - ASTM
  - Proprietary Methods (Hach, etc.)

TESTING INFORMATION					REGULATORY INFORMATION		
Analyte Name	Result	Units	RL	Date Tested	MCL/AL	Method	[redacted]
Calcium	48	mg/L	0.6	03/20/2020		200.7	7440-70-2
Chloride	25	mg/L	4	03/19/2020		SM 4500-Cl E	7647-14-5
Cyanide-Available	Not Detected	mg/L	0.02	03/19/2020	0.2	ASTM D6888-04	57-12-5
Fluoride	0.79	mg/L	0.1	03/19/2020	4.0	10-109-12-2-A	16984-48-8
Hardness as CaCO3	194	mg/L	2	03/21/2020		SM 2340 C	HARD-00-C
Iron	0.30	mg/L	0.1	03/20/2020		200.7	7439-89-6
Magnesium	18	mg/L	0.1	03/20/2020		200.7	7439-95-4
Nitrate as N	Not Detected	mg/L	0.4	03/19/2020	10	EPA 353.2	14797-55-8
Nitrite as N	Not detected	mg/L	0.05	03/19/2020	1	EPA 353.2	14797-65-0

CAS

- Chemical Abstracts Service Registry Number
  - Unique identifier
  - Many chemicals have different names

TESTING INFORMATION					REGULATORY INFORMATION		
Analyte Name	Result	Units	RL	Date Tested	MCL/AL	[redacted]	CAS #
Calcium	48	mg/L	0.6	03/20/2020		200.7	7440-70-2
Chloride	25	mg/L	4	03/19/2020		SM 4500-Cl E	7647-14-5
Cyanide-Available	Not Detected	mg/L	0.02	03/19/2020	0.2	ASTM D6888-04	57-12-5
Fluoride	0.79	mg/L	0.1	03/19/2020	4.0	10-109-12-2-A	16984-48-8
Hardness as CaCO3	194	mg/L	2	03/21/2020		SM 2340 C	HARD-00-C
Iron	0.30	mg/L	0.1	03/20/2020		200.7	7439-89-6
Magnesium	18	mg/L	0.1	03/20/2020		200.7	7439-95-4
Nitrate as N	Not Detected	mg/L	0.4	03/19/2020	10	EPA 353.2	14797-55-8
Nitrite as N	Not detected	mg/L	0.05	03/19/2020	1	EPA 353.2	14797-65-0

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Analyzed By/Date Tested

- Information about when lab test performed and by whom

ANALYTICAL RESULTS

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Gross Alpha		-1.0 ± 2.0	pCi/L	3.0	1		1/3/2019 16:38	SUB
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Radium 228 (Ra-228)		0.42 ± 0.41	pCi/L	1.0	1		1/4/2019 12:42	SUB

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Qualifiers

- Used to flag results for various reasons
  - Codes
    - Letters on report (referred to later in report)
  - Footnotes
    - Notations after results (may affect compliance)

TESTING INFORMATION					REGULATORY INFORMATION		
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Calcium	64	mg/L	0.6	02/21/2020		200.7	7440-70-2
Chloride	29	mg/L	4	02/20/2020		SM 4500-Cl E	7647-14-5
Fluoride	Not detected	mg/L	0.1	02/20/2020	4.0	10-109-12-2-A	16984-48-8
Hardness as CaCO3	246	mg/L	2	02/24/2020		SM 2340 C	HARD-00-C
Iron	Not detected	mg/L	0.1	02/21/2020		200.7	7439-89-6
Magnesium	21	mg/L	0.1	02/21/2020		200.7	7439-95-4
Nitrate as N	1.0	mg/L	0.4	02/19/2020	10	EPA 353.2	14797-55-8
Nitrite as N	Not detected	mg/L	0.05	02/19/2020	1	EPA 353.2	14797-65-0
Matrix spike recovery was below the acceptance criteria due to the presence of residual chlorine in the sample. This does not affect the validity of the sample result.							
Sodium	12	mg/L	0.5	02/21/2020		200.7	7440-23-5
Sulfate	17	mg/L	10	02/20/2020		SM 4500 SO4E	14808-79-8

TESTING INFORMATION					REGULATORY INFORMATION		
Analyte Name	Result	Units	RL	Date Tested	MCL/AL	Method	CAS #
Arsenic	Not detected	mg/L	0.002	03/28/2020	0.010	EPA 200.8	7440-38-2
Calcium	45	mg/L	0.6	03/28/2020		200.7	7440-70-2
Chloride	Not detected	mg/L	4	03/27/2020		SM 4500-Cl E	7647-14-5
Fluoride	0.29	mg/L	0.1	03/27/2020	4.0	10-109-12-2-A	16984-48-8
Hardness as CaCO3	178	mg/L	2	03/28/2020		SM 2340 C	HARD-00-C
Iron	Not detected	mg/L	0.1	03/28/2020		200.7	7439-89-6
Magnesium	16	mg/L	0.1	03/28/2020		200.7	7439-95-4
Nitrate as N	Not Detected	mg/L	0.4	03/27/2020	10	EPA 353.2	14797-55-8
Sample did not meet thermal preservation requirements for this analysis when received at the lab. Result(s) may not be accepted for compliance purposes.							
Nitrite as N	Not detected	mg/L	0.05	03/27/2020	1	EPA 353.2	14797-65-0
Sample did not meet thermal preservation requirements for this analysis when received at the lab. Result(s) may not be accepted for compliance purposes.							
Sodium	5.2	mg/L	0.5	03/28/2020		200.7	7440-23-5
Sulfate	15	mg/L	10	03/27/2020		10-116-10-3-A	14808-79-8
Sample did not meet thermal preservation requirements for this analysis when received at the lab. Result(s) may not be accepted for compliance.							

QA/QC

- Blanks (BLK, LRB)
- Lab Fortified Blank (LFB)
- Matrix Spikes

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EGLE | WATER | DRINKING WATER | COMMUNITY WATER SUPPLY

Community Water Supply

The Community Water Supply Program oversees the primary EPA program that sets forth minimum standards for safe drinking water as well as administering the requirements of Michigan's Safe Drinking Water Act. The program's primary function is regulatory oversight of approximately 1,400 community public water supplies in Michigan.

COVID-19: Information for Water Operators

Information

- **Recommendations When Reconnecting Water Services**
- Michigan.gov/MiLeadSafe: information on lead exposure and testing results
- Lead and Copper in Drinking Water
- Lead Public Advisory
- Community Water Supply District Offices Map and Contact Information
- What is a Community Public Water Supply?
- Community Water Supply Listings
- Public Notice for Emergencies
- EGLE Water Sampling 101 - Thermal Preservation
- Harmful Algal Blooms and Drinking Water
- Related Programs & Web Sites
- School Drinking Water Training Program
- Backflow Prevention Assembly Testing Certification
- Edward Dunbar Rich Service Awards

Programs and Activities

- Capacity Development
- Asset Management
- Operator Training and Certifications
- Certified Laboratories
- CWS Annual Fees
- EGLE Training & Workshops

Laws and Rules

- Safe Drinking Water Act 399
- Safe Drinking Water Rules-Supplying Water to the Public
- Current Drinking Water Standards
- Public Notification Rule
- Consumer Confidence Report Rule
- Revised Total Coliform Rule
- Drinking Water Rule Promulgation
- Lead and Copper Rule

Manuals, Forms and Brochures

- Water Supply Permit Application & Streamlined Checklist
- 10 States Standards
- Suggested Practices for Water Works
- Cross Connection Brochure
- Fluoridation Information
- Water Well Disinfection Manual
- Cross Connection Rules Manual - Fourth Edition
- Reporting Forms
- Drinking Water Laboratory

Reports

- Annual Reports on Public Water System Violations
- Capacity Development Reports

EGLE MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY

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ABOUT EGLE | AIR | LAND | WASTE | WATER | SUSTAINABILITY

EGLE | LABORATORY SERVICES | DRINKING WATER

Drinking Water

The Drinking Water Analysis Laboratory offers services for the analysis of drinking water quality. These services include all physical, chemical, and microbiological testing procedures currently used for this purpose by state and local water supply programs.

For information regarding Flint Water testing results, please visit Michigan.gov/FlintWater or contact EGLE's Environmental Assistance Center at 800-662-9278.

Information

- Drinking Water FAQ
- Drinking Water Test Fees
- Obtaining The Necessary Sampling Units
- Drinking Water Contamination Health Risks
- Arsenic in Well Water
- EGLE Drinking Water Site
- Interpretation of Test Results for Partial Chemistry
- Interpretation of Test Results
- Map to Drinking Water Laboratory
- Safety Data Sheets (MSDS/SDS) Sample Preservatives
- Video: How to Fill Out Your Water Analysis Form
- Trip Blank FAQ

Instructions and Guidance Documents

- 1st and 5th Draw Lead Testing
- FSMA Guidance
- New Total Coliform / E. coli Bottles
- Surface Water Guidance

Forms

- Bottle Order Form
- FSMA Request Form - Full Reset
- FSMA Request Form - Partial Reset
- Request for Water Analysis Fillable Form - Full Reset
- Request for Water Analysis Form - Partial Reset
- Surface Water Form - Full Reset
- Surface Water Form - Partial Reset

PFAS Information

- Videos: How to Collect PFAS Samples and Fill Out Analysis Form
- PFAS Water Analysis Form Tutorial

Interpretation of Test Results

Any technical information found in these pages is primarily intended for environmental health and water supply professionals. Others should be aware of the value of consulting professionals for selection and interpretation of the types of testing which will best address individual concerns.

Laboratory testing of drinking water is done to investigate causes of problems with water quality or to assure that sample sources may be used safely for domestic, recreational, or other purposes. Legal standards for many possible drinking water contaminants have been established. These standards are referred to as "Maximum Contaminant Limits" and are regulated under the federal Safe Drinking Water Act for protection of public water supplies.

Many substances have not been sufficiently studied to set a legal standard. Laboratory tests are designed to detect as many substances in water as possible, including many unregulated compounds. Assistance in decision making related to unregulated substances may be provided by the laboratory, county sanitarians, or staff within the MDEQ Remediation Division, Laboratory Services Section.

In many cases, it is not possible to use only testing data to judge current, and especially future, protection of a water sample source from harmful contamination. Overall evaluation of water supply safety should be based on a combination of information including field observations, system construction and operation, local hydrology, historical land use, and "related" testing information.

Laboratory Report

The laboratory report provides both Testing Information and Regulatory Information. The first three columns are the testing information:

Analyte Name **Result** **Date tested**

Analyte name - name of the analyte/substance for which testing was performed.

The next 4 columns provide regulatory information:

RL (Reporting Limit) – This is the lowest concentration that would be reported by the laboratory. Substances not found or found at concentrations less than the RL are reported as Not Detected.

MCL/AL (Maximum Contaminant Level/Action Level) - The Maximum Contaminant Level is set by U.S. EPA and is the highest level which is acceptable under the Safe Drinking Water Act.

Method – The analytical method used.

CAS# - A unique identifier for the analyzed substance developed by Chemical Abstracts Service.

Commonly used references for interpreting testing information

U.S. EPA Website

KEEP THIS FORM TO HELP YOU INTERPRET YOUR RESULTS

DEPARTMENT OF ENVIRONMENTAL QUALITY
LABORATORY SERVICES SECTION

The Environmental Protection Agency requires testing of Nitrate (NO_3) and Nitrite (NO_2) in drinking water from public supplies be performed within 48 hours of taking the sample. If testing takes place after 48 hours, results will be evaluated for validity by the regulating agency. In order to meet this time constraint, please submit samples so they are received in the DEQ Laboratory between Monday and Thursday.

If you have questions about our schedule, testing, or any other water testing matter, please feel free to call us at (517) 335-8184 or the Environmental Assistance Center at 1-800-662-9278.

INTERPRETATION OF COMMON TESTS

General guidelines for interpreting results of the most common types of chemical testing are given below. Contact your local health department for a more detailed evaluation. Chemical testing results are reported in mg/L, which is equivalent to parts per million (ppm).

TEST	EXCELLENT	SATISFACTORY	MAY BE OBJECTIONABLE
Chloride	ND - 20	20 - 250	Over 250
Fluoride	1.0 - 1.2	0.7 - 2.0	Over 4.0
Hardness	25 - 100	100 - 250	Over 250
Iron	ND - 0.2	0.2 - 0.5	Over 0.5
Nitrate	ND	1 - 10	Over 10
Nitrite	ND	0 – 1.0	Over 1.0
Sodium	ND - 20	20 - 160	Over 160
Sulfate	ND - 50	50 - 250	Over 250