October 9, 2019

Ms. Jamie Dalbesio
Concord Education Center
9015 Broderick Boulevard
Inver Grove Heights, MN 55076

Re: **LEAD IN DRINKING WATER**
Concord Education Center
9015 Broderick Boulevard
Inver Grove Heights, MN

Dear Ms. Delbesio:

The Javelin Group, Inc. (Javelin) was authorized to conduct sampling and testing for lead in drinking water within the Concord Education Center located at 9015 Broderick Boulevard in the City of Inver Grove Heights, Minnesota. The water sampling was completed on September 25, 2019 by MDH Lead Risk Assessor, Nicolas Boldon.

SCOPE OF SERVICES

Javelin conducted lead in drinking water sampling in accordance with Minnesota Department of Health (MDH), Minnesota Pollution Control Agency (MPCA) and applicable federal regulations. The sampling and testing was comprised of the following components:

- Identification of all drinking water faucets within the building and the collection of "first draw" water samples from each faucet.
- Submittal of water samples to an accredited laboratory for laboratory analysis of lead by EPA Method 200.8.
- Preparation of a Lead in Drinking Water report to include sample analysis results, and sample locations.

LEAD IN DRINKING WATER SAMPLING

Drinking water from six faucets (6) within the building were sampled in accordance with the MDH Statute 121A.335 "Lead in School Drinking Water". Javelin collected water samples from faucets that were not used overnight to ensure the collection of "first draw" samples. The faucets were sampled beginning at the closest faucet to the water main entering the building to prevent flushing subsequent faucets. Water samples were collected directly into laboratory-supplied containers and transferred on ice in a cooler to Pace Analytical, an accredited Safe Drinking Water Program Laboratory.

Lead concentrations in drinking water collected from the faucets were all below 1 microgram per liter (µg/l). The results of the laboratory analyses are listed below in Table 1.

Table 1: Lead (Pb) In Water		
Sample Number	**Sample Location**	**Pb Results (µg/L)**
1	Life Skills Room Kitchen Tap	0.69
2	Kitchen Hand Sink	0.68
3	Kitchen Dish Sink	0.44
4	Hallway Drinking Fountain 1	0.10
5	Hallway Drinking Fountain 2	0.11
6	Nurse Tap	0.36

According to the Minnesota Department of Health Guidance Document *Reducing Lead in Drinking Water*, provided in Attachment B, the following options are recommended for each lead level. The lead concentrations detected in the water samples collected from the 6 drinking faucets are below 2 µg/L. MDH recommendations are that the tested faucets can be used as normal and the water should be tested for lead again in 5 years.

Table 2: MDH Recommended Lead Hazard Reduction Options	
Lead Level at The Tap	**Lead Hazard Reduction Options**
<2 µg/L	• Tap may be used as normal; • Record result and test again in 5 years; and • Make all test results and lead education materials accessible to the community, such as on a website, or annual report, and available upon request
2 µg/L – 20 µg/L	The tap may be used for cooking and drinking water while steps are taken to reduce overall exposure. A higher number of taps with elevated results increases the urgency to implement hazard reduction. Options include: • Retest the sample tap and attempt to more accurately determine the source of the lead; consider monitoring tap more frequently until the source of lead is found and removed; • Consider the feasibility of flushing or other steps to minimize lead exposure, including limiting softened water supplies to hot water taps only, taking into account other actions that the school may already have in place; • Make all test results and lead education materials accessible to the community, such as on a website, or annual report, and available upon request.

If you have any questions, please contact us at (952) 380-3668.

Nicolas R. Boldon

NICOLAS R. BOLDON
ENVIRONMENTAL SPECIALIST
MDH CERTIFIED LEAD RISK ASSESSOR (LR5511)

JOHN E. FINDLEY, M.S.
PRINCIPAL ENVIRONMENTAL PROFESSIONAL
MDH CERTIFIED LEAD RISK ASSESSOR: # LR527

Attachments

A – Laboratory Results
B – MDH Reducing Lead in Drinking Water Guidance Document

ATTACHMENT A

LABORATORY REPORT

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

October 03, 2019

Brady MacLean
The Javelin Group
10125 Crosstown Circle
Suite 107
Eden Prairie, MN 55344

RE: Project: Concord Education Center
Pace Project No.: 10492791

Dear Brady MacLean:

Enclosed are the analytical results for sample(s) received by the laboratory on September 25, 2019. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Timothy Sandager
timothy.sandager@pacelabs.com
(612)607-6456
Project Manager

Enclosures

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

CERTIFICATIONS

Project: Concord Education Center
Pace Project No.: 10492791

Minnesota Certification IDs

1700 Elm Street SE, Minneapolis, MN 55414-2485
A2LA Certification #: 2926.01
Alabama Certification #: 40770
Alaska Contaminated Sites Certification #: 17-009
Alaska DW Certification #: MN00064
Arizona Certification #: AZ0014
Arkansas DW Certification #: MN00064
Arkansas WW Certification #: 88-0680
California Certification #: 2929
CNMI Saipan Certification #: MP0003
Colorado Certification #: MN00064
Connecticut Certification #: PH-0256
EPA Region 8+Wyoming DW Certification #: via MN 027-053-137
Florida Certification #: E87605
Georgia Certification #: 959
Guam EPA Certification #: MN00064
Hawaii Certification #: MN00064
Idaho Certification #: MN00064
Illinois Certification #: 200011
Indiana Certification #: C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky DW Certification #: 90062
Kentucky WW Certification #: 90062
Louisiana DEQ Certification #: 03086
Louisiana DW Certification #: MN00064
Maine Certification #: MN00064
Maryland Certification #: 322
Massachusetts Certification #: M-MN064
Michigan Certification #: 9909
Minnesota Certification #: 027-053-137
Minnesota Dept of Ag Certifcation #: via MN 027-053-137
Minnesota Petrofund Certification #: 1240
Mississippi Certification #: MN00064
Missouri Certification #: 10100
Montana Certification #: CERT0092
Nebraska Certification #: NE-OS-18-06
Nevada Certification #: MN00064
New Hampshire Certification #: 2081
New Jersey Certification #: MN002
New York Certification #: 11647
North Carolina DW Certification #: 27700
North Carolina WW Certification #: 530
North Dakota Certification #: R-036
Ohio DW Certification #: 41244
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507
Oregon Primary Certification #: MN300001
Oregon Secondary Certification #: MN200001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification #: MN00064
South Carolina Certification #:74003001
Tennessee Certification #: TN02818
Texas Certification #: T104704192
Utah Certification #: MN00064
Vermont Certification #: VT-027053137
Virginia Certification #: 460163
Washington Certification #: C486
West Virginia DEP Certification #: 382
West Virginia DW Certification #: 9952 C
Wisconsin Certification #: 999407970
Wyoming UST Certification #: via A2LA 2926.01

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

SAMPLE SUMMARY

Project: Concord Education Center
Pace Project No.: 10492791

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10492791001	**1-Life Skills Kitchen Sink**	Water	09/25/19 07:00	09/25/19 08:12
10492791002	**2-Kitchen Sink Hand**	Water	09/25/19 07:03	09/25/19 08:12
10492791003	**2-Kitchen Sink Dish**	Water	09/25/19 07:03	09/25/19 08:12
10492791004	**4-Hallway Drinking Fountain 1**	Water	09/25/19 07:08	09/25/19 08:12
10492791005	**5-Hallway Drinking Fountain 2**	Water	09/25/19 07:11	09/25/19 08:12
10492791006	**6-Nurse Sink**	Water	09/25/19 07:13	09/25/19 08:12

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Minneapolis, MN 55414
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SAMPLE ANALYTE COUNT

Project: Concord Education Center
Pace Project No.: 10492791

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10492791001	**1-Life Skills Kitchen Sink**	EPA 200.8	BWB	1	PASI-M
10492791002	**2-Kitchen Sink Hand**	EPA 200.8	BWB	1	PASI-M
10492791003	**2-Kitchen Sink Dish**	EPA 200.8	BWB	1	PASI-M
10492791004	**4-Hallway Drinking Fountain 1**	EPA 200.8	BWB	1	PASI-M
10492791005	**5-Hallway Drinking Fountain 2**	EPA 200.8	BWB	1	PASI-M
10492791006	**6-Nurse Sink**	EPA 200.8	BWB	1	PASI-M

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ANALYTICAL RESULTS

Project: Concord Education Center
Pace Project No.: 10492791

Sample: 1-Life Skills Kitchen Sink **Lab ID: 10492791001** Collected: 09/25/19 07:00 Received: 09/25/19 08:12 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS, DW	Analytical Method: EPA 200.8							
Lead	**0.69**	ug/L	0.10	1		10/03/19 05:43	7439-92-1	

Sample: 2-Kitchen Sink Hand **Lab ID: 10492791002** Collected: 09/25/19 07:03 Received: 09/25/19 08:12 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS, DW	Analytical Method: EPA 200.8							
Lead	**0.68**	ug/L	0.10	1		10/03/19 05:54	7439-92-1	

Sample: 2-Kitchen Sink Dish **Lab ID: 10492791003** Collected: 09/25/19 07:03 Received: 09/25/19 08:12 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS, DW	Analytical Method: EPA 200.8							
Lead	**0.44**	ug/L	0.10	1		10/03/19 06:01	7439-92-1	

Sample: 4-Hallway Drinking Fountain 1 **Lab ID: 10492791004** Collected: 09/25/19 07:08 Received: 09/25/19 08:12 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS, DW	Analytical Method: EPA 200.8							
Lead	**0.13**	ug/L	0.10	1		10/03/19 06:05	7439-92-1	

Sample: 5-Hallway Drinking Fountain 2 **Lab ID: 10492791005** Collected: 09/25/19 07:11 Received: 09/25/19 08:12 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS, DW	Analytical Method: EPA 200.8							
Lead	**0.11**	ug/L	0.10	1		10/03/19 06:08	7439-92-1	

Sample: 6-Nurse Sink **Lab ID: 10492791006** Collected: 09/25/19 07:13 Received: 09/25/19 08:12 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS, DW	Analytical Method: EPA 200.8							
Lead	**0.36**	ug/L	0.10	1		10/03/19 06:12	7439-92-1	

Pace Analytical Services, LLC
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QUALITY CONTROL DATA

Project: Concord Education Center
Pace Project No.: 10492791

QC Batch: 635638 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: ICPMS Metals, Drinking Water
Associated Lab Samples: 10492791001, 10492791002, 10492791003, 10492791004, 10492791005, 10492791006

METHOD BLANK: 3425707 Matrix: Water
Associated Lab Samples: 10492791001, 10492791002, 10492791003, 10492791004, 10492791005, 10492791006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Lead	ug/L	ND	0.10	10/03/19 05:39	

LABORATORY CONTROL SAMPLE: 3425708

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Lead	ug/L	100	105	105	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3426770 3426771

Parameter	Units	10492791001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Lead	ug/L	0.69	100	100	106	107	105	106	70-130	1	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALIFIERS

Project: Concord Education Center
Pace Project No.: 10492791

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-M Pace Analytical Services - Minneapolis

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: Concord Education Center
Pace Project No.: 10492791

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10492791001	**1-Life Skills Kitchen Sink**	EPA 200.8	635638		
10492791002	**2-Kitchen Sink Hand**	EPA 200.8	635638		
10492791003	**2-Kitchen Sink Dish**	EPA 200.8	635638		
10492791004	**4-Hallway Drinking Fountain 1**	EPA 200.8	635638		
10492791005	**5-Hallway Drinking Fountain 2**	EPA 200.8	635638		
10492791006	**6-Nurse Sink**	EPA 200.8	635638		

Pace Analytical®
www.pacelabs.com

CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page: of .

2297029

Section A — Required Client Information:

Company:	The Javelin Group
Address:	10125 Crosstown Cir Ste. 107 Eden Prairie, MN
Email To:	bmaclean@thejavelingroup.com
Phone:	952-380-3668
Fax:	
Requested Due Date/TAT:	5-Day

Section B — Required Project Information:

Report To:	Brady Maclean
Copy To:	bmaclean@thejavelingroup.com
Purchase Order No.:	
Project Name:	Concord Education Center
Project Number:	

Section C — Invoice Information:

Attention:	
Company Name:	
Address:	
Pace Quote Reference:	
Pace Project Manager:	
Pace Profile #:	37559

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☐ OTHER ______

Site Location STATE: ______

Section D Required Client Information

Matrix Codes (MATRIX / CODE): Drinking Water DW, Water WT, Waste Water WW, Product P, Soil/Solid SL, Oil OL, Wipe WP, Air AR, Tissue TS, Other OT

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Requested Analysis Filtered (Y/N)

WO#: 10492791

10492791

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	Pb in Drinking water	Res	Pace Project No./ Lab I.D.
1	1 - Life Skills Kitchen Sink			9/25	700														X		001
2	2 - Kitchen Sink - Hand				703																002
3	3 - Kitchen Sink - Dish				703																003
4	4 - Hallway Drinking Fountain 1				708																004
5	5 - Hallway Drinking Fountain 2				711																005
6	6 - Nurse Sink				713																006
7																					
8																					
9																					
10																					
11																					
12																					

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
	Nicolas Bolder Javelin	9/25/19	810	[signature] Pace	9/25/19	8:12	19.3	N	N	Y

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER:

SIGNATURE of SAMPLER: DATE Signed (MM/DD/YY):

ORIGINAL

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

F-ALL-C-010-rev.00, 09Nov2017

Sample Condition Upon Receipt

Client Name: The Javelin Group

Project #: **WO#: 10492791**

PM: TJS Due Date: 10/02/19
CLIENT: JAVELIN

Courier: [ ] Fed Ex [ ] UPS [ ] USPS [x] Client [ ] Pace [ ] SpeeDee [ ] Commercial [ ] See Exceptions

Tracking Number:

Custody Seal on Cooler/Box Present? [ ] Yes [x] No **Seals Intact?** [ ] Yes [x] No **Biological Tissue Frozen?** [ ] Yes [ ] No [x] N/A

Packing Material: [x] Bubble Wrap [ ] Bubble Bags [ ] None [ ] Other: ______ **Temp Blank?** [x] Yes [ ] No

Thermometer: [ ] T1(0461) [ ] T2(1336) [ ] T3(0459) [ ] T4(0254) [x] T5(0489) **Type of Ice:** [ ] Wet [ ] Blue [x] None [ ] Dry [ ] Melted

Note: Each West Virginia Sample must have temp taken (no temp blanks)

Temp should be above freezing to 6°C **Cooler Temp Read w/temp blank:** 19.2 °C	**Average Corrected Temp (no temp blank only):** ____ °C [ ] See Exceptions [ ] 1 Container
Correction Factor: +0.1 **Cooler Temp Corrected w/temp blank:** 19.3 °C	

USDA Regulated Soil: ([x] N/A, water sample/Other: ______) **Date/Initials of Person Examining Contents:** RVC 9.25.19

Did samples originate in a quarantine zone within the United States: AL, AR, CA, FL, GA, ID, LA. MS, NC, NM, NY, OK, OR, SC, TN, TX or VA (check maps)? [ ] Yes [ ] No

Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)? [ ] Yes [ ] No

If Yes to either question, fill out a Regulated Soil Checklist (F-MN-Q-338) and include with SCUR/COC paperwork.

				COMMENTS:
Chain of Custody Present and Filled Out?	[x] Yes	[ ] No		1.
Chain of Custody Relinquished?	[x] Yes	[ ] No		2.
Sampler Name and/or Signature on COC?	[ ] Yes	[ ] No	[x] N/A	3.
Samples Arrived within Hold Time?	[x] Yes	[ ] No		4.
Short Hold Time Analysis (<72 hr)?	[ ] Yes	[x] No		5. [ ] Fecal Coliform [ ] HPC [ ] Total Coliform/E coli [ ] BOD/cBOD [ ] Hex Chrome [ ] Turbidity [ ] Nitrate [ ] Nitrite [ ] Orthophos [ ] Other ______
Rush Turn Around Time Requested?	[x] Yes	[ ] No		6.
Sufficient Volume?	[x] Yes	[ ] No		7.
Correct Containers Used?	[x] Yes	[ ] No		8.
-Pace Containers Used?	[x] Yes	[ ] No		
Containers Intact?	[x] Yes	[ ] No		9.
Field Filtered Volume Received for Dissolved Tests?	[ ] Yes	[ ] No	[x] N/A	10. Is sediment visible in the dissolved container? [ ] Yes [ ] No
Is sufficient information available to reconcile the samples to the COC? Matrix: [x] Water [ ] Soil [ ] Oil [ ] Other ______	[x] Yes	[ ] No		11. **If no, write ID/ Date/Time on Container Below:** **See Exception** [ ]
All containers needing acid/base preservation have been checked?	[ ] Yes	[ ] No	[x] N/A	12. Sample #
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, <2pH, NaOH >9 Sulfide, NaOH>12 Cyanide)	[ ] Yes	[ ] No	[x] N/A	[ ] NaOH [ ] HNO_3 [ ] H_2SO_4 [ ] Zinc Acetate
Exceptions: VOA, Coliform, TOC/DOC Oil and Grease, DRO/8015 (water) and Dioxin/PFAS	[ ] Yes	[ ] No	[x] N/A	Positive for Res. Chlorine? [ ] Yes [ ] No **pH Paper Lot#** **See Exception** [ ]
				Res. Chlorine / 0-6 Roll / 0-6 Strip / 0-14 Strip
Headspace in VOA Vials (greater than 6mm)?	[ ] Yes	[ ] No	[x] N/A	13. **See Exception** [ ]
Trip Blank Present?	[ ] Yes	[ ] No	[x] N/A	14.
Trip Blank Custody Seals Present?	[ ] Yes	[ ] No	[x] N/A	Pace Trip Blank Lot # (if purchased): ______

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** [ ] Yes [ ] No

Person Contacted: ______ Date/Time: ______

Comments/Resolution: ______

Project Manager Review: Tim Sandager **Date:** 09/25/19

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers).

Labeled by: SJ (2)

During sample triage, this form is to be placed in each cooler that arrives above 6.0 degrees Celsius

SCUR Exceptions: **Workorder #:**

Out of Temp Sample IDs	Container Type	# of Containers

PM Notified? ☐Yes ☐No

If yes, indicate who was contacted/date/time.
If no, indicate reason why.

Multiple Cooler Project? ☐Yes ☐No
If you answered yes, fill out information to the left.

No Temp Blank		
Read Temp	Corrected Temp	Average Temp

Tracking Number/Temperature	

Other Issues		
Issue Type:	Container Type	# of Containers
Sample ID		

pH Adjustment Log for Preserved Samples

Sample ID	Type of Preserv.	pH Upon Receipt	Date Adjusted	Time Adjusted	Amount Added (mL)	Lot # Added	pH After	In Compliance after addition?	Initials
001 - 006	HNO_3	7b	9/25/19	1100	2	1118110	2	☒Yes ☐No	SJ
								☐Yes ☐No	
								☐Yes ☐No	
								☐Yes ☐No	

ATTACHMENT B

MDH REDUCING LEAD IN DRINKING WATER GUIDANCE DOCUMENT

Reducing Lead in Drinking Water

A TECHNICAL GUIDANCE AND MODEL PLAN FOR

MINNESOTA'S PUBLIC SCHOOLS

MINNESOTA

DEPARTMENT OF EDUCATION

DEPARTMENT OF HEALTH

April 2018

Minnesota Department of Education
Division of School Finance – Long-Term Facilities Maintenance
1500 Highway 36 West
Roseville, Minnesota 55113
651-582-8779
mde.funding@state.mn.us
Minnesota Department of Education (http://www.education.state.mn.us)

Minnesota Department of Health
Environmental Health Division – Drinking Water Protection
PO Box 64975
St. Paul, MN 55164-0975
651-201-4700
health.drinkingwater@state.mn.us
www.health.state.mn.us

Foreword

Reducing potential lead risks in school drinking water

We are pleased to present this guidance and model plan, *Reducing Lead in Drinking Water: A Technical Guidance and Model Plan for Minnesota's Public Schools*. This plan reflects the commitment of public health, education, and legislative leaders, as well as those directly responsible for operating school drinking water systems, to reduce the chance that children are exposed to the health hazards of lead through school drinking water. It provides information on both required steps (testing, reporting) and flexible guidance that schools can consider to meet their individual needs. Reducing lead exposure is a high priority for all of us.

When children take in even small amounts of lead, there can be detrimental health effects. The longer children are exposed to lead, or the higher the dose, the greater the impact. While current science has not found a safe level of lead exposure, lead is still present in many areas of our environment, making it very difficult and costly to reach a point of zero exposure. That is why it is so important for those of us who are concerned for the health and safety of our children to do what we can to reduce lead exposures for children.

While the greatest risks, by far, for children to be exposed to lead are typically in their own homes from a source such as lead paint, under certain conditions children can be exposed to lead through school drinking water. This manual builds on existing guidance that schools have used since 1989. It is designed to help schools develop and implement plans to test for lead in drinking water and communicate results to parents and the public – fulfilling the requirements of a new state law passed in 2017. Further, the manual describes steps schools may take to reduce lead in drinking water.

We recognize the challenges school managers will face in executing lead testing, communicating results, and taking action to reduce lead in drinking water. Many schools have already taken steps to reduce lead in drinking water and we are learning from their experience. If all schools take appropriate actions and continue to follow best practices, potential exposures across the State can be greatly limited and children protected from the life-long negative impacts of lead exposure. Staff in both of our agencies are available to provide assistance to help school staff to address these challenges.

We look forward to working with all schools in Minnesota to create a more lead-free future for our children.

Brenda Casselius
Commissioner of Education

Jan Malcolm
Commissioner of Health

Contents

Introduction

Purpose of this Technical Guidance and Model Plan

This technical guidance is designed to assist Minnesota's school districts and charter schools in minimizing the exposure of students and staff to lead in drinking water. It also contains the model plan for lead testing of school drinking water as required under Minnesota Statutes, section 121A.335. The specific text of the statute can be found at:

- Lead in School Drinking Water (https://revisor.mn.gov/statutes/?id=121A.335)

Minnesota Statutes, section 121A.335 requires schools to either adopt the model plan outlined in this document or develop and adopt an alternative plan that accurately and efficiently tests for the presence of lead in water in public school buildings serving students. The statute further directs that this technical guidance be based on "standards established by the United States Environmental Protection Agency (EPA)" and current Minnesota Department of Health (MDH) guidance. In addition to describing required aspects (planning, testing, reporting), the manual also presents flexible guidance that schools can consider to meet their individual needs most efficiently.

The Minnesota Department of Education (MDE) and MDH intend that school administrators consult this technical guidance and model plan when testing for lead in their drinking water and implement activities as needed to reduce exposure to lead. The school district is responsible for adopting and retaining the model plan/alternative plan and test results records, as well as making those results available to parents and the public.

Who is Required to Use this Technical Guidance and Model Plan?

This technical guidance and model plan are intended for use by all school districts and charter schools subject to requirements of Minnesota Statutes, section 121A.335.

School administrators, school boards and others in positions of governance should review this guidance. Beyond the model plan for lead testing, this technical guidance includes recommendations to reduce lead levels at taps used for drinking water and food preparation. The instructions for testing and suggested lead hazard reduction options are designed for school health, safety, and maintenance personnel, as well as consultants working with educational agencies.

If your school is served by a Community Public Water System (CPWS), i.e. municipality, you should contact your CPWS to learn more about lead in your water supply before testing your facility. It's important to develop a working relationship with your CPWS, including having a coordinated communications plan.

While this technical guidance and model plan pertains specifically to school districts and charter schools subject to Minnesota Statutes, 121A.335, other facilities serving infants, preschoolers, and children are encouraged to use this technical guidance and model plan to identify and reduce lead in drinking water.

Health Information

Why Worry About Lead in Schools?

Lead is a toxic material known to be harmful to human health if ingested or inhaled. Recent research has shown that exposure to lead is associated with adverse mental, physical, and behavioral effects on children. The current scientific consensus is that there is no safe level of lead exposure. For more background see:

- Centers for Disease Control and Prevention (https://www.cdc.gov/nceh/lead/).

Therefore, any measureable blood lead level can have negative health effects. While water is just one potential source of exposure to lead in the environment, reducing lead in school drinking water can decrease an individual's overall exposure to lead.

Health Risks of Lead

While we have known that lead is toxic for many centuries, there has historically been a level of exposure presumed to be "safe." Over the years, the safe level has been reduced based on new research, but it was always there. However, in 2012, the Centers for Disease Control and Prevention dramatically changed the way lead toxicity is assessed. Instead of setting a safe level, the new approach acknowledges the fact that there is no currently known safe level of lead exposure and recommends a primary prevention approach (i.e., preventing a problem before it occurs) to reducing risk. This concept of "no safe level" is similar to the way we assess risks from carcinogens.

Health risks from carcinogens are managed by setting an acceptable risk probability (not zero) that balances the need to reduce exposure with the practicality of avoiding chemicals that are widely distributed in our environment. The new approach for lead hazard reduction is similar in that it balances the need to reduce exposure (i.e., primary prevention) while recognizing that lead is still present in many areas of our environment.

Children

Children are more susceptible to lead exposure because their bodies absorb metals at higher rates than the average adult. Children younger than six years old are most at risk due to their rapid rate of growth and ongoing brain development. Exposure to lead can cause damage to the brain, nervous system, red blood cells, and kidneys. Lead also has the potential to cause lower IQs, hearing impairments, reduced attention span, hyperactivity, developmental delays, and poor classroom performance.

The damage from lead exposure in children is permanent. Fortunately, the impacts of lead exposure can be minimized with good nutrition, a stimulating education, and a supportive environment.

Adults

High blood lead levels in adults have been linked to increased blood pressure, poor muscle coordination, nerve damage, decreased fertility, and hearing and vision impairment. Pregnant women and their fetuses are especially vulnerable to lead exposure since lead can significantly harm the fetus, causing lower birth weight and slowing normal mental and physical developments. For more information on the health impacts of lead on children and adults, please see the Minnesota Department of Health lead page:

- Lead (http://www.health.state.mn.us/topics/lead/index.html)

Common Sources of Lead

There are a number of pathways of exposure to lead in the environment. While this guidance focuses on lead in drinking water at schools, it is important to reduce exposure from all potential sources of lead. These include:

- Lead-based paint in older homes (i.e., built before 1978). This is the most common source for childhood lead poisoning;
- Lead-contaminated dust and soil;
- Imported spices, cosmetics, and medications contaminated with lead;
- Pottery or ceramics with lead glazes;
- Exposure through lead dust from a household member who has a job or hobby that involves lead, such as construction or shooting firearms;
- Swallowing items that contain lead, such as fishing sinkers; and
- Corrosion of plumbing materials including brass, solder and pipes.

Therefore, while water is not typically the most prominent source of lead exposure for an individual, reducing lead in drinking water can help in lowering an individual's overall exposure.

How Does Lead Get Into Drinking Water?

Lead found in drinking water comes primarily from materials and components associated with the water distribution system and plumbing. While public water distribution systems may have lead components, the highest concentrations of lead are typically found nearest to the tap. Lead may be present in various materials in a building's plumbing system such as lead solder, brass fixtures, valves, and lead pipes. Corrosion of these materials allows lead to dissolve into the water passing through the plumbing system. The amount of corrosion depends on the type of plumbing materials, water quality characteristics, electrical currents, and how water is used. The longer water remains in contact with lead materials, the greater the chance lead can get into the water.

Why is Lead a Special Concern for Schools?

Children are more vulnerable to lead

Children typically have higher intake rates for environmental materials (such as soil, dust, food, water, air, paint) than adults. They are more likely to play in the dirt and put their hands and other objects in their mouths. Children tend to absorb a higher fraction of ingested lead than adults, which can slow the normal physical and mental development of their growing bodies. In addition, the physical and behavioral health effects from lead exposure can impact student success and school function. While the most vulnerable age for lead exposure is for children less than six years old, the brains of school-age children are still developing and can be significantly impacted by lead exposure.

Plumbing materials and water use patterns at schools

Lead levels in the water within the plumbing system of schools can vary greatly from tap to tap. Plumbing materials and usage patterns influence the amount of lead in drinking water due to the variety of materials in the system (e.g., lead or copper pipes, lead solder, and brass fixtures). The amount of time the water is in contact with various materials in the plumbing system may have a significant effect on the concentrations found as well. The "on-again, off-again" water use patterns of most schools can contribute to elevated lead levels in drinking water. Water that remains stagnant in plumbing overnight, over a weekend, or during a vacation has longer contact with plumbing materials and therefore may contain higher levels of lead.

What Can Be Done to Reduce Lead Levels in Drinking Water?

This section is relevant to any tap used for drinking water or food preparation. These are best practices in reducing lead concentrations and can be used at home, school, or at work.

When evaluating the best approach for protecting against lead exposure in schools, it is important to balance a number of factors:

- Current research has not identified a safe level of exposure to lead;
- Lead is still present in many areas of the environment, making it very difficult to eliminate all exposure;
- The risks of developing irreparable damage from lead in water increase with higher concentrations of lead and longer exposure times;
- School buildings across the state are very different, being old/new, big/small, busy/limited, targeted/multi-purpose, which impacts the likelihood of lead exposure; and
- Local school districts have the best understanding of their buildings and how they are used; they can work with parents, students, teachers, and administrators to come up with the best approach for their specific situation.

An effective response to lead in water must consider all of the factors listed above. Both MDE and MDH are readily available for technical assistance and consultation, but the local school district is in the best position to understand and implement an effective strategy for their specific situation.

Use only cold water for drinking and food preparation

Use only cold water for drinking, preparing food, and making baby formula. Hot water releases more lead from pipes than cold water. The water may be warmed before use in formula.

Let it run before use

Running water at a tap, prior to using it for drinking or food preparation, will typically help reduce lead levels in the water. This works by removing the water that has been in the longest contact with the plumbing materials, thus removing the water with the highest concentration of lead. Let the water run for 30-60 seconds before using it for drinking or cooking if the water has not been turned on in over six hours. The only way to know if lead has been reduced after letting it run is to check with a test.

Other routine maintenance

Like any appliance, water systems require routine maintenance to function properly. Steps to help reduce the presence of lead in your water include:

- Clean faucet aerators on a quarterly basis - more often if debris buildup is observed - as lead-containing materials may accumulate in aerator screens;
- Use only certified lead free materials when performing plumbing work.
    - Lead Free Certification Marks (http://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P100GRDZ.txt) ; and
- Follow the manufacturer's recommendations for water softener settings to ensure an appropriate level of hardness. The hardness of the incoming water may have to be determined by asking your water supplier or having a sample analyzed.

Test the water for lead

The only way to determine how much lead may be present in drinking water is to have the water tested. Each tap or fixture providing water for drinking or food preparation should be tested at least every five years. Some form of lead hazard reduction should implemented for taps where lead is found. Detailed instructions on testing water for lead and recommended lead hazard reduction options can be found later in this document.

Regulations and Guidance

Due to lead's health effects and the special circumstances that make lead a concern in schools, a number of legal requirements and guidance materials exist that are applicable to reducing lead in school drinking water.

Table 1 displays the rules, regulations and guidance applicable to schools. They represent a range of laws, rules (enforceable) and guidance (not enforceable) developed over the past 30 years. Much has been learned over that time regarding lead health impacts, requiring an ongoing evolution in the way we address lead hazards. Each rule, regulation or guidance is explained in detail in the sections following the table.

Table 1: Regulations and Guidance Governing Lead in Schools Drinking Water

Type	State Statutory Requirement	Federal Laws and Rules			State Guidance	Federal Guidance (EPA)
Name	Minnesota Statute 121A.335	Lead and Copper Rule (SDWA)	Lead Contamination Control Act	Reduction of Lead in Drinking Water Act (SDWA)	Reducing Lead in Drinking Water	3Ts (Training, Testing and Telling)
Effective Date	2018	1991/2007	1988	2014	1989/2014	1994/2006
Applicability	All public and charter schools in Minnesota	Directly applies to schools served by their own water source (e.g., well) and serving 25 or more people	All schools	All schools	All schools	All schools

Minnesota State Statute 121A.335

The document you are reading was developed in response to Minnesota State Statute 121A.335. It requires public and charter schools to have a plan for efficiently and accurately testing for lead in drinking water using the model plan developed by MDE and MDH or by adopting an alternative plan. The law applies in addition to any other current testing requirements. The full Statute is found at:

- Lead in School Drinking Water (https://revisor.mn.gov/statutes/?id=121A.335)

Under the statute, **by July 1, 2018 school districts must:**

- Adopt the model plan from this document or develop and adopt an alternative plan to accurately and efficiently test for lead in school buildings serving students from prekindergarten to grade 12;

- Create a schedule for testing that includes all school district buildings and charter schools serving students where there is a source of water that may be consumed by students (used in cooking or directly by drinking). Each tap must be tested at least once every five years. Testing must have begun by July 1, 2018 and complete testing of all buildings serving students must be done within five years; and
- Make the results of testing available to the public to review and notify the parents and guardians of the availability of the information.

The Safe Drinking Water Act, Lead and Copper Rule

The Lead and Copper Rule (LCR) of the federal Safe Drinking Water Act (SDWA) was first passed in 1991, was updated in 2007, and applies to the public water system (PWS) supplying drinking water to a school building. Compliance with the LCR is based on the 90^{th} percentile concentration value from samples collected at different points in the PWS. Compliance is a statistical calculation used to determine when a PWS must explore options to reduce lead in the water in the whole system. The LCR does not apply to individual taps.

Testing under the LCR is conducted based on a tier system, with the highest priority being individual residences. Therefore, a school served by a community water supply will not be tested under the LCR. However, if a school has a private well and has 25 or more staff and students, they are classified as a PWS and must test for lead under the LCR. More information on the LCR is at:

- Lead and Copper Rule (http://water.epa.gov/lawsregs/rulesregs/sdwa/lcr/index.cfm)

The Lead Contamination Control Act

The Lead Contamination and Control Act (LCCA) - Public Law 100-572 was passed in 1988 and applies to all schools. The intent of the LCCA is to identify and reduce lead in drinking water at schools and relies on voluntary compliance by individual schools and school districts. In particular, it focuses on certain models of water coolers in existence at the time of the law's enactment, while also addressing lead risk reduction generally. Although compliance with the LCCA is voluntary, schools are encouraged to review its recommendations and consider implementation where appropriate.

More information on the LCCA is at:

- Lead in Drinking Water in Schools Historical Documents (https://www.epa.gov/dwreginfo/lead-drinking-water-schools-historical-documents)

The Safe Drinking Water Act, Reduction of Lead in Drinking Water Act

The Reduction of Lead in Drinking Water Act (Public Law 111-380 amending Section 1417 of the Safe Drinking Water Act) became effective in January 2014. This law applies to all schools. The most common source of lead in drinking water is the corrosion of pipes and plumbing fixtures. In an effort to reduce this contamination source, the EPA amended the SDWA to mandate that all pipes, solders, fittings, and fixtures be "lead free." The Act revised the definition of lead free to lower the allowable amount of lead to a weighted average of 0.25% percent of the wetted surfaces of plumbing products and established a statutory method for calculating lead content; it retains a 0.20% lead limit for solder and flux. The law also created exemptions from the lead free requirements for plumbing products used exclusively for non-potable services as well as for other specified products. All plumbing fittings and fixtures must meet the NSF/ANSI Standard 61, Annex G.

More information on identifying lead free certification marks is at:

- EPA How to Identify Lead-Free Certification Marks for Drinking Water System and Plumbing Materials (http://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P100GRDZ.txt)

MDH Guidance

In 1989, MDH developed its first guidance document addressing lead in school drinking water based on the information in the 1988 EPA Lead Contamination Control Act. The latest revision in 2014 was based on new information in the 2014 EPA Reduction of Lead in Drinking Water Act. The 2014 version is superseded by this 2018 guidance.

3Ts (Training, Testing and Telling)

In 1994 the EPA developed the Lead in Drinking Water in Schools and Nonresidential Buildings guidance to assist schools in reducing the lead concentrations in their drinking water. In 2005, it was updated to become technical guidance titled "3Ts for Reducing Lead in Drinking Water in Schools and Child Care Facilities." The 3Ts were designed to aid schools with the following:

- Establishing partnerships;
- Determining current water quality;
- Identifying potential problem areas;
- Developing a monitoring plan;
- Collecting and submitting water samples;
- Implementing corrective actions if lead is detected in any sample result; and
- Communicating and conducting public outreach.

The 3Ts guidance may be found at:

- 3Ts for Reducing Lead in Drinking Water in Schools and Child Care Facilities (https://www.epa.gov/dwreginfo/3ts-reducing-lead-drinking-water-schools-and-child-care-facilities)

Guidance Values of Lead

Lead is still present in many areas of our environment, including materials that were commonly used in plumbing systems. To help in understanding the risks posed by environmental lead, a variety of guidance values have been developed at different times by different organizations. Some of the values are relatively recent, others much older; some are health based, while others are for statistical assessment of a water system. Table 2 summarizes guidance values frequently identified with public health protection.

Table 2: Lead in Drinking Water: by the Numbers

Guidance Value: ppb (parts per billion)	Description
0 ppb	EPA has set a maximum contaminate level goal (MCLG) of zero for lead in water. *Note: analytical tests can only measure down to their detection limits; it is not possible to actually measure down to 0 ppb.*
1 ppb	The American Academy of Pediatrics recommends this level be used as a standard for school drinking water taps. *Note: The minimum repeatable detection limits achieved by laboratories today are typically between 0.5 and 2.0 ppb.*
5 ppb	Illinois, Michigan and Washington DC use this value as a trigger for schools to implement lead hazard reduction or provide notification. Health Canada has proposed this value as their new Maximum Allowable Concentration. See Health Canada (https://www.canada.ca/en/health-canada/programs/consultation-lead-drinking-water/document.html#a1) Is the International Bottled Water Association (IBWA) Bottled Water Code of Practice finished water quality product standard.
15 ppb	Public water systems sample for lead following the EPA Lead and Copper Rule. No more than 10 percent of a water system's samples are allowed to be above this level. However, this is not a health-based value. It is applied as a statistical calculation to determine when a public water system must explore corrosion control treatment options to reduce lead in the water based on the laboratory detection limit available at the time of the rule making. This action level has not been updated since 1991. Several states have adopted this value in their school guidance in order to match the Lead and Copper Rule value.
20 ppb	This is the trigger value used in EPA's Lead in Drinking Water in Schools and Nonresidential Buildings (1994), now the 3Ts (2005). This value has not been updated since the publication of these documents and is not a health-based value.

Model Plan for Lead Testing

This section presents the model plan as required by Minnesota Statute 121A.335. If schools adopt the model plan, all steps should be implemented. If there are questions regarding the model plan, contact MDE at 651-582-8779 or MDH at 651-201-4700 for further information.

Required Components of a Model Plan

The model plan includes three required steps:

Step 1. Sampling Program Development
Step 2. Conduct First Draw Tap Monitoring
Step 3. Communicate Results

All schools must complete these steps or formulate a plan that addresses the core concepts of a sampling plan, testing, and communicating results. An alternative plan must accurately and efficiently test for the presence of lead in water in school buildings serving pre-kindergarten students and students in kindergarten through grade 12.

Recommendations for interpreting results and possible hazard reduction steps, which must be tailored to meet specific local needs and conditions, are presented later in this document. The recommendations are presented as guidance and are not a required part of Minnesota Statute 121A.335

MDE Support for Lead Reduction Activities

MDE administers the Long-Term Facilities Maintenance Revenue program under Minnesota Statutes, section 123B.595. This program may be utilized to reimburse costs associated with lead testing and remediation. Funding does not cover staff time used to perform daily flushing or water use utility cost associated with flushing procedures. Memorandums from MDE, program guidance documents, spreadsheets and forms used to obtain approval to receive revenue are available at this link:

- Long-Term Facilities Maintenance (http://education.state.mn.us/MDE/dse/schfin/fac/ltfm/)

Step 1- Sampling Program Development:

A program to assess and sample for lead in drinking water must incorporate, at a minimum, the following actions:

- **Inventory drinking water taps used for consumption (i.e., drinking water and food preparation):**
    - A drinking water faucet or tap is the point of access for people to obtain water for drinking or food preparation. A faucet/tap can be a fixture, faucet, drinking fountain or water cooler. Drinking water taps typically do not include bathroom taps, hose bibbs, laboratory faucets/sinks or custodial closet sinks; these should be clearly marked not for drinking.

  - Taps used for human consumption should only be cold water taps.
  - Hot water taps should never be used to obtain water for drinking water or food preparation.
- **Check all drinking fountains to ensure EPA has not identified them as having a lead lined tank under the LCCA.** This list can be found at: Lead in Drinking Water Coolers (http://tinyurl.com/kr8kppf) ;
  - If a drinking fountain within the school is found on this list, it should be removed from use immediately.
- **Determine a schedule for sampling:**
  - All taps used for drinking water or food preparation must be tested at a minimum of once every five years.
  - If budget or resources do not allow all taps to be tested in the first year, it is suggested that taps be prioritized, with all high priority taps tested the first year, medium priority the second, and low priority the third. The fourth year should be used as a "make up" year, if needed.
  - Recommended priority levels are:
    - High priority: taps used by children under the age of six years of age or pregnant women (e.g., drinking fountains, nurse's office sinks, classrooms used for early childhood education and kitchen sinks);
    - Medium priority: other taps regularly used to obtain water for drinking or cooking (e.g., Family and Consumer Science sinks, classroom sinks, and teacher's lounges); and
    - Low priority: other taps that could reasonably be used to obtain water for drinking but are not typically used for that purpose
- **Determine logistics for sampling:**
  - Water testing should be done consistent with the established schedule. Prior to testing it must be determined if school staff or a contractor will conduct the testing.
  - If the school will be doing the testing itself, it will need to contact a laboratory or purchase field testing equipment.
  - Schools will also need to decide if they will use field analyzers or laboratories to analyze results. Either method is acceptable with appropriate quality control and experience.
- **Analysis by an Accredited Laboratory:**
  - Laboratory analysis typically involves a school district or consultant contracting with an accredited lab to obtain sample bottles. The laboratory will send instructions for sampling, sample bottles, and a chain-of-custody form to document time and date collected, collector name, and sample location.
  - Limitations:
    - Analytical costs. These vary from lab to lab. Currently, typical per sample costs for lead and copper analysis may range from $20 - $50, depending on a variety of factors;
    - May take longer to get results than using a field analyzer; and
    - Typically requires shipping.

- Benefits
  - District and/or consultant will not need to maintain instrument calibration records;
  - Uses a Chain-of-Custody to ensure integrity of sample analysis process;
  - Analysis done by third-party may provide more independent review/transparency;
  - Accredited labs use EPA approved methods and have met industry standards for analysis; and
  - Analysts are certified and trained.

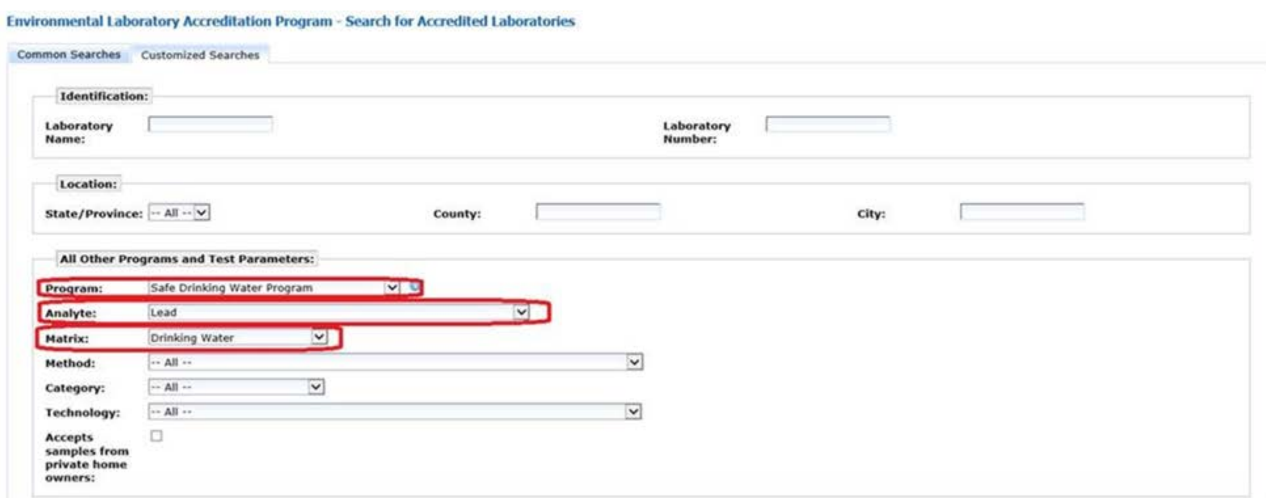
A listing of accredited laboratories may be found at:

- [Accredited Laboratories (http://www.health.state.mn.us/labsearch)](http://www.health.state.mn.us/labsearch)

Figure 1 presents a screen shot from the MDH website on search terms for finding an accredited lab using a customized search.

Program = Safe Drinking Water Program
Analyte = Lead
Matrix = Drinking Water

Figure 1: Screenshot of Customized Searches from MDH website



- **Analysis Using Field Analyzers:**
  A Field Analyzer can be a great tool for quickly and efficiently testing for lead in drinking water. If you or your consultant uses a field analyzer, it is important that you understand its limitations and proper use.
  - Limitations:
    - Some analyzers may not measure all forms of lead in drinking water. It is important that the instrument you use measures *total* lead (particulate and dissolved). If the instrument does not measure all types of lead in drinking water, your result could be biased low;

    - Staff using an instrument need to ensure that the instrument is properly calibrated and maintained according to manufacturer's specifications, and that records of calibration and maintenance are kept;
    - Instruments may require chemicals which will need to be stored and that can expire;
    - Field instruments may not have limits of detection that are as low as an accredited laboratory. Be sure that the method you use can identify concentrations as low as 1 ppb; and
    - Some instruments may have interferences with other contaminants and, therefore, under or overestimate the lead level. This may require that additional tests for iron, manganese, hardness, alkalinity or other contaminants be done prior to use to ensure that the instrument will be operated as designed.
  - Benefits:
    - Get results faster;
    - Useful when doing large numbers of samples or investigative sampling where many samples might be taken from one tap;
    - Can be done on-site (no shipping needed); and
    - Can be more cost efficient depending on frequency of use.

Step 2- Conduct First Draw Tap Monitoring:

Once the plan from Step 1 is set, water sampling must be conducted according to the established schedule and priority. Water from taps used for drinking or food preparation must be tested for lead using "first draw" samples. First draw means that the samples are collected before the fixture is used or flushed during the day. Use only cold water for collecting lead samples. It is necessary to consider the order in which tap samples are collected to avoid the potential of accidentally flushing a tap. Always start at taps closest to where the water enters the building.

Sample site preparation and sample collection must be performed consistent with the following conditions:

- Note that it may be necessary to collect samples over a number of days to ensure only first draw samples were collected;
- The day before sampling - normal usage of the sampling tap should occur;
- The night before sampling - secure the fixture from being used (e.g., hang a "Do Not Use" sign);
- Do not use sampling taps for a minimum of six hours. MDH recommends not exceeding 18 hours;
- Do not remove aerators or attachments;
- Collect the first draw sample using a 250 mL bottle. Be sure to start sampling at taps closest to where the water enters the building so that no accidental flushing occurs;
- Complete all scheduled sampling for that sampling period; and
- Have samples analyzed by sending to a laboratory or conduct analysis using field analyzers. Be sure to follow all instructions from the lab or field analyzer manufacturer.

Schools with active flushing programs or considering a flushing program may also want to collect a flushed sample in order to verify flushing effectiveness.

Step 3- Communicate Results:

Minnesota Statutes section 121A.335, subdivision 5 creates a reporting requirement for schools as follows - "A school district that has tested its buildings for the presence of lead shall make the results of the testing available to the public for review and must notify parents of the availability of the information."

In addition to testing for lead and meeting the reporting requirements, a lead hazard reduction program should include a comprehensive communication plan. The purpose of a communication plan is to provide a process for school employees, students and parents to address questions, report results and provide ongoing, up-to-date information regarding sampling efforts.

School management should:

- Assign a designated person to be the contact;
- Notify affected individuals about the availability of the testing and results within a reasonable time. School employees, students, and parents should be informed and involved in the communication process. Results of initial and any follow-up testing should be easily accessible along with documentation of lead hazard reduction options. Posting the information on a website is preferred, but the information should also be available to those without easily accessible internet access. Examples of other information venues are: meetings, open houses, and public notices; and
- Identify and share specific activities pursued to correct any lead problems. Local health officials can assist in understanding potential health risks, technical assistance and communication strategies.

MDE and MDH have developed an Education and Communication Toolkit to aid schools in implementing this Model Plan.

The three steps presented above constitute the required portions of the Model Plan. Guidance provided in the remaining sections of this manual, which are highly recommended but not statutorily required, can be used by schools to help ensure that results from required sampling are appropriately reviewed, interpreted, and communicated. Information is also presented to help school districts assess and implement effective and reasonable lead hazard control measures.

Lead Hazard Reduction Options

Information gathered as part of the required three steps of the model plan can be used to formulate actions to address and mitigate lead exposure. The options presented here are not a required part of Minnesota Statutes, section 121A.335. Recommended lead hazard reduction options include:

Step 4. Interpret Sample Results
Step 5. Take Corrective Actions
Step 6. Reassess

Because individual school buildings vary tremendously across the state, it is imperative that final decisions on hazard reduction options are driven by local conditions and considerations. Actions that may be ideal in one district may not be appropriate for another district.

The recommendations in this section were compiled by MDE and MDH to assist school districts in choosing the best lead hazard reduction option to reduce exposure to lead in their schools. They should not be taken to be requirements, but may be implemented individually, in combination, or not at all, depending on the specific situation at an individual school. Because no two districts or buildings are exactly alike, best management practices will likely vary across the state.

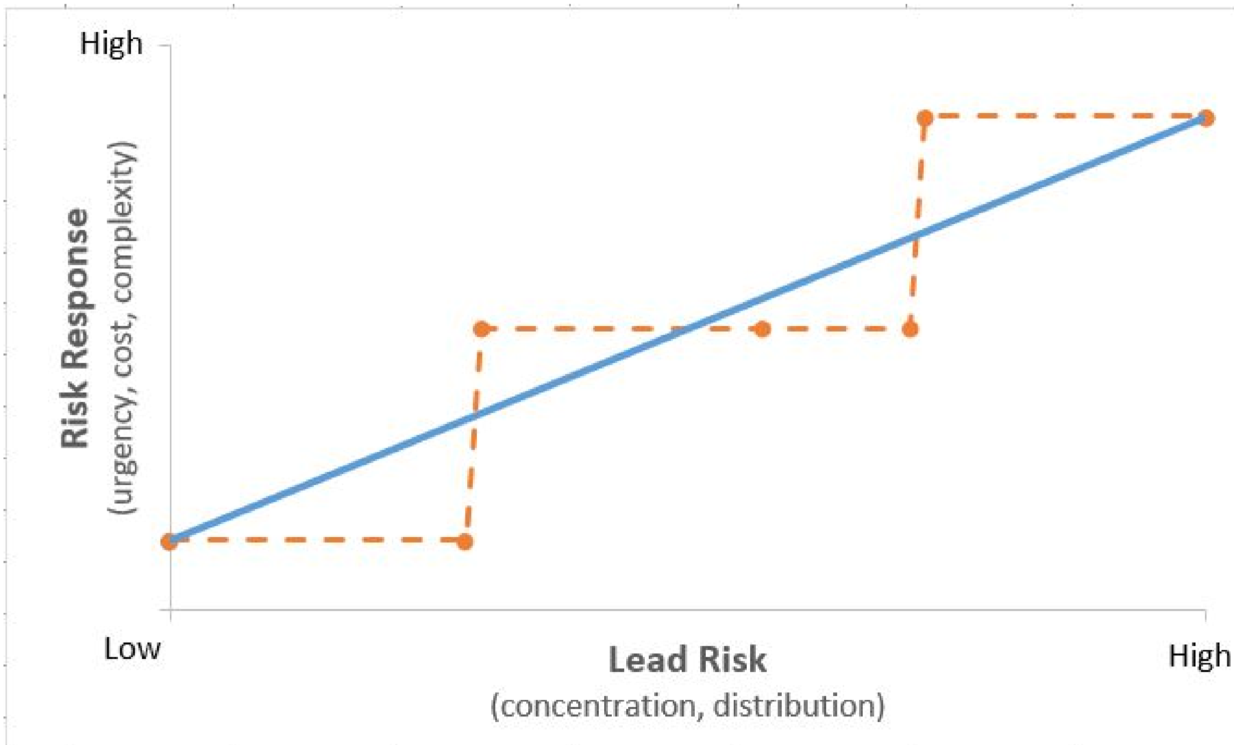
Guidance on Interpreting Results and Recommended Lead Hazard Reduction Options

It is widely understood that there is no safe level of lead exposure from any environmental hazard, including water. When confirmed evidence of a lead hazard is identified, some response to manage the exposure (risk or harm) is necessary and appropriate. MDH encourages some level of response be taken for any plumbing fixtures identified as producing a detectable level of lead.

Districts should be prepared to communicate with parents about decisions made to address lead hazards. In their communication plan, schools should be prepared to speak to taking some action at every level. However, given that lead is still found in many environments and products, it is also important to recognize that attaining zero exposure to lead may not be reasonable, or even possible, under some circumstances.

In addition, it is critical to understand that health risks from lead do not abruptly change at varying concentration of lead. As lead concentrations, the duration of exposure, or the number of taps impacted (i.e., distribution) steadily increases, the risks posed to students steadily increase. Response options should consider vulnerability of those exposed, concentration of lead, duration of exposures, and current practices to reduce lead, among other things. The most accurate relationship between lead risk and appropriate responses follow a smooth path (i.e., solid line) as concentration increases (Figure 2). Therefore, a result of 19 ppb is not appreciably safer than a result of 21 ppb. The dashed line represents a standards-based approach (e.g. responses are similar up to a threshold, and then abruptly change). Both the risk present and response options needed for lead exposure should be evaluated as a continuum and not be driven by specific numbers.

Figure 2: Relationship between Lead Risk and Risk Response



Mitigation strategies used will depend on the site-specific conditions of the school building such as building age, plumbing materials, water use pattern, incoming water quality, and population served. It may take a combination of options and multiple steps over a period of time to manage/remove lead in drinking water. Analytical results can be highly variable and a clear pattern should be identified before implementing any strategy. Schools may consider prioritizing strategies to prevent exposures to students and staff most at risk. The following discussion provides the most common hazard reduction options, but is not intended to be all-inclusive. EPA's 3Ts guidance document is also an excellent resource for strategies on finding lead sources and implementing mitigation.

Step 4- Interpret Sample Results:

Once a school receives its sample results, it should verify that all results are expressed in parts per billion (ppb). For water samples, this will sometimes be stated as micrograms per liter (µg/L), which is equivalent to ppb.

Table 3 presents possible lead hazard reduction options for various lead levels. The intention of presenting the information is to provide perspective on possible actions in response to increasing lead concentrations in water. The concentration ranges represent increasing levels of lead and should not be used as strict thresholds. More comprehensive actions may be necessary to address health threats from higher concentrations. As there is no safe level of lead, it is important to incorporate lead hazard reduction options and communicate at all levels of lead in order to raise awareness and reduce exposure.

Table 3: Recommended Lead Hazard Reduction Options

Lead Level At The Tap	Lead Hazard Reduction Options
< 2 ppb or Non-Detected	• Lead was not detected. Tap may be used as normal; • Record result and test again in 5 years; and • Make all test results and lead education materials accessible to the community, such as on a website, or annual report, and available upon request.
2 ppb to 20 ppb*	The tap may be used for cooking and drinking water while steps are taken to reduce overall exposure. A higher number of taps with elevated results increases the urgency to implement hazard reduction. Options include: • Retest the sample tap and attempt to more accurately determine the source of the lead; consider monitoring tap more frequently until the source of lead is found and removed; • Consider the feasibility of flushing or other steps to minimize lead exposure, including limiting softened water supplies to hot water taps only, taking into account other actions that the school may already have in place; • Make all test results and lead education materials accessible to the community, such as on a website, or annual report, and available upon request.
> 20 ppb*	Action should be taken to reduce exposure. The specific action(s) taken will be dependent on individual school conditions. Options include: • Remove tap from service until problem is demonstrably corrected by replacement, a flushing program, filtration, or treatment; • Do ***not*** use tap for cooking or drinking water; • Retest the tap and attempt to determine the source of the lead; If the tap is not replaced, consider monitoring tap more frequently, such as annually, until the source of lead is found and removed; • Implement a flushing protocol or other lead hazard reduction option; sampling should be use to evaluate effectiveness; • Make all test results and lead education materials accessible to the community, such as on a website, or annual report, and available upon request; and • Provide targeted communication and education to individuals, parents, and staff members that routinely use that tap.

*established by EPA 3Ts guidance; if EPA amends, Table 3 will be adjusted to be consistent with new value

Step 5- Lead Hazard Reduction Options:

In addition to possible lead hazard reduction options outlined in Table 3, the options further described here are in priority order of long-term effectiveness in reducing lead hazards. Some lead hazard reduction option needs to be implemented when lead is detected.

If the school receives its water from a Community Public Water Supply (such as a municipal water supply) the school is encouraged to work with them to assess the source contribution of lead coming into the school and if the school has a lead service line. For schools on their own well, the only way to characterize lead contribution from the water source is to do a test of water coming into the building.

Option 1. Removal of Lead Sources

Engineering plans and specifications for the plumbing system are useful for identifying sources of lead and helpful in determining if sources of lead can be removed from service or replaced with lead free fixtures. Options for eliminating lead sources include:

- Remove tap/fixture from service. If the tap is seldom used, it may be disconnected or removed from the water supply line, but first verify the tap is not required for local building code compliance;
- Replace with lead free fixture/plumbing component in accordance with Reduction of Lead in Drinking Water Act;
  - If the existing tap is suspected to be the source of contamination, replace with a lead free tap;
  - Replace other sources of lead, including lead pipe, lead solder joints, and brass plumbing components with lead free materials; and
  - To minimize the introduction of lead into drinking water systems, go to EPA's website to identify lead free certification marks for drinking water systems and plumbing materials.
    - Lead Free Certification Marks (http://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P100GRDZ.txt)

Option 2. Implement a Flushing Program

Flushing the drinking water taps (letting the water run for a set amount of time on a regular basis) can effectively reduce lead concentrations in drinking water. A flushing program works to reduce lead concentrations by clearing the taps of water that has been in contact with plumbing components that may contain lead. While flushing can work to reduce lead, it requires staff time, diligence, and commitment to ensure effectiveness. Essential to any flushing program is monitoring after flushing to verify effectiveness.

There are two primary types of flushing programs: Individual Tap Flushing and Main Pipe Flushing.

Individual Tap Flushing Program

- May be implemented if lead concentrations are found to be high at certain taps;
- Flush individual taps that have been tested and found to have high lead levels. This procedure is to be followed each day the school is in session;
- During periods of normal use:

  - Run each tap for 2 to 3 minutes in the morning before children arrive
  - Run each tap midday for two to three minutes if the tap has been unused and stagnant for the morning period
- Periodic testing may be done prior to and after the midday flushing to ensure the lead concentrations have remained low throughout the morning hours. If they have not, the flushing time should be increased or another option should be implemented;
- After weekends or breaks, run each tap for ten to fifteen minutes before children return to school then return to normal use; and
- Frequency and duration of flushing should be reasonably documented.

Main Pipe Flushing Program

- May be implemented if lead concentrations are found to be high throughout the entire school or confined to a certain area of the school. This procedure is to be followed each day the school is in session;
- Begin by flushing the tap furthest away from the water source for at least ten minutes;
- Next flush the tap the second furthest away and continue in this manner until all taps have been flushed;
- Flushed samples should be periodically collected and analyzed for lead to confirm the effectiveness of flushing programs;
- It is recommended that midday samples and end of the day samples be taken periodically to ensure the lead concentrations have remained low throughout the day. If they have not, another option should be implemented; and
- Review the results upon receipt and continue to optimize the procedure to reduce lead.

More on Flushing

Flushing is a best management practice used to reduce lead levels by controlling the age of the water. It can be an interim or long-term option. This guidance presents flushing procedures that MDH has found effective in reducing the lead level in drinking water. Site-specific conditions will determine how long a tap needs to be flushed and the number of times a day a tap needs flushing. The key to using flushing as a best management practice is monitoring that demonstrates the lead level has been reduced.

Note that schools implementing a flush program may wish to identify non-consumptive uses for the flushed water (watering, cleaning, etc.) in order to make use of this resource.

Option 3. Treatment

Point-of-Use (POU) Treatment Device

A POU water treatment device may be installed at taps where lead has been detected. It is strongly encouraged that the POU device is approved to meet NSF Standard 53, NSF Standard 58, or an equivalent standard. It is to be installed, operated, and maintained in accordance with the manufacturer's recommendations. **POU treatment systems may be subject to Department of Labor and Industry (DLI) or local administrative authority plan review and approval prior to installation. Contact DLI at (651) 284-5063 for more information.**

Point of Entry (POE) Chemical Treatment

Adjusting the water chemistry may reduce the amount of lead absorbed by the water. This may be done by adding a chemical to the water as it enters the building. Typical methods of chemical treatment include addition of a phosphate-based or silica-based corrosion inhibitor or an adjustment to the water's pH or hardness. **All chemical treatment systems are subject to MDH plan review and approval prior to installation**. In addition, a school that installs POE corrosion control treatment becomes a public water system and is required to meet the regulatory requirements of the SDWA. As a public water system, the school would be responsible for meeting all of the water quality standards of the SDWA, be subject to inspection of the water distribution system, and be required to have a certified water operator.

Contact the Minnesota Department of Health Drinking Water Protection Program at 651-201-4700 to determine if additional requirements will apply to your school prior to installing treatment.

Step 6- Reassess:

All taps affected by a lead hazard reduction option should be retested to ensure the control options worked. A first draw sample is to be taken using the procedure outlined in Step 2.

Interpreting Post Control Option Results

- If the analysis does not detect lead, no further action is required, as long as the control option remains in place. The next sample should be collected within five years;
- If the analysis shows lead remains present, continue twice daily flushing. A midday sample, as specified in Step 5, should be collected to determine if flushing is effective. Alternatively, a new control option can be implemented followed by retesting as specified in Step 2.

MN Statute 121A.335 specifies that each building be tested at least once every five years. MDH and MDE recommend that schools repeat monitoring once every five years if results are below two ppb. If results show persistent elevated lead levels, testing should continue until the lead source is found and hazard reduction options implemented. The overall goal is to have MDH, MDE, school districts, parents, and students all work together to ensure that available resources are best targeted to minimize exposure to lead in drinking water.

Glossary of Terms and Abbreviations

Aerator - An aerator is found at the tip of the faucet. Aerators are screwed onto the faucet head, creating a non-splashing stream and delivering a mixture of water and air

Corrosion - A dissolving and wearing-away of metal caused by a chemical reaction between water and plumbing materials in contact with the water

Detection Level (DL) - The lowest concentration of lead that can be analyzed with a certainty of precision. Results below this level are often expressed as “non-detected,” “nd,” or “<DL.” For the purposes of this document, 2 ppb is the maximum detection level recommended for lead analysis

Detected: An amount of lead above the detection level. A concentration of lead analyzed with a certainty of precision to be at or above the detected level

Drinking Water Faucet/Tap - Point of access for people to obtain water for drinking or food preparation. A faucet/tap can be a fixture, faucet, drinking fountain or water cooler. Drinking water taps typically **do not** include bathroom taps, hose bibs, laboratory faucets/sinks or custodial closet sinks when clearly marked

Field Analyzer - Instrument suitable for water quality analysis in the field and will provide results without the use of a laboratory

First Draw Sample - The first water drawn from a faucet/tap after the water has sat undisturbed in the plumbing system for at least six hours

Fittings - Plumbing components used to join sections of pipe or to join pipe to fixtures

Fixture - Exchangeable device connected for the distribution and use of water in a building. Examples: fountain, sinks, shower, tub, toilet, hydrant

Flush(ing) - Running the water at a faucet/tap or combination of faucets/taps to clear standing water from the plumbing system

Flush Sample - A water sample that has been collected following the flushing of a drinking water tap

Flux - A substance applied during soldering to facilitate the flow of solder. Flux used prior to 1986 contains lead and can itself be a source of lead contamination in water

LCCA – Lead Contamination Control Act, July 1989

LCR – Lead and Copper Rule, June 1991

Lead Free - Weighted average of not more than 0.25% in wetted surface material for pipe, pipe and plumbing fittings and fixtures and 0.2% for solder and flux. More information is available from the EPA website at the following link:

- Basic Information about Lead in Drinking Water (https://www.epa.gov/ground-water-and-drinking-water/basic-information-about-lead-drinking-water)

Limit of Detection (LOD) – The lowest quantity of a substance that can be distinguished from the absence of the substance due to the instrument's analytical process. It is usually lower than the detection level

MDE – Minnesota Department of Education

MDH – Minnesota Department of Health

Model Plan - The plan developed by the commissioners of health and education to accurately and efficiently test for the presence of lead in drinking water in public school buildings, as required under Minnesota Statutes 121A.335

Non-Detect: A lead result below the limit of detection, often expressed as "non-detected," "nd," or "<DL."

pH - A logarithmic measure of acidity and alkalinity between 0 (highly acidic) and 14 (highly basic); 7 is neutral

Parts per Billion (ppb) - A standard unit of measurement commonly used to describe the concentration of lead in drinking water. Also expressed as micrograms/liter (µg/L)

Point of Entry (POE) - A water treatment device installed to treat all water entering a single school, building, facility or home. Example: water softener

Point of Use (POU) - A water treatment device intended to treat water for direct consumption, typically at a single tap or a limited number of taps. Example: faucet mount cartridge filter

Primary Prevention - aims to prevent disease or injury before it ever occurs. It is done by preventing exposures to hazards that cause disease or injury, altering unhealthy or unsafe behaviors that can lead to disease or injury, and increasing resistance to disease or injury should exposure occur

Public Water System (PWS) - A system that has at least 15 service connections or regularly serves an average of 25 individuals daily at least 60 days out of the year

- **Community Public Water System (CPWS)** - A PWS which serves at least 15 service connections used by year round residents or regularly serves at least 25 year round residents. Examples: municipalities, manufactured mobile home parks

- **Nontransient Noncommunity (NTNC) Public Water System** - A PWS that is not a CPWS and that regularly serves at least 25 of the same persons over 6 months per year
    - Examples: schools, childcare centers, factories

Schools - Minnesota's public and charter schools serving students in pre-kindergarten through grade 12

SDWA – Federal Safe Drinking Water Act

Service Connection - The pipe that carries tap water from the public water main to a building

Solder - A metallic compound used to seal the joints between pipes. Until 1988, solder containing up to 50% lead was legally used in potable water plumbing. Lead free solders, which can contain up to 0.2% lead, often contain one or more of the following metals: antimony, tin, copper or silver

United States Environmental Protection Agency (EPA) - Federal agency with a mission to protect human health and the environment; oversees implementation of the SDWA