St. Louis Park Drinking Water

SITE UPDATE: JANUARY 23, 2017

ORIGINAL REPORT: OCTOBER 12, 2016

MDH Minnesota Department *of* Health
ENVIRONMENTAL HEALTH DIVISION

St. Louis Park Drinking Water

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St. Louis Park Drinking Water Update

JANUARY 23, 2017

Background

MDH released a drinking water report in October 2016. MDH produced the report in response to community concerns about the water quality in the city of St. Louis Park. The report provides and explains drinking water monitoring data up until June 2016. The report focused on MDH concern about possible exposure to volatile organic compounds (VOCs) found in drinking water from Treatment Plant #4.

Update

The city shut down Treatment Plant #4 on December 28, 2016. Therefore, MDH no longer has the concerns about the drinking water quality as stated in the October 2016 report.

This change occurred after the city worked with MDH, MPCA and EPA to find an appropriate process that would lower the levels of contaminants in drinking water. The city explored several options during Fall 2016. Community groups and media voiced their concerns during this time. The city was able to gain permission from the US EPA and the MPCA to stop pumping the contaminated well temporarily as the design and construction of a new treatment plant is pursued.

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Introduction

The City of St. Louis Park has a long history of addressing questions and concerns about its mission to provide a safe and reliable supply of drinking water to its residents. Recently, some community members and former residents have expressed renewed concerns. Information on drinking water is difficult for the public to find and challenging to understand. This document is intended to provide and explain drinking water quality data in St. Louis Park.

A. Sources of Groundwater Contamination

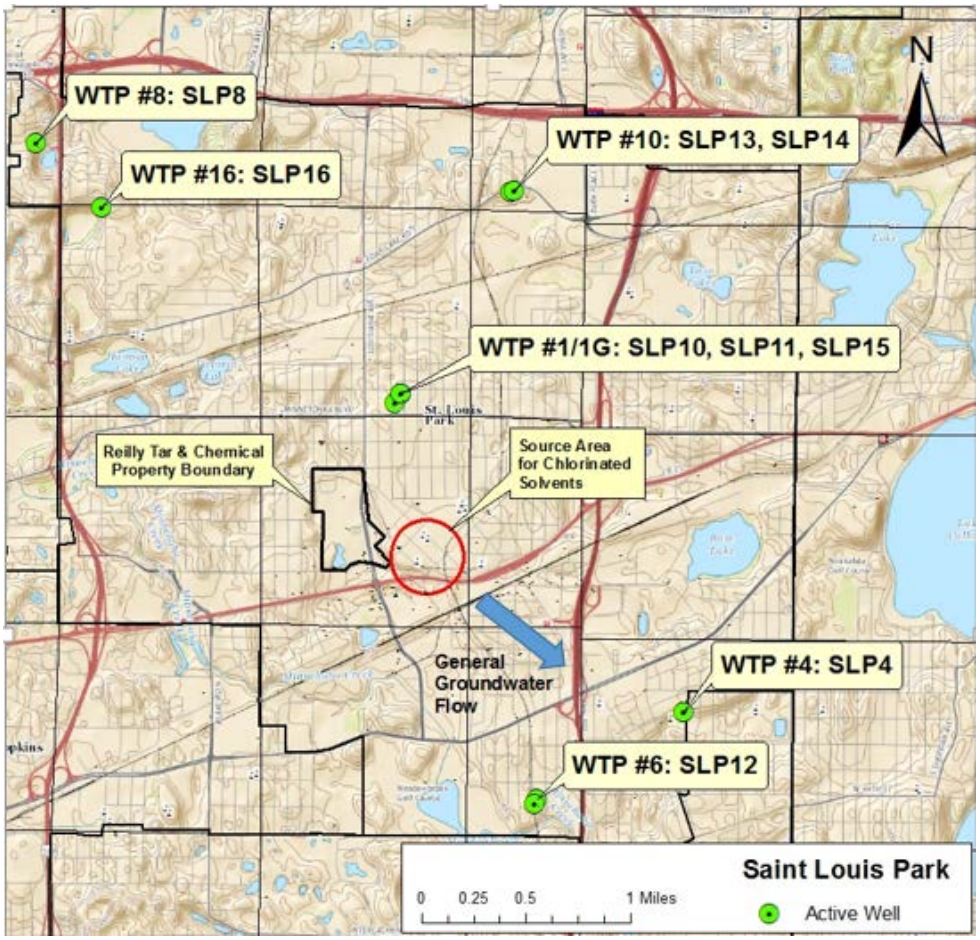
Drinking water in St. Louis Park comes entirely from groundwater. Noteworthy sources of contaminants that have affected groundwater in parts of St. Louis Park and the city's drinking water over time include the following:

1. Reilly Tar & Chemical site
   From 1917 until 1972, Reilly Tar & Chemical Corporation operated a coal tar distillation and creosote wood preserving plant on an 80-acre site in St. Louis Park. Reilly Tar disposed waste on the site which contaminated the groundwater with polycyclic aromatic hydrocarbons (PAHs) and other contaminants. PAHs are a large group of chemicals that occur naturally in coal, crude oil, and gasoline; they are also produced when organic materials are burned. It was known as early as the 1930s that groundwater was affected by waste that was released from the site. As a result of Reilly Tar's disposal practice, private wells and municipal drinking water wells became contaminated. Study of the Reilly Tar groundwater contamination plume began in the mid-1970s, and six municipal drinking water wells were closed in 1978-1979 due to elevated levels of PAHs measured in or near the wells. A remedial action plan was put into place in the 1980s and continues, resulting in remediation and monitoring of the PAH groundwater contamination plume.
2. Solvent site
   In 2004, vinyl chloride was detected in two municipal drinking water wells in Edina. Investigation of this groundwater contamination was eventually traced back to identify the source area near Highway 7 and West Lake Street in St. Louis Park where releases of chlorinated solvents were found. Tetrachloroethylene (a commonly used chlorinated solvent, also known as PCE) was identified to be the original cause of the vinyl chloride contamination. Under certain conditions in groundwater, tetrachloroethylene may break down to trichloroethylene (TCE), then cis-1,2-dichloroethene (cis-1,2-DCE), and eventually vinyl chloride (VC). The Minnesota Pollution Control Agency (MPCA) is continuing to work on identifying the parties responsible for releasing the chlorinated solvents, and is currently developing response actions to clean identified release areas.

This chlorinated solvent plume is unrelated to the PAH contamination that originated from the Reilly Tar site.

B. Description of the Municipal Water System

The city of St. Louis Park owns and operates the water pumping, treatment, and distribution system that provides drinking water from groundwater. The system includes nine primary wells and six water treatment plants (WTPs; see the figure below for the locations of wells [SLP#] and WTPs). Different locations within the city are served by different water treatment plants. This can vary depending on the amounts of pumping and use throughout parts of the system at any particular time. The city also owns additional wells that are not actively used to supply drinking water.



The Reilly Tar & Chemical property boundary (the PAH source area) and the suspected chlorinated solvents source area are shown on the figure to the left. WTP #1 uses granular activated carbon (GAC) to remove PAHs. WTP #4 is affected by the chlorinated solvent plume. WTP #6 is connected to wells SLP6 and SLP12. Well SLP6 is currently not used due to chlorinated solvents and PAHs in the water. Well SLP12 draws water from a deeper aquifer that is not contaminated by chlorinated solvents or PAHs. WTP #8, WTP #10, and WTP #16 are minimally affected by PAH contamination.

The depth of the city's primary drinking water wells, the aquifers they draw their water from, the associated WTPs they supply, and treatment status are shown in Table 1 below.

Table 1: St. Louis Park Primary Wells and Water Treatment Plants

Water Treatment Plant	Wells	Depth (ft)	Aquifer	Treatment
WTP #1/1G	SLP10 SLP11 SLP15	500 1093 503	Prairie du Chien-Jordan Mt. Simon Jordan- St. Lawrence	Treated to remove PAHs (SLP10 & SLP15) and naturally occurring iron and radionuclides
WTP #4	SLP4	503	Jordan	Treated to remove naturally occurring iron and radionuclides; treatment design in progress for chlorinated solvents
WTP #6*	SLP12	1095	Mt. Simon	Treated to remove naturally occurring iron and radionuclides
WTP #8	SLP8	507	Prairie du Chien-Jordan	Treated to remove naturally occurring iron
WTP #10	SLP13 SLP14	1045 485	Mt. Simon Jordan	Treated to remove naturally occurring iron and radionuclides
WTP #16	SLP16	500	Jordan	Treated to remove naturally occurring iron

*SLP6 is located near WTP #6 and draws from the Prairie du Chien aquifer at a depth of 482 feet. It is not used because it is contaminated by solvents and PAHs. It is possible that this water may be treated and used for drinking water in the future.

C. Agency Roles and Responsibilities for Safe Drinking Water

Community members have expressed confusion over the various roles of multiple government entities in protecting groundwater and drinking water.

The MPCA oversees the investigation of contaminated groundwater that may be used for drinking water. Both the MPCA and the U.S. Environmental Protection Agency (EPA) Superfund program oversee the Reilly Tar groundwater contamination monitoring.

The 1974 federal Safe Drinking Water Act (SDWA) directs the EPA Office of Water to set national drinking water standards for naturally occurring and human-made contaminants in public drinking water. These regulatory standards are known as Maximum Contaminant Levels (MCLs) and represent legally enforceable limits. MCLs are established through a national-level scientific process that evaluates the potential health impacts of the contaminant and the technology and costs associated with prevention, testing and/or treatment.

The Minnesota Department of Health (MDH) Drinking Water Protection Program enforces the SDWA for public water supplies in Minnesota. MDH enforcement is based on the regular testing and monitoring of drinking water from public water supplies. Results of MDH compliance monitoring are available to consumers through an annual consumer confidence report available on the city's website. Public water supplies that exceed MCLs (per EPA rules) for any contaminant must take action to reduce the contaminant in drinking water.

The MDH Health Risk Assessment Program also develops drinking water guidance values used to evaluate health risks of contaminants in groundwater called Health Risk Limits (HRLs) and Health-Based Values (HBVs). HRLs and HBVs are developed using the same methodology and are defined as a level of a contaminant that poses little or no health risk to a person drinking that water. HRLs have been adopted into state rule through a formal rulemaking process. MDH develops these guidance values by considering the most current information on health impacts of a chemical to the most sensitive and most exposed populations. Unlike the MCLs, these values are strictly based on health considerations alone and are not enforceable requirements for public water supplies. Instead, public water systems can use these guidance values as goals, benchmarks, or indicators of potential concern. These guidance values are especially important for interpreting test results when no other guidance is available, but they do not consider the cost and/or technology of prevention/treatment and can be set at levels that are challenging to meet.

In addition to the regulatory testing by MDH to assure drinking water is protected, St. Louis Park Utilities staff regularly test the city's drinking water through a certified, independent laboratory.

D. Safe Drinking Water Act Compliance Testing

The results described in this section represent testing done by MDH to measure specific contaminants covered by the federal Safe Drinking Water Act. Compliance with the SDWA is determined according to EPA policies and procedures for regulating public water supplies.

MDH reviewed compliance monitoring records and found records of four notices of violation for St. Louis Park - in 1981, 2003, and two violations in 2008. Details of these violations, including when compliance was once again achieved, are provided in Table 2; a brief explanation for each contaminant follows the table. The public was notified of these violations, and each of these violations were resolved as soon as possible with adjustments to treatment. None of these violations were related to the Reilly Tar PAH contamination or the groundwater solvent plume.

Table 2: St. Louis Park SDWA Violations

Contaminant	MCL	Result*	Date of Violation	Compliance Achieved	Location of Sample
Total coliform bacteria	presence	present	9/1/81	9/30/81	Distribution System
Gross Alpha	15 pCi/L	15.6 pCi/L	7/1/03	6/23/04	Distribution System
Gross Alpha	15 pCi/L	16.6 pCi/L	5/28/08	12/4/08	WTP #6
Combined Radium (-226 & -228)	5 pCi/L	9.4 pCi/L	3/17/08	12/4/08	WTP #6

pCi/L = picocuries per liter (a measure of radioactivity)

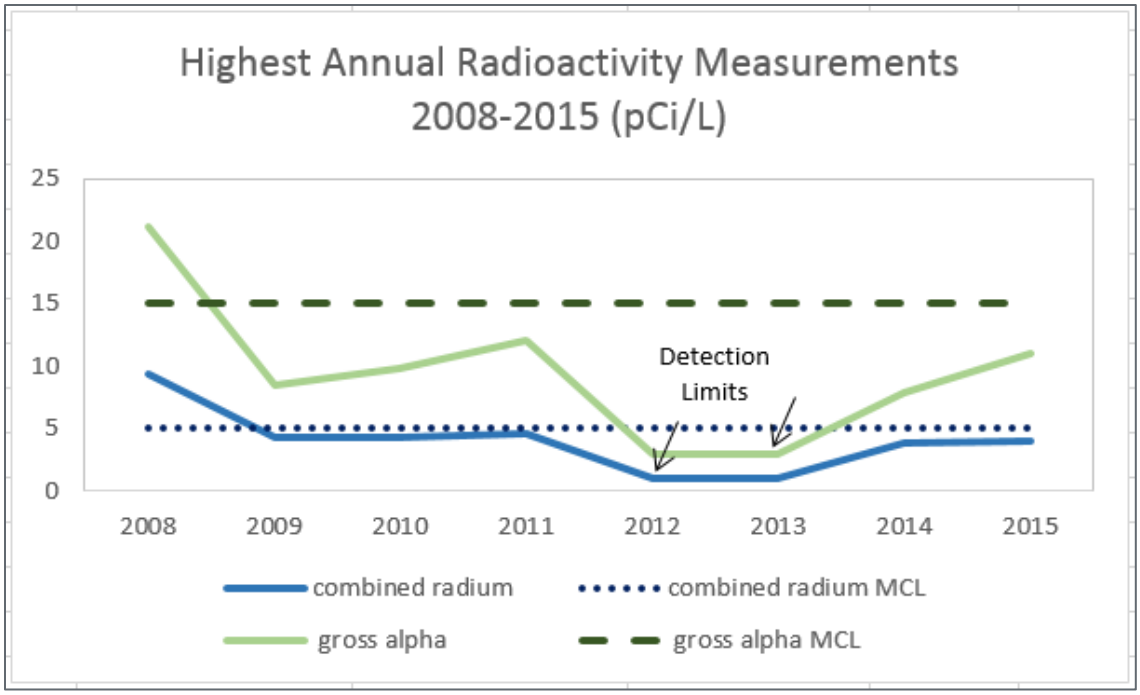
* For gross alpha and combined radium, the result value for compliance is based on a running average of four quarterly sample results

Total coliform bacteria
Total coliform bacteria are an indicator that harmful micro-organisms (such as bacteria, viruses, etc.) may be present in the water. If indicator organisms are found, an effort is made to identify the source of the contamination, correct the problem, and thoroughly disinfect the system. In addition, the public is notified of the situation and an order may be issued to boil water before drinking and cooking.

Gross Alpha and Combined Radium (Ra-226 & Ra-228)
Two MCLs are important when considering exposure to natural radiation sources in drinking water: gross alpha and combined radium. Gross alpha and combined radium (a sum of two isotopes, or forms, of radium known as Ra-226 & Ra-228) are measures of radioactivity given off by radioactive elements dissolved in water. Deep aquifers often contain small amounts of naturally occurring radioactive material, which can produce radiation of different types, including alpha particles. Radium is a natural component of rock and soil. It can enter groundwater and be present as one source of the alpha particles. Ingesting water with naturally occurring alpha emitters increases a person's exposure to radiation and slightly increases the lifetime risk of developing cancer over many years.

If a system measures radioactivity above the MCL, the system begins quarterly sampling. Compliance values for gross alpha and combined radium are based on a running average of four quarterly sample results (the "result" column in Table 2). To be in compliance, the average of any four consecutive samples cannot exceed the MCL. If the running average exceeds the MCL (15 pCi/L for gross alpha; 5 pCi/L for combined radium) it is considered a violation of the SDWA and must be corrected.

In 2008, EPA began new standardized monitoring requirements for radioactivity as a result of a rule update. The frequency of sampling for gross alpha and radium was determined by the radioactivity amounts previously measured in baseline monitoring. The graph below shows the highest values of gross alpha and combined radium measured from the St. Louis Park system from 2008 to 2015. In some years, the highest value represents the only sample taken, and for other years it was the highest result measured among many samples. All values since 2008 have been under the MCLs.

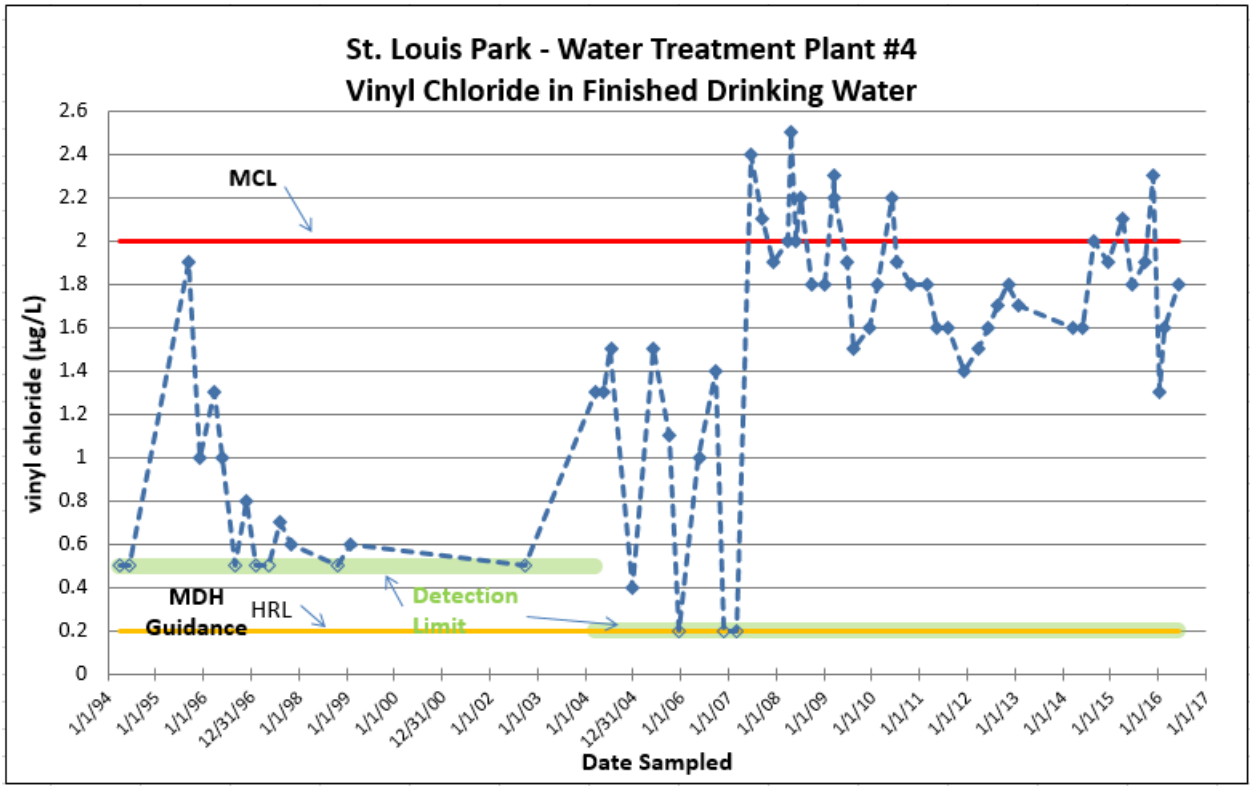


Note: The results from 2012 and 2013 were below the detection limit for both gross alpha (3 pCi/L) and radium (1 pCi/L).

E. Monitoring Drinking Water for Solvent Site Contaminants

Water entering and leaving WTP #4 has been and continues to be affected by the chlorinated solvent groundwater plume. MDH sent a letter to St. Louis Park's City Manager in March 2016 to recommend that they work to meet the HRL for vinyl chloride and the HBV for cis-1,2-dichloroethylene in the water from WTP #4.

The three graphs shown below were provided in MDH's letter to the city (they have been updated with more recent sampling results). They show measurements since 1994 of three chemicals in water from WTP #4 before it enters the distribution system (note that data prior to 1994 are archived on microfiche and were not gathered for this report).



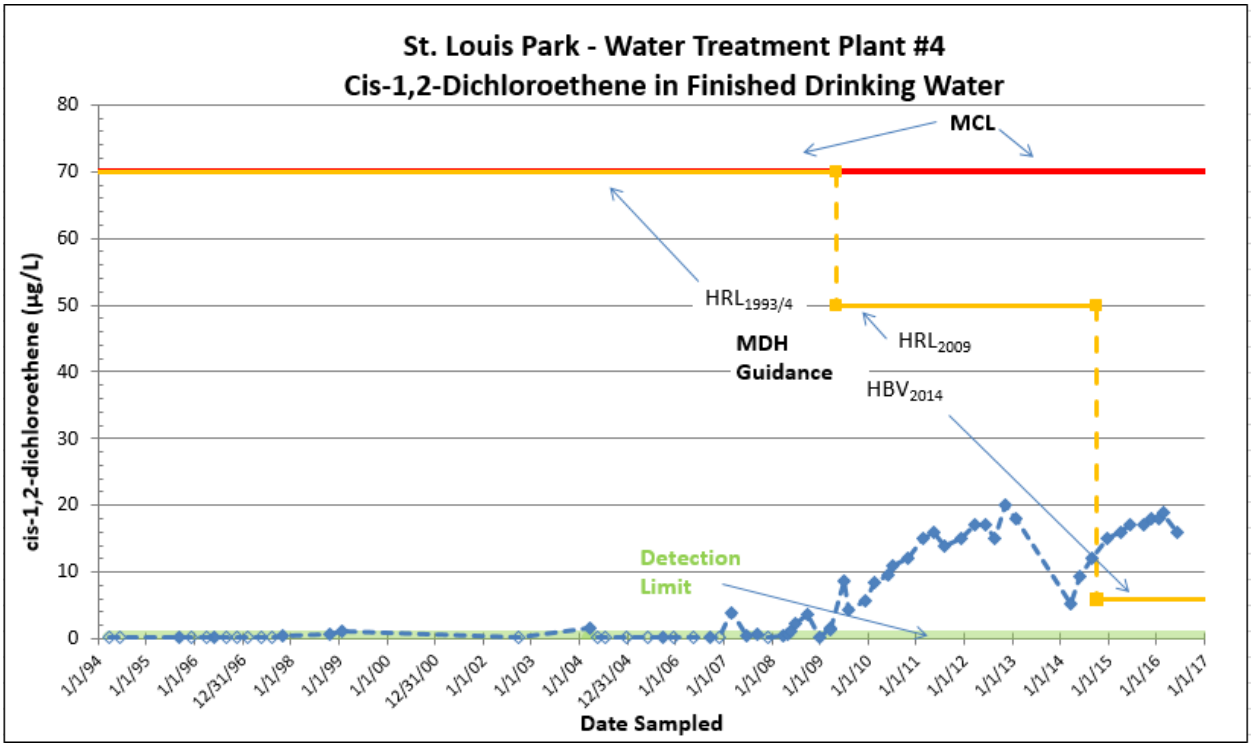
Note: Results shown at the detection limit may actually be at concentrations lower than the detection limit.

Vinyl chloride (VC)

The first graph illustrates that amounts of VC measured have been inconsistent over the years. Although individual samples exceeded the MCL of 2 µg/L (micrograms per liter), no violations of the SDWA occurred because, for compliance purposes, EPA mandates use of an average of four quarterly samples rounded to the nearest whole number.

MDH developed a HRL of 0.2 µg/L for VC in 1994 and conducted an updated toxicological review of this chemical in 2009. As a result of the 2009 review, the HRL remained at 0.2 µg/L. As the graph indicates, VC could not be detected at such a low concentration until 2004.

The HRL is calculated to protect lifetime users of water against risk of cancer that is no greater than 1 additional case in 100,000 people. MDH estimates that the increased cancer risk of using drinking water with vinyl chloride at the MCL for a lifetime is still a very low cancer risk of 1 in 10,000. Because the VC concentrations exceed the HRL and are very close to exceeding the MCL, MDH recommends steps be taken to reduce concentrations in the drinking water.



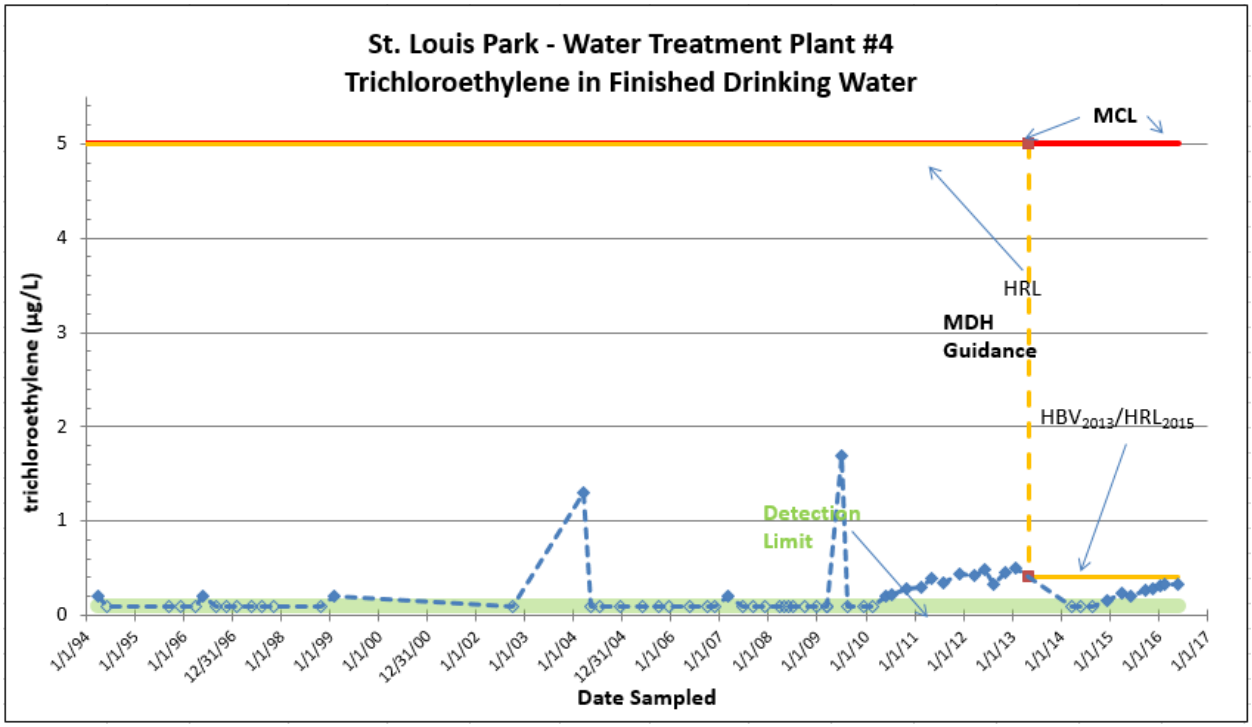
Note: Results shown at the detection limit may actually be at concentrations lower than the detection limit.

Cis-1-2-Dichloroethylene (cis-1,2-DCE)

This graph shows that concentrations of cis-1,2-DCE have increased over time. However, all results are well below the MCL of 70 µg/L.

In 2014 MDH conducted an updated toxicological review of cis-1,2-DCE and as a result, lowered its health guidance value from 50 µg/L to 6 µg/L. This updated value is based on protecting the liver and kidneys. Exposures to levels of cis-1, 2-DCE much higher than those found in the St. Louis Park drinking water resulted in increased liver and kidney weights in laboratory animals. Increased organ weights may be an early indicator of organ injury or dysfunction.

Because recent concentrations of cis-1,2-DCE in drinking water from WTP #4 exceed the HBV established in 2014, MDH recommends that steps be taken to reduce cis-1,2-DCE in the drinking water.



Note: Results shown at the detection limit may actually be at concentrations lower than the detection limit.

Trichloroethylene (TCE)

This graph illustrates that very low concentrations of TCE have been detected at a greater frequency in recent years. These concentrations are well below the MCL (and the previous MDH HRL) of 5 µg/L.

In 2013, MDH updated health based guidance for TCE and lowered its value to 0.4 µg/L. The value was lowered because human and animal studies provide evidence that TCE can affect the immune system and developing fetuses. TCE is also known to be able to cause cancer in people.

Although the amount of TCE in water from WTP #4 remains below the HRL and well below the MCL, this graph was also provided to the city to call attention to this chemical since the amounts measured have nearly approached the HRL.

Contaminant Detections in 2015 and 2016 from WTP #4

In addition to the three chemicals described above, Table 3 shows additional contaminant detections in water from WTP #4 that are related to the solvent plume.

In a June 2016 sample, 1,4-dioxane was measured near its HRL. The 1,4-dioxane HRL is based on a lifetime cancer risk of no greater than 1 additional case in 100,000 people. The other three contaminants included in Table 3 have been measured at concentrations far below levels of potential health concern.

Table 3: 2015/2016 Water Treatment Plant #4 Solvent Plume Contaminant Detections (µg/L)

Contaminant	MCL	HRL/HBV	Mar 2015	Jun 2015	Sept 2015	Nov 2015	Jan 2016	Feb 2016	Jun 2016
Vinyl chloride	2	0.2	**2.1**	**1.8**	**1.9**	**2.3**	**1.3**	**1.6**	**1.8**
cis-1,2-dichloroethene	70	6	**16**	**17**	**17**	**18**	**18**	**19**	**16**
trans-1,2-dichloroethene	100	40	0.62	0.7	0.72	0.87	0.74	0.81	0.72
trichloroethylene (TCE)	5	0.4	0.24	0.21	0.26	0.28	0.31	0.33	0.33
1,1-dichloroethane	NA	80 (RAA)*	<0.2	0.18	<0.2	0.21	<0.2	<0.2	<0.2
dichlorofluoromethane	NA	30 (RAA)*	1.1	1.1	1.1	1.4	1.1	1.1	1.2
1,4-dioxane	NA	1	NA	0.35	NA	NA	NA	NA	0.83

Concentrations in this table are from samples of finished drinking water entering the distribution system
NA = Not available
Bolded values are above MDH Health Risk Limit/Health Based Value
*RAA is MDH Risk Assessment Advice, which generally contains greater uncertainty than an HRL/HBV, usually because of the amount of information known about the chemical is limited

F. Monitoring Drinking Water for Reilly Tar Site Contaminants

Polycyclic Aromatic Hydrocarbons (PAHs)
The PAH contamination plume related to the Reilly Tar site is different from the solvent plume affecting water from WTP #4.

Contamination from the Reilly Tar site is currently addressed under a legal agreement (called the Consent Decree and Remedial Action Plan, or CD-RAP) that was signed in 1986 by the EPA, the city of St. Louis Park, MPCA, and MDH (among other parties). The CD-RAP requires the city to submit an annual sampling plan for monitoring PAH groundwater contamination to the EPA and MPCA for approval. Flexibility in sampling each year allows for changes to be made to most effectively monitor the groundwater. The CD-RAP also provides the list of PAHs that must be sampled and concentrations of PAHs that must be met in drinking water.

There were no federal or state drinking water standards for PAHs at the time the CD-RAP was written. The CD-RAP established site-specific Drinking Water Criteria for groups of PAHs (see Table 4). There are three drinking water criteria in the CD-RAP: the sum of two specific PAHs – benzo(a)pyrene and dibenzo(a,h)anthracene; total carcinogenic PAHs (a list of 9 PAHs); and the total "other" PAHs (a list of 23 PAHs). The CD-RAP requires resampling drinking water wells that exceed the criteria.

Table 4: CD-RAP Drinking Water Criteria

PAH groups	CD-RAP Drinking Water Criteria
Sum of benzo(a)pyrene and dibenzo(a,h)anthracene	0.0056 µg/L
Sum of 9 carcinogenic PAHs	0.028 µg/L
Sum of 23 other PAHs	0.28 µg/L

All of St. Louis Park's current primary drinking water wells have ongoing monitoring for PAHs (see Table 5 below). There were no exceedances of the CD-RAP drinking water criteria for SLP4, SLP8, SLP15, and SLP12. For all other wells, the historical sampling data shows an occasional exceedance of the CD-RAP criteria. All follow-up sampling post-exceedances were in compliance, i.e. none of the exceedances were confirmed by additional sampling. It is likely that at least some of the exceedances were due to laboratory error.

Table 5: PAH Sampling Frequency and CD-RAP Compliance Results, 1988-2016*

WTP	Wells	PAH sampling frequency**	Exceedance of CD-RAP
WTP #1	SLP10	Quarterly sampling post-GAC (2000-2016)	1
	SLP11	Annual sampling	1
	SLP15	Alternatively sampled if SLP10 is not running	None
WTP #4	SLP4	Quarterly sampling post-GAC (1994-2016)	None
WTP #6	SLP12	Annual sampling	None
WTP #8	SLP8	Sampled annually (1988-1992, 2015-2016)	None
WTP #10	SLP13	Annual sampling	1
	SLP14	Sampling every other year	2
WTP #16	SLP16	Sampling every other year	1

*1988-2016, unless the dates are provided in PAH sampling frequency column

**there are exceptions, such as if a well wasn't operational at the time of sampling, etc.

The drinking water criteria set in the CD-RAP in 1986 appear to be very protective for the PAHs being measured. However, methods to calculate health risk from mixtures of PAHs have changed and the EPA and MDH have more recent lists of PAHs they recommend to measure. The requirements for monitoring PAHs in groundwater from the Reilly Tar site are expected to be updated within the next year or so. A review of available data suggests that revising the PAH list and criteria is not expected to result in any health concerns regarding PAHs in the St. Louis Park drinking water wells.

Benzene

Very low levels of benzene have been found occasionally in drinking water samples, the most recent a concentration of 0.27 µg/L in 2013 at WTP #1, and a concentration of 0.3 µg/L in 2009 at WTP #4. These values are well under both the MCL of 5 µg/L and the MDH HRL of 2 µg/L. Benzene may be associated with the Reilly contamination.

G. Other Sources of Water Quality Information

A common frustration heard from community members was how difficult it can be to know where sources of information about drinking water quality are and how to access the information. The information listed below provides more complete information for consumers.

Consumer Confidence Report
Annual consumer confidence reports, available on the city's website, indicate that other contaminants are present at low levels in the St. Louis Park drinking water. These contaminants are commonly found in nearly all water systems and their concentrations in St. Louis Park drinking water have never come close to the MCLs. The following additional contaminants are described in the reports:

- **Disinfection byproducts –** Trihalomethanes and haloacetic acids can occur when naturally-occurring organic and inorganic materials in the water react with the disinfectants chlorine and chloramine.
- **Nitrate –** Nitrate is a chemical compound made up of nitrogen and oxygen. Low levels of nitrate, like the amounts found in St. Louis Park, are naturally present in water.
- **Lead and copper –** Lead and copper in drinking water often results from corrosion of the plumbing materials in homes or other buildings which belong to water system customers.
- **Barium –** Barium is a naturally occurring metal found at trace levels in groundwater.

U.S. EPA Unregulated Contaminant Monitoring Rule
A research effort by the U.S. EPA called the Unregulated Contaminant Monitoring Rule (UCMR) requires testing of public water systems for as many as 30 unregulated contaminants every five years. This provides data on the occurrence of contaminants in drinking water that are currently not required to be monitored for SDWA compliance and is used to develop regulatory decisions. During the latest round of UCMR testing in 2014-2015, drinking water in St. Louis Park was monitored for an additional 28 chemicals. Five contaminants (1,1-dichloroethane, 1,4-dioxane, chromium, molybdenum, and strontium) were detected during this sampling. As described above, 1,4-dioxane has been found just below the HRL at WTP #4. All four of the other contaminants detected were found at very low levels that are well under available health guidance.

Minnesota Drinking Water Annual Report
For additional information about Minnesota's drinking water in general, MDH issues a report regarding the state of drinking water in Minnesota each year. This report summarizes the results of testing done the previous year, provides an overview on the role of the department's drinking water program in monitoring and protecting drinking water, and examines emerging issues. These annual reports can be found on the MDH Drinking Water Annual Reports webpage at http://www.health.state.mn.us/divs/eh/water/com/dwar/index.html.

H. Conclusions

The goal of this document is to collect and summarize detailed information on the drinking water in St. Louis Park to address questions and concerns that members of the public raised in recent months during meetings and interactions involving MDH, MPCA, EPA and the city of St. Louis Park.

All of St. Louis Park's municipal drinking water currently complies with all regulatory requirements under the Safe Drinking Water Act and therefore, is considered generally safe for most people to drink and use. However, as shown on the vinyl chloride graph on page seven, individual samples have exceeded the MCL. The average of four quarterly samples has come close to exceeding the MCL.

In addition, MDH develops its health-based guidance (HRLs, HBV, RAA) by considering the most current information on health impacts to the most sensitive and most exposed populations across all stages of human development. MDH guidance values are based only on health considerations and are considered goals. They may provide some additional health protection for some individuals but may also be challenging for drinking water suppliers and some communities to meet. Drinking water that is contaminated above MDH guidance may pose some level of health risk to some people drinking the water.

In the case of the solvent plume contamination that has affected groundwater in a portion of St. Louis Park, and which has resulted in exceedances of MDH's HRL for VC and the HBV for cis-1,2-DCE, the city is considering interim steps they may take to maintain and improve drinking water quality within the city and reduce exposure to these contaminants.

Frequent sampling for PAHs from the Reilly Tar site is conducted in nearly all of the city drinking water wells. If PAHs are detected, they found at very low levels and not of health concern.

What's Next?

The MPCA has funded a water treatment feasibility study to explore options for treatment design for SLP4 at WTP #4 and the currently unused SLP6 at WTP #6. Funding for construction of new treatment plants for these wells was requested in the last legislative session and was not passed; however, discussions continue. In the meantime, MPCA is working with the EPA to see if the chlorinated solvent plume would qualify for listing on the EPA National Priorities List. If it qualifies, the listing status will create EPA support to determine the party responsible for the contamination and to secure the funding to add additional treatment for drinking water, as well as develop a remedy for the groundwater plume.