ANNUAL MONITORING REPORT
FOR 2014

SUBMITTED TO THE

REGIONAL ADMINISTRATOR
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION V

EXECUTIVE DIRECTOR
MINNESOTA POLLUTION CONTROL AGENCY

BY

THE CITY OF ST. LOUIS PARK, MINNESOTA

PURSUANT TO
CONSENT DECREE - REMEDIAL ACTION PLAN
SECTION 3.4

UNITED STATES OF AMERICA, ET AL.

vs.

REILLY TAR & CHEMICAL CORPORATION, ET AL.

UNITED STATES DISTRICT COURT
DISTRICT OF MINNESOTA
CIVIL NO. 4-80-469

March 15, 2015

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1.0 INTRODUCTION

This is the annual monitoring report for the Reilly Tar & Chemical Corporation site (Reilly Site) in St. Louis Park, Minnesota. This report was prepared in accordance with Section 3.4 of the Consent Decree - Remedial Action Plan (CD-RAP) in the case of the United States of America, *et al.* vs. Reilly Tar & Chemical Corporation, *et al.* (effective date September 4, 1986). The CD-RAP is the legal agreement that compels various parties to address contamination at this Superfund site. The United States Environmental Protection Agency and the Minnesota Pollution Control Agency (Agencies) have further described the remedial activities for the Reilly Site in the following Records of Decision:

1. Reilly Tar & Chemical Corp. (St. Louis Park Plant), EPA ID: MND980609804, OU 01, St. Louis Park, MN. 06/06/1984.
2. Reilly Tar & Chemical Corp. (St. Louis Park Plant), EPA ID: MND980609804, OU 02, St. Louis Park, MN. 05/30/1986.
3. Reilly Tar & Chemical Corp. (St. Louis Park Plant), EPA ID: MND980609804, OU 04, St. Louis Park, MN. 09/28/1990
4. Reilly Tar & Chemical Corp. (St. Louis Park Plant), EPA ID: MND980609804, OU 03, St. Louis Park, MN. 09/30/1992.
5. Reilly Tar & Chemical Corp. (St. Louis Park Plant), EPA ID: MND980609804, OU 05, St. Louis Park, MN. 06/30/1995
6. Explanation of Significant Differences in the Approved Remedy for Operable Unit 5, Northern Area of the Platteville Aquifer at the Reilly Tar and Chemical Company Superfund Site in St. Louis Park, Minnesota. 04/11/1997.

The Agencies have provided the City with a fresh perspective of their requirements for this report and, as a result, the content and format is somewhat different than prior annual reports for the site. This report presents and discusses the data collected during 2014 to monitor:

- Pumping rates in the various Reilly Site remedy wells,
- Groundwater treatment facilities,
- Groundwater elevations, and
- Groundwater quality.

2.0 PUMPING RATE MONITORING

Table 1 lists all of the pumping wells required by CD-RAP or selected in a Record of Decision for the site including wells W420, W421, W422, W439, W440, W434, W410, W23, SLP10/15, SLP4, W48, W105. The table identifies the aquifer, the purpose of the pumping according to the CD-RAP/ROD, the required minimum pumping rate and the source of that requirement, and the current status of each well (i.e., pumping, properly abandoned, etc.).

Table 2 is a series of tables showing the 2014 monthly average pumping rate for the currently pumping wells required by CD-RAP or selected in a ROD for the site (namely, wells W420, W421, W439, W410, W23, SLP10/15, and SLP4). Wells W422, W434, and W105 are not currently pumped because they have previously met cessation criteria and the Agencies have approved cessation of pumping. Well W440 was never pumped and was properly sealed soon after installation because the Platteville Aquifer at that location did not yield adequate quantities of water. Well W440 is the subject of the 1997 Explanation of Significant Differences listed in Section 1. Well W48 is used to irrigate landscaped areas around Methodist Hospital. The pumping rate is much less than it was prior to 1991 when it was used to provide once-through cooling water, but the pumping rate and flow from this well is not currently measured, thus it is not included in Table 2.

Table 3 provides average annual pumping rates for the pumping wells since 2000.

A comparison of Table 1 and 2 indicates that the following wells meet the minimum pumping rates established for each well:

Well	Pumping Goal	2014 Actual
SLP10/15	200 mgy and 10 mg per month	269 mg and >10.5 mg per month
W421	25 gpm	29 gpm
W23	50 gpm	57 gpm

The following wells did not meet the minimum pumping rates:

Well	Pumping Goal	2014 Actual Averages
SLP4	900 gpm winter/300 gpm summer	871 gpm winter/895 gpm summer
W420	40 gpm	36 gpm
W410	65 gpm	42 gpm
W439	50 gpm	49 gpm
W48	No goal established	Unknown

Well SLP4 did not meet the minimum pumping rate of 900 gpm between October and April. Note that the value of 871 gpm was calculated using only 2014 data. The winter pumping goal is a hardship for the City because water demand is much lower in the winter. Rather than pumping and wasting the water, the City pumps close to the minimum winter rate all year long.

Wells W420, W410, and W439 have all recently been redeveloped due to declining yields in recent years. Records of this work are provided in Appendix A. The 2014 actual average pumping rates were the maximum that were obtainable in these wells without drawing the water levels in the wells below the pumps. The City proposes to continue pumping at the maximum capacity of these wells until a decision is made regarding cessation of the pumping, or replacing the wells. Also, the Methodist Hospital is in the process of permanently abandoning well W48 in accordance

with the Minnesota Department of Health Water Well Construction Code. No further pumping is anticipated from well W48.

3.0 GROUNDWATER TREATMENT MONITORING

Three groundwater treatment plants that use granular activated carbon (GAC) filter media are operating at the Site. Two of the plants treat municipal well water and the GAC is used as a polishing step to pre-existing City treatment plants that use sand filters to remove iron and other naturally occurring minerals. The third treatment plant is known as the groundwater treatment facility (GTF) which was a new plant built by Reilly to treat water from remediation wells installed at the Site. The three treatment plants are described below.

- Water treatment plant number 1 is located near Minnetonka Boulevard and Jersey Avenue and treats water from wells SLP10, SLP15, and SLP11. Aeration and sand filtration is used to remove iron, and the water from these wells is also treated with chlorine and fluoride before distribution. In 1985 GAC treatment was added at this plant in order to provide the City with an adequate quantity of clean water at the earliest time possible. It includes two 20,000-pound GAC vessels operated in parallel to remove PAH from wells SLP 10 and/or SLP15. The building has space for two additional GAC vessels, if needed, although the City's experience has shown that the original two vessels are sufficient. In accordance with CD-RAP Section 4.1.3, this GAC plant was designed to handle a flow rate of 1200 gpm and attain the drinking water criteria specified in CD-RAP Section 2.2. The GAC plant meets both requirements and the treated water is used in the City of St. Louis Park municipal water supply system.

- Water treatment plant number 4 is located near 41st Street and Natchez Avenue and treats water from well SLP4. GAC treatment was added to the iron removal and chemical treatment facilities by the City in 1991. The GAC was added after the City received adverse public responses to the planned surface water discharge for well SLP4 described in CD-RAP Section 7.2.3. GAC treatment plant number 4 uses four 20,000-pound GAC polishing vessels to remove PAH from well SLP4. Other design and operation specifications are the same as GAC treatment plant number 1. The GAC plant meets the flow design and treatment requirements and the finished water is used in the City of St. Louis Park municipal water distribution system. Both GAC plants are covered under National Pollution Discharge Elimination System (NPDES)/State Disposal System (SDS) permits for the discharge of backwash to surface water, as summarized in the table below.

- The GTF was built by Reilly in 1989 in accordance with CD-RAP, Appendix B, Section 2 (c) to treat the groundwater pumped from wells W420, W421, W105, and W23. The GTF has a treatment capacity of 150 gpm and the water is treated to meet effluent limits of an NPDES/SDS permit. Water from the plant is routed to South Oak Pond that has an outfall to Minnehaha Creek. Electronic copies of the quarterly permit monitoring reports to MCES were sent to the Superfund project leads at the Agencies to demonstrate compliance.

Treatment Plant ID	Permit ID	Permit Monitoring Requirements	Report Destination
Treatment Plant Number 1	MNG640000	Daily flow and quarterly grab samples for pH, total suspended solids, chlorine, and phosphorus	MPCA
Treatment Plant Number 4	MNG640000	Daily flow and quarterly grab samples for pH, total suspended solids, chlorine, and phosphorus	MPCA
Groundwater Treatment Facility	MN0045489	Daily flow and monthly grab samples for pH, phosphorus, anthracene, fluoranthene, naphthalene, diesel range organics, phenanthrene, phenols, and CPAH	MPCA

In addition to the permit monitoring described in the table above, the 2014 Sampling Plan developed in accordance with the requirements of Section 3.3 of the RAP, provided for quarterly monitoring of the treatment system effluent, and annual monitoring of the treatment system feed water for PAH and for acid fraction analysis (Section 4.3.4). The 2014 monitoring was jointly conducted by Summit and TestAmerica Laboratories. Summit collected all samples and TestAmerica was responsible for the analytical services. Laboratory analyses were conducted at the TestAmerica laboratory in Arvada, Colorado.

Raw groundwater samples from the wells being treated (samples collected prior to treatment) are discussed in Section 4 of this report.

4.0 GROUNDWATER MONITORING

4.1 Groundwater Elevation Summary

Water levels are measured at the time of sampling unless access to the well is blocked in some way, or if automated measurement data are available. The water level data are recorded along with other information of the groundwater sampling information sheets (Appendix A). Since groundwater sampling events can last a week or more, water levels were measured in as many wells as possible on the same day. Table 4 contains the water levels measured on October 15, 2014 including manual measurements at monitoring wells and automated data for wells equipped with transducers on or about noon on October 15, 2014.

Table 4 also identifies the measuring point elevations and gives data for the screened or open-hole intervals that provide water to the wells. In general, the measuring point elevations were surveyed at the time of installation and have been updated when changes in the configuration of the well heads have been known to occur. For many of the wells, the measuring point elevations were surveyed approximately 20 years ago. For this reason, the City plans to re-survey the measuring points of all the monitoring wells shown on Table 4 within the City of St. Louis Park in 2015.

As shown on Table 4, the following wells were unable to be measured in 2014:

Well ID	Explanation for Lack of Measurement	Resolution
W29	Water level not measured to avoid loss of measuring tape in this well.	To be discussed with Agencies
W119	Water level not measured to avoid loss of measuring tape in this well.	Substitute new nearby well that is equipped with a transducer for continuous water level measurements.
W401	Well head is sealed and no measurement is possible. It would require a new well seal with a measurement port installed by a driller.	This is a private well owned by Interlachen Country Club and they would need to approve a change. The City and the Agencies should discuss this.
W48	Water leaking down the well during pumping prevented accurate measurement. The electric probe was activated before the level of water in the well.	Methodist Hospital has plans to abandon this well in Q1 2015.
SLP6	One or two measuring tapes are stuck in the well. The pump would need to be pulled and the drop pipe replaced by a driller.	To be discussed with Agencies
H6	Water level not measured to avoid loss of measuring tape in this well.	Hopkins does not have a transducer in this well. To be discussed with Agencies
MTK6	Water level not measured to avoid loss of measuring tape in this well.	Minnetonka does not have a transducer in this well. To be discussed with Agencies

Many of the municipal wells and several monitoring wells are equipped with transducers for automated water level measurements. A protocol for transmittal of these water level measurements to the Agencies is under discussion. Lists of vented and non-vented transducers are provided below.

Wells Equipped with Vented Transducers

SLP4	E6	W23
SLP8	E7	W33R
SLP10	E8	W409
SLP11	E10	W410
SLP13	E11	W411
SLP14	E12	W412
SLP16	E13	W413
ETW	E16	W414
E2	E17	W415
E3	E18	W416
E5	E19	W420
	E20	W421

Wells Equipped with Non-Vented Transducers

SLP5	SLP7	SLP12

4.2 Chemicals of Concern

The Annual Sampling Plan describes the groups of contaminants for which monitoring is being conducted and the goals for monitoring each aquifer. Table 5 identifies the contaminants and the following:

- Whether the contaminant is listed in the CD-RAP and in which category (e.g., routine monitoring CPAH etc.)
- What analytical group the contaminant is part of (e.g., "MPCA Extended List" "PPT PAH")
- CD-RAP Drinking Water Criteria & Advisory Levels
- Other current regulatory, advisory, and screening levels
- Analytical reporting limits for the methods/labs

4.3 Groundwater Sampling Summary

Table 6 provides a summary of the groundwater sampling done in 2014. All of the samples were collected by Summit Envirosolutions, Inc. and Table 6 indicates which samples were analyzed by Test America's Arvada, Colorado laboratory, and which were analyzed by Pace Analytical Services' Minneapolis, Minnesota laboratory.

The identities of the wells sampled, frequency of sampling, and the analyses performed were described in the Annual Sampling Plan for 2014. That document was originally submitted on October 30, 2013 and was eventually approved with new requirements on July 9, 2014. The new requirements included changing the analytical method for Drift and Platteville Aquifer samples. That is the reason why the three first quarter samples were analyzed for priority pollutant PAH and the remaining samples were analyzed for MPCA's extended PAH list (25CPAH).

Deviations to the planned sampling in 2014 are described below:

- Well SLP3 was abandoned prior to the St. Peter Aquifer sampling event.
- Well E15 was due to be sampled once in 2014, but was not available for sampling due to damaged equipment that prevented the City of Edina from pumping the well. The City added a sample from well ETW to help fill the void left by well E15.
- Heavy June rains caused local flooding, especially at several golf courses where wells are sampled. The only sample that was not collected in 2014 due to the flooding was the second quarter sample from well W119 at Meadowbrook Golf Course.
- Additional sampling for three wells in the Prairie du Chien – Jordan Aquifer was approved separately by the Agencies on October 30, 2014. Wells SLP5 and W440 (a private well owned by Midland Glass) were to be sampled from three discrete depth intervals. That sampling was not done in 2014 pending a switch in analytical laboratories.
- None of the planned fourth quarter sampling was conducted due to the proposed switch in analytical laboratories. The prior laboratory was Test America in Denver, Colorado, which had a variety of quality assurance/quality control problems that degraded the quality of data produced by the lab. The Annual Sampling Plan for 2015 proposed a switch to ALS' Kelso, Washington laboratory and all sampling was suspended pending their method development, MDL study, and QAPP revisions. Agencies' approval of ALS Kelso is expected in Q1 2015.

All Reilly Site validated laboratory reports were emailed to the Agencies shortly after they were received. As part of the preparation of this annual monitoring report, the site database has been updated and submittal of the analytical results (transmitted electronically to MPCA in EQuIS-ready format) is contemporaneous with the submittal of this report each year. Qualifiers are shown in the database, where needed, including 'R' for rejected data.

4.4 Comparison to Cessation Criteria

This section discusses the analytical results for wells that were once pumped as part of the CD-RAP requirements, but where pumping was discontinued because cessation criteria were met.

Well W422 – Pumping was discontinued in 2000 with the approval of the Agencies because the well met numerical cessation criteria that matched the Minnesota Department of Health's Health Risk Limits (HRLs) for six specific PAH plus the Health Based Value (HBV) for benzo(a)pyrene toxic equivalents. Table 7 shows the cessation criteria and the analytical results for samples from well W422 for each year since pumping was discontinued. Table 7 shows that the water quality results at well W422 remain below cessation criteria.

Well W434 – Pumping was discontinued in 2006 with the approval of the Agencies because the well met numerical cessation criteria that matched the Minnesota Department of Health's HRLs for six specific PAH plus the HBV for benzo(a)pyrene toxic equivalents. Table 8 shows the cessation criteria and the analytical results for samples from well W434 for each year since pumping was discontinued. Table 8 shows that the water quality results at well W434 remain below cessation criteria.

Well W105 – Pumping was discontinued in 1991 with the approval of the Agencies. The CD-RAP (Section 6.1.5) that states that the criterion for cessation of pumping well W105 was the mean plus one standard deviation of at least four consecutive samples collected quarterly being less than 10 ug/L total PAH. The historical PAH data for well W105 are summarized in Table 9 which gives CPAH, OPAH, and benzo(a)pyrene plus dibenz(a,h)anthracene sums. Total PAH concentrations in samples from well W105 were below 10 ug/l for the entire five years it was pumping and concentrations remained below that level for all samples since cessation, with the exception of the results for the following samples:

- November 1992. Resampling showed PAH concentrations >10 ug/l.
- May 2008. Resampling showed PAH concentrations >10 ug/l.
- June 2010. Resampling showed PAH concentrations >10 ug/l.
- September 2014. The City will resample well W105 in 2015.

Well W440 – This well was constructed in 1996 in a location that the Agencies considered most likely to produce water, but it did not provide sufficient draw-down to produce a significant capture zone and was shut down (properly abandoned) soon after construction.

Well W48 – This well was used for cooling water (air conditioning) prior to 1991 by Methodist Hospital. After Methodist Hospital switched to a closed-loop cooling system the well was used for landscape irrigation. The pumping rate went from approximately 300 million gallons per year in the late 1980s (WDNR data for permit number 1985-6010) to approximately 3 million gallons per year recently (personal communication from Bill Tester to Jay Hall on January 29, 2015). Methodist Hospital is planning to properly abandon well W48 during Q1 2015. The CD-RAP does not include cessation criteria for well W48. The Agencies have requested actions pursuant to Section 7.4.1 "W48 Pumping Rate" and these actions remain under discussion.

4.5 Time Series Tables and Graphs

This section includes time series tables and graphs as requested by the Agencies. Tables 10 through 14 provides the historical CPAH, OPAH, and benzo(a)pyrene plus dibenz(a,h)anthracene sums for each well sampled in 2014 for the Mt. Simon – Hinckley, Prairie du Chien – Jordan, St. Peter, Platteville, and Drift Aquifers, respectively.

EPA has hired a contractor to perform statistical tests and groundwater modeling using data supplied by the City. A draft report containing the EPA's contractor's findings was used to identify individual PAH compounds that have increasing concentration trends over the last 10 years. Graphs have been prepared to depict the last 10 years of CPAH and OPAH sums for the following wells:

E13	W18	W119	W421
E7	W23	W129	W426
SLP4	W27	W133	W434
SLP6	W48	W410	W437
SLP10	W105	W420	W439
W14	SLP17*		

*Well SLP17 was last sampled in 1999 so data from 1988 to 1999 are graphed in Appendix E.

Also, shown on the graphs are individual PAH compounds that contribute the most to the concentration sums shown. All of the graphs are contained in Appendix E.

Tables

Reilly – Summary of CD-RAP- & ROD-Required Pumping Wells
L Evison 12-18-14 draft

Aquifer	Pumping Well	Purpose Stated in CD-RAP or ROD	Pumping Requirements	Current Status	Cessation Criteria
Drift-Platteville	W420 W421	Source control CD-RAP Section 9.1.1 required Reilly to submit a plan for two source control wells (one Drift, one Platteville) "each capable of controlling the flow of groundwater from beneath an area defined by Walker St. on N, temp Louisiana Ave on E, Lake St. & South Frontage St. Extension on S, and a N-S line extending from intersection of Walker & W 37th St on W". W420 – constructed in Drift. Began operating 1987. Original maximum capacity 48 gpm. W421 – constructed in Platteville. Began operating 1987. Original maximum capacity 48 gpm.	CD-RAP Section 9.1.3 requires pumping of each well at 25 gpm with discharge to sanitary sewer; however, current requirement is 40 gpm for W420 (see below). 1989 – Capture zones evaluated based on area of influence of water levels (SDMS doc #234560 dated 6/30/89 describes method; no record of results in SDMS) 1989 letter from Reilly contractor states that "W420 will continue to be pumped at a monthly avg rate of at least 40 gpm, which has been shown to effectively control groundwater flow in the bog area" (SDMS doc #234558). 1995 ROD states that "...W420... and 421... have been operating since October 1987 at the CD-RAP required pumping rate of 40 and 25 gpm respectively".	Both wells are pumping with discharge treated by GAC & discharged to Minnehaha Creek. (CD-RAP Section 2.9 allows the discharge of any source control or gradient control well to be changed.) W420 - 2013 avg = 47 gpm W421 - 2013 avg = 17 gpm; currently can only attain 22 gpm before breaking suction. City has redeveloped the well to ty try to increase flow without success.	CD-RAP Section 9.1.4 states that Reilly may submit a request to cease "when the Drift-Platteville source control system is no longer required to control the source of contamination in the area defined in Section 9.1.1(A)", i.e., "an area defined by Walker St. on N, temp Louisiana Ave on E, Lake St. & South Frontage St. Extension on S, and a N-S line extending from intersection of Walker & W 37th St on W".
Drift-Platteville	W422	Gradient control CD-RAP Section 9.2.1 requires Reilly to submit "a plan for installing a gradient control well system in the Drift-Platteville aquifer." The plan was required to include "a well in the Drift within 500 ft of W12." This well was constructed and began operating in 1987.	CD-RAP Section 9.2.1 requires pumping at a monthly average rate of 50 gpm with discharge to sanitary sewer. 1991- city increased pumping rate to its maximum of 61 gpm (SDMS doc#234589)(no explanation given)	Shut down. Well operated until 2000 when Agencies approved shut-down, documenting rationale and stating that "Control wells W420 and W421... appear to sufficiently capture the highly contaminated groundwater immediately south of the former Reilly Site." (SDMS doc#908885)	CD-RAP Section 9.2.4 states that Reilly may submit a request "when the Drift-Platteville gradient control system is no longer required to limit the spread of contamination into the area delineated by the buried bedrock valley as mapped by..." (specifies the report)
Drift-Platteville	W439 W440	Gradient control in northern area CD-RAP Section 9.3 & 9.4 require an RI/FS for an area bounded by West 32nd St. to the north, Alabama Ave. to the east, Hwy 7 to the south, and Louisiana Ave to the west. Section 9.5.1 states that the Agencies "may, for the purpose of limiting the further spread of contamination located within the study area defined in Section 9.3.1, require Reilly to implement and operate a remedy of installing one or more gradient control wells." 1992 ROD selected one Drift well to prevent further spread of contaminants exceeding Drinking Water Criteria in the area defined in the CD-RAP. This well was constructed and began operating in 1995. 1995 ROD selected one Platteville well (designated W440 in the ROD) to prevent further spread of contaminants exceeding Drinking Water Criteria in the area defined in the CD-RAP. This well was constructed but couldn't produce enough water. 1997 ESD modified the 1995 ROD to allow W434 to fulfill the purpose of the ROD.	CD-RAP does not specify pumping rates for northern area wells. 1992 ROD does not specify a pumping rate. Northern Area Drift Aquifer Gradient Control Well Plan specified 50 gpm (find May 9, 1994 approval letter). 1995 ROD does not specify a pumping rate. It states that "The well will be pumped at a rate, depending on the extent of contamination in the aquifer as determined by groundwater monitoring, to control the further spread of contamination in the Platteville Aquifer."	W439 - Pumping. 2013 avg = 42 gpm (discharged to sanitary sewer?) W440 - Shut down or plugged. Well was constructed in what the Agencies considered the location most likely to produce water but it did not provide sufficient draw-down to produce a significant capture zone.	CD-RAP Section 9.5.2 states that "Reilly may submit a request... to cease operating the Drift-Platteville area remedy... when operation of this remedy is no longer required to limit the spread of contamination located within the study area described in Section 9.3.1" (i.e., "an area bounded by West 32nd St. to the north, Alabama Ave. to the east, Hwy 7 to the south, and Louisiana Ave to the west.")

Platteville	**W434**	Gradient Control This well is not mentioned in the CD-RAP. W434 was constructed in 1991. Following pump tests and the northern area FS, in 1994 the City requested a modification to the gradient control well system in the Drift/Platteville to allow W434 as an additional Platteville aquifer gradient control well located up-gradient of the buried bedrock valley (SDMS doc #234620). Agencies agreed that pumping W434 will enhance gradient control for Platteville and also may reduce scope/duration of St. Peter remedy (SDMS doc #234621) The 1997 ESD for the northern area of the Platteville states that "Well W434 was originally installed to capture any contamination before such contamination entered the buried valley southeast of the site. However, W434 should be able to provide for both capture of contaminants, as well as reasonable gradient control in the Platteville aquifer."	City recalls that operation was at 20 – 25 gpm and that this was effective for preventing contamination from entering the bedrock valley.	Shut down. 2006 – Agencies approved cessation of pumping, stating that the concentrations were below Minnesota Department of Health's Health-Risk Limits, the aquifer was not used as a source of drinking water, the well had a very small capture area and W421 was capturing what was present in the area, The letter cites re-start criteria in a April 15, 2005 Agency letter. (Find that letter.)	W434 is not mentioned in the CD-RAP.
St. Peter	**W410**	Gradient Control CD-RAP Sections 8.1 & 8.2 required a RI/FS for the St. Peter aquifer. Section 8.3 stated that the Agencies "may, for the purpose of preventing the further spread of groundwater exceeding any of the Drinking Water Criteria defined in Section 2.2, require Reilly to install and operate a gradient control well system consisting of one or two gradient control wells." 1990 ROD selected one gradient control well. The well was constructed and began operating in 1991.	1990 ROD selected 1 well operated at 65 – 100 gpm. 2005 City contractor letter states that "W410 pumps at a minimum rate of 50 gpm..." (SDMS doc#474698)	Pumping 2013 avg = 44 gpm. Discharged to sanitary sewer. Well initially achieved 70 gpm in 1991; was redeveloped in 2008 (and again more recently?) but it didn't help.	The CD-RAP does not include cessation criteria for the St. Peter.
Prairie du Chien	**W23**	Source control CD-RAP Section 7.1 is entitled "Source Control at W23". Section 7.1.1 requires a plan for reconstruction and pumping of the well, with untreated discharge to sanitary sewer. The well was reconstructed and began pumping in 1987.	CD-RAP Section 7.1.3 requires pumping at a monthly average rate of 50 gpm.	Pumping 2013 avg = 52 gpm Water is treated with GAC and discharged to Minnehaha Creek.	CD-RAP Section 7.1.4 requires pumping to continue until the mean plus one standard deviation of at least six consecutive samples collected bimonthly contain less than 10 ug/L total PAH. (This is equivalent to 10,000 ppt, several orders of magnitude higher than the Drinking Water Criteria.) The CD-RAP also includes restart criteria for this well.
Prairie du Chien	**SLP10/15**	Drinking Water Supply (and, according to the ROD, also gradient control) The section of the CD-RAP that discusses SLP10/15 does not mention source control or gradient control. CD-RAP Section 4-1 requires construction of a GAC treatment system for SLP10/15 that is includes as a design criteria a flow rate of 1200 gpm. The treatment system was constructed and began operating in 1986. 1984 ROD describes the remedy (construction of the treatment system for SLP10/15) as "a major component of restoration of drinking water quality to St. Louis Park, Minnesota" and also states that "Operation of the above system at 1200 gallons per minute will also serve as a major component of a gradient control well system. The operation of the gradient control well system will protect the drinking water supplies of neighboring cities from contamination, and allow St. Louis Park eventually to open other wells closed due to contamination." (p. 1). See also the discussion of alternatives on p. 14.	CD-RAP Section 4.2.1 requires operation of the treatment system (emphasis added) at a minimum annual pumping rate of 200 Mgal/yr, min. pumping volume of 10 Mgal in any calendar month. The CD-RAP does not include a pumping requirement independent of the treatment system.	Pumping 2013 avg = 530 gpm (~278Mgal/yr) Currently ~1250 gpm (~657Mgal/yr)	CD-RAP Section 4.2.2 requires operation of the treatment system whenever the water is used for drinking water, until the Agencies approve stopping GAC system operation in accordance with Section 4.4. Section 4.4 states that GAC system operation may cease when the mean plus one standard deviation of at least six consecutive feed water samples collected bimonthly are less than all Drinking Water Criteria and the mean of such samples are less than Advisory Levels for cPAH and the sum of B(a)P + dibenz(a,h)anthracene.

Prairie du Chien	**SLP4**	Gradient control (now also drinking water supply) The CD-RAP section that discusses SLP4 (Section 7.2) is titled "Gradient Control". Section 7.2.1 requires FS to study discharge of 1000 gpm from SLP4 to surface waters. Section 7.2.3 & 7.2.4 require study & implementation of treatment if required by an NPDES permit. Section 7.2.8 states that Reilly or the City may request use of the water for drinking water supply if treated below Drinking Water Criteria.	CD-RAP Section 7.2.7 requires pumping "at its capacity (900 gpm or as near as practicable) from October through April and 300 gpm from May through September". This section also specifies that if SLP, Reilly, MPCA & EPA agree, rate can be adjusted up or down by up to 250 gpm.	Pumping 2013 avg = 938 gpm Currently ~1000 gpm Water has been treated with GAC and used for drinking water since 1992.	CD-RAP (Section 7.2.9): When SLP4 and all wells north of a E-W line through W48, including W48 but not W23, are each less than Drinking Water Criteria for PAH for two consecutive years (based on semi-annual sampling - see Section 7.3).
Prairie du Chien	**W48**	A contributor to gradient control Section BB(2)(c) of the CD includes W48 in a list of wells included in the "source and gradient control well system in the Prairie du Chien-Jordan aquifer". Section 7.4 of the CD-RAP titled "Contingent Actions" recognizes that pumping at W48 affects gradient control. However, W48 is not discussed in Section 7.2 titled "Gradient Control", likely because it is not under the direct control of the City of St. Louis Park. CD-RAP Section 7.4.1 says (paraphrasing) that if Reilly is unable to make arrangements for the pumping rate to be maintained, we may either make the hospital do it or we may require other modifications to the gradient control system (see actual language in next box).	CD-RAP Section 7.4.1 titled "W48 Pumping Rate" states that "If changes in the rate of usage of groundwater from W48 result in a significant reduction in the pumping rate, Reilly shall use its best effort to ensure that the pumping rate is maintained at levels adequate to maintain effective operation of the gradient control system. This may include obtaining an access agreement pursuant to Part P of the Consent Decree. If Reilly is unable to make such arrangements, the Regional Administrator and Director shall assess the effect of diminution of this pumping stress, and may use their authority under statutes and regulations they administer to maintain the pumping rate or may require gradient control system modifications pursuant to Section 7.4.1." 1993 – Agencies asked for documentation of Reilly efforts to ensure pumping is maintained at W48 (SDMS doc #908914)	Pumping intermittently at a low rate during summer for irrigation use by Methodist Hospital (details?). 1985 USGS modeling report cites 1980 withdrawal rate for W48 of 162 gpm spring and 785 gpm summer (SDMS doc # 234543) 1995 Agencies letter presents modeled PdC capture comparing 785 and 0 gpm for W48 (SDMS Doc #908810) 2000 FFS by City states that W48 is capable of pumping ~750 gpm, that a pump was installed with a capability of pumping ~450 gpm, and that pumping for cooling water was discontinued in 1991. (SDMS doc#364700)	The CD-RAP does not include cessation criteria for W48.
Ironton-Galesville	**W105**	Source control CD-RAP Section Section 6.1 is titled "Source Control at W105". Section 6.1.1 requires a plan to use W105 as a pumping well with untreated discharge to the sanitary sewer. The well was constructed and began operating in 1987.	CD-RAP Section 6.1.3 requires pumping at a monthly average rate of 25 gpm.	1992 ROD states that Agencies approved discontinuing pumping W105 in 1991 after well met the cessation criteria. (Letter itself is not in SDMS.)	CD-RAP (Section 6.1.5) states that the criterion for cessation of pumping is the mean plus one standard deviation of at least four consecutive samples collected quarterly being less than 10 ug/L total PAH. This is equivalent to 10,000 ppt, several orders of magnitude higher than the Drinking Water Criteria.

Table 2. Reilly Site 2014 Pumping Data
Prairie du Chien – Jordan Aquifer

	SLP10		W23		SLP4	
Month	Total Gallons Pumped	Monthly Average Flow Rate Gallons Per Minute	Total Gallons Pumped	Monthly Average Flow Rate Gallons Per Minute	Total Gallons Pumped	Monthly Average Flow Rate Gallons Per Minute
January	18,504,000	415	2,267,190	51	39,745,000	890
February	18,523,000	459	2,028,450	50	34,483,000	855
March	10,585,000	237	2,290,950	51	38,376,000	860
April	17,806,000	412	2,200,340	51	40,122,000	929
May	13,406,000	300	1,881,110	42	38,667,000	866
June	31,135,000	721	2,284,340	53	42,537,000	985
July	33,682,000	755	2,788,760	62	41,245,000	924
August	36,746,000	823	2,725,040	61	36,053,000	808
September	30,217,000	699	2,730,600	63	38,639,000	894
October	23,937,000	536	2,895,240	65	41,584,000	932
November	15,852,000	367	2,832,440	66	37,653,000	872
December	18,635,000	417	3,039,980	68	33,862,000	759
TOTAL	**269,028,000**	**512**	**29,964,440**	**57**	**462,966,000**	**881**

Table 2. Reilly Site 2014 Pumping Data
St. Peter Aquifer

Month	W410 Total Gallons Pumped	Monthly Average Flow Rate Gallons Per Minute
January	1,933,040	43
February	1,709,910	42
March	1,957,610	44
April	1,855,300	43
May	1,897,770	43
June	1,702,880	39
July	1,820,920	41
August	1,745,050	39
September	1,806,690	42
October	1,848,360	41
November	1,835,380	42
December	1,896,580	42
TOTAL	**22,009,490**	**42**

Table 2. Reilly Site 2014 Pumping Data
Drift - Platteville Aquifer

	W420		W421		W439	
Month	Total Gallons Pumped	Monthly Average Flow Rate Gallons Per Minute	Total Gallons Pumped	Monthly Average Flow Rate Gallons Per Minute	Total Gallons Pumped	Monthly Average Flow Rate Gallons Per Minute
January	0	0	0	0	2,217,720	50
February	0	0	0	0	1,962,230	49
March	1,720,350	39	783,710	18	2,125,350	48
April	1,986,510	46	1,241,070	29	2,160,000	50
May	1,840,230	41	1,276,230	30	2,184,450	51
June	1,853,950	43	884,610	20	2,134,180	48
July	1,991,800	45	910,650	20	2,120,600	48
August	929,660	45	2,02100	21	2,237,640	50
September	910,040	45	1,950,040	21	2,149,800	50
October	930,780	45	2,009,680	21	2,229,20	50
November	1,875,640	43	882,540	20	2,144,850	50
December	2,006,110	45	984920	22	2,101,950	47
TOTAL	16,045,070	**43**	12,944,450	**22**	**25,768,940**	**49**

Table 3. Average Annual Pumping Rates 2000-2014

(gallons per minute*)

W23	
Year	Ave. GPM
2000	50.0
2001	43.6
2002	49.3
2003	47.1
2004	46.6
2005	46.4
2006	53.0
2007	53.5
2008	48.8
2009	54.4
2010	55.0
2011	56.4
2012	49.7
2013	52.5
2014	57.0

W410	
Year	Ave. GPM
2000	79.9
2001	78.2
2002	64.8
2003	48.3
2004	51.8
2005	85.1
2006	69.3
2007	57.5
2008	37.8
2009	45.3
2010	57.8
2011	52.6
2012	57.6
2013	44.2
2014	41.9

W420	
Year	Ave. GPM
2000	27.6
2001	28.7
2002	33.9
2003	32.9
2004	33.6
2005	33.2
2006	37.4
2007	43.0
2008	28.3
2009	50.1
2010	49.2
2011	39.9
2012	35.5
2013	43.6
2014	36.4

W421	
Year	Ave. GPM
2000	27.6
2001	25.7
2002	26.7
2003	22.7
2004	27.3
2005	29.7
2006	29.2
2007	25.0
2008	24.0
2009	18.2
2010	19.6
2011	31.0
2012	20.0
2013	15.9
2014	29.4

W422	
Year	Ave. GPM
2000	50.7
2001	0
2002	0
2003	0
2004	0
2005	0
2006	0
2007	0
2008	0
2009	0
2010	0
2011	0
2012	0
2013	0
2014	0

W434	
Year	Ave. GPM
2000	29.6
2001	29.3
2002	26.7
2003	26.0
2004	31.4
2005	32.4
2006	28.6
2007	0.0
2008	0.0
2009	0.0
2010	0.0
2011	0.0
2012	0.0
2013	0.0
2014	0.0

W439	
Year	Ave. GPM
2000	50.4
2001	53.1
2002	52.1
2003	43.8
2004	44.4
2005	48.6
2006	55.1
2007	46.8
2008	40.2
2009	42.3
2010	48.2
2011	58.0
2012	42.0
2013	42.4
2014	49.0

SLP 4	
Year	Ave. GPM
2000	889.0
2001	954.1
2002	782.0
2003	875.7
2004	953.5
2005	831.0
2006	906.4
2007	934.9
2008	919.9
2009	976.0
2010	999.2
2011	984.6
2012	919.4
2013	938.0
2014	880.8

SLP 10/15	
Year	Ave. GPM
2000	572.0
2001	719.4
2002	675.4
2003	686.6
2004	681.0
2005	614.6
2006	648.1
2007	589.1
2008	669.0
2009	524.8
2010	391.2
2011	461.8
2012	630.8
2013	530.4
2014	511.8

*Averages do not include months in which the well was out of operation for more than 30 days.

Table 4 2013 Water Elevation Data

WELL	DATE	TIME	MP Elevation	Top of Screen Elevation	Bottom of Screen Elevation	DEPTH TO WATER	WL Elev
St. Peter							
W14	10/15/2014	14:46	891.35	805.49	796.49	21.10	870.25
W21	10/15/2014	10:10	892.60	800.60	800.60	23.01	869.59
W24	10/15/2014	9:20	893.19	806.19	803.19	23.44	869.75
W33R	10/15/2014	14:08	893.99	730.99	710.99	23.62	870.37
W122	10/15/2014	11:20	918.58	701.58	679.58	59.63	858.95
W129	10/15/2014	11:15	916.33	799.33	799.33	46.16	870.17
W133	10/15/2014	13:41	921.06	805.06	799.06	54.16	866.90
W408	10/15/2014	8:40	923.53	810.53	783.53	49.12	874.41
W409	10/15/2014	16:00	923.61	781.56	701.56	51.91	871.70
W410	10/15/2014	10:35	908.04	803.04	783.04	73.17	834.87
W411	10/15/2014	10:58	896.25	813.25	786.25	29.50	866.75
W412	10/15/2014	12:30	915.17	803.17	776.17	48.16	867.01
W414	10/15/2014	11:45	921.29	714.00	700.00	54.05	867.24
Platteville							
W18	10/15/2014	14:45	892.28	822.27	815.27	6.48	885.80
W20	10/15/2014	10:47	895.83	815.83	805.83	15.18	880.65
W22	10/15/2014	9:12	897.06	826.06	806.06	9.93	887.13
W27	10/15/2014	14:55	910.47	829.47	798.47	25.34	885.13
W100	10/15/2014	9:06	899.71	822.71	810.71	9.11	890.60
W101	10/15/2014	13:49	918.03	815.03	812.03	38.09	879.94
W120	10/15/2014	13:06	919.81	819.90	810.90	38.09	881.72
W121	10/15/2014	11:11	922.85	813.85	807.85	73.20	849.65
W124	10/15/2014	12:56	887.65	813.65	801.65	22.13	865.52
W130	10/15/2014	10:53	894.83	814.83	806.83	19.41	875.42
W131	10/15/2014	15:21	919.27	822.27	822.27	36.44	882.83
W132	10/15/2014	11:03	904.95	818.95	811.95	29.90	875.05
W143	10/15/2014	10:42	905.09	835.31	815.31	23.49	881.60
W415	10/15/2014	11:55	920.16	827.16	815.16	41.52	878.64
W417	10/15/2014	13:22	928.08	837.08	825.08	50.05	878.03
W421	10/15/2014	14:38	895.86	828.82	811.82	11.95	883.91
W424	10/15/2014	15:30	917.57	817.57	807.57	32.46	885.11
W426	10/15/2014	15:53	923.95	824.41	807.91	39.06	884.89
W428	10/15/2014	15:15	919.40	821.40	810.40	36.46	882.94
W429	10/15/2014	9:50	892.21	820.21	812.21	7.49	884.72
W431	10/15/2014	13:35	922.77	816.62	808.62	43.24	879.53
W433	10/15/2014	13:14	925.84	829.84	813.84	43.83	882.01
W434	10/15/2014	13:09	919.70	823.59	808.59	37.97	881.73
W437	10/15/2014	15:00	913.18	819.18	809.01	28.15	885.03
W438	10/15/2014	15:09	921.12	824.62	814.62	37.97	883.15

Table 4 2013 Water Elevation Data

WELL	DATE	TIME	MP Elevation	Top of Screen Elevation	Bottom of Screen Elevation	DEPTH TO WATER	WL Elev
				Drift			
P109	10/15/2014	10:45	895.11	853.11	851.11	10.78	884.33
P112	10/15/2014	11:05	903.80	855.80	853.80	20.48	883.32
P304	10/15/2014	9:50	892.21	858.21	855.21	7.29	884.92
P307	10/15/2014	14:58	913.10	849.40	839.40	28.66	884.44
P308	10/15/2014	15:38	923.29	864.59	854.59	39.20	884.09
P309	10/15/2014	15:04	925.16	862.16	852.16	41.16	884.00
P310	10/15/2014	15:07	921.48	861.98	851.98	38.31	883.17
P312	10/15/2014	13:04	919.45	844.47	834.47	37.69	881.76
P313	10/15/2014	13:32	923.98	862.98	852.98	42.77	881.21
W2	10/15/2014	9:04	897.96	865.96	861.96	10.15	887.81
W9	10/15/2014	14:50	891.32	870.21	866.21	7.25	884.07
W10	10/15/2014	10:06	892.03	867.03	863.03	6.65	885.38
W15	10/15/2014	9:35	894.47	822.44	814.44	8.23	886.24
W117	10/15/2014	13:50	917.75	849.75	845.75	37.74	880.01
W128	10/15/2014	11:10	922.89	859.89	855.89	44.93	877.96
W136	10/15/2014	15:23	919.17	870.17	866.17	35.81	883.36
W416	10/15/2014	12:06	920.21	869.21	857.21	42.08	878.13
W418	10/15/2014	13:23	928.21	862.21	850.21	48.45	879.76
W420	10/15/2014	14:28	895.88	855.84	828.84	36.13	859.75
W422	10/15/2014	10:20	908.04	855.04	830.04	27.15	880.89
W423	10/15/2014	15:32	917.51	882.51	872.51	32.66	884.85
W425	10/15/2014	15:54	923.81	888.76	878.76	38.53	885.28
W427	10/15/2014	15:14	919.40	884.40	874.40	36.50	882.90
W439	10/15/2014	16:09	924.90	866.38	830.88	51.36	873.54

Table 4 2013 Water Elevation Data

WELL	DATE	TIME	MP Elevation	Top of Screen Elevation	Bottom of Screen Elevation	DEPTH TO WATER	WL Elev
Prairie Du Chien							
W23	10/15/2014	12:00	897.22	637.22	447.22	47.74	849.48
W29			896.20	639.20	561.20		
W119			890.00	633.00	388.00		
W401			922.99	630.99	440.99		
W402	10/15/2014	16:45	868.21	606.64	482.64	70.59	797.62
W403	10/15/2014	16:35	868.21	633.21	483.21	58.66	809.55
W406	6/23/2014	9:14	920.28	658.28	335.28	113.35	806.93
W48			893.93	664.80	404.80		
SLP 4	10/15/2014	12:00	904.87	600.87	414.87	151.10	753.77
SLP 5	9/29/2014	10:40	927.13	622.13	462.13	130.06	797.07
SLP6			914.87	611.87	434.87		
SLP 7	10/15/2014	12:00	903.49	629.49	457.49	190.40	713.09
SLP 8	10/15/2014	12:00	940.07	626.07	433.07	133.00	807.07
SLP 10	10/15/2014	12:00	927.81	615.00	431.00	131.90	795.91
SLP 14	10/15/2014	12:00	906.54	517.54	421.54	106.90	799.64
SLP 16	10/15/2014	12:00	934.34	509.34	434.34	179.10	755.24
E 2	10/16/2014	12:04	879.85	613.00	433.00	89.90	789.95
E 3	10/17/2014	12:04	877.65	612.00	381.00	0.00	877.65
E 4	10/18/2014	12:04	892.35	629.00	395.00	31.90	860.45
E 5	10/19/2014	12:04	877.65	630.00	439.00	76.80	800.85
E 6	10/20/2014	12:04	911.98	595.00	408.00	173.80	738.18
E 7	10/21/2014	12:04	953.97	603.00	406.00	174.10	779.87
E 8	10/22/2014	12:04	876.08	644.00	404.00	79.00	797.08
E 11*	10/23/2014	12:04	831.37	510.00	428.00	182.00	649.37
E 13	10/24/2014	12:04	935.47	506.00	440.00	164.30	771.17
E 15	10/25/2014	12:04	898.10	275.00	475.00	0.00	898.10
E 16	10/26/2014	12:04	891.44	623.00	423.00	83.00	808.44
E17	10/27/2014	12:04	864.37	491.00	403.00	78.70	785.67
E 18	10/28/2014	12:04	863.95	498.00	417.00	58.90	805.05
E 19	10/29/2014	12:04	948.95	511.00	428.00	158.10	790.85
E 20	10/30/2014	12:04	886.36	622.00	419.00	88.00	798.36
H 6			961.00	571.45	380.45		
MTK 6			916.94	521.00	427.00		
ETW	10/15/2014	17:30	902.03	631.03	452.03	102.07	799.96

*Edina municipal staff are checking this transducer due to apparent low elevation.

Reilly Tar - Summary of Available PAH Criteria

Reilly COCs/Potential COCs Joint Working Draft 1/26/15 State values are in pink; Fed values in blue. See below the table and the next tab for footnotes.

Chemical	CAS Number	Analytes Included in 2015 SAP		Regulatory Levels		Advisory Levels	Screening Levels	Toxicity/Potency of cPAH Relative to B(a)P			2014 MDH Reporting Limit 8270D SIM/GC/MS (ug/L)	2015 ALS Project-Specific Reporting Limit Goals[C] (ug/L)	2014 Pace Reporting Limit 8270D SIM/GC/MS (ug/L)
		MPCA "Extended List PAH"[A]	CD-RAP "PPT PAH"[B]	MDH HRL[3] (ug/L)	EPA MCL[4] (ug/L)	MDH HBV[5] (ug/L)	EPA Tapwater Screening[6] (ug/L)	MDH RPF[7]	Previous MDH PEF, currently in use by MPCA[8]	EPA TEF[9]			
CD-RAP Routine Monitoring cPAH *(See CD-RAP Appendix A.1, required for routine monitoring.)*													
benz[a]anthracene	56-55-3	X	X				0.034	0.2	0.1	0.1	0.05	0.0043	0.041
benzo[b]fluoranthene[D]	205-99-2	X	X				0.034	0.8	0.1	0.1	0.05	0.0047	NA(0.21 total benzfluoranthenes)
benzo[j]fluoranthene[D]	205-82-3	X	X				0.065	0.3	0.1		0.05	NA	NA(0.21 total benzfluoranthenes)
benzo[g,h,i]perylene[I]	191-24-2	X	X					0.009			0.05	0.0062	0.041
benzo[a]pyrene	50-32-8	X	X		0.2	0.06 B(a)P equiv	0.0034	1	1	1	0.05	0.0025	0.041
chrysene	218-01-9	X	X				3.4	0.1	0.01	0.001	0.05	0.0056	0.041
dibenz[a,h]anthracene[E]	53-70-3	X	X				0.0034	10	0.56	1	0.05	0.0059	0.041
indeno[1,2,3,-c,d]pyrene	193-39-5	X	X				0.034	0.07	0.1	0.1	0.05	0.0054	0.041
quinoline[I]	91-22-5		X									0.009	
CD-RAP Extended List cPAH *(See CD-RAP Appendix A.2 . CD-RAP states that these are not routinely detected in SLP drinking water aquifers, but if detected in a special analysis, should be included in the sum.)*													
3-methylcholanthrene[#]	56-49-5	X						13	3		0.05	0.0044	0.041
7,12-dimethylbenz(a)anthracene[#]	57-97-6	X					0.0001	150	34		0.05	0.0028	0.1
benzo[c]phenanthrene	195-19-7											NA[J]	
dibenz[a,c]anthracene[E]	215-58-7											NA (coelutes)	
dibenzo[a,e]pyrene	192-65-4	X					0.0065	0.4	1		0.2	NA[J]	0.041
dibenzo[a,h]pyrene	189-64-0	X						0.9	10		0.2	NA[J]	0.041
dibenzo[a,i]pyrene	189-55-9	X						0.6	10		0.2	NA[J]	0.041
CD-RAP Total cPAH Drinking Water Criteria = 0.028 ug/L; Advisory Level = 0.015 ug/L													
CD-RAP Routine Monitoring oPAH *(see CD-RAP Appendix A.1., required for routine monitoring.)*													
1-methylnapthalene	90-12-0		X				1.10				0.05	0.0056	
2-methylnaphthalene	91-57-6		X				3.6				0.05	0.0059	
2,3-benzofuran	271-89-6		X									0.0054	
2,3-dihydroindene	496-11-7		X	(development planned)								0.005	
acenaphthene	83-32-9	X	X	400 (update planned)			53				0.05	0.0057	0.041
acenaphthylene	208-96-8	X	X								0.05	0.0048	0.041
acridine	260-94-6		X									0.0062	
anthracene	120-12-7	X	X	2000			180				0.05	0.0042	0.041
benzo(k)fluoranthene[D]	207-08-9	X	X				0.34	0.03	0.1	0.01	0.05	0.0041	NA(0.21 total benzfluoranthenes)
benzo[e]pyrene	192-97-2		X								0.05	0.0043	
benzo[b]thiophene	95-15-8		X									0.0052	
biphenyl	92-15-8		X									0.0056	
carbazole	86-74-8		X								0.05	0.0038	

Reilly Tar - Summary of Available PAH Criteria

Chemical	CAS Number	MPCA "Extended List PAH"[A]	CD-RAP "PPT PAH"[B]	MDH HRL[3] (ug/L)	EPA MCL[4] (ug/L)	MDH HBV[3] (ug/L)	EPA Tapwater Screening[6] (ug/L)	MDH RPF[7]	Previous MDH PEF, currently in use by MPCA[8]	EPA TEF[9]	Reporting Limit 8270D SIM/GC/MS (ug/L)	Project-Specific Reporting Limit Goals[C] (ug/L)	2014 Pace Reporting Limit 8270D SIM/GC/MS (ug/L)
dibenzofuran	132-64-9		X								0.05	0.0057	
dibenzothiophene	132-65-0		X	(development planned)								0.0041	
fluoranthene[F]	206-44-0	X	X	300 (Update planned)			80	0.08			0.05	0.0046	0.041
fluorene	86-73-7	X	X	300			29				0.05	0.0041	0.041
indene	95-13-6		X									0.0047	
indole	120-72-9		X									0.0047	
naphthalene[H]	91-20-3	X	X	70			0.170				0.05	0.0086	0.041
perylene	198-55-0		X								0.05	0.0033	
phenanthrene	85-01-08	X	X								0.05	0.0063	0.041
pyrene	129-00-0	X	X	200 (Update planned)			12.0				0.05	0.0042	0.041
CD-RAP oPAH Drinking Water Criteria = 0.280 ug/L; Advisory Level = 0.175 ug/L													
MDH Priority cPAHs Not in CD-RAP *(see MDH 2014 guidance)*													
5-methylchrysene	3697-24-3	X						1	1		0.05		0.041
6-nitrochrysene	7496-02-8	X						10	10		0.2		0.31
anthanthrene**	191-26-4							0.4			0.05		
benzo[c]fluorene**	205-12-9							20			0.05		
cyclopenta[c,d]pyrene**	27208-37-3							0.4					
dibenzo[a,l]pyrene	191-30-0	X						30	10		0.2		0.1
MPCA Extended List cPAHs Not in CD-RAP, not on MDH Priority cPAHs and not EPA Priority Pollutants													
1,6-dinitropyrene*	42397-64-8	X						10	10				1
1,8-dinitropyrene*	42397-65-9	X						1	1				1
2-nitrofluorene*	607-57-8	X						0.01	0.01		0.1		0.31
1-nitropyrene	5522-43-0	X							0.1				0.31
4-nitropyrene*	57835-92-4	X					0.019	0.1	0.1				0.31
5-nitroacenaphthene*	602-87-9	X						0.02	0.02		0.1		0.31
7H-dibenzo[c,g]carbazole*	194-59-2	X						1	1		0.05		0.041
dibenzo[a,h]acridine*	226-36-8	X						0.1	0.1		0.1		0.041
dibenzo[a,j]acridine*	224-42-0	X						0.1	0.1		0.1		0.1
Other Potential Reilly COC not in CD-RAP													
benzene				2	5		0.45						1

BOLD = EPA's 16 Priority Pollutant PAHs (same as MPCA's "short list" of 7 cPAHs and 9 oPAHs)

* These PAHs are on MPCA's Extended List but MDH 2014 cPAH guidance states that MDH does not consider these to be Priority PAHs at this time based on analytical issues, toxicological or environmental database uncertainties or low risk.

red = MDH Priority cPAH (2014 guidance)

** These 3 cPAH are not on MPCA's Extended List because their current policy not to put cPAHs on the list until there are both water and soil analytical methods for them and these lack a soil method.

Table 5 Reilly Tar - Summary of Available PAH Criteria, Footnotes

	In **bold** = EPA's 16 Clean Water Act Priority Pollutants (see http://water.epa.gov/scitech/methods/cwa/pollutants.cfm), that is the same as MPCA's routine "short list" PAHs (see http://www.pca.state.mn.us/index.php/view-document.html?gid=5482).
A	[illegible] and the same 9 oPAHs, that is the same as EPA's 16 Priority Polutant PAHs.) According to MPCA's 2011 guidance (see http://www.pca.state.mn.us/index.php/view-document.html?gid=16052), the cPAH extended list was developed by CalEPA for their air toxics program based on availability of toxicological data for the additional compounds. MPCA's guidance states that for some compounds on the list, laboratory analytical methods are currently unable to attain meaningful detection limits relative to the risk-based threshold levels. The primary source of the cPAHs that are on the extended list but not on MPCA's short list (7 cPAH) is combustion and coal-tar derivatives. (See also MPCA interim policy statement on cPAH at http://www.pca.state.mn.us/index.php/waste/waste-and-cleanup/cleanup/superfund/risk-based-site-evaluation-process-guidance-documents.html#carcinogenic-polycyclic-aromatic-hydrocarbons-cpah.) The current Reilly QAPP has "Extended List PAHs" analyzed by Pace-Minneapolis to low detection limits. Certain samples from the drinking water treatment plants, and the Drift and Platteville aquifers will be analyzed for this list.
B	The "PPT PAH" list is made up of the PAHs required for routine monitoring by the CD-RAP. The current Reilly QAPP has "PPT PAHs" analyzed by ALS-Kelso to ultra-low detection limits. Samples from the Prairie du Chien/Jordan, Mt. Simon/Hinkley, and St. Peter aquifers, plus annual samples from the drinking water treament plants, are analyzed for this list.
C	ALS-Kelso SOPs included in the QAPP state that method reporting limits are normally 2 to 10 X the method
D	Benzo(j)f coelutes with either benzo(b)f or benzo(k)f, depending on the relative concentration of the two in solution. Therefore, is generally reported as (j)+(b) or (j)+(k) or total. MDH and EPA now consider all three to be cPAH.
E	Dibenzo(a,h)anthracene and dibenzo(a,c)anthracene coelute. Results are the total of the two.
F	MDH considers fluoranthene to be also a cPAH. EPA's tapwater screening value is based on non-cancer risks.
G	EPA considers 1-methylnapthalene to have both cancer and non-cancer risk. The value given is for cancer risk and is lower than the screening value for non-cancer risk (62 ug/L).
H	EPA considers naphthalene to have both cancer and non-cancer risk. The value given is for cancer risk and is lower than the screening value for non-cancer risk (0.61 ug/L).
I	benzo(g,h,i)perylenel is now considered mainly an oPAH by MDH.
J	Lab reports that analytical standards are consistently available.
1	CD-RAP specifies that if quinoline is the only cPAH detected, the oPAH standard should be used instead of cPAH.
3	**Minnesota Department of Health - Health Risk Limits (promulgated values), Health-Based Values (non-promulgated values), Risk Assessment Advice.** For this purpose, the lowest value should be used (typically the "chronic" or "cancer" value). Generally these are based on HI of 1 & cancer risk of 10^{-5}. See web site below. http://www.health.state.mn.us/divs/eh/risk/guidance/gw/table.html

Table 5 Reilly Tar - Summary of Available PAH Criteria, Footnotes

4	**EPA Maximum Contaminant Levels (MCLs)** -- the maximum permissible level of a contaminant in water delivered to users of a public water system. These values consider both health-based and other factors. See web site below. http://water.epa.gov/drink/contaminants/upload/mcl-2.pdf
6	**EPA Regional Screening Levels (RSLs)** - Developed by the Superfund program for screening sites/areas/media that warrent further analysis. Based on 10^{-6} cancer risk and a child-based Hazard Quotient of 0.1 non-cancer risk. (EPA recommends screening at HQ of 0.1 when there are multiple contaminants present.) Values given in the spreadsheet are for residential **tapwater** and include ingestion, inhalation & dermal pathways, as of Nov 2014. See web site below. http://www.epa.gov/region9/superfund/prg/
7	**Minnesota Department of Health Relative Potency Factors (RPFs).** See *Guidance for Evaluating the Cancer Potency of Polycyclic Aromatic Hydrocarbon (PAH) Mixtures in Environmental Samples* , MDH, October 31, 2014. See web sites below. This added six cPAH to the list of MDH's previous "Potency Equivalence factors". These values are based in part on EPA's draft 2010 RPF document (see footnote 9.) http://www.health.state.mn.us/divs/eh/risk/guidance/pahmemo.html http://www.health.state.mn.us/divs/eh/risk/guidance/pahguidance.pdf
8	**Previous Minnesota Department of Health Potency Equivalence Factors (PEFs).** As of 2014, MPCA Interim Policy states "Although it is MPCA's practice to adopt MDH's guidance, since laboratory analytical methods are not available to analyze the six additional cPAH compounds added to the RPF list [see above], it is not feasible at this time. MPCA and MDH are working together to develop analytical methods for the new cPAH compounds. Once analytical methods have been established MPCA will re-evaluate the feasibility of implementing this guidance. Until then, MPCA will continue to use the PEF method to evaluate human health risks from cPAHs." (The link below contains the statement above. If you scroll down to "Groundwater" section, you see a link to MPCA's "Drinking Water Criteria Spreadsheet", that lists the PEF's (in a column titled "RPF") currently in use by MPCA.) http://www.pca.state.mn.us/index.php/waste/waste-and-cleanup/cleanup/superfund/risk-based-site-evaluation-process-guidance-documents.html#carcinogenic-polycyclic-aromatic-hydrocarbons-cpah
9	**EPA's Toxicity Equivalence Factors**. EPA currently uses TEFs developed in 1993. In 2010, EPA released a preliminary draft Relative Potency Factors document for external review. It was reviewed by the SAB but has not been finalized so cannot be cited or used for site decisions. (The first link below includes the table of TEFs. The second link is the 1993 source document. The third link is the draft 2010 document.) http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/usersguide.htm http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/documents/600R93089.pdf http://cfpub.epa.gov/ncea/iris_drafts/recordisplay.cfm?deid=194584
10	MPCA's extended list PAHs (25 cPAH + 9 oPAH) is found in Remediation Division Policy on Analysis of Carcinogenic Polynuclear Aromatic Hydrocarbons (cPAH) June 2011. I have a copy but I don't see it on the web.

Table 6
2014 Sampling Schedule

Well Name	Analysis	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter[5]
Mount Simon Hinckley Aquifer					
SLP 11	PAH[1]		6/16/2014		
SLP 12	PAH		7/9/2014		
SLP 13	PAH		6/16/2014		
Wonewoc Aquifer					
W105	PAH			9/29/2014	
Prairie du Chien-Jordan Aquifer					
E2	PAH		6/24/2014		
E3	PAH		6/24/2014		
E4	PAH		6/24/2014		
E7	PAH	4/9/2014	6/24/2014	9/30/2014	
E13	PAH	4/15/2014	6/24/2014	9/30/2014	
E15	PAH				
EWT	PAH		7/9/2014		
H6	PAH		6/16/2014		
MTKA6	PAH		6/16/2014		
SLP4	PAH		6/16/2014		
SLP5	PAH		6/24/2014	9/29/2014	
SLP6	PAH	4/9/2014	7/9/2014	9/29/2014	
SLP10	PAH		6/16/2014		
SLP10 FEED	PAH		6/16/2014		
SLP10T	PAH	4/9/2014	6/16/2014	9/30/2014	
SLP10TExtended	25CPAH[2]			9/30/2014	
SLP10TAcid	AF[3]		6/16/2014		
SLP14	PAH		6/16/2014		
SLP16	PAH		6/23/2014		
W23	PAH		6/16/2014		
W29	PAH		6/23/2014		
W48	PAH	4/9/2014	6/24/2014	9/30/2014	
W119	PAH	4/9/2014		10/9/2014	
W401	PAH			9/30/2014	
W402	PAH		6/24/2014		
W403	PAH	4/9/2014	6/23/2014	9/29/2014	
W406	PAH		6/23/2014		
W441	PAH			9/30/2014	
St. Peter Aquifer					
W14	PAH		6/18/2014		
W 24	PAH		6/17/2014		
W 33R	PAH		6/17/2014		
W122	PAH		6/17/2014		
W133	PAH		6/18/2014		
W 129	PAH		6/17/2014		
W 408	PAH		6/17/2014		
W 409	PAH		6/18/2014		
W 410	PAH		6/17/2014		
W 411	PAH		6/18/2014		

Table 6
2014 Sampling Schedule

Well Name	Analysis	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter[5]
W 412	PAH		6/18/2014		
W 414	PAH		6/18/2014		
SLP3	SLP3 was abandoned on May 1, 2014				
Platteville Aquifer					
W18	25CPAH			9/22/2014	
W20	25CPAH			9/24/2014	
W22	25CPAH			9/25/2014	
W27	25CPAH			9/22/2014	
W101	25CPAH			9/23/2014	
W121	25CPAH			9/24/2014	
W130	25CPAH			9/22/2014	
W131	25CPAH			9/22/2014	
W143	25CPAH			9/22/2014	
W421	25CPAH	4/9/2014[4]		9/23/2014	
W424	25CPAH			9/23/2014	
W426	25CPAH			9/26/2014	
W428	25CPAH			9/26/2014	
W434	25CPAH			9/25/2014	
W437	25CPAH			9/23/2014	
W438	25CPAH			9/24/2014	
Drift Aquifer					
P109	25CPAH			9/24/2014	
P112	25CPAH			9/25/2014	
P307	25CPAH			9/23/2014	
P308	25CPAH			9/25/2014	
P309	25CPAH			9/25/2014	
P310	25CPAH			9/24/2014	
P312	25CPAH			9/25/2014	
W2	25CPAH			9/25/2014	
W9	25CPAH			9/22/2014	
W10	25CPAH			9/25/2014	
W15	25CPAH			9/25/2014	
W117	25CPAH			9/23/2014	
W128	25CPAH			9/26/2014	
W136	25CPAH			9/22/2014	
W420	25CPAH	4/9/2014[4]		9/23/2014	
W422	25CPAH			9/26/2014	
W423	25CPAH			9/23/2014	
W425	25CPAH			9/26/2014	
W427	25CPAH			9/26/2014	
W439	25CPAH	4/9/2014[4]		9/26/2014	

[1] PAH means 31 compounds listed in the CD-RAP. All of these analyses were conducted by Test America in 2014.

[2] 25CPAH is the Extended PAH listed at http://www.pca.state.mn.us/index.php/view-document.html?gid=5482. All of these analyses were conducted by Pace in 2014.

[3] AF means acid fraction compounds. This sample was analyzed by Test America.

[4] These three samples collected in the first quarter of 2014 were analyzed by Pace for EPA's 16 Priority Pollutant PAH.

[5] None of the planned fourth quarter sampling was conducted pending a switch to a new laboratory.

Table 7 Well W422

Comparison to Cessation Criteria

Sample Date	Current Minnesota Department of Health Health Risk Limits and Health Based Values						
	Benzo(a)pyrene Equivalents, ug/l	Acenaphthene	Anthracene	Fluoranthene	Fluorene	Naphthalene	Pyrene
	0.06	400	2,000	300	300	70	200
9/6/2000	ND[1]	8.2	ND	ND	ND	0.82	ND
12/11/2000	ND	6.3	ND	ND	ND	ND	ND
5/1/2001	ND	13	3.0	2.3	ND	ND	ND
9/5/2001	ND	11	ND	ND	0.092	0.013	ND
10/29/2001	ND	7.1	ND	ND	ND	ND	ND
3/12/2002	ND	14	ND	ND	ND	ND	ND
5/7/2002	ND	15	ND	ND	ND	ND	ND
9/24/2002	ND	9.3	ND	ND	ND	ND	ND
5/6/2003	ND	8.6	ND	ND	ND	ND	ND
8/5/2003	ND	2.2	ND	ND	ND	ND	ND
4/27/2004	ND	3.5	ND	ND	ND	ND	ND
8/3/2004	ND	1.2	ND	ND	ND	ND	ND
4/26/2005	ND	7.4	ND	ND	ND	ND	ND
9/7/2005	ND	9.2	ND	ND	ND	ND	ND
5/2/2006	ND	7.2	ND	ND	ND	ND	ND
8/15/2006	ND	ND	ND	ND	ND	ND	ND
5/7/2007	ND	6.3	ND	ND	ND	ND	ND
8/13/2007	ND	8.7	ND	ND	ND	ND	ND
4/29/2008	ND	3.5	ND	ND	1.6	ND	ND
8/20/2008	ND	9.5	ND	ND	ND	ND	ND
5/7/2009	ND	7.1	ND	ND	ND	ND	ND
8/13/2009	ND	5.4	ND	ND	ND	ND	ND
6/1/2010	ND	13.5	0.046	ND	ND	ND	ND
9/15/2010	ND	6.4	ND	ND	0.096	2.5	ND
9/25/2012	ND	12.5	ND	ND	ND	ND	ND
6/21/2013	ND	9	ND	ND	ND	ND	ND
9/26/2014	ND	7.0	ND	ND	ND	ND	ND

1. ND = Not detected.

Table 8 Well W434

Comparison to Cessation Criteria

Sample Date	Current Minnesota Department of Health Health Risk Limits and Health Based Values						
	Benzo(a)pyrene Equivalents, ug/l	Acenaphthene	Anthracene	Fluoranthene	Fluorene	Naphthalene	Pyrene
	0.06	400	2,000	300	300	70	200
5/3/2006	ND[1]	2.8	ND	ND	ND	ND	ND
8/16/2006	ND	2.6	ND	ND	ND	ND	ND
5/8/2007	ND	2.4	ND	ND	ND	ND	ND
8/14/2007	ND	2.4	ND	ND	ND	ND	ND
5/7/2008	ND	1.9	ND	ND	ND	ND	ND
8/20/2008	ND	1.6	ND	ND	ND	ND	ND
5/7/2009	ND	ND	ND	ND	ND	ND	ND
6/4/2010	ND	1.5	ND	ND	ND	ND	ND
9/16/2010	ND	1.4	ND	ND	ND	ND	ND
9/14/2011	0.001	1.1	ND	0.021	ND	0.037	0.011
9/25/2012	ND	1.2	ND	ND	ND	ND	ND
6/20/2013	ND	1.1	ND	ND	ND	ND	ND
9/26/2014	ND	1.2	ND	ND	ND	ND	ND

1. ND = Not detected.

Table 9
Historical Summary of Analytical Results in Well W105, 1988 through 2014

All concentrations reported in nanograms per liter (ng/l).

Sampling Date	W105		
	Total CPAH	Total Other PAH	Sum of BaP & DBA[1]
1988	0[2]	3,670	0
	0	2,614	0
1989	0	1,400	0
	0	1,086	0
1990	0	2,019	0
	0	2,347	0
	0	2,600	0
	0	1,548	0
	0	0	0
1991	0	1,460	0
	10	2,164	0
	0	1,014	0
1992	0	2,185	0
	381	5,057	0
	21	30,900	0
1993	39	1,966	1
1994	71	2,311	1
1996	29	2,746	6
1998	0	5,493	0
2000	89	5,595	0
2002	142	5,292	0
2004	33	2,380	3
2006	200	5,736	2
2008	195	14,546	9
2009	290	4,159	20
2010	105	13,797	0
	23	984	0
2012	75	944	10
2013	0	1,918	0
	95	2,331	5
2014	256	19,569	7

Notes:

[1] Sum of Benzo(a)pyrene and Dibenz(a,h)anthracene.

[2] Result reported as 0 indicates that all parameters were not detected above the laboratory detection limit.

Table 10
Historical Summary of Other PAH and CPAH Analytical Results 1988 through 2014, SLP 11, 12, 13, and 17

All concentrations reported in nanograms per liter (ng/l).

Sampling Date	SLP11			SLP12			SLP13			SLP17		
	Total CPAH	Total Other PAH	Sum of BaP & DBA	Total CPAH	Total Other PAH	Sum of BaP & DBA	Total CPAH	Total Other PAH	Sum of BaP & DBA	Total CPAH	Total Other PAH	Sum of BaP & DBA
1988	0	42	0	0	10	0	0	15	0	0	12	0
1989	0	34	0	0	16	0	0	9	0	0	12	
1990				0	109	0	0	14	0	0	18	0
1991	0	51	0	0	21	0	0	13	0	0	17	0
1992	0	43	0	1	25	0	2	11	0	3	47	0
1993	0	50	0	0	9	0	0	10	0	0	12	0
1994	0	66	0	0	21	0	0	28	0	4	36	0
1995	0	113	0	0	9	0	0	9	0	0	8	0
1996	0	109	0	0	3	0	0	5	0	0	5	0
1997	0	78	0	0	12	0	0	22	0	62	412	15
1998				0	3	0	0	4	0	0	3	0
1999	0	156	0	0	10	0	0	15	0	0	40	0
2000	0	22	0	0	11	0	0	6	0			
2001	0	19	0	0	2	0	0	0	0			
2002				3	7	0	0	0	0			
2003	46	47	0	0	2	0	0	0	0			
2004	0	26	0									
	0	22	0									
	0	27	0	0	21	0						
2005	0	27	0	0	5	0	0	10	0			
2006	1	27	0	0	4	0	3	8	1			
2007	0	30	0	0	4	0	0	5	0			
2008	0	28	0	0	1	0	0	10	0			
2009	0	10	0	0	0	0	0	0	0			
2010	0	11	0	0	2	0	0	4	0			
2011	0	112	0	0	4	0						
2012	0	0	0	0	0	0	0	0	0			
2013	0	6	0	0	0	0	133	55	31			
							0	0	0			
							0	0	--			
2014	0	11	0	0	0	0	0	0	0			

Notes:

Blank result indicates no samples were collected at that time.

Result reported as -- indicates that both parameters were rejected during validation.

Table 11
Historical Summary of Analytical Results for Prairie Du Chien-Jordan Aquifer Wells, 1988 through 2014

All concentrations reported in nanograms per liter (ng/l).

Sampling Date	H3			H6			MTK6		
	Total CPAH	Total Other PAH	Sum of BaP & DBA	Total CPAH	Total Other PAH	Sum of BaP & DBA	Total CPAH	Total Other PAH	Sum of BaP & DBA
1988	0	378	0	0	19	0			
1989	0	93	0	0	16	0			
	0	370	0						
1990	0	188	0	0	15	0			
	500	8,743	0						
1992				0	16	0			
1993				0	5	0			
1994				0	6	0			
1995				0	3	0			
1996				0	3	0			
1997				0	2	0			
1998				0	5	0			
1999				0	5	0	0	2	0
2000				0	5	0	0	3	0
2002				0	0	0	0	0	0
2004				0	8	0	0	10	0
2006				5	99	0	0	14	0
2008				0	16	0	0	0	0
2010				0	96	0	0	3	0
2012				0	38	0	0	0	0
2013				0	27	0	0	0	--
2014				0	2	0	0	0	--

Sampling Date	ETW			W441_Blake School		
	Total CPAH	Total Other PAH	Sum of BaP & DBA	Total CPAH	Total Other PAH	Sum of BaP & DBA
2014	0	9	--	98	39	21

Table 11 Continued
Historical Summary of Analytical Results for Prairie Du Chien-Jordan Aquifer Wells, 1988 through 2014

All concentrations reported in nanograms per liter (ng/l).

Sampling Date	E13			E15			E2			E3			E4			E7		
	Total CPAH	Total Other PAH	Sum of BaP & DBA	Total CPAH	Total Other PAH	Sum of BaP & DBA	Total CPAH	Total Other PAH	Sum of BaP & DBA	Total CPAH	Total Other PAH	Sum of BaP & DBA	Total CPAH	Total Other PAH	Sum of BaP & DBA	Total CPAH	Total Other PAH	Sum of BaP & DBA
1988	0	4	0	0	11	0	0	14	0	0	15	0						
1989	0	20	0	0	16	0	0	21	0	0	15	0						
	0	6	0			0	0	8	0									
1990	0	13	0	0	11	0	3	22	0	0	18	0						
	2	23	0			0	0	14	0									
1991	0	12	0	0	13	0	0	17	0									
	1	11	0			0	4	21	0	0	13	0						
1992	0	46	0	1	22	0				4	21	0						
										0	19	0						
1993	0	4	0	0	4	0	0	9	0	0	5	0						
1994	0	3	0	0	6	0	0	16	0	0	7	0						
1995	0	3	0	0	8	0				0	8	0						
							0	10	0									
1996	0	4	0	0	10	0	0	14	0	0	3	0				0	3	0
	0	5	0	0	29	0	0	20	0							0	5	0
1997	0	5	0	0	3	0	0	14	0							0	3	0
	0	8	0	0	14	0	0	13	0	0	4	0				0	2	0
1998	0	21	0	0	22	0	0	13	0	0	3	0				0	1	0
	0	36	0	0	7	0	0	196	0							0	6	0
							0	34	0									
1999	0	15	0	0	38	0				0	0	0				0	5	0
	0	35	0	0	19	0	0	6	0							0	2	0
2000	0	39	0	0	26	0	0	8	0	0	0	0				0	16	0
	0	49	0	0	14	0	0	6	0							0	9	0
2001	0	41	0	0	27	0	0	16	0	0	16	0				0	22	0
2002	0	80	0	0	5	0	0	0	0	0	0	0				0	29	0
2003	7	90	1	0	5	0	0	8	0	0	1	0				0	22	0
2004	0	116	0	0	15	0	0	5	0	0	4	0						
2005	0	208	0	0	26	0				0	5	0						
	0	169	0															
	0	170	0															
2006	0	112	0	0	13	0				0	7	0						
2007	9	156	0	0	9	0	0	72	0									
2008	0	158	0	0	5	0	0	7	0									
2009	0	169	0	0	5	0	0	8	0	0	0	0						
2010	0	142	0	0	7	0	0	4	0	0	2	0						
2011	0	154	0	0	8	0	0	9	0	0	3	0						
	2	155	0															
2012	0	177	0	0	1	0	0	0	0	0	15	0						
	0	137	0															
	0	186	0													7	37	4
	1	151	0													0	12	0
2013				0	1	0	0	1	0	0	8	0	0	0	0	0	19	0
	0	78	0													0	19	0
2014	0	103	--													0	18	--
	0	106	--				0	0	--	0	0	--	0	0	--	0	15	--
	0	143	--													0	27	--

Table 11 Continued
Historical Summary of Analytical Results for Prairie Du Chien-Jordan Aquifer Wells, 1988 through 2014
All concentrations reported in nanograms per liter (ng/l).

Sampling Date	SLP6			W23			W48		
	Total CPAH	Total Other PAH	Sum of BaP & DBA	Total CPAH	Total Other PAH	Sum of BaP & DBA	Total CPAH	Total Other PAH	Sum of BaP & DBA
1988	0	33	0	0	111,100	0	0	2,418	0
	0	55	0	0	123,100	0			
1989	0	61	0	0	120,200	0	0	1,636	0
	0	36	0	0	117,600	0	0	1,850	0
	0	40	0	0	106,300	0	0	1,130	0
1990	0	48	0	0	129,100	0	0	1,690	0
	0	82	0				0	1,809	0
	3	117	0	0	114,700	0	22	4,566	0
	0	68	0	0	67,700	0			
1991	0	63	0	0	87,800	0			
	0	293	0						
	3	78	0	0	71,800	0			
	1	159	0	0	91,200	0			
	0	123	0	0	82,600	0			
1992	3	124	0	0	67,600	0			
	0	173	0	0	78,000	0			
1993	0	222	0						
	0	113	0				0	430	0
1994	0	98	0	0	60,000	0	0	286	0
				0	64,000	0			
1995				3,680	129,910	0			
	0	90	0	0	69,730	0	0	313	0
1996	0	181	0	0	47,880	0	0	261	0
	0	178	0	0	48,200	0			
	0	190	0						
	0	243	0						
	0	223	0						
1997	0	234	0						
	0	210	0						
	0	274	0						
	0	180	0	0	34,300	0			
	0	217	0	0	46,800	0	0	316	0
	0	148	0	0	0	0	0	290	0
1998	0	146	0				0	186	0
	0	173	0	0	42,090	0	0	50	0
1999				0	25,970	0	0	226	0
	0	174	0	0	14,850	0	0	226	0
2000	0	217	0	0	8,790	0	0	222	0
				0	37,980	0	0	134	0
				0	25,000	0			
2001				454	26,063	42	0	234	0
	0	158	0				0	149	0
	0	138	0				0	180	0
2002	0	181	0	0	28,700	0	0	222	0
	0	189	0	514	30,623	34	0	185	0
	0	231	0				0	149	0
	0	178	0				0	187	0
2003	0	124	0				0	108	0
	0	165	0				0	135	0
	2	138	0	514	23,391	37	0	138	0
	0	244	0				0	175	0

Table 11 Continued
Historical Summary of Analytical Results for Prairie Du Chien-Jordan Aquifer Wells, 1988 through 2014
All concentrations reported in nanograms per liter (ng/l).

Sampling Date	SLP6			W23			W48		
	Total CPAH	Total Other PAH	Sum of BaP & DBA	Total CPAH	Total Other PAH	Sum of BaP & DBA	Total CPAH	Total Other PAH	Sum of BaP & DBA
2004	0	240	0				0	159	0
	0	162	0	275	17,822	17	0	195	0
	0	250	0				0	163	0
	0	189	0				0	173	0
2005	0	205	0				0	144	0
	0	198	0	254	25,150	7	0	141	0
	3	186	0				0	82	0
	0	194	0				0	156	0
2006	0	127	0				0	154	0
	0	275	0	111	12,181	3	0	111	0
	7	217	0				0	169	0
	0	149	0				0	53	0
2007	0	196	0				0	154	0
	0	139	0	292	19,551	11	1	114	0
	0	206	0				0	156	0
	0	168	0				0	147	0
2008	0	173	0				0	132	0
	0	140	0	215	20,293	10	0	144	0
	0	196	0				0	191	0
	0	213	0				0	176	0
2009	0	206	0						
	0	144	0	365	14,370	18	0	156	0
	0	221	0				0	271	0
2010	0	198	0				0	163	0
	0	249	0	313	19,088	11	1	187	0
	0	192	0				0	187	0
	0	183	0	389	14,114	38	0	152	0
2011	0	183	0				0	143	0
	1	190	0	144	12,830	8	0	151	0
	0	188	0				8	153	1
							0	145	0
2012							0	155	–
	0	228	0				0	101	–
	2	205	0	558	16,818	58	2	187	–
	0	123	–				0	191	–
2013	0	182	0	234	14,464	47	0	347	–
	21	539	–	423	16,891	47	0	293	–
2014	0	158	–				0	363	–
	0	141	–	309	10,938	9	0	321	–
	0	187	–				0	240	–

Table 11 Continued
Historical Summary of Analytical Results for Prairie Du Chien-Jordan Aquifer Wells, 1988 through 2014
All concentrations reported in nanograms per liter (ng/l).

Sampling Date	W119			W29			W40			W401		
	Total CPAH	Total Other PAH	Sum of BaP & DBA	Total CPAH	Total Other PAH	Sum of BaP & DBA	Total CPAH	Total Other PAH	Sum of BaP & DBA	Total CPAH	Total Other PAH	Sum of BaP & DBA
1988	0	3	0	0	495	0	0	1,062	0			
1989	0	18	0	3	338	0	0	540	0	0	15	0
	0	11	0									
1990				9	369	0	16	705	0	2	27	0
1991				6	405	0	5	474	0	0	28	0
1992				12	531	0	5	283	0	0	10	0
1993				44	1,887	0	5	347	0	1	10	0
1994				10	749	0	4	484	0	0	8	0
1995				32	3,781	0	0	369	0	0	16	0
1996				0	82	0	0	498	0	0	19	0
										0	29	0
1997				3	418	0	0	624	0			
										0	174	0
										0	121	0
1998				0	261	0	0	220	0	0	66	0
										0	5	0
1999				0	99	0	0	299	0	0	64	0
										0	23	0
2000				3	212	0	2	129	0	0	105	0
										0	153	0
2001				3	175	0	7	390	0	0	295	0
	0	294	0									
2002				0	44	0				0	149	0
2003				0	62	0						
										0	64	0
	1	195	0									
2004	0	127	0	11	162	0				0	196	0
	0	232	0									
2005	0	152	0									
	0	140	0	0	21	0						
										0	92	0
2006	0	210	0	9	45	1				0	48	0
	0	148	0									
2007	0	136	0	1	14	0				0	41	0
	0	138	0									
2008										0	35	0
				0	20	0						
	0	105	0									
2009	0	76	0	1	27	0				0	42	0
	0	124	0									
2010	0	95	0							0	9	0
	0	130	0									
2011	0	61	0									
	3	95	0							0	48	0
2012	0	26	0	1	92					0	3	0
	3	62	0									
	1	99	0									
2013												
	0	80	0									
	0	129	0	0	0	--				0	1	0
2014	1	129	--									
				0	19	--						
	0	126	--							0	9	0

Table 11 Continued
Historical Summary of Analytical Results for Prairie Du Chien-Jordan Aquifer Wells, 1988 through 2014
All concentrations reported in nanograms per liter (ng/l).

Sampling Date	W402			W403			W406			W70		
	Total CPAH	Total Other PAH	Sum of BaP & DBA	Total CPAH	Total Other PAH	Sum of BaP & DBA	Total CPAH	Total Other PAH	Sum of BaP & DBA	Total CPAH	Total Other PAH	Sum of BaP & DBA
1988				0	75	0				0	682	0
1989				40	1,113	6				5	426	0
				0	0	0				0	280	0
	9	151	2				0	26	0			
1990	47	720	0				8	43	0	9	560	0
	16	133	0	51	1,102	1	15	119	0			
1991	16	498	0	0	1,086	0	1	30	0	8	669	0
	0	18,320	0	0	11,570	0	0	42	0			
1992							6	53	0			
	26	896	0	19	993	0				8	401	0
1993	8	145	0	8	539	0	0	22	0	4	342	0
1994	5	104	0	0	1,278	0	0	31	0	22	364	0
1995	6	567	0	0	543	0	0	34	0	0	384	0
1996	0	396	0	8	182	0	0	21	0	0	342	0
1997	0	224	0	0	139	0	0	27	0	0	335	0
1998	0	349	0	0	11	0	0	15	0	0	307	0
1999	1	539	1	0	169	0	0	28	0	0	254	0
2000	0	1,287	0	0	195	0	0	30	0	0	3	0
2001	0	267	0	0	458	0						
2002	13	167	1	3	135	0						
2003	3	56	0	125	66	0				0	0	0
2004	73	67	0	131	91	0	0	13	0			
2005	96	88	0									
				4	83	0				7	18	1
2006	3	91	0	2	74	0	2	21	0	0	5	0
2007	9	68	0	302	329	67						
2008	0	48	0									
				1,003	868	221						
							0	11	0			
2009	0	149	0	450	376	97						
2010	1	77	0	121	173	24	0	7	0			
2011												
	0	72	0	178	91	42						
2012	0	24	0	165	140	30	0	8	0			
2013				1	61	0						
				0	24	--						
	0	6	0	0	0	--	0	9	--			
				0	21	--						
2014				0	41	--						
				0	13	--	0	8	--			
	0	8	--	0	43	--						

Table 12
Historical Summary of Analytical Results for St. Peter Aquifer Wells
1988 Through 2014

All concentrations reported in nanograms per liter (ng/l)

Sampling Date	W410		
	Total CPAH	Total Other PAH	Sum of BaP & DBA
1988	0	1,289	0
	0	1,123	0
	0	1,435	0
1989	5	424	0
	0	357	0
1991	0	85	0
	0	5,330	0
1992	0	15,410	0
	0	16,930	0
	0	18,360	0
1993	0	17,790	0
	0	19,529	0
	0	13,400	0
	0	14,000	0
1994	0	18,920	0
	0	21,140	0
1995	0	21,640	0
	0	17,590	0
1996	0	15,970	0
	0	14,170	0
1997	0	14,690	0
	0	10,150	0
1998	0	9,600	0
	0	9,600	0
	0	8,620	0
	0	1,900	0
	0	9,690	0
	0	5,942	0
1999	0	13,700	0
	0	21,606	0
	0	8,780	0
	0	3,800	0
2000	0	4,750	0
	950	44,110	0
	0	6,207	0
	0	1,500	0
2001	0	2,940	0
	0	6,195	0
	0	2,804	0
	0	2,000	0
2002	0	2,090	0
	0	2,142	0
	0	3,340	0
2003	0	4,453	0
	0	4,334	0

Sampling Date	W410		
	Total CPAH	Total Other PAH	Sum of BaP & DBA
2004	0	4,492	0
	0	7,079	0
2005	0	7,701	0
	0	10,553	0
2006	0	9,545	0
	0	8,359	0
2007	0	17,690	0
2009	0	32,718	0
	0	61,812	0
2010	0	53,603	0
	0	62,470	0
2011	0	82,505	0
2012	0	32,720	0
2013	0	165,291	--
	0	152,685	--
2014	0	104,619	--

Table 12 Continued
Historical Summary of Analytical Results for St. Peter Aquifer Wells
1988 Through 2014
All concentrations reported in nanograms per liter (ng/l)

Sampling Date	SLP3			W122			W129			W133			W14		
	Total CPAH	Total Other PAH	Sum of BaP & DBA	Total CPAH	Total Other PAH	Sum of BaP & DBA	Total CPAH	Total Other PAH	Sum of BaP & DBA	Total CPAH	Total Other PAH	Sum of BaP & DBA	Total CPAH	Total Other PAH	Sum of BaP & DBA
1988	0	10	0	16	142	3	0	88	0	0	52,370	0	54	95	11
	0	10	0	38	2,246	0	0	290	0	0	54,135	0	26	175	4
										0	29,830	0	0	438	0
1989	0	10	0	18	969	4	1	600	0	0	37,870	0			
	0	15	0	13	119	1	0	43	0	0	21,369	0			
1990	5	29	0				0	143	0	0	19,200	0			
	1	18	0				0	96	0	0	14,030	0			
1991				39	756	4	30	159	4	14	2,587	0			
	0	24	0	10	853	0	0	430	0	0	4,610	0			
1992	0	16	0	43	568	3	47	252	4	0	2,539	0			
	0	24	0	7	179		5	296	1	0	2,244	0			
1993	0	9	0	40	411	1	17	121	1	4	1,134	0			
	0	5	0	26	330	2	2	53	0	0	836	0			
1994	0	10	0	21	585	0	0	171	0	5	665	0			
	0	6	0	14	374	0	2	112	0	0	434	0			
1995	4	43	0	0	281	0	12	94	0	0	165	0			
	0	31	0	11	220	0	0	55	0	0	157	0			
1996	0	11	0	6	148	0	0	53	0	0	142	0			
	0	4	0	0	235	0	0	75	0	0	285	0			
1997	0	6	0	0	256	0	0	104	0	0	241	0			
	0	4	0	0	243	0	0	181	0	0	108	0			
1998	0	7	0	7	372	1	9	88	2	0	88	0			
	0	247	0	0	99	0	0	8	0	0	299	0			
1999	0	7	0	0	71	2	1	79	1	7	634	2			
	0	0	0	5	48	0	0	79	0	0	190	0			
2000	0	4	0	39	68	0	26	225	4	0	167	0			
	2	25	0	6	160	1	8	150	0	0	327	0			
2001	0	10	0	0	92	0				0	156	0			
	0	2	0	0	24	0				0	43	0			
2002	0	15	0	0	92	0				0	904	0			
	0	0	0	5	73	2				0	343	0			
2003	0	0	0	29	73	0				6	114	1			
	0	2	0	6	137	1				11	426	2			
2004	0	7	0	100	76	0				0	907	0			
	0	11	0	1	79	0				84	198	17			
2005	0	9	0	78	88	1				50	1,624	10			
	2	13	0	6	78	1				10	435	2			
2006	1	5	0	8	64	2				15	1,990	3			
	0	5	0	2	88	0				0	463	0			
2007	0	5	0	13	69	1				0	552	0			
	1	5	0	9	54	1				14	732	2			
2008				11	104	2				23	184	4			
	0	2	0	0	95	0				0	567	0			
2009	0	0	0	0	329	0				0	856	0			
	0	0	0	2	194	0				2	343	0			
2010	0	2	0	4	282	0				6	514	2			
	0	3	0	5	243	0				27	220	0			
2011				6	22	1	38	601	3				75	98	9
2012				0	48	0	0	160	0				0	0	0
2013							0	885	--						
	0	0	0	0	3	0	0	2,258	0	0	114	0	151	418	24
2014				0	13	--	10	3,700	2	0	88	--	33	229	5

Table 12 Continued
Historical Summary of Analytical Results for St. Peter Aquifer Wells
1988 Through 2014
All concentrations reported in nanograms per liter (ng/l)

Sampling Date	W24			W33			W33R			W408		
	Total CPAH	Total Other PAH	Sum of BaP & DBA	Total CPAH	Total Other PAH	Sum of BaP & DBA	Total CPAH	Total Other PAH	Sum of BaP & DBA	Total CPAH	Total Other PAH	Sum of BaP & DBA
1988	0	3,309	0	0	16,430	0				0	153	0
	0	5,410	0	0	110,500	0				0	44	0
	0	3,622	0									
1989										5	145	0
										12	110	0
1990				0	19,448	0				0	24	0
				0	290	0				28	130	0
1991	0	4,023	0	0	17,912	0				13	343	1
	0	4,160	0	0	12,621	0				25	1,163	0
1992	0	3,490	0	0	4,841	0				33	283	2
	0	3,650	0	0	3,304	0				4	172	0
1993	0	2,950	0	0	1,337	0				5	150	0
	0	3,294	0	0	1,013	0				6	217	0
1994	0	2,669	0	8	968	0				5	70	0
	0	4,029	0	0	1,751	0				3	170	0
1995	0	3,190	0	0	1,901	0				9	143	0
	0	1,550	0	0	702	0				15	135	0
1996	0	974	0	0	576	0				0	66	0
	0	1,603	0	0	655	0				0	103	0
1997	0	1,513	0	0	651	0				6	169	0
	0	1,340	0	120	1,779	0				0	166	0
1998	0	689	0	0	2,516	0				1	96	0
	0	1,120	0	0	4,792	0				0	62	0
1999	0	2,085	0	2	2,383	1				0	64	0
	0	3,590	0	0	1,355	0				2	51	2
2000	0	940	0	235	1,139	0				89	103	0
	35	951	4	1	925	1				0	53	0
2001	0	152	0	0	1,411	0						
	0	619	0	6	698	6						
2002	0	439	0	0	80	0						
	0	329	0	1	54	0						
2003	0	335	0	66	115	0						
	0	246	0	35	179	7						
2004	0	214	0	50	174	9						
	0	192	0	37	170	6						
2005	0	102	0	44	2,904	6						
	0	122	0	6	129	0						
2006	11	72	0	12	76	1						
	0	93	0									
2007	0	65	0									
							16	767	2			
2008	0	24	0				2	496	0			
	0	51	0				15	183	2			
2009	0	26	0				45	885	5			
	0	50	0				11	109	2			
2010	0	82	0				14	122	2			
	0	38	0				31	96	1			
2011	0	41	0				0	27	0	2	41	0
2012	0	3,580	0				0	0	0	0	0	0
2013												
	0	28	0				0	22	0	0	3	0
2014	0	30	--				0	72	--	0	8	--

Table 12 Continued
Historical Summary of Analytical Results for St. Peter Aquifer Wells
1988 Through 2014

All concentrations reported in nanograms per liter (ng/l)

Sampling Date	W409			W411			W412			W414		
	Total CPAH	Total Other PAH	Sum of BaP & DBA	Total CPAH	Total Other PAH	Sum of BaP & DBA	Total CPAH	Total Other PAH	Sum of BaP & DBA	Total CPAH	Total Other PAH	Sum of BaP & DBA
1988	159	2,198	0	0	1,274	0	0	1,317	0			
	0	242	0	0	207	0	36	339	0			
1989	48	579	5	8	200	0	16	213	2			
	0	830	0	0	460	0	0	132	0			
1990	0	156	0	15	451	0						
	43	167	0	0	336	0	1	484	6			
1991	0	360	0	12	384	12	48	1,479	0			
	0	3,853	0	0	251	0	0	5,283	0			
1992	0	77,120	0	24	313	0	27	1,569	0			
	0	49,660	0	2	181	0	0	3,796	0			
1993	150	49,960	0	7	191	0	149	894	0			
	0	42,440	0	5	113	0	16	677	0			
1994	0	131,000	0	3	120	0	20	302	2			
	0	151,000	0	6	221	0	23	542	0			
1995	0	177,110	0	6	235	0	18	369	0			
	0	167,130	0	0	184	0	0	402	0			
1996	0	805,420	0	0	79	0	0	139	0			
	0	312,500	0	0	253	0	0	1,620	0			
1997	0	156,500	0	0	82	0	0	806	0			
	0	64,200	0	3	253	0	0	614	0			
1998	0	159,200	0	1	120	0	30	269	10			
	0	107,700	0	61	424	3	60	562	11			
1999	0	446,860	0	0	99	0	20	269	6			
	0	342,000	0	0	79	0	0	764	0			
2000	0	1,196,900	0	0	56	0	250	105	0			
	620	468,710	0	17	140	3	1	164	1			
2001	0	269,800	0	0	124	0	4	363	2			
	0	228,300	0	0	46	0	0	1,125	0			
2002	0	324,300	0	0	34	0	10	243	2			
	0	135,200	0	0	16	0	3	135	0			
2003	0	170,600	0	38	113	0	12	82	3			
	0	213,700	0	0	59	0	15	134	0			
2004	0	152,200	0	97	110	1	84	132	2			
	0	125,800	0	2	93	0	11	239	3			
2005	0	148,300	0	43	75	0	85	134	2			
	0	91,300	0	3	77	1	3	115	1			
2006	0	48,480	0	1	57	0	14	108	1			
	0	33,000	0	0	68	0	9	246	2			
2007	0	28,800	0	4	84	0	3	54	0			
	0	18,170	0	2	78	0	2	255	0			
2008	0	28,200	0	0	84	0	15	270	3			
	0	35,900	0	0	95	0	0	710	0			
2009	0	1,600	0	0	112	0	0	530	0			
	0	29,000	0	0	22	0	0	450	0			
2010	0	18,170	0	2	183	0	0	207	0			
	0	8,623	0	0	197	0	0	10	0			
2011	0	15,289	0	0	26	0	21	72	5	4	47	0
2012	0	8,351	0	0	0	0	0	46	0	0	0	0
2013												
	89	19,681	0	0	13	0	0	25	0	1	41	0
2014	67	13,837	--	0	36	--	0	11	--	0	27	--

Table 13
Historical Summary of Analytical Results for Platteville Aquifer Wells, 1988 through 2014

All concentrations in micrograms per liter (ug/l).

Sampling Date	W421			W434		
	Total CPAH	Total Other PAH	Sum of BaP & DBA	Total CPAH	Total Other PAH	Sum of BaP & DBA
1988	0	764	0			
	0	1,083	0			
1989	0	878	0			
	0	1,024	0			
	0	995	0			
	0	828	0			
1990	0	1,416	0			
	0	714	0			
	0	1,409	0			
	0	1,142	0			
1991	0	1,449	0			
	10	1,420	10			
	0	1,226	0			
	0	1,358	0			
1992	0	1,406	0	0	4,200	0
	0	1,387	0			
	0	1,547	0			
	0	1,309	0			
1993	0	1,332	0			
	0	1,545	0			
	0	1,025	0			
	0	1,017	0			
1994	0	1,045	0			
	0	977	0			
	0	940	0			
	0	966	0			
1995	0	952	0			
	0	913	0			
	0	966	0			
	0	764	0			
1996	0	618	0			
	0	630	0			
	0	884	0			
	0	843	0	0	4	0
1997	0	709	0			
	0	630	0	0	7	0
	0	791	0			
	0	884	0			
	0	699	0	0	5	0
	0	843	0			
1998	0	787	0	0	4	0
	0	915	0	0	3	0
	0	684	0	0	3	0
	0	306	0	0	0	0
	0	518	0	0	12	0
1999	0	393	0	0	14	0
	0	611	0	0	1	0
	0	389	0	0	1	0
	0	479	0	0	1	0
2000	0	462	0	0	2	0
	0	626	0	0	5	0
	49	962	8	0	4	0
	0	376	0	0	1	0
2001	8	342	1	0	3	0
	7	717	2	0	6	0
	31	417	5	0	4	0
	36	269	6	0	4	0
2002	8	557	0	0	5	0
	6	410	0	0	5	0
	0	551	0	0	5	0
	8	532	0			

Sampling Date	W421			W434		
	Total CPAH	Total Other PAH	Sum of BaP & DBA	Total CPAH	Total Other PAH	Sum of BaP & DBA
2003	430	1,361	80			
	310	2,152	55	0	4	0
	5	545	126	0	3	0
	715	4,484	4			
2004	23	679	0			
	0	618	2	0	6	0
	13	759	3	0	3	0
	18	996	1			
2005	8	532	0			
	0	518	0	0	3	0
	0	533	2	0	3	0
	6	407	0			
2006	0	645	0			
	0	539	0	0	3	0
	2	577	0	0	3	0
	2	596	0			
2007	36	608	1			
	9	608	3	0	2	0
	22	799	1	0	2	0
	7	682	15			
2008	106	870	5	0	2	0
	38	651	2	0	2	0
2009	14	525	224	0	0	0
	140	1,319	60			
2010	360	3,077	17			
	111	827	38	0	2	0
	260	1,652	12	0	1	0
	74	999	11			
2011	65	737	1			
	6	606	30			
	181	2,131	24	0	1	0
	467	3,269	68			
2012	528	4,393	73			
	153	1,565	12	0	1	0
	26	624	4			
2013	10	612	1	0	1	0
	5	1,201	1			
2014	1	1,407	0			
	99	1,926	25	0	1	0

Table 13 Continued
Historical Summary of Analytical Results for Platteville Aquifer Wells, 1988 through 2014
All concentrations in micrograms per liter (ug/l).

Sampling Date	W101			W121			W130			W131		
	Total CPAH	Total Other PAH	Sum of BaP & DBA	Total CPAH	Total Other PAH	Sum of BaP & DBA	Total CPAH	Total Other PAH	Sum of BaP & DBA	Total CPAH	Total Other PAH	Sum of BaP & DBA
1988	0	4	0	0	0	0	0	0	0	0	0	0
	0	24	0	0	0	0	0	0	0	0	0	0
1989	0	48	0	0	0	0	0	0	0	0	0	0
1990	0	22	0	0	0	0	0	0	0			
1991												
1992	0	18	0							0	13	0
1994	0	11	0	0	0	0				0	0	0
1996	0	5	0	0	0	0	0	0	0	0	0	0
	0	32	0	0	0	0	0	0	0	0	0	0
1997	0	31	0	0	0	0	0	0	0	0	0	0
	0	15	0	0	0	0	0	0	0	0	0	0
1998	0	17	0	0	0	0	0	0	0	0	0	0
1998	0	125	0	0	0	0	0	0	0	0	0	0
1999	0	32	0	0	0	0	0	0	0	0	0	0
	0	24	0	0	0	0	0	0	0	0	0	0
2000	0	41	0	0	0	0	0	0	0	0	0	0
	0	32	0	0	0	0	0	0	0			
2001	0	18	0							0	0	0
	0	12	0							0	0	0
2002	0	17	0							0	0	0
	0	6	0							0	0	0
2003	0	14	0							0	0	0
	0	3	0							0	0	0
2004	0	19	0							0	2	0
	0	3	0							0	3	0
2005	0	3	0							0	0	0
	0	2	0							0	0	0
2006	0	2	0							0	0	0
	0	3	0							0	2	0
2007	0	8	0							0	0	0
	0	0	0							0	0	0
2008	0	0	0							0	0	0
	0	0	0							0	0	0
2009	0	0	0							0	0	0
	0	10	0							0	0	0
2010	0	0	0							0	0	0
	0	0	0							0	0	0
2011	0	0	0	0	0	0	0	0	0	0	0	0
2012												
	0	0	0	0	0	0	0	0	0	0	4	0
2013	0	0	0	0	0	0	0	0	0	0	0	0
2014	0	0	0	0	0	0	0	0	0	0	0	0

Table 13 Continued
Historical Summary of Analytical Results for Platteville Aquifer Wells, 1988 through 2014
All concentrations in micrograms per liter (ug/l).

Sampling Date	W143			W18			W20			W22		
	Total CPAH	Total Other PAH	Sum of BaP & DBA	Total CPAH	Total Other PAH	Sum of BaP & DBA	Total CPAH	Total Other PAH	Sum of BaP & DBA	Total CPAH	Total Other PAH	Sum of BaP & DBA
1988	0	0	0	0	10	0	0	0	0			
	0	0	0	0	361	0	0	3	0			
1989	0	1		0	39	0	0	7	0			
1990							0	7	0	0	0	0
1991												
1992				0	10	0				0	1	0
										0	5	0
1994							0	1	0			
1996	0	1	0	0	2	0	0	1	0	0	0	0
	0	1	0	0	2	0	0	1	0	0	0	0
1997	0	9	0	0	1	0	0	2	0	0	2	0
	0	1	0	0	1	0	0	2	0	0	2	0
1998	0	4	0	0	1	0	0	1	0	0	1	0
1998	0	24	0	0	0	0	0	0	0	0	115	0
1999	0	15	0	0	1	0	0	1	0	0	22	0
	0	4	0	0	1	0	0	1	0	0	24	0
2000	0	0	0	0	1	0	0	1	0	0	3	0
				0	1	0	0	1	0	0	43	0
2001	0	5	0				0	0	0			
	0	4	0				0	0	0			
2002	0	10	0				0	0	0			
	0	0	0				0	0	0			
2003	0	0	0				0	6	0			
	0	0	0				0	5	0			
2004	0	0	0				0	2	0			
	0	3	0				0	0	0			
2005	0	6	0				0	0	0			
	0	2	0				0	0	0			
2006	0	14	0				0	0	0			
	0	3	0				0	0	0			
2007	0	3	0				0	0	0			
	0	0	0				0	4	0			
2008	0	0	0				0	0	0			
	0	2	0				0	0	0			
2009	0	0	0				0	0	0			
	0	8	0				0	0	0			
2010	0	1	0				0	0	0			
	0	0	0				0	0	0			
2011	0	0	0	0	8	0	0	0	0	0	0	0
2012										0	0	0
	0	0	0	0	8	0	0	0	0	0	0	0
2013	0	0	0	0	4	0	0	0	0	0	0	0
2014	0	0	0	0	32	0	0	0	0	0	0	0

Table 13 Continued
Historical Summary of Analytical Results for Platteville Aquifer Wells, 1988 through 2014
All concentrations in micrograms per liter (ug/l).

Sampling Date	W27			W424			W426			W428		
	Total CPAH	Total Other PAH	Sum of BaP & DBA	Total CPAH	Total Other PAH	Sum of BaP & DBA	Total CPAH	Total Other PAH	Sum of BaP & DBA	Total CPAH	Total Other PAH	Sum of BaP & DBA
1988				0	0	0	0	1,148	0	0	0	0
	0	678	0	0	0	0	0	1	0	0	1	0
1989	0	1,345	0	0	1	0	0	544	0	0	1	0
1990				0	0	0				0	1	0
1991												
1992				0	5	0	0	82	0	0	3	0
				0	11	0	0	59	0	0	9	0
1994				0	0	0				0	0	0
1996	0	2	0	0	0	0	0	56	0	0	0	0
	0	10	0	0	0	0				0	0	0
1997	0	281	0	0	0	0	0	76	0	0	0	0
	0	416	0	0	0	0	0	64	0			
1998	0	184	0	0	0	0	0	108	0	0	0	0
1998	0	422	0	0	0	0	0	1,508	0	0	1	0
1999	0	312	0	0	0	0	0	642	0	0	1	0
	0	158	0	0	0	0	0	258	0	0	1	0
2000	0	415	0	0	0	0	0	112	0	0	2	0
	0	243	0	0	0	0	0	160	0	0	1	0
2001	0	199	0				0	131	0	0	2	0
	0	99	0				0	32	0	0	0	0
2002	0	123	0				0	564	0	0	0	0
	0	193	0				0	271	0	0	0	0
2003	0	89	0				0	574	0	0	0	0
	0	85	0				0	289	0	0	0	0
2004	0	196	0				0	636	0	0	0	0
	0	116	0				0	218	0	0	0	0
2005	0	143	0				0	598	0	0	0	0
	0	106	0				0	410	0	0	0	0
2006	0	133	0				0	259	0	0	0	0
	0	118	0				0	262	0	0	0	0
2007	0	77	0				0	301	0	0	0	0
	0	97	0				0	144	0	0	0	0
2008	0	48	0				0	147	0	0	0	0
	0	109	0				0	267	0	0	0	0
2009	0	76	0				0	141	0	0	0	0
	0	121	0				0	116	0	0	0	0
2010	0	54	0				0	92	0	0	0	0
	1	69	0				0	37	0	0	0	0
2011	0	79	0	0	0	0	0	121	0	0	0	0
2012												
	0	64	0	0	0	0	0	231	0	0	0	0
2013	0	86	0	0	0	0	1	387	0	0	1	0
2014	0	107	0	0	0	0	0	221	0	0	0	0

Table 13 Continued
Historical Summary of Analytical Results for Platteville Aquifer Wells, 1988 through 2014

All concentrations in micrograms per liter (ug/l).

Sampling Date	W437			W438		
	Total CPAH	Total Other PAH	Sum of BaP & DBA	Total CPAH	Total Other PAH	Sum of BaP & DBA
1988						
1989						
1990						
1991						
1992	0	3,096	0	0	20	0
	0	489	0	0	0	0
1994						
1996						
1997						
1998						
1998						
1999						
2000						
2001	0	6,305	0	1	1	0
	0	5,342	0	1	1	0
2002	0	5,438	0	0	5	0
	0	5,292	0	0	0	0
2003	0	1,116	0	0	0	0
	0	5,977	0	0	0	0
2004	0	6,265	0	0	0	0
	0	4,553	0	0	0	0
2005	0	4,749	0	0	0	0
	0	5,802	0	0	0	0
2006	0	4,212	0	0	0	0
	0	5,443	0	0	0	0
2007	0	3,699	0	0	0	0
	0	3,703	0	0	0	0
2008	0	2,667	0	0	0	0
	0	3,520	0	0	0	0
2009	0	2,507	0	0	0	0
	0	2,868	0	0	0	0
2010	0	1,248	0	0	0	0
	0	1,515	0	0	0	0
2011	0	907	0	0	0	0
2012						0
	0	695	0	0	0	0
2013	0	583	0	0	0	0
2014	0	841	0	0	0	0

Table 14
Historical Summary of Analytical Results for Drift Aquifer Wells, 1988 through 2014
All concentrations in micrograms per liter (ug/l).

Sampling Date	W420			W422			W439		
	Total CPAH	Total Other PAH	Sum of BaP & DBA	Total CPAH	Total Other PAH	Sum of BaP & DBA	Total CPAH	Total Other PAH	Sum of BaP & DBA
1988	0	2,477	0	0	77	0			
	0	1,103	0	0	50	0			
1989	0	2,389	0	0	48	0			
	0	3,418	0	0	52	0			
	0	3,442	0	0	61	0			
	0	3,016	0	0	52	0			
1990	0	3,949	0	0	74	0			
	0	2,430	0	0	59	0			
	0	3,143	0	0	88	0			
	0	3,024	0	0	65	0			
1991	0	4,200	0	0	67	0			
	0	2,494	0	0	59	0			
	88	4,967	0						
	0	4,163	0	0	89	0			
1992	0	3,172	0	0	125	0			
	0	3,229	0	0	77	0			
	0	2,281	0	0	100	0			
	0	2,374	0	0	90	0			
1993	0	2,537	0	0	94	0			
	0	3,512	0	0	118	0			
	0	1,825	0	0	81	0			
	0	2,052	0	0	74	0			
1994	0	2,033	0	0	67	0			
	0	2,573	0	0	66	0			
	0	2,439	0	0	66	0			
	0	2,507	0	0	59	0			
1995	0	2,436	0	0	54	0	0	3,934	0
	0	2,407	0	0	62	0	0	4,053	0
	0	2,526	0	0	53	0	0	2,564	0
	0	2,543	0	0	29	0	0	2,115	0
1996	0	1,968	0	0	24	0	0	1,552	0
	0	2,165	0	0	26	0	0	1,419	0
	0	2,725	0	0	26	0	0	1,765	0
	0	2,164	0	0	23	0	0	1,557	0
1997	0	2,324	0	0	24	0	0	1,552	0
	0	2,165	0	0	26	0	0	1,419	0
	0	2,974	0	0	20	0	0	1,813	0
	0	2,725	0	0	26	0	0	1,765	0
	0	2,151	0	0	19	0	0	1,547	0
	0	2,164	0	0	23	0	0	1,557	0
1998	0	3,519	0	0	18	0	0	1,236	0
	0	2,938	0	0	21	0	0	1,377	0
	0	2,933	0	0	17	0	0	1,221	0
	0	3,144	0	0	7	0	0	978	0
	0	2,570	0	0	13	0	0	954	0
1999	0	3,374	0	0	20	0	0	1,385	0
	0	3,714	0	0	14	0	0	1,278	0
	0	2,425	0	0	13	0	0	755	0
	0	2,145	0	0	13	0	0	1,123	0
2000	0	2,353	0	0	12	0	0	1,087	0
	0	4,519	0	0	19	0	0	1,985	0
	0	3,093	0	0	13	0	0	1,868	0
	0	2,525	0	0	6	0	0	1,187	0

Table 14
Historical Summary of Analytical Results for Drift Aquifer Wells, 1988 through 2014

All concentrations in micrograms per liter (ug/l).

Sampling Date	W420			W422			W439		
	Total CPAH	Total Other PAH	Sum of BaP & DBA	Total CPAH	Total Other PAH	Sum of BaP & DBA	Total CPAH	Total Other PAH	Sum of BaP & DBA
2001	0	3,487	0				0	1,498	0
	0	6,946	0	0	20	0	0	1,623	0
	0	2,528	0	0	12	0	0	1,056	0
	0	3,547	0	0	7	0	0	1,095	0
2002	0	4,405	0	0	15	0	0	1,205	0
	0	4,110	0	0	15	0	0	1,214	0
	0	3,981	0	0	9	0	0	1,027	0
	0	3,456	0						
2003	0	3,558	0						
	0	3,899	0	0	9	0	0	921	0
	0	3,148	0	0	4	0	0	1,495	0
	0	2,835	0						
2004	0	3,771	0						
	0	3,805	0	0	4	0	0	1,260	0
	0	3,167	0	0	1	0	0	1,789	0
	0	4,685	0						
2005	0	4,005	0	0	7	0	0	1,395	0
	0	2,463	0						
	0	4,447	0	0	9	0	0	1,303	0
	0	4,204	0						
2006	0	3,576	0						
	0	3,511	0	0	7	0	0	1,327	0
	0	3,782	0	0	0	0	0	1,015	0
	0	3,671	0						
2007	0	3,444	0						
	0	3,029	0	0	6	0	0	898	0
	0	3,209	0	0	9	0	0	963	0
	0	3,531	0						
2008	0	3,397	0	0	28	0	0	1,776	0
	0	3,514	0	0	10	0			
2009	0	2,050	0						
	0	3,168	0	0	7	0	0	1,144	0
	0	3,483	0	0	5	0	0	1,308	0
2010	0	2,911	0						
	0	2,623	0	0	14	0	0	905	0
	0	2,389	0	0	10	0	0	789	0
	0	2,202	0						
2011	0	2,277	0						
	0	2,252	0				0	1,002	0
	0	1,762	0				0	433	0
	0	1,371	0						
2012	0	1,686	0				0	747	0
	0	1,950	0	0	13	0	0	484	0
	0	1,975	0						
2013	0	813	0	0	9	0	0	2,336	0
	0	219	0						
2014	0	2,771	0	0	7	0	0	484	0
	0	2,140	0				0	493	0

Table 14
Historical Summary of Analytical Results for Drift Aquifer Wells, 1988 through 2014

All concentrations in micrograms per liter (ug/l).

Sampling Date	P109			P112			P307			P308			P309			P310		
	Total CPAH	Total Other PAH	Sum of BaP & DBA	Total CPAH	Total Other PAH	Sum of BaP & DBA	Total CPAH	Total Other PAH	Sum of BaP & DBA	Total CPAH	Total Other PAH	Sum of BaP & DBA	Total CPAH	Total Other PAH	Sum of BaP & DBA	Total CPAH	Total Other PAH	Sum of BaP & DBA
1988	0	3	0	0	0	0												
	0	5	0															
1989	0	4	0	0	0	0												
1990	0	5	0	0	0	0												
1991							0	225	0	0	98	0	0	318	0	0	33	0
1992				0	0	0				0	62	0						
1994																		
2001	0	1	0	0	0	0				0	3	0	0	27	0	0	13	0
	0	0	0	0	0	0	0	76	0	0	10	0	0	40	0	0	31	0
2002	0	0	0	0	0	0	0	42	0	0	3	0	0	50	0	0	14	0
	0	0	0	0	0	0	0	89	0	0	0	0	0	24	0	0	10	0
2003	0	0	0	0	0	0	0	42	0	0	0	0	0	91	0	0	16	0
	0	0	0	0	0	0	0	60	0	0	0	0	0	43	0	0	18	0
2004	0	0	0	0	0	0	0	52	0	0	0	0	0	38	0	0	14	0
	0	0	0	0	0	0	0	68	0	0	2	0	0	35	0	0	37	0
2005	0	0	0	0	0	0	0	110	0	0	0	0	0	75	0	0	31	0
	0	0	0	0	0	0	0	122	0	0	0	0	0	57	0	0	28	0
2006	0	0	0	0	0	0	0	27	0	0	5	0	0	47	0	0	11	0
	0	0	0	0	0	0	0	140	0	0	0	0	0	31	0	0	15	0
2007	0	0	0	0	0	0	0	97	0	0	9	0	0	47	0	0	12	0
	0	0	0	0	0	0	0	78	0	0	4	0	0	26	0	0	9	0
2008	0	0	0	0	0	0	0	63	0	0	1	0	0	20	0	0	5	0
	0	0	0	0	0	0	0	41	0	0	1	0	0	21	0	0	8	0
2009	0	0	0	0	0	0	0	43	0	0	0	0	0	16	0	0	2	0
	0	0	0	0	0	0	0	46	0	0	0	0	0	10	0	0	0	0
2010	0	0	0	0	0	0	0	17	0	0	1	0	0	12	0	0	3	0
				0	0	0	0	15	0	0	4	0	0	7	0	0	2	0
2011	0	0	0				0	14	0	0	2	0	0	7	0	0	1	0
													0	13	0			
2012													0	11	0			
	0	0	0	0	0	0	0	11	0	0	0	0	0	12	0	0	1	0
2013	0	0	0	0	0	0	0	10	0	0	3	0	0	26	0	0	2	0
2014	0	0	0	0	0	0	0	12	0	0	3	0	0	72	0	0	2	0

Table 14
Historical Summary of Analytical Results for Drift Aquifer Wells,
1988 through 2014
All concentrations in micrograms per liter (ug/l).

Sampling Date	P312			W10			W117			W128			W136			W15		
	Total CPAH	Total Other PAH	Sum of BaP & DBA	Total CPAH	Total Other PAH	Sum of BaP & DBA	Total CPAH	Total Other PAH	Sum of BaP & DBA	Total CPAH	Total Other PAH	Sum of BaP & DBA	Total CPAH	Total Other PAH	Sum of BaP & DBA	Total CPAH	Total Other PAH	Sum of BaP & DBA
1988				0	0	0	0	7	0	0	0	0	0	0	0			
				0	0	0	0	19	0	0	0	0	0	0	0			
1989				2	6	0	0	28	0	0	0	0	0	0	0			
1990				1	4	0	0	29	0	0	0	0				0	11	0
1991	0	14	0															
1992	0	23	0	0	0	0	0	12	0				0	1	0	2	8	0
1994				0	0	0	0	6	0	0	0	0	0	0	0	0	1	0
2001	0	3	0				0	2	0				0	0	0			
	0	4	0				0	1	0				0	0	0			
2002	0	4	0				0	0	0				0	0	0			
	0	5	0				0	0	0				0	0	0			
2003	0	9	0				0	0	0				0	0	0			
	0	6	0				0	0	0				0	0	0			
2004	0	11	0				0	0	0				0	0	0			
	0	4	0				0	0	0				0	0	0			
2005	0	14	0				0	0	0				0	0	0			
	0	7	0				0	0	0				0	0	0			
2006	0	12	0				0	0	0				0	2	0			
	0	6	0				0	0	0				0	0	0			
2007	0	5	0				0	0	0	0	0	0	0	10	0			
	0	7	0				0	0	0	0	0	0	0	8	0			
2008	0	6	0				0	0	0	0	0	0	0	0	0			
	0	4	0				0	0	0	0	0	0	0	0	0			
2009	0	0	0				0	0	0	0	0	0	0	0	0			
	0	0	0				0	0	0	0	0	0	0	0	0			
2010	0	3	0				0	0	0	0	0	0	0	0	0			
	0	2	0				0	0	0	0	0	0	0	0	0			
2011																0	0	0
																0	0	0
2012																0	0	0
	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2013	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2014	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 14
Historical Summary of Analytical Results for Drift Aquifer Wells, 1988 through 2014

All concentrations in micrograms per liter (ug/l).

Sampling Date	W2			W423			W425			W427			W9		
	Total CPAH	Total Other PAH	Sum of BaP & DBA	Total CPAH	Total Other PAH	Sum of BaP & DBA	Total CPAH	Total Other PAH	Sum of BaP & DBA	Total CPAH	Total Other PAH	Sum of BaP & DBA	Total CPAH	Total Other PAH	Sum of BaP & DBA
1988	0	0	0	0	0	0	0	4	0	0	0	0			
	0	0	0	0	0	0	0	6	0	0	0	0			
1989	0	0	0	0	0	0	0	6	0	0	0	0			
1990				0	0	0				0	0	0			
1991															
1992							0	6	0	0	1	0			
1994	0	0	0	0	0	0	0	4	0						
2001															
										0	0	0			
2002										0	0	0			
										0	0	0			
2003										0	0	0			
										0	0	0			
2004										0	0	0			
										0	0	0			
2005										0	0	0			
										0	0	0			
2006										0	0	0			
										0	0	0			
2007										0	0	0			
										0	0	0			
2008										0	0	0			
										0	0	0			
2009										0	0	0			
										0	0	0			
2010										0	0	0			
										0	0	0			
2011	0	0	0										0	9	0
	0	0	0										0	11	0
2012	0	0	0										0	0	0
	0	0	0							0	0	0	0	126	0
2013	0	0	0	0	0	0	0	17	0	0	0	0	0	2	0
2014	0	0	0	0	0	0	0	5	0	0	0	0	0	82	0