Five-Year Review Report

Fourth Five-Year Review Report

for

Reilly Tar and Chemical Corporation

St. Louis Park

Hennepin County, Minnesota

June, 2011

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List of Acronyms

Agencies	MPCA and EPA
AMR	Annual Monitoring Report
bgs	Below Ground Surface
CD-RAP	Consent Decree-Remedial Action Plan
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	Code of Federal Regulations
DNAPL	Dense Non-Aqueous Phase Liquid
EPA	United States Environmental Protection Agency
ESD	Explanation of Significant Differences
GAC	Granular Activated Carbon
gpm	Gallons per Minute
HRL	Health Risk Limits
IC	Institutional Control
MCL	Maximum Contaminant Level
MDH	Minnesota Department of Health
MG/MGY	Million Gallons/Million Gallons per Year
MOU	Memorandum of Understanding
MPCA	Minnesota Pollution Control Agency
NCP	National Contingency Plan
ng/L	Nanograms per Liter
NPL	National Priorities List
O&M	Operation and Maintenance
OU	Operable Unit
PAH	Polynuclear Aromatic Hydrocarbon
PCOR	Preliminary Closeout Report
PLP	Permanent List of Priorities
ppt	Parts Per Trillion (also equal to ng/L)
RA	Remedial Action
RAO	Remedial Action Objective
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
SLP	City of St. Louis Park
SSPA	S.S. Papadopulos and Associates Inc.
µg/L	Micrograms per Liter
USFWS	United States Fish and Wildlife Service
UU/UE	Unlimited use or unrestricted exposure
WasteLAN	Regional Database related to CERCLIS

Executive Summary

The Reilly Tar and Chemical Corporation (Reilly) Superfund Site (Site) is located in St. Louis Park, Minnesota. The Reilly Site operated as a coal tar distillation and wood preserving plant from 1917 through 1972. During the time that the Reilly facility operated, wastes containing coal tar and its distillates were disposed of into a ditch that emptied into a peat bog to the south of the Site. The discharge into the bog continued for the duration of the facility's operation. Consequently, many private wells and eventually municipal supplies became contaminated with polynuclear aromatic hydrocarbons (PAHs).

Remedial action at the Site to address PAH-impacted groundwater is addressed through treatment and gradient control through pumping. Granular activated carbon (GAC) is utilized to treat PAH-impacted groundwater, from municipal wells, to meet drinking water standards prior to entering the City of St. Louis Park municipal water supply. The ongoing remedial actions are meeting remedial action objectives established in the Records of Decision (RODs) for the Site.

However; further evaluation of vapor intrusion pathways is necessary in order to fully assess protectiveness. A protectiveness determination of the remedy at Operable Unit 2 cannot be made at this time until further information is obtained. Further information will be obtained by completing a vapor intrusion investigation. It is expected that this action will take approximately one year to complete, at which time a protectiveness determination will be made. Long term protectiveness will be assured by additional evaluation of groundwater conditions and potential enhancement of the gradient control system. Long-term protectiveness also requires compliance with effective institutional controls (ICs). Compliance with effective ICs will be ensured through implementing, maintaining, monitoring and enforcing effective ICs. An IC plan will be developed to determine what ICs are needed at the Site.

Five-Year Review Summary Form

SITE IDENTIFICATION		
Site name *(from WasteLAN)*: Reilly Tar and Chemical Company Superfund Site		
EPA ID *(from WasteLAN)*: MND 980609804		
Region: 5	**State: MN**	**City/County: City of St. Louis Park/Hennepin County**
SITE STATUS		
NPL status: Final		
Remediation status (choose all that apply): **Operating**		
Multiple OUs?* Yes	**Construction completion date: 06/30/97**	
Has site been put into reuse? Yes		
REVIEW STATUS		
Lead agency: Minnesota Pollution Control Agency (MPCA)		
Author name: Nile Fellows		
Author title: Project Leader	**Author affiliation: Minnesota Pollution Control Agency**	
Review period: 10/20/2010 to 6/27/2011**		
Date(s) of site inspection: 10/28/2010		
Type of review: Post SARA		
Review number: Fourth (4)		
Triggering action: Previous Five-Year Review Report		
Triggering action date *(from WasteLAN)*: 9/28/2006		
Due date *(five years after triggering action date)*: 9/28/2011		

* ["OU" refers to operable unit]

** [Review period should correspond to the actual start and end dates of the Five-Year Review in WasteLAN.]

Fill in the data below:

Date of last Regional review of Human Exposure Indicator (from WasteLAN): ____8/12/2010_____

Human Exposure Survey Status (from WasteLAN): __Current Human Exposure Controlled_____

Date of last Regional review of Groundwater Migration Indicator (from WasteLAN): __9/15/2010_____

Groundwater Migration Survey Status (from WasteLAN): __Contaminated Ground Water Migration Not Under Control_____

Ready for Reuse Determination Status (from WasteLAN): _____Not ready for Site wide Ready for Anticipated Use—unscheduled in WasteLAN_____

Five-Year Review Summary Form, cont'd.

Issues:

- Regarding the potential migration of the plume in the Prairie du Chien-Jordan Aquifer, complete evaluation of groundwater elevations and flow modeling, including continuous data from the Edina municipal wells, has not been completed to evaluate the necessity of pumping wells W119, SLP-6, and/or W48 and installing new monitoring wells upgradient of the Edina field.
- Institutional controls for areas of the site where unlimited use or unrestricted exposure (UU/UE) has not been achieved are not in place to ensure long-term protectiveness of the remedy. An IC Plan has not been developed to aid in determining the type and scope of institutional controls and in the implementation and maintenance of any needed ICs.
- Vapor intrusion pathways have not yet been fully evaluated at the Site.
- Evaluation of SLP-3 with regard to vertical influence on pumping in the Platteville Aquifer has not been conducted.
- Revised drinking water standards, based on updated toxicity data, have been developed since the time of the remedy selection.
- Assessment of possible downward vertical contaminant migration at the Site has not been completed, a report has been provided by the City and is being evaluated by Agency staff.
- Inspection and maintenance of the complete monitoring well network recommended in the previous five-year review has not been documented.

Recommendations and Follow-up Actions:

- Evaluation of groundwater elevations and flow modeling, including continuous data from the Edina municipal wells, should be completed. The completed evaluation should consider enhancement to the gradient control and monitoring systems based on increasing contaminant concentrations in downgradient municipal wells E13 and H6.
- Develop an Institutional Control Plan for the evaluation, development, and implementation of ICs.
- Evaluation of vapor intrusion pathways should be completed.
- Evaluation of SLP-3 should be conducted with regard to vertical influence and/or abandonment as proposed by the City of St. Louis Park.
- Evaluation of current standards specific to carcinogenic, non-carcinogenic and individual PAH compounds should be considered.
- Complete the evaluation of possible vertical contaminant migration at the Site as recommended by the previous five-year review; evaluation should include recent continuous data collected by St. Louis Park.
- Document inspection and maintenance of the entire well network on an annual basis.

Protectiveness Statement(s):

Operable Unit 1

The remedy at OU 1 is protective of human health and the environment; exposure pathways that could result in unacceptable risks are being controlled by filtering groundwater through granulated active carbon (GAC) prior to introduction into the municipal supply.

Operable Unit 2

The performance of the remedial actions selected by the OU2 ROD is substantially consistent with the intent of the decision documents. Individual components of the OU2 ROD are discussed in Section IV of this review. The following remedial actions selected by the OU2 ROD require further evaluation based on data presented during this review period (2006-2011). The status of one of the remedial actions, discussed below, affects the determination about current protectiveness of the remedy.

A protectiveness determination of the remedy at OU 2 cannot be made at this time until further information is obtained. Further information will be obtained by completing a vapor intrusion investigation. It is expected that these actions will take approximately one year to complete, at which time a protectiveness determination will be made.

Monitoring, pumping and treatment of the Ironton-Galesville Aquifer to protect the deeper Mt. Simon-Hinckley Aquifer.

This RA is being implemented as required in the CD-RAP and is protective of human health and the environment. Groundwater Well W105 is the only well in the Ironton-Galesville aquifer. As required by the CD-RAP, this well was operated as a pump and treat well until December 31, 1991. During this Five-Year review period, groundwater concentrations above CD-RAP cessation criteria have been reported at well W105; however, confirmation samples as required by the CD-RAP have indicated groundwater conditions are below criteria established in the CD-RAP. Further monitoring and evaluation of concentrations at this well is recommended.

Monitoring, pumping and treatment of the Prairie du Chien-Jordan Aquifer until such time that drinking water quality is uniformly established within the area of gradient control.

The remedial action for the Prairie du Chien-Jordan Aquifer currently protects human health and the environment because groundwater flow and contaminant migration within the Prairie du Chien-Jordan Aquifer is being limited by aquifer pumping and subsequent removal of PAH from the groundwater. However, in order for the remedy to be protective in the long-term, the following actions need to be taken:

- Complete evaluation of groundwater elevations and flow modeling including the use of continuous data from the Edina municipal wells using pressure transducers

should be completed. Due to increasing PAH concentrations in municipal wells E13 and H6, the completed evaluation should consider enhancement to the gradient control system.

- Evaluation of vertical contaminant migration at the Site should be completed as recommended by the previous five-year review. Evaluation should include recent continuous data collected by St. Louis Park.

These studies have been started by the City of St. Louis Park, but were not completed at the time of this review.

Monitoring and contingent action for the maintenance of drinking water quality in the St. Peter Aquifer.

The remedial action for the St. Peter Aquifer currently protects human health and the environment because groundwater flow and contaminant migration within the St. Peter Aquifer is being limited by aquifer pumping and subsequent removal of PAHs from the groundwater by filtering through GAC. However, in order for the remedy to be protective in the long-term, the following actions need to be taken:

- Evaluation of SLP-3 should be conducted with regard to vertical influence and/or abandonment as proposed by the City of St. Louis Park.

This study is being done in conjunction with the Prairie Du Chien study, and was not complete at the time of this review.

Further subsurface investigation in the vicinity of the Site, to implement deed restrictions for current and future land use in the areas of contamination.

The remedial action regarding subsurface investigation in the vicinity of the Site has been partly completed; a 1988 study south of the Site reported no significant soil impacts in the area defined in the CD-RAP. But, more subsurface investigation to evaluate the vapor intrusion exposure pathway is needed to assess remedy protectiveness and also inform the implementation of appropriate institutional controls. A protectiveness determination of the remedy at Operable Unit 2 cannot be made at this time until further information is obtained. Further information will be obtained by completing a vapor intrusion investigation. It is expected that this action will take approximately one year to complete, at which time a protectiveness determination will be made. Also, in order for the remedy to be protective in the long-term, evaluation and implementation of ICs are needed. An IC plan needs to be undertaken to determine the type and scope of ICs that may be needed as well as to develop a plan to implement and enforce any ICs put in place.

Operable Unit 3

The remedy at OU 3 is protective of human health and the environment, and in the interim, exposure pathways that could result in unacceptable risks are being controlled. At the specified

pumping rate, gradient control wells are limiting contaminant migration in the northern area Drift; however, pumping rates at W439 have been reported slightly (46 gpm) below ROD required minimums (50 gpm) during 2007-2010. The City of St. Louis Park asserts that the pump is operating at maximum capacity for the surrounding groundwater hydraulics.

Operable Unit 4

The remedy at OU 4 is protective of human health and the environment, and in the interim, exposure pathways that could result in unacceptable risks are being controlled. Groundwater pumping in the St. Peter Aquifer continues to limit contaminant migration in the vicinity of the Site and is removing PAH contaminants from the Aquifer.

Operable Unit 5

The remedy at OU 5 is protective of human health and the environment, and in the interim, exposure pathways that could result in unacceptable risks are being controlled. Stable to decreasing concentrations of PAHs are generally below drinking water criteria established by the CD-RAP.

Site Wide Protectiveness Statement

The remedial actions at OUs 1, 3, 4, and 5 are protective in the short term. Granular activated carbon treatment of PAH-impacted municipal wells controls exposure and provides water which meets drinking water criteria established for the Site. A gradient control network is limiting contaminant migration in the vicinity of the Site and generally contains the spread of PAH-impacted groundwater; however, groundwater modeling and data collected to date indicate potential downgradient risk to other municipal wells in the area. Because a protectiveness determination of the remedy at OU2 cannot be made at this time, the Site-wide determination on the remedy's protectiveness of human health and the environment is deferred. The determination is deferred at OU 2 because of the current lack of information on the vapor intrusion exposure pathway. Based on issues and recommendations of this five-year review, the following actions need to be taken in order to achieve long-term protectiveness:

- Complete the evaluation of groundwater elevations and flow modeling, including continuous data from the Edina municipal wells. While the City has begun this work it will not be completed in time for this review. The completed evaluation should consider enhancement to the gradient control system based on increasing concentrations in downgradient municipal wells E13 and H6.
- Develop an IC Plan for the evaluation, development and implementation of ICs.
- Complete the evaluation of the vapor intrusion pathway.
- Evaluation of SLP-3 should be conducted with regard to vertical influence and/or abandonment as proposed by the City of St. Louis Park.

- Evaluation of current standards specific to carcinogenic, non-carcinogenic and individual PAH compounds should be considered.
- Evaluation of vertical contaminant migration at the Site should be completed as recommended by the previous five-year review; evaluation should include recent continuous data collected by St. Louis Park.
- Inspection and maintenance of the complete monitoring well network recommended in the previous five-year review should be completed and documented on an annual basis.

Five-Year Review Report

I. Introduction

The Purpose of the Review

The purpose of the five-year review is to determine whether the remedy at the Reilly Tar and Chemical Corporation Site (Site) is protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in Five-Year Review reports. In addition, Five-Year Review reports identify issues found during the review, if any, and recommendations to address them.

Authority for Conducting the Five-Year Review

This review is required by statute. The United States Environmental Protection Agency (EPA or Agency) is preparing this Five-Year Review report pursuant to CERCLA Section 121 and the National Contingency Plan (NCP) CERCLA Section 121 which states:

> *If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to ensure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgment of the President that action is appropriate at such site in accordance with section [104] or [106], the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such actions.*

The Agency interpreted this requirement further in the NCP; 40 CFR Section 300.430(f)(4)(ii) states:

> *If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after initiation of the selected remedial action.*

Who Conducted the Five-Year Review

The MPCA, on behalf of the EPA (collectively as the Agencies), has conducted a five-year review of the remedial actions implemented at the Reilly Tar and Chemical Corporation Site (Site) in St. Louis Park, Minnesota. The MPCA conducted the review from October 2010 through June 2011. This report documents the results of the review conducted with the assistance of MPCA contractor, Antea™Group (formerly Delta Consultants) of St. Paul, Minnesota. The EPA and MPCA jointly are the lead environmental regulatory agencies for the implementation and oversight of response actions at the Site.

Other Review Characteristics

This is the fourth five-year review for the Reilly Tar and Chemical Corporation Site. The triggering action for this statutory review is the date of the previous five-year review, as shown in the EPA WasteLAN database: September 28, 2006. This five year review is required due to the fact that hazardous substances, pollutants, or contaminants remain at the Site above levels that allow for unlimited use and unrestricted exposure

II. Site Chronology

Table 1: Chronology of Site Events

Event	Date
Initial discovery of problem or contamination	1938
Final listing on the National Priorities List	September 8, 1983
Record of Decision (ROD) for Operable Unit 1 (OU 1)	June 6, 1984
ROD for OU 2	May 30, 1986
Consent Decree issued with Remedial Action Plan (CD-RAP)	September 5, 1986
ROD for OU 4 (St Peter Aquifer)	September 28, 1990
ROD for OU 3 (Northern Area of the Drift Aquifer)	September 30, 1992
ROD for OU 5 (Northern Area of the Platteville Aquifer)	June 30, 1995
First Five-Year Review	April 3, 1996
Explanation of Significant Differences (ESD) for OU 5	March 26, 1997
Preliminary Close Out Report (PCOR)	June 30, 1997
Amendment to Consent Decree	November 8, 1999
Second Five-Year Review	September 28, 2001
Third Five-Year Review	September 28, 2006

III. Background

Physical Characteristics

The Reilly Tar and Chemical Corporation Site is located in the City of St. Louis Park, Hennepin County, Minnesota (Figure 1). The 80-acre Reilly Tar & Chemical site is bounded to the north by West 32nd Street and to the south by Walker Street in St. Louis Park. The property extends east of Louisiana Avenue and about 1,200 feet west of Louisiana Avenue. The Site itself is developed for residences and a park. Commercial areas are immediately east and south of the Site. The U.S. Census Bureau reports the population of St. Louis Park in 2010 was 45,250. St. Louis Park is a first ring suburb immediately west of Minneapolis and covers approximately 10.8 square miles. The City of St. Louis Park is fully developed with a mix of residential, commercial, industrial and parkland use. Figure 2 identifies the extent of wells monitored as related to remedial actions for the Site.

Land and Resource Use

Between 1917 and 1972, Reilly Industries (Reilly) operated a coal tar distillation and wood preserving plant, known as the Republic Creosoting Company (Republic). Plant operations were primarily located in the south-central and southeastern portions of the Site. These areas contained the coal tar distillation still, wood-treating building and aboveground and underground storage tanks for creosote, tars, pitch and fuel oils.

In 1972, the plant was dismantled and the land was sold to the City of St. Louis Park (City). Since 1972 the site has been put into reuse by development of Louisiana Avenue, townhouses, condominiums, a restaurant and bowling alley, and a recreational park with athletic fields, walking paths, storm water pond, playground and parking lot. In 1973, the lined storm water pond was installed at the site. The pond discharges into a drain that is connected to another pond off-site to the south before eventual discharge to Minnehaha Creek. The City monitors the discharge into the creek. Construction of Louisiana Avenue was completed in 1991 and 1992. Additionally the City is in the process of evaluating future realignment options for the intersection of Louisiana Avenue and State Highway 7 to the south of the Site.

The regional geology consists of unconsolidated glacial drift over sedimentary bedrock. The glacial drift ranges from sand to sandy clay and is generally 80 to 100 feet thick in the vicinity of the Site. Groundwater aquifers underlying the site include; Mount Simon/Hinckley, Ironton/Galesville, Prairie du Chien/Jordan (Prairie du Chien), St. Peter, Platteville and the Glacial Drift aquifers.

The Prairie du Chien Aquifer is the primary source of drinking water for the population in the St. Louis Park area. The deeper Mount Simon/Hinckley Aquifer is the second most extensively utilized drinking water aquifer in the area. The St. Peter Aquifer is also utilized for drinking water purposes to a lesser extent due to the better water quality found in the Prairie du Chien.

History of Contamination

From approximately 1917 to 1939, wastes containing coal tar and its distillation by-products were discharged, as a matter of disposal practice, overland into a ditch that ran the length of the Site and discharged into a peat bog south of the Site. The waste discharge was observed to contain floating oil, emulsified oil and settled tar. The road ditch between Walker Street and the plant contained a tar accumulation of about six inches. Oily water extended over the surface of the bog and much of the vegetation and peat was covered by tar. A 1938 report by L.L. Kemps, Assistant Public Health Engineer, noted that 6,000 gallons per week of effluent (coal tar distillates and wood treating waste) were discharged into the swamp with observed flow rates of 150 to 200 gallons per minute (gpm).

A wastewater treatment facility was installed in 1940; however, the effluent continued to be discharged into the bog for the duration of the facility's operation through 1972. The concentrations of phenols and oil and grease in the effluent typically varied from 100 to 1,000 micrograms per liter (µg/L).

Chemical contaminants may have also been released from a waste pond located in the main coal tar distilling/wood preserving area in the southeast corner of the Site. Coal tar and creosote impacts to soil occurred throughout the Site's operational history through leaking, piping, and leaching from stockpiled treated lumber and spills of process materials.

Groundwater Contamination

Prior to Reilly Tar and Chemical's ownership, and throughout the history of the site, numerous production wells have been installed. At least one of these productions wells, W23, have exacerbated the release of contaminants within the study area.

Prior to Reilly Tar and Chemical's ownership of the site in 1917, the Minnesota Sugar Beet Company was located on the Site. The Minnesota Sugar Beet Company utilized a large production well, W105, which remained intact when the property was sold to Reilly. The production well was reportedly 955 feet deep and completed in the Mt. Simon/Hinckley Aquifer. The well was originally constructed with a 16-inch casing to 58 feet and 12-inch casing to 150 feet. In 1917, Republic cleaned out the Sugar Beet Well and added a 10-inch casing to 150 feet.

Twelve additional wells were constructed at the Site since the time of the Minnesota Sugar Beet Company owned the property. Well log information indicates that some of the wells were completed in the middle to lower drift aquifers (50 to 60 feet) and others were completed in the St. Peter Sandstone (100 to 200 feet).

Republic drilled well W23 in 1918 to a depth of 909 feet into the Mt. Simon/Hinckley sandstone. In 1933, 10-inch casing was added to a depth of 73 feet, 8-inch casing to 260 feet and 4.5 inch casing to 373 feet, the approximate depth of the Jordan Sandstone. Original well construction data (prior to 1933) for Well W23 was not available for comparison. A 1940 letter states that this well water was never used for drinking water purposes due to taste and odor. In 1982,

approximately 100 feet of coal tar material was removed from W23, this well was then reconstructed in the Prairie du Chien/Jordan Aquifer and continues to be utilized as part of the selected remedial action at the Site. The contamination of the aquifers beneath the Site occurred through spills of coal tar product that eventually migrated down well W23 on site and contaminated multiple aquifers, and through leachate generated by discharge of wastewater overland into the bog to the south of the site.

Historical reports and accounts of the site also indicate that past disposal practices may have included discharge of waste into wells at the Site. A document from the 1930s indicated that Republic utilized a waste well for disposal of refuse oil and a letter from McCarthy Well Company stated that two wells were found at the Republic Plant which were being utilized to drain creosote from the ground.

In 1932, the City of St. Louis Park (SLP or the City) constructed its first municipal well into the Prairie du Chien Aquifer. The water was discerned to have a pronounced creosote taste and odor. The City attempted to alleviate the problem by advancing the well another 150 feet through the St. Lawrence confining bed but the problem continued to persist and the well was abandoned.

During the 1930s and 1940s, several private well owners near the Site complained of contamination in water drawn from the Drift-Platteville Aquifer. The first written complaint from a resident in the vicinity, about a phenol taste in his well water, occurred in 1938. Users of commercial wells in the St. Peter and Prairie du Chien also commented on the presence of phenolic tastes in their well water.

Initial Response

In November 1978, St. Louis Park well SLP-10 and SLP-15, which are contiguous, were closed due to elevated levels of PAH detected in the untreated water. Due to their proximity to the groundwater plume wells SLP-7 and SLP-9 were also closed. These wells were closed in order to prevent SLP-7 and SLP-9 from controlling the hydraulic gradient and drawing additional PAH contaminants to these wells. In December 1979, wells SLP-4 and SLP-5 were also closed due to elevated PAH concentrations. The amount of water supply lost to the City due to the closure of six wells was approximately 35 percent of the existing capacity prior to 1978. In order to accommodate the decrease in water supply the City of St. Louis Park instituted a water conservation program during the summer, increased pumping rates at uncontaminated supply wells, and drilled SLP-17 to the deeper Mt. Simon-Hinckley Aquifer. The City also purchased a limited amount of water from the neighboring City of Plymouth. Since 1978, Reilly and the City have constructed and maintained treatment plants for municipal supply wells SLP-4, SLP-10 and SLP-15. Treated water from these wells is added to the municipal water distribution system so that special conservation measures are no longer necessary.

In 1979, 28 multi-aquifer wells were abandoned or reconstructed to prevent the spread of contaminants. Additional remedial measures conducted under two cooperative agreements between the MPCA and EPA included:

- Clean out of on-site wells known to contain coal tar contamination,
- Abandonment of multi-aquifer wells,
- Complete a feasibility study for water treatment at St. Louis Park,
- Remedial investigation to determine the aerial extent of the contaminant source,
- Complete a feasibility study for source control measures.

Basis for Taking Action

Previous Site operations and disposal practices have been identified as the cause of PAH impacts to soil and groundwater. Hazardous substances have been detected in soil and groundwater at concentrations in excess of risk of exposure limits to human health and the environment and are the basis for taking action at the Site. Site contaminants posed unacceptable risk to human health via ingestion of contaminated ground water through drinking and cooking and via exposure to contaminated soils from direct contact and ingestion. For a complete list of contaminants of concern, see Appendix E.

Soil

Previous estimates indicated that approximately 1,000,000 cubic yards of soil, impacted above ten times the background concentrations, is present at the Site. Based on the prohibitive cost of excavating and removing all of the contaminated soil, the decision documents for the Site rely on maintaining the soil cap and institutional controls to address soil exposure risk to potential receptors.

The CD-RAP also requires that plans for improvement and construction at the Site be submitted to the MPCA and EPA for review. Each plan is required to contain provisions for protection of Site workers and disposal considerations in the event that PAH impacted soil is encountered during construction.

Groundwater

Groundwater contaminated with PAH concentrations exceeding acceptable risk levels have been detected in the Drift/Platteville Aquifers and deeper bedrock aquifers. The Drift/Platteville Aquifers have had PAH concentrations detected in excess of 1,000 µg/L. Several wells completed in the Prairie du Chien Aquifer have had PAH concentrations in excess of 10 µg/L.

IV. Remedial Actions

Remedy Selection

The Reilly site is one of the nation's oldest Superfund sites. In 1986, a settlement agreement was reached between the United States, the State of Minnesota, the City of St. Louis Park, and the City of Hopkins versus Reilly Tar & Chemical Corporation, the Housing and Redevelopment Authority of St. Louis Park, Oak Park Village Associates, Rustic Oaks Condominium Inc., and

Philip's Investment Company. This settlement was embodied in a Consent Decree-Remedial Action Plan (CD-RAP) for the site. The remedial actions are implemented as described in five different RODs written from 1984 to 1995. Each ROD addresses a separate operable unit (OU) of the Site.

Operable Unit 1

The ROD for OU1 was signed on June 6, 1984. The objective of this remedial action OU1 is to restore water quality and quantity to the St. Louis Park municipal supply. The remedy selected includes utilizing GAC that treats groundwater pumped from wells SLP-10 and SLP-15 (SLP-10/15). The ROD also recognized the groundwater gradient control potential of utilizing SLP-10/15 to prevent contaminant migration.

Operable Unit 2

The ROD for OU2 was signed on May 30, 1986. The remedial actions selected are presented in and incorporated by reference to the September 1986 Consent Decree. The OU2 ROD and Exhibit A of the CD-RAP identify 11 remedial actions. Generally, the remedial actions described for OU2 include; containment, treatment, and monitoring of groundwater in the five contaminated aquifers, capping and filling the bog and contaminated soil at the Site, pumping source material from Well 23, controlling construction waste, and further remedial investigation (RI) for the purpose of implementing institutional controls and limiting the spread of contaminants through groundwater aquifers. The investigations identified three additional operable units for the Site (OU3, OU4, OU5). The CD-RAP identifies specific cessation criteria for remedial actions at the Site. The CD-RAP also presents risk based drinking water criteria developed for the Site. Table 4 of this document presents the drinking water criteria established by the CD-RAP.

Operable Unit 3

The ROD for OU3 was signed on September 30, 1992. The remedial action includes interception and containment of PAH-impacted groundwater in the northern area of the Drift Aquifer by groundwater pumping. The remedy identifies pumping of well W422 and one other well as necessary to control the groundwater gradient within the northern area of the Drift Aquifer. The ROD called for either discharge to the sanitary sewer or discharge to the storm sewer following treatment, if necessary. Continued monitoring of the northern area Drift Aquifer is also part of the selected remedy for OU3.

Operable Unit 4

The ROD for OU4 was signed on September 28, 1990. The remedial action is intended to prevent, reduce and control the spread of contaminants in the St. Peter Aquifer. The OU4 ROD identifies pumping of well W410 and continued monitoring of the St. Peter Aquifer as the selected remedy for OU4.

Operable Unit 5

The ROD for OU5 was signed on June 30, 1995. The remedial action selected for OU5 is intended to remediate the contamination in the northern area of the Platteville Aquifer. The remedy selected by the OU5 ROD includes installation of a pumping well to provide gradient control of the northern area Platteville Aquifer and continued groundwater monitoring.

An Explanation of Significant Differences (ESD) was issued in March 1997 to select an alternative remedy. The alternative remedy was to use Well W434, which is located immediately south of the Northern area, as a substitute gradient control well. Well W434 was originally installed to capture contamination before it entered the buried bedrock valley southeast of the site. It was determined that Well W434 should also be able to provide reasonable gradient control for the Northern area of the Platteville Aquifer.

Based upon the ground water contours generated in the Annual Monitoring Report for 2005, pumping well W434 had little effect on the Platteville Aquifer. It appears that the well had a local effect in controlling ground water in the Platteville Aquifer immediate area; however, due to the low transmissivity of the Platteville Aquifer in this area, the capture zone was limited. The capture zone of W434 was likely affected by leakage from the above Drift Aquifer recharging the Platteville Aquifer and this effect decreases the lateral extent of the capture area of W434. The City requested cessation of W434 and this well was turned off in 2006.

Remedial Action Objectives

The remedial action objectives of each operable unit are discussed below:

Operable Unit 1

Restoration of drinking water supply for St. Louis Park to drinking water criteria contained in the CD-RAP. See Table 3 in Section VII of this report for the drinking water criteria.

Operable Unit 2

1. Containment or treatment of ground water in contaminated aquifers.
2. Source control of the bog and contaminated soil at the Site. Because of the large volume of soils remaining at the site, this source could not be cost-effectively addressed. The focus of the RA has been the maintenance of a site soil cover and containment and removal of contaminated ground water.
3. Further subsurface investigation in the vicinity of the site, to implement deed restrictions for current and future land use in the areas of contamination.

Operable Unit 3

The interception and containment of contaminants by use of gradient control wells which will prevent the further spread of contaminated ground water in the Northern Area of the Drift

Aquifer. This aquifer will be continuously monitored for water level and water quality.

Operable Unit 4

The interception and containment of contaminants by pumping well number W410 in the St. Peter Aquifer. This aquifer will be continuously monitored for water level and water quality.

Operable Unit 5

The interception and containment of contaminants by use of a gradient control well which will prevent the further spread of contaminated ground water in the Northern Area of the Platteville Aquifer. This aquifer will be continuously monitored for water level and water quality.

Remedy Implementation

Operable Unit 1

1) Restoration of the drinking water supply and water quality by construction of a GAC treatment system for St. Louis Park municipal wells SLP-10 and SLP-15.

Construction of a GAC treatment system was initiated on December 27, 1985, by Calgon Corporation under contract to Reilly. Full operation of the treatment system began on July 9, 1986. The City analyzes the quality of the water being produced for the water supply on a quarterly basis in accordance with the CD-RAP. In the event that detections of PAH concentrations exceed levels established in the CD-RAP or drinking water criteria, the sampling frequency is increased in order to determine when GAC replacement is necessary. Based on past usage, the City changes the carbon once per year. A report is submitted annually to the MPCA and EPA regarding the operation and effectiveness of the GAC treatment system. During this review period detections of PAH concentrations did not exceed levels established in the CD-RAP.

During this reporting period SLP 10/15 were operated without incident, except for periods in 2007, 2009, and 2010. The wells are required to pump 10 million gallons per month and 200 MGY by the terms of the CD-RAP. Performance of these requirements is summarized in Table 2 below. In October and November 2007, the low monthly pumping volumes were due to the temporary shutdown of the GAC treatment system to paint the municipal supply reservoir. However, the temporary shutdown of the system did not affect the ability of the system to meet the annual pumping volume requirements in 2007. From September 2009 through April 2010, the pump was out of service for filter treatment plant rehabilitation. In September, November, and December of 2010 the monthly pump rates were low due to control problems reported by the City.

Table 2 – Pumping Performance of SLP10/15, 2006-2010

Year	MGY Pumped	Months Below 10 MG
2006	341	None
2007	310	October, November
2008	352	None
2009	207	October through December
2010	121	Jan.-April, Sept., Nov., Dec.

Operable Unit 2

1) Monitoring and contingency treatment of the Mt. Simon-Hinckley Aquifer to maintain drinking water quality.

Section 5 of the CD-RAP requires monitoring of water quality in the Mt. Simon-Hinckley Aquifer and to provide contingent remediation if PAH impacts are detected in the aquifer. Wells SLP-11, SLP-12, SLP-13 and SLP-17 are completed within the Mt. Simon-Hinckley Aquifer. Well SLP-17 has been out of service since 2000 and has not been sampled since then. Wells SLP-11 and SLP-13 were turned off in 2003 and 2004 respectively; however, these wells continue to be sampled annually. The CD-RAP also requires that the City monitor any new Mt. Simon-Hinckley wells constructed within one mile of the Site. No new Mt. Simon-Hinckley wells were sampled during this reporting period because none were constructed. The locations of the St. Louis Park wells in this aquifer are presented in Figure 3.

During this review period, PAH concentrations detected in the Mt. Simon-Hinckley Aquifer have been below advisory levels established in the CD-RAP.

2) Monitoring, pumping and treatment of the Ironton-Galesville Aquifer to protect the deeper Mt. Simon-Hinckley Aquifer.

The Ironton-Galesville Aquifer is currently monitored by well W105. This well was previously utilized by the Minnesota Sugar Beet Company and was converted to a groundwater pumping well in accordance with the CD-RAP. In 1991, the City requested that pumping cease due to PAH concentrations meeting cessation criteria. The EPA and MPCA approved the request and pumping was terminated on December 31, 1991. Well W105 is currently utilized as a monitoring well and is sampled on a bi-annual (even number year) schedule.

Concentrations detected at W105 in 2008 indicated PAH concentrations exceeding 10,000 parts per trillion (ppt). The CD-RAP sets 10,000 ppt as the criterion for initiating confirmation sampling for W105. Two confirmation samples collected in March 2009 indicated that concentrations were below the criterion. In June 2010, concentrations of PAH at W105 were again detected at a level exceeding 10,000 ppt. Two confirmation samples collected in December 2010 indicated that PAH levels were again below 10,000 ppt.

3) Monitoring, pumping and treatment of the Prairie du Chien-Jordan Aquifer until such time that drinking water quality is uniformly established within the area of gradient control.

The selected remedy to address monitoring, pumping and treatment of the Prairie du Chien Aquifer includes municipal production wells in Edina, Hopkins, Minnetonka, St. Louis Park as well as source control wells and monitoring wells throughout the area of the Site. The location of pumping and monitoring wells completed in the Prairie du Chien Aquifer is presented in Figure 4.

Key source and gradient control wells for the Prairie du Chien Aquifer are discussed in detail below:

Well W23

Well W23 was initially drilled in 1918 to an approximate depth of 909 feet below ground surface (bgs). The construction of this well may have allowed for groundwater to flow between the Prairie du Chien-Jordan Aquifer to the underlying Ironton-Galesville and Mt. Simon-Hinckley Aquifers. During the environmental investigation of the Site W23 was found to be partially filled with coal tar material. In 1981, the MPCA cleaned out W23 to a depth of 866 feet.

The CD-RAP requires that W23 be pumped at an average monthly rate of 50 gallons per minute (gpm) and continue for at least five years or until PAH concentrations are less than 10,000 ppt. The extracted groundwater from W23 is treated by a GAC facility prior to discharge to Minnehaha Creek.

For 2006-2010, pumping rates were below the required monthly average rate for two to three months of the year. However, annual average pumping rates reported during this period indicated that W23 operated at the required flow rate (50 gpm), except for 2008. The annual average pumping rate reported for 2008 was 48.8 gpm. The lower pumping average rate is likely due to a malfunctioning flow meter in June and July 2008. Additionally, the pump for W23 was pulled for repair in July 2008. W23 operates at its maximum capacity year round. The concentration of total PAH consistently exceeds the cessation criteria of 10,000 ppt.

SLP-4

The CD-RAP requires that SLP-4 be pumped for gradient control at 300 gpm from May through September and 900 gpm during the months of October through April. Pumping at this well is required to continue until water quality in this well and monitoring wells in the vicinity are each less than the drinking water criteria in the CD-RAP. The groundwater treatment system for SLP-4 is operated similar to the treatment system for SLP-10/15.

During this reporting period SLP-4 achieved the required pumping rate in 2010. From 2007-2009, pumping rates were below required rates in two to five months of each year. The well was out of operation from February 6, 2006, through April 30, 2006, for installation of a variable frequency drive (VFD). Concentrations at SLP-4 during this reporting period were consistent with historic data and indicate a decreasing concentration trend.

4) Monitoring and contingent action for the maintenance of drinking water quality in the St. Peter Aquifer.

Additional discussion regarding remedial action concerning the St. Peter Aquifer is provided in discussion of OU4.

Monitoring and gradient control of the St. Peter Aquifer is performed as a result of a RI performed in 1988 as required by the CD-RAP. Well W410 is utilized as the gradient control well for the St. Peter Aquifer. Groundwater pumped from W410 is discharged to the sanitary sewer. Annual reports submitted during this review period indicate that W410 is capturing PAH contamination migrating from the Site.

5) Monitoring, pumping and treatment of the Drift and Platteville Aquifers to protect the downgradient use of the aquifer and the deeper St. Peter Aquifer.

The remedial action selected is intended to control migration of contaminants in the Drift and Platteville Aquifers outside of the Northern Area. Remedial action for the Northern Area Drift and Platteville Aquifers are discussed under Operable Unit 3 and Operable Unit 5 respectively. The remedial action for the drift and Platteville Aquifer is intended to protect the underlying St. Peter Aquifer, specifically in an area southeast of the Site where a buried bedrock valley is present. The buried bedrock valley is an area where the Platteville and Glenwood Shale bedrock formations have eroded exposing the St. Peter Aquifer to the overlying glacial drift.

The Selected remedy consists of a gradient control well, W422, and a source control well, W420, in the Drift Aquifer. A source control well, W421, was also constructed in the Platteville Aquifer. Pumping at W422 was discontinued in October 2000 in accordance with the EPA and MPCA approval when CD-RAP cessation criteria were met. Well W422 continues to be monitored.

Until 2005, the groundwater treatment system for the Drift and Platteville Aquifer Wells included pre-filtering with a continuous backwashing sand filter prior to GAC treatment. In 2005, the sand filter was eliminated from the treatment system due to continued clogging and maintenance problems; the groundwater is now directed to the GAC units without pre-treatment.

Maintenance on wells W420 and W421 was performed in May 2008, due to decreasing performance observed at these pumping wells. Well W420 was returned to service in December 2008. During the maintenance action dense non-aqueous phase liquid (DNAPL) was observed to

be present in well W421. A work plan submitted to address DNAPL indicated that an access pipe will be installed to allow for monitoring and recovery of DNAPL while pumping of W421 continued. Well W421 was returned to service in April 2009. A January 16, 2009, pilot test indicated that the DNAPL proved too viscous to be recovered by pumping. Recovery of DNAPL was performed by bailer and by the DNAPL adhering to the pump and tubing. Work plans submitted during this reporting period indicated that approximately 4 gallons of DNAPL was recovered during this reporting period. Recoverable amounts of DNAPL were not recorded following the pilot test in 2009.

6) Monitoring, pumping and treatment of the source material in the Glacial Drift Aquifer and in the Prairie du Chien-Jordan Aquifer Well, W23.

An evaluation of well W23, which is located in the Prairie du Chien-Jordan Aquifer, is discussed under Operable Unit 2 item 3.

A discussion of the RA for the Glacial Drift Aquifer is included above under Operable Unit 2 item 5. A discussion of the RA for the Northern Area of the Glacial Drift Aquifer is included under Operable Unit 5 section below.

7) Capping and filling of exposed hazardous wastes in the vicinity of the bog, south of the Site, in accordance with the U.S Fish and Wildlife Service (USFWS) and EPA regulations.

The bog and wetland areas are located adjacent to the south east corner of the Site, south of Walker Street and north of Highway 7. In accordance with the CD-RAP, approximately 2-3 feet of clean soils were brought in to fill the wetland. A USFWS biologist inspected the area in question on January 6, 1987, and determined that requirements of the CD-RAP and work plan for the wetlands had been met. The work plan for this project had been prepared in accordance with Sections 11.3.1 and 11.3.1.3 of the CD-RAP and had been approved by the MPCA, EPA and United States Department of the Interior. Figure 5 indicates the location of the wetland and bog area at the time of the development of the CD-RAP.

8) Discharge of hazardous wastes to a sanitary sewer for any contaminated material excavated and dewatered for the purposes of construction of an intersection in the vicinity of the bog.

A memorandum of understanding (MOU) between the Minnesota Department of Transportation, Minnesota Department of Health (MDH) and MPCA was entered into in 1978 to prevent construction of the intersection at Highway 7 and Louisiana Avenue, because construction would interfere with the RI. The MOU was redrafted in 1984 to allow for construction of the intersection subject to the following restrictions:

1) The peat should be surcharged to permit it to support a roadway, in lieu of massive excavation of peat;
2) Water removed from the peat during surcharging should be collected and discharged to

the sanitary sewer;

3) Any contaminated soil which is excavated must be handled in accordance with State and federal hazardous waste rules and regulations, if applicable; and

4) Monitoring wells and piezometers which are in the path of construction must be closed in accordance with MDH requirements, and other monitoring wells and piezometers located near the proposed roadway must be either properly closed or protected, as directed by MPCA and MDH staff.

In 1991 and 1992, the road construction work was completed. As a result of this work, 400 cubic yards of contaminated soil was generated. This soil was disposed of at the U.S. Pollution Control Inc. landfill in Rosemount, Minnesota. No information was located indicating that contaminated water was generated during this work.

9) Further subsurface investigation in the vicinity of the Site, to implement deed restrictions for current and future land use in the areas of contamination.

The purpose of the investigation was to identify soil conditions in the vicinity of the Site where contaminants may affect future development near the Site and to provide a basis for institutional controls for affected properties. The work consisted of at least 20 borings to a minimum depth of 35 feet in an area bounded by Lake Street on the north, Monitor Street and an imaginary line connecting Monitor Street and Methodist hospital on the east, Minnehaha Creek on the south and Taft avenue and an imaginary line connecting Taft avenue and Minnehaha Creek on the west. A soil investigation conducted in September 1988 found no significant soil impacts in the area defined in the CD-RAP and south of the Site. However, the qualitative findings of that era are undergoing re-evaluation by EPA in terms of future land use restrictions at and near the Site.

10) Further RI/FS to determine the aerial extent of, and remedy for, the contamination in the Northern Area of the Glacial Drift Aquifer adjacent to the Site.

The CD-RAP considers the Glacial Drift and Platteville Aquifers to be part of the same aquifer system. Further investigations have shown that the Drift and Platteville Aquifers have distinctly different hydrogeologic properties. The MPCA and EPA have determined that, for the purposes of remediation, the two aquifers should be considered separately. The goals and alternatives defined in the CD-RAP for the Drift-Platteville are applied independently to the two aquifers and have been organized into two separate operable units. Operable Unit 3 addresses the Northern Area Drift Aquifer and Operable Unit 5 addresses the Northern Area Platteville Aquifer. The remaining areas of the Drift and Platteville Aquifers are addressed by Operable Unit 2.

The CD-RAP required an investigation and response action in the Drift and Platteville Aquifers in the northern area. The CD-RAP called for six monitoring wells in this area and an evaluation of the need for gradient and source area control of contaminants. The Northern Area of the Site is an area bounded by West 32nd Street to the north, Alabama Avenue to the east, Highway 7 to the South and Louisiana Avenue to the west.

Operable Unit 3

The Drift Aquifer lies between zero and 90 feet below the surface. There are no wells in the area that utilize the Drift Aquifer for drinking water. The remedial action implemented for the Northern Area Drift Aquifer is intended to limit further spread of PAH impacts to underlying aquifers that may be utilized as a drinking water supply. The Northern Area of the Site is previously described in Section 10 of Operable Unit 2.

The RI/FS completed in 1992 identified additional gradient control was necessary in the Northern Area Drift Aquifer and called for construction of W439 as a pumping well. Well W439 was screened in the lower one-third of the Drift Aquifer to maximize available drawdown. Well W439 began operation in January 1996.

On an annual basis, Well W439 operated below the monthly average of 50 gpm required by the CD-RAP in 2007 (46.8), 2008 (20.1), 2009 (42.3), and 2010 (48.2). The City reports that the pump on W439 is at maximum capacity and was pulled for repair in 2000, 2003, and 2008. Groundwater analytical data reviewed during this reporting period indicated a stable total other PAH concentration trend ranging from788 µg/L to 1,776 µg/L. Concentrations detected were within the historic concentration range for W439. Carcinogenic PAH compounds have historically not been detected at this well.

Operable Unit 4

The selected remedy for OU4 is intended to contain the spread of PAH contaminants within the St. Peter Aquifer. The results of the St. Peter Aquifer RI indicated that a gradient control well was necessary. The ROD for OU4 selected the use of monitoring well W410 as a gradient control well. Well W410 was converted to a pumping well and placed into service in May 1991.

The 1992 ROD calls for a required pumping rate for W410 of between 65 to 100 gpm based on a November 1989 study of pumping at this well. During this reporting period yearly average pumping rates from well W410 were above the required 65 gpm only during 2006. The yearly average pumping rates for 2007, 2008, 2009, and 2010 were 57.5 gpm, 22.1 gpm, 45.3 gpm, and 57.8 gmp respectively. The 2008 discharge rate reflects operational down time due to maintenance from May through September.

Water from well W410 is discharged directly to the sanitary sewer due to high PAH concentrations that do not allow for direct discharge to the storm sewer. Total other PAH concentrations observed during this reporting period ranged from 8,359 ppt, to 62,470 ppt. Concentration values presented for total other PAH indicate an increasing concentration trend at W410 during this reporting period. Carcinogenic PAH compounds historically have not been detected at W410.

Well SLP-3 is the only municipal supply well in the St. Peter Aquifer. It is utilized during high municipal demand periods. Historically, analytical samples collected from SLP-3 have indicated PAH concentrations below CD-RAP drinking water criteria. Analytical results presented during this review period were consistent with historic groundwater data.

Operable Unit 5

The Platteville Aquifer lies between 70 and 100 feet below the surface. There are no wells in the area that utilize the Platteville Aquifer for drinking water. The remedial action implemented for the Northern Area Platteville Aquifer is intended to limit further spread of PAH impacts to underlying aquifers that may be utilized as a drinking water supply. The Northern Area of the Site is previously described in Section 10 of Operable Unit 2.

Section 9 of the CD-RAP specified the installation and operation of one or more gradient control wells to prevent the further spread of PAH impacted groundwater, exceeding the drinking water criteria defined in the CD-RAP, in the Northern Area of the Platteville Aquifer. The 1995 ROD identified the installation of well W440 as the selected remedy for OU5. The well was installed in July 1996. Subsequent pumping tests determined that the well could not achieve sufficient draw down to establish gradient control. Since the location of Well W440 was determined to be the best potential location for a gradient control well in the Northern Area it was determined that the Northern Area would not have a gradient control well. An Explanation of Significant Differences (ESD) was issued in March 1997 to select an alternative remedy. The alternative remedy was to utilize well W434, located immediately south of the Northern Area, as a substitute gradient control well. Well W434 was initially installed to capture PAH-impacted groundwater before it entered the buried bedrock valley to the southeast of the Site. Pumping at Well W434 continued until 2006 when, at the request of the City, the MPCA and EPA approved cessation of pumping. The Third Five-Year Review Report indicated that based upon groundwater contours presented; pumping of well W434 had little effect on the Platteville Aquifer. The limited affect of pumping was attributed to the low transmissivity of the Platteville Aquifer in this area and likely recharge of the aquifer from the Drift Aquifer above.

Monitoring of W434 continued on a semi-annual (twice per year) basis during this reporting period. Concentrations of carcinogenic and other PAH compounds reported are within the historic range observed at this well and indicate a decreasing or stable concentration trend over the last five years.

Institutional Controls

Institutional controls (ICs) are non-engineered instruments, such as administrative and/or legal controls, that help minimize the potential for exposure to contamination and protect the integrity of the remedy. Compliance with ICs is required to assure long-term protectiveness for any areas which do not allow for unlimited use or unrestricted exposure (UU/UE).

IC evaluation activities are in progress. Once the IC evaluation activities have been completed, an IC plan will be developed by the Agencies, the potentially responsible party, and St. Louis

Park to incorporate the results of the evaluation activities and plan for additional IC activities as needed, including planning for long term stewardship. This will include the development of maps which will depict the current conditions of the site and areas which do not allow for UU/UE; determining what ICs, if any, are needed at the Site and discussing how to implement, maintain, monitor and enforce any ICs determined to be needed.

Development of an IC Plan was recommended in the Third Five-Year Review Report for the Site. Continued development of an IC Plan including IC monitoring is recommended for the Site.. Further discussion regarding the status of IC activities for the Site is included in Section V of this document.

The CD-RAP identifies deed restrictions and covenants that should "run with the land" for the on-site residential properties. The CD-RAP identifies the properties as Oak Park Village Associates and Philip's Investment Co. The CD-RAP and ROD for OU2 also indicate the development of deed restrictions for PAH-impacted properties identified as a result of the RI for the area south of the bog in the vicinity of the Site. The RI study area is previously defined in this review under Item 9 of the Operable Unit 2 Remedy Implementation discussion.

According to the 1986 ROD, the hazard remaining to potential receptors is direct contact to excavated contaminated soil. The ROD anticipates that this hazard can be mitigated with institutional controls to be implemented through the Consent Decree. After the RI for the area south of the bog, a progression of submittals to the EPA by owners and the City was required to acknowledge the owners' compliance with the State of Minnesota's Statute Section 115B.16, Subd. 2 (2010) regulating registration of affadavits on such contaminated areas. The owners were to file their affidavits with the Recorder of Deeds. This provision applies to current and future land owners in the entire on-site and off-site study area. The acknowledgements were not submitted; currently no ICs are in place for the Site or surrounding areas. Other requirements of the CD-RAP, such as Agency review of construction plans, and completed remedial actions such as the soil cover, mean to prevent exposures to contaminated materials.

System Operations/O&M

During this review period the City of St. Louis Park conducted long term monitoring and maintenance activities in accordance with the CD-RAP which was filed in the U.S. District Court District of Minnesota Fourth Division on September 4, 1986. Since the closing of the Republic Creosote Plant, millions of dollars have been spent redeveloping the property into the residential and recreation area it's known as today. Included in those costs is continuous monitoring of the environmental effects of the former operations to ensure that the city's drinking water remains safe. Drinking water for the community continues to meet standards set by the federal Safe Drinking Water Act. Activities conducted associated with the operation and maintenance (O&M) of the selected remedial actions include the following:

- Pumping source and gradient control wells
- Long term groundwater monitoring
- Discharge permitting and associated sampling requirements

- GAC filter change outs
- Utilities
- Consulting Services
- Personnel and administration

A summary of the annual O&M costs as provided by the City of St. Louis Park are included in Table 3.

Table 3: Annual System Operations/O&M Costs

Year	Total Cost rounded to nearest $1,000
2006	$526,000
2007	$546,000
2008	$541,000
2009	$638,000
2010	$440,000

Correspondence between the City of St. Louis Park and the MPCA indicated that higher than normal costs were incurred in 2009 due to additional activities related to DNAPL recovery, continuous groundwater elevation data collection, development of a database to manage increased data, and acquisition of data from other municipalities. According to email correspondence, *"the City considers these expenses as an investment in the future management of the Reilly Site, as the data collected and presented will enable the City and Agencies to make informed decisions on monitoring and sampling in the future."*

The O&M at the site is critical to the remedy performance, is broad in scope, and may present opportunities to cut costs (e.g. using reconditioned carbon, closing unneeded wells, or streamlining groundwater reports). Work on institutional controls will be important to the long term protectiveness of the remedy. Managing the migration of the contaminants of concern affects both short and long term protectiveness of the remedy. Requirements of O&M appear to be substantially met and marginally effective in maintaining the remedy. However, there are some possible early indicators of issues, and improvements can be evaluated as indicated above and by the recommendations presented in this review.

V. Progress Since the Last Review

The previous five-year review concluded that sufficient protectiveness, at least in the short term, had been achieved for each remedial action and OU for the Site. The Site wide protectiveness statement from the Third Five-Year Review Report is included below.

> *"The remedy at the Reilly Tar and Chemical site is generally functioning as intended and is considered protective of human health and the environment in the short-term.*

Granular activated treatment of contaminated municipal wells provides water which is safe to drink and the gradient control well systems are generally containing the spread of contamination in the multiple aquifers underlying the site. However, groundwater model simulations indicate the potential for contaminant migration in the Prairie du Chien Aquifer to have future impact to the City of Edina Well E13 and other municipal wells in the area. Potential migration between aquifers, potential vapor intrusion into on-site buildings and the implementation of institutional controls are also issues. Therefore, the following actions need to be taken to achieve long-term protectiveness:

1. *Further evaluation will be performed on the need for additional pumping of wells in the Prairie du Chien Aquifer to achieve gradient control. The evaluation will also assess the need for additional monitoring wells.*
2. *Further evaluation of the effect of pumping St. Peter Aquifer municipal well SLP-3 on contaminant migration in the upper Platteville Aquifer will be performed.*
3. *Further evaluation will be performed of the condition of multi-aquifer Monitoring Well W70 which may be contributing to contamination of the Prairie du Chien Aquifer. The well may be sealed if groundwater modeling shows significant contaminant impact from the overlying St. Peter Aquifer.*
4. *Monitoring will be performed to determine whether the extent of vertical migration of contamination between aquifers, predicted by groundwater modeling, can be verified.*
5. *An evaluation will be performed of the potential for vapor intrusion into on-site buildings and soil gas monitoring/indoor air sampling will also be performed, if necessary.*
6. *Implement and maintain long-term, effective institutional controls."*

Actions Since the Last Review

Table 4 identifies issues, recommendations and action taken since the previous five year review.

Table 4: Actions Taken Since the Last Five-Year Review

Issues from Previous Review	Recommendations/ Follow-up Actions	Party Responsible	Milestone Date	Action Taken and Outcome	Date of Action
Potential migration of plume in the Prairie du Chien-Jordan Aquifer	Evaluate the necessity of pumping of W119, SLP-6 and W48 Recommend installation of monitoring wells upgradient of Edina well field.	MPCA	1/08	Additional modeling conducted by MPCA and EPA. Further investigation and modeling by City of St. Louis Park in progress.	MPCA-2006, 2008, EPA-2010
W70 may be damaged and perforated, water may flow from St. Peter Aquifer to Prairie du Chien-Jordan Aquifer	Evaluate the condition of W70 against existing well codes. Seal well if groundwater model shows impact from St. Peter Aquifer	City of St. Louis Park	9/07	W70 determined to be damaged and was abandoned.	October 2007

Issues from Previous Review	Recommendations/ Follow-up Actions	Party Responsible	Milestone Date	Action Taken and Outcome	Date of Action
Institutional Controls- In order for the remedy to be protective in the long-term, effective ICs must be implemented, maintained, and enforceable	Develop an IC Plan to determine 1) what ICs are needed; 2) recorded ICs for both on-site and off-site properties; 3) determine how effective governmental controls are implemented for controlling use restrictions in areas affected by downgradient groundwater contamination; and 4) mechanisms are in place to ensure ICs are maintained. Also IC maps should be created which depict the areas subject to use restrictions and areas subject to ICs.	Vertellus/City of St. Louis Park/MPCA/EPA	3/07	IC Plan is currently being evaluated and developed by the Agencies.	Ongoing
Possible Vapor Intrusion issues for on-site residents.	Evaluate Potential Vapor intrusion into on-site structures	MPCA/EPA	3/08	Initial passive soil vapor study has been conducted. Scheduling of future investigation is in progress after work plan approval	June 2008; May 2011
Evaluate the impact of pumping SLP-3 on the Platteville Aquifer through further groundwater monitoring, modeling and/or pump tests	Evaluate the impact of pumping SLP-3 on the Platteville Aquifer through further groundwater monitoring, modeling and/or pump tests.	City of St. Louis Park	9/08	Further investigation and modeling by City of St. Louis Park in progress.	Ongoing
Possible downward vertical migration of contamination from the Drift, Platteville, and St. Peter Aquifers.	Monitor affected aquifers to assess the extent of vertical migration.	City of St. Louis Park	9/08	Further investigation and modeling by City of St. Louis Park in progress	Ongoing

Recommendations from the previous five-year review and actions taken to address issues described in the previous five-year review are detailed below.

Previous Recommendation #1:

> *"Evaluate the necessity of pumping W119, SLP-6 and W48. Recommend installation of monitoring wells upgradient of Edina well field."*

A Technical Memorandum entitled *Hydrogeological Analysis for 3rd Five Year Review – Reilly Tar and Chemical Corporation Superfund Site,* submitted to the MPCA on August 2, 2006, by STS Consultants LTD. (STS) presented groundwater modeling based on data available during the previous five-year review. The STS memorandum indicated that additional pumping would

likely improve the performance of the gradient control well network for the Site. The memo indicated that a barrier pump out system to prevent further migration of contamination from St. Louis Park in to Edina should be considered. Up to three pump-out wells were identified as being needed in the report. These were St. Louis Park municipal well number 6 (SLP6), W119 (Meadowbrook Golf Course Well), and W48 (Methodist Hospital Well), which ceased pumping in the early 1990's. The 2010 S.S. Papadopulos and Associates Inc. (SSPA) Report also indicated the possible need for additional pumping wells to replace the Methodist Hospital well along with increased pumping rates.

In 2008, STS performed further groundwater modeling utilizing updated data. The 2008 update focused on groundwater flow between the City of St. Louis Park and Edina with respect to a volatile organic compound (VOC) plume known to be in the area of, but unrelated to the Site. The 2008 update indicated that additional continuous groundwater elevation data was necessary to evaluate long term flow paths in the area of the Site based on fluctuating preferential flow paths likely due to seasonal demand on the Prairie du Chien-Jordan Aquifer.

In July 2010, SSPA submitted a report on behalf of the EPA entitled *Remedy Evaluation and Optimization Reilly Tar and Chemical Corporation St. Louis Park Plant Superfund Site* (SSPA Report). This report provided additional modeling and analysis of available groundwater elevation data through December 2008. Recommendations of this report further supported expanded groundwater pumping and monitoring as recommended in the Third Five-Year Review. Additionally the SSPA Report suggests the need for three Prairie du Chien monitoring wells. Further support is found in the Focused Feasibility Study, Edina Well 7 Groundwater Contamination from STS consultants (November 19, 2008) and the Edina FFS Addendum from AECOM consultants dated May 2009. This latter report supports the need for a monitoring network in the Prairie Du Chien Aquifer at the boundary between the two cities in order to track the PAH contamination moving south from St. Louis Park toward Edina. To obtain a better understanding of the levels of PAH contamination near the boundary area of the Cities of St. Louis Park and Edina, the Agencies expect that up to three additional monitoring wells in the Prairie du Chien Aquifer may be necessary to better define the PAH contamination in this area. These monitoring wells may serve as early warning locations of PAH contamination moving south, and would aid in evaluating effects of pumping and treating should that remedy need to be implemented.

Based on the recommendations of the Third-Five Year Review, the City of St. Louis Park submitted a work plan on April 14, 2008, (conditionally approved by the Agencies in August 2008) to collect continuous groundwater elevation data with regard to evaluation of expanding pumping for gradient control in the Prairie du Chien-Jordan Aquifer. The work plan identified additional modeling to determine where remedial enhancements are necessary. The work plan proposed utilizing continuous data transducers from local municipal wells including City of Edina, City of Hopkins and City of Minnetonka municipal wells. Pressure transducers which monitor groundwater elevation have been installed in select Site wells and the other City municipal wells; however, the Edina municipal well data has not been available because of technical problems downloading data. Therefore a complete evaluation of groundwater elevations and flow modeling for this area including continuous data from the Edina municipal

wells has not been completed. It is anticipated that the Edina data will be available in late 2011 and the City of St. Louis Park will be able to obtain the data and complete the groundwater evaluation.

Previous Recommendation #2

> *Evaluate the condition of W70 against existing Well Codes. Seal well if groundwater model shows impact from St. Peter Aquifer.*

In November 2006, the City of St. Louis Park arranged to inspect well W70 by video logging. The video log indicated that W70 was perforated at approximately 86 feet bgs. Well W70 was abandoned between October 3 and October 5, 2007.

Previous Recommendation #3

> *Develop an IC Plan, to ensure that:*
> 1) *Deed restrictions are recorded at both on-site and off-site properties;*
> 2) *Effective Governmental controls are implemented for controlling use restrictions in areas affected by downgradient groundwater contamination; and*
> 3) *Mechanisms are in place to ensure regular inspections of ICs and annual certification to EPA that ICs are in place and are effective. Also IC maps should be created which depict the areas subject to use restrictions and areas subject to ICs.*

An IC Plan has not yet been developed for the Site. Further evaluation of current IC status regarding both on and off Site properties and governmental controls is necessary. Section V of the Third Five-Year Review indicates that some of the neighboring properties have already implemented deed restrictions; however, a comprehensive IC plan identifying and confirming the effectiveness of any existing ICs and the need for additional ICs is necessary. As recommended in the previous five-year review IC maps depicting areas subject to use restrictions and subject to existing or future ICs should be developed. In order to assure long-term protectiveness this five-year review will include recommendations to develop and implement an IC Plan in Section IX.

Previous Recommendation #4

> *Evaluate potential vapor intrusion into on-site structures.*

In 2008, the MPCA hired STS to conduct a soil vapor survey (*Soil Vapor Survey – 2008)* utilizing passive soil gas sampling technology. Passive soil gas samples provide qualitative data indicating the presence and relative magnitude of targeted compounds, in this case PAHs. Passive soil gas samplers were placed in predetermined locations for 11 days in order to determine areas where further investigation may be necessary.

Results of the passive soil gas survey indicated that PAH compounds were present in the soil

underlying the former Reilly Site, specifically in areas developed for residential use on the north end of the Site where potential receptor pathways may be present. The 2008 STS report recommended a follow-up soil vapor study to collect soil vapor samples for direct measurement of contaminant concentrations in soil vapor. At the time of this review, planning for a follow up study is in progress by the EPA, after the City declined to do the study in late 2009. A contractor was selected to perform the work on behalf of EPA in December 2010; access requests to residents and property owners were sent by EPA in February 2011; a site survey, access follow ups, and a public open house were completed in March 2011; and technical and site-specific work plans are scheduled to be finalized in June 2011. Sampling (~30 sub-slab soil gas) is scheduled for June 2011. The study area includes the residences on the perimeter of the Site and a park building on-site.

Previous Recommendation #5

Evaluate the impact of pumping SLP-3 on the Platteville Aquifer through further groundwater monitoring, modeling and/or pump tests.

Documents reviewed as part of this five-year review process did not indicate the impact of pumping SLP-3 on the Platteville Aquifer has been evaluated. The impact of pumping at SLP-3 was discussed as documented in meeting notes from a November 2007 meeting with the MPCA and City of St. Louis Park. Meeting notes indicated that a pumping test could be conducted by September 2008; however, no information regarding evaluation of SLP-3 was located during this review. During the Site Inspection and interview on October 29, 2010 the City expressed interest in abandoning well SLP-3. In order to assure protectiveness this five-year review will include recommendations to evaluate SLP-3 in Section IX.

Previous Recommendation #6

Monitor affected aquifers to assess the extent of vertical migration.

Modeling and data evaluation presented by the city in January 2011 addressed vertical contamination in their report. The SSPA Report also began addressing this issue. The reports are being evaluated by Agency staff. In order to assure protectiveness this five-year review will include recommendations to further evaluate vertical contaminant migration in Section IX.

Recommendation Not Affecting Protectiveness of the Remedy

The Third Five-Year Review Report recommended that *the City of St. Louis Park should evaluate the conformance of several monitoring wells with Minnesota Department of Health Well Codes and make repairs to monitoring wells by September 2007, as needed.*

Documentation that evaluation or repair of monitoring wells was not completed with regard to MDH Well Code. Evaluation of the condition of the monitoring well network is ongoing and further discussed in Sections VI and VIII of this five-year review. Maintaining monitoring wells to meet MDH Well Code will prevent vertical transport of contaminants from the surface.

VI. Five-Year Review Process

Administrative Components of the Five-Year Review Process

The Site five-year review was prepared by the MPCA in cooperation with the EPA with assistance from MPCA contractor Antea™Group. Team members from MPCA were Nile Fellows and Dave Scheer, from EPA were Michelle Kerr, and from Antea™Group Jacob Knapp and John Estes. The EPA notified MPCA via letter of the beginning of the five-year review process in April 2010 and other potentially interested parties in October 2010 via telephone or meeting. The five-year review consisted of the following components during the following timeframes:

- Community Involvement (November 2010)
- Local Interviews (October 2010)
- Document Review (May 2010-June 2011)
- Data Review (May 2010-June 2011)
- Site Inspection (October 2010)
- Five-Year Review Report Development and Review (December 2010-May 2011)

Site Inspection

A Site Inspection was conducted at the Reilly Tar and Chemical Site on October 29, 2010. Representatives from St. Louis Park present at the Site Inspection include: Mark Hanson, Scott Anderson, Mike Rardin, Scott Merkley and Bill Gregg from AECOM. Representatives from the MPCA present at the Site Inspection included: Nile Fellows and Dave Scheer. Jacob Knapp and John Estes represented Antea Group. Michelle Kerr was present representing the EPA. A Site Inspection Checklist including sign-in sheet is included as Appendix A. Photographs from the Site Inspection are included as Appendix B. The procedure was to meet briefly with the inspection team in the morning, tour/inspect the site and wells and discuss items on the inspection checklist, and regroup in the afternoon for interviews and more discussion.

MPCA and EPA inspected as many wells as possible during the site visit. Two of the Site's carbon treatment facilities were visited during the October 2010 Site Inspection (SLP-10/15 and W23/W420/W421 treatment facilities). The carbon treatment facilities were operating and appeared to be in good condition. Observed sampling ports were properly marked and functional. Electrical panels, storage vessels, discharge structures, and treatment buildings appeared to be in good condition. During the Site Inspection it was observed that the grout seal at the ground surface of well W33R appeared to be damaged. W33R appeared to need some grout, and a repair is recommended.

During the Site Inspection paint and epoxy cans were observed to be stored in the W105 well house. St. Louis Park indicated they were temporarily placed in the well house to dry prior to disposal. The well house for W421/W420 contained a drum containing DNAPL related to the DNAPL removal pilot test discussed in Section IV of this report. All other wells observed during the October 2010 Site Inspection appeared to be in good condition and operating properly. Records and permits were available electronically. Observed buildings and wells were property secured. City staff reported minor incidents of vandalism during the review period, such as pulling on transducer wires. Roads around the site were adequate and the vegetative cover over the main area of soil contamination is intact. In 2003, the City added new soil cover (0-36 inches) for the ball fields in Louisiana Oaks Park which are central to the Reilly site. The storm water drainage basin is lined.

Community Involvement

A public notice announcing this five-year review was published in the St. Louis Park Sun Sailor on November 4, 2010. A copy of the notice is included in Appendix C. No comments or concerns were received from the public regarding the Site. When the five-year review report is complete another public notice will be placed summarizing the results of the review. A copy of the completed report will also be placed in the community information repository.

An interview was conducted with the City of St. Louis Park at the time of the October 2010 Site Inspection in St. Louis Park. During the interview the City indicated that there were no planned changes regarding groundwater use in the area of the Site. AECOM, performing contractor for the City, indicated that the City was pumping too much water and that the compliance criteria are too stringent. Additionally, the City indicated occasional interest with the status of the site is expressed by the community. They noted that that most concerns were with regard to occasional work at the Site or general drinking water quality questions, which they receive approximately 12 times per year. The City expressed interest in making more progress with ICs for the site, such as notices or possibly governmental controls, due to potential development of geothermal energy systems in the area. Geothermal energy systems utilizing groundwater could create groundwater exposure pathway and installation of systems in the area of the site may disturb soils or create disposal issues for excavation of contaminated soils.

On December 16, 2010, MPCA and EPA interviewed representatives from Vertellus Specialties Inc. by telephone. Vertellus is the successor to Reilly Tar and Chemical Corp. During the interview, current site issues were discussed along with ongoing data collection and modeling for groundwater. Vertellus indicated that the remedy appears to be functioning as intended and is monitored as planned. Interview documentation is presented in Appendix A.

Document Review

All relevant documents associated with the Site were reviewed during this five year review period. A complete list of documents reviewed is included in Appendix D. Documents reviewed include Site decision documents, annual monitoring reports (AMRs), the previous five-year review reports, and other reports which address O&M activities.

Data Review

The data review was performed evaluating each aquifer separately, starting with the Mt. Simon-Hinckley Aquifer, which is the deepest aquifer below ground surface, and ending with the Drift Aquifer, which is the uppermost aquifer monitored. Data reviewed and discussed in this section refers to contaminant concentrations in the aquifers. Further discussion of the effectiveness of source and gradient control wells is presented in Section IV and Section VII, Question A of this report.

Mt. Simon-Hinckley Aquifer, Operable Unit 2

St. Louis Park municipal water supply wells SLP-11, SLP-12, SLP-13 and SLP-17 are located in the Mt. Simon-Hinckley Aquifer. Data presented during this reporting period indicated that concentrations at SLP-11, SLP-12 and SLP-13 were consistent with historic concentration data. Well SLP-17 has been out of service since 2000 and has not been sampled since. Data presented during this reporting period indicates that the Mt. Simon-Hinckley Aquifer has not been significantly affected by contaminants originating from the former Reilly Site. Data presented during this review period indicates that PAH concentrations from wells SLP-11, SLP-12 and SLP-13 were below CD-RAP drinking water criteria.

Ironton-Galesville Aquifer, Operable Unit 2

Well W105 is the only well completed in the Ironton-Galesville Aquifer for the Site. Data presented during this reporting period indicates that PAH concentrations remained below the 10,000 ng/L cessation criterion during all sampling events except 2008 and 2010. Samples collected in May 2008 indicated total other PAH concentrations were 14,546 ng/L. Two confirmation samples collected in March 2009, in accordance with the CD-RAP, indicated concentrations consistent with historic values (4,107 ng/L and 4,450 ng/L). Results from June 2010 indicate total other PAH concentrations exceeded the 10,000 ng/L cessation criterion at 13,797 ng/L. Two more confirmation samples were collected December 14 and 22, 2010. Results showed total other PAH concentrations below the 10,000 ng/L cessation criterion at 984 and 894 ng/L respectively. The City asserts that the pump in well W105 did not work correctly during the June 2010 sampling event and this resulted in the collection of a stagnant water sample. The stagnant sample had higher PAH concentrations than normally expected. The City repaired the pump and re-sampled the well in December 2010.

Prairie du Chien-Jordan Aquifer, Operable Unit 1, 2

Concentrations and distribution of PAH in this aquifer are consistent with the historic data presented in AMRs submitted during this review period. In general, PAH concentrations have been decreasing in the Prairie du Chien Aquifer over the life of the Site. Increasing and/or anomalous concentrations have been observed during this review period at Edina municipal well E13 and Hopkins municipal well H6. Edina well E13 has shown historically increasing trends of total other PAH compounds; however, concentrations reported during this review period

remained below CD-RAP advisory levels. Concentrations of total other PAH compounds detected in Hopkins well H6 in 2006 (99 ng/L), 2008 (16 ng/L) and 2010 (96.3 ng/L) were elevated compared to historic results; however, concentrations remained below CD-RAP advisory levels.

The rising concentration of PAHs in Edina well E13, set in the Prairie du Chien Aquifer, is an indicator of an important issue. Groundwater flow from the City of St. Louis Park where the Site is located is generally to the South or Southeast. This means that contamination, likely from the Reilly Site, in the groundwater at St. Louis Park is moving toward the City of Edina which is located south of St. Louis Park. This can be especially true during the summer months when heavy pumping of groundwater may be pulling the contamination south toward the city of Edina. In the St. Louis Park/Edina area the primary aquifer used for drinking water is the Prairie du Chien Aquifer. Monitoring of this aquifer as required by the Consent Decree shows that PAH contamination from the Site is moving toward the City of Edina.

Figure 6 below is a projection which shows that PAH contamination may need to be treated within the next five years if the current trend continues, as required by the OU2 ROD. Overall, concentrations have been rising. The most recent data (September 2010), are considered in Figure 6.

According to the City's Report on Prairie du Chien-Jordan Aquifer Gradient Control Plan (AECOM, January 20, 2011), "The purpose of gradient control in the Prairie du Chien – Jordan Aquifer is to limit the spread of PAH in St. Louis Park towards the drinking water supply wells in Edina. Edina well E13 is the only well in Edina that contains PAH above apparent background levels." PAH concentrations, through 2010, in E13 do not exceed either state or federal drinking water standards. However, carbon treatment would be necessary to treat the water should PAH contamination exceed the action levels in the Consent Decree, as shown by the red line in the figure. Installing carbon filtration at this drinking water well may soon be necessary to protect human health.

Completing the follow up action to Previous Recommendation #1 (discussed above) to evaluate additional pumping at W119, SLP6, and/or W48 and installing monitoring wells up-gradient of the Edina well field is necessary to address this issue.

St. Peter Aquifer, Operable Unit 4

Total other PAH concentrations presented during this reporting period indicate stable to decreasing concentration trends at wells SLP-3, W24, W133, W409 and W411. Increasing concentration trends have been observed at well W410 during this reporting period, concentrations ranged from 9,545 ng/L in May 2006 to 62,470 in September 2010. Well W33R was installed during this reporting period and shows decreasing concentration trends since May 2007. Sampling at other St. Peter wells during this reporting period indicated fluctuating concentrations within historic ranges.

Platteville Aquifer, Operable Unit 2, 5

Wells W421 and W434 are gradient control wells for the Platteville Aquifer. Well W434, however, is no longer utilized as a pumping well but continues to be monitored. During this reporting period groundwater samples from well W421 indicated increasing concentration trends for both carcinogenic PAH compounds and total other PAH compounds. The increasing concentration trend may be attributed to the presence of DNAPL in the vicinity of well W421 as discussed in Section IV of this review. Concentrations reported for well W434 were consistent with historic values and indicated stable or decreasing trends at this well.

Drift Aquifer, Operable Unit 2, 3

Wells W420 and W439 are gradient control wells for the Drift Aquifer. Data presented from gradient control wells and monitoring wells during this reporting period indicate stable PAH concentrations are present in the Drift Aquifer. During this review period, levels of Other PAHs in W420, W421, and W439 exceeded action levels set by the CD-RAP. Beginning in 2007, levels of Carcinogenic PAHs in W412 have exceeded action levels set by the CD-RAP. Discharge from these wells is regulated by a NPDES permit and treated before it is discharged.

VII. Technical Assessment

Question A: Is the remedy functioning as intended by the decision documents?

Operable Unit 1

Yes, the selected remedy for OU1 continues to function as intended by the decision documents. Operation of the granular activated carbon units to provide treatment to restore the drinking water supply at SLP-10/15 has been ongoing since December 27, 1985. The treatment system continues to provide adequate treatment of PAH-impacted groundwater in accordance with the CD-RAP and OU1 ROD requirements.

Operable Unit 2

The performance of the remedial actions selected by the OU2 ROD is substantially consistent with the intent of the decision documents. Individual components of the OU2 ROD are discussed in Section IV of this review. The following remedial actions selected by the OU2 ROD require further evaluation based on data presented during this review period. The status of one of the remedial actions, discussed below, affects current protectiveness of the remedy and therefore a determination is deferred at this time.

Monitoring, pumping and treatment of the Ironton-Galesville Aquifer to protect the deeper Mt. Simon-Hinckley Aquifer.

Total other PAH concentrations at well W105 have exceeded cessation criteria two times during this reporting period. Resampling results, as required by the CD-RAP, have remained below the cessation criteria. However, the CD-RAP does require the restart of pumping of W105 if the additional samples exceed the cessation criteria. Re-sampling results are below the cessation criterion, reported in March 2011.

Monitoring, pumping and treatment of the Prairie du Chien-Jordan Aquifer until such time that drinking water quality is uniformly established within the area of gradient control.

In the St. Louis Park/Edina area the primary aquifer used for drinking water is the Prairie du Chien Aquifer. Monitoring of this aquifer as required by the Consent Decree shows that PAH contamination from the Site is moving toward the City of Edina. Completing the follow up action to Previous Recommendation #1 (discussed above) to evaluate additional pumping at W119, SLP6, and/or W48 and installing monitoring wells upgradient of the Edina well field is necessary to address this issue.

Monitoring, pumping and treatment of the Drift and Platteville Aquifers to protect the downgradient use of the aquifer and the deeper St. Peter Aquifer.

Monitoring for DNAPL should continue at pumping wells W420 and W421. The presence of DNAPL at well W421 was reported during this review period; however, significant amounts of DNAPL have not been reported since January 2008.

Further subsurface investigation in the vicinity of the Site, to implement deed restrictions for current and future land use in the areas of contamination.

Verification of deed restrictions, as required by the OU2 ROD and CD-RAP has not yet been completed. Further evaluation and implementation of institutional controls for the Site and surrounding properties will be addressed by an IC Plan to be developed by the Agencies and the City of St. Louis Park, in consultation with Vertellus.

The remedial action regarding subsurface investigation in the vicinity of the Site has been partly completed; a 1988 study south of the Site reported no significant soil impacts in the area defined in the CD-RAP. But, more subsurface investigation to evaluate the vapor intrusion exposure pathway is needed to assess current remedy protectiveness and also inform the implementation of appropriate deed restrictions. Further information will be obtained by completion of the vapor intrusion investigation.

Operable Unit 3

Yes, the remedy selected by the OU3 ROD continues to control groundwater within the Northern Area Drift Aquifer. Well W439 continues to remove PAH-impacted groundwater from the Drift

Aquifer; however, pump rates reported during this reporting period were below the required monthly average rates identified in the ROD during 2007, 2008, 2009, and 2010. This may be an early indicator of an issue. Contaminant trends appear stable.

Operable Unit 4

Yes, the remedy selected by the OU4 ROD continues to control groundwater within the St. Peter Aquifer. Well W410 continues to remove PAH-impacted groundwater from the St. Peter Aquifer; however, pump rates reported during this reporting period were below the required annual average rates identified in the ROD during 2007, 2008, 2009, and 2010. This may be an early indicator of an issue. Increasing concentration trends at W410 may suggest that W410 is continuing to reduce downgradient migration of PAH-impacted groundwater.

Operable Unit 5

Yes, the remedy selected for OU5 continues to meet the objective of protecting human health and the environment as described in the OU5 ROD. The remedy selected by the OU5 ROD was gradient control of the Northern Area Platteville Aquifer. Stable to decreasing concentrations and a limited influence of gradient control wells have been observed in the Northern Area Platteville Aquifer. Based on conditions observed, pumping in the Northern Area Platteville Aquifer was discontinued, as approved by the MPCA and EPA in 2006.

Opportunities for optimization include evaluating the use of reconditioned carbon in the treatment plants instead of virgin material, properly closing unneeded wells, and streamlining groundwater monitoring reports. The Agencies will discuss these opportunities with the City.

Question B: Are the exposure assumptions, toxicity data, cleanup levels and remedial action objectives (RAOs) used at the time of remedy selection still valid?

Yes, exposure assumptions, cleanup levels and RAOs used at the time of remedy selection are still valid. Other than the vapor intrusion pathway that was described in the previous Five Year Review, there are no new exposure pathways or changes to existing exposure pathways. The vapor intrusion pathway is being evaluated. The implemented remedy at the Reilly site is making progress toward meeting RAOs. Containment of contaminants is achieved in Operable Units 3, 4, and 5. Containment or treatment of groundwater in all contaminated aquifers is maintained for Operable Unit 2. The soil cover is also maintained, but deed restrictions to limit current and future land use have not been implemented. More progress toward this RAO for Operable Unit 2 is recommended through Follow-Up Actions in this review. The City made and continues to make overall progress toward the RAO for Operable Unit 1, which is to restore St. Louis Park's drinking water supply to criteria listed in the CD-RAP.

General land use and exposure pathways have not changed since the development of the decision documents and selected remedies. However; revised drinking water standards, based on updated toxicity data, have been developed since the time of the remedy selection.

At the time the CD-RAP was written, drinking water standards for PAHs had not been developed. Therefore, risk-based drinking water criteria were developed for the Site and were included in the CD-RAP. Since the signing of the CD-RAP and initial ROD, drinking water standards have been developed for some PAH compounds. Table 5 lists the original drinking water criteria documented in the CD-RAP and compares them to the MDH Health Risk Limits and Safe Drinking Water Act (SDWA) Maximum Contaminant Limits (MCL).

Table 5 - Drinking Water Criteria

Chemical	CD/RAP/ROD (ng/L)	HRLs (ng/L)	MCLs (ng/L)
Sum of Benzo(a)pyrene and dibenzo(a,h)anthracene	5.6	None	None; 200[A]
Carcinogenic PAHs*	28.0	50	200[A]
Other PAHs*	280.0	300,000	None

[A]Benzo(a)pyrene
* See Attachment A Section 2.2 from CD-RAP

The drinking water standards developed for the CD-RAP are more stringent when compared to MDH HRL and SDWA MCLs. However, the current drinking water standards reflect more recent information with regard to PAH toxicity and likely provide a more comprehensive basis for evaluation of protectiveness at the Site. Therefore, further evaluation of current standards specific to carcinogenic, non-carcinogenic and individual PAH compounds should be considered.

Discharge limits are also still valid. The OU 2 source and gradient control wells W23, W420, W421 are pumped to a treatment facility then discharged to a storm sewer that discharges to surface water. The limits on this discharge are described in Table 6.

The water from OU 3 gradient control well W439 and OU 4 gradient control well W410 discharges to the sanitary sewer system and has pretreatment requirements regulated by the Metropolitan Council of Environmental Services (MCES). These requirements are summarized in Table 7.

Table 6 – Current Effluent Limitations for Surface Water Discharge. Treated Water from Wells W23, W420, W421

Parameter	Monthly Average (µg/L)	Daily Maximum (µg/L)
Anthracene	0.035	0.32
Fluoranthene	1.9	3.5
Nappthalene	17	17
Diesel Range Organics		200
Total Carcinogenic PAHs	0.070	0.311
Phenanthrene	1.0	2
Phenols, total	10	
	--	
	--	
PH	--	between 6 and 9

Table 7 – Current Effluent Limitations for Discharge to MCES

Cadmium	1.0 mg/l
Chromium- total	6.0 mg/l
Copper	4.0 mg/l
Lead	1.0 mg/l
Mercury	0.002 mg/l
Nickel	6.0 mg/l
Zinc	6/0 mg/l
PH	Between 511
One toxic organic parameter	3 mg/l
Combined total toxic organics concentration	10 mg/l
Total hydrocarbons	100 mg/l

Question C: Has any other information come to light that could call into question the protectiveness of the remedies?

According to the City of St. Louis Park, reconstruction of the intersection at Highway 7 and Louisiana Avenue is in the planning stages. Reconstruction of this intersection could affect the operation and protectiveness of remedial actions for the Site. This intersection is adjacent to the former bog area and is in the vicinity of W420 and W421. Piping for wells W105 and W23 may also cross underground through the proposed area of reconstruction. Water extracted from these pumping wells is treated by a GAC facility located near the south east corner of this intersection.

Future reconstruction and realignment activities should consider maintaining the integrity and function of the remedial actions in this area. Additionally, PAH-impacted soil and groundwater are known to be in the area of the intersection; disposal and/or treatment of PAH-impacted materials should be evaluated and approved by the Agencies prior to construction activities. Worker exposure impact precautions should also be evaluated and approved by the Agencies, as necessary. A work plan addressing disposal and exposure issues should be developed and submitted for MPCA and EPA review and approval prior to the start of realignment work.

The previous Five-Year Review identified that a vapor intrusion evaluation was necessary. At the time of this review, an initial vapor intrusion evaluation has been completed and additional assessment is being planned by the Agencies. Results of the complete vapor intrusion assessment should be evaluated to determine what risk, if any, is present; specifically as related to the residential properties at the Site.

Technical Assessment Summary

According to the data reviewed and the site inspection, the remedy is substantially functioning as intended by the RODs. Monitoring for DNAPL should continue at pumping wells W420 and W421. Groundwater monitoring and modeling also suggests that the gradient control system in the Prairie du Chien Aquifer may not be fully controlling the spread of contamination towards Edina. Completing the follow up action to evaluate additional pumping wells and installing "sentry" monitoring wells in the Prairie du Chien Aquifer upgradient of the Edina well field may be necessary to address PAH concentrations in well E13. Further evaluation of institutional controls for the Site and surrounding properties will be addressed by an IC Plan.

Exposure assumptions, cleanup levels and RAOs used at the time of remedy selection are still valid. There are no new exposure pathways or changes to existing exposure pathways. The implemented remedy at the Reilly site is making progress toward meeting RAOs. Since the signing of the CD-RAP and initial ROD, drinking water standards have been developed for some PAH compounds. The current drinking water standards [MDH Health Risk Limits and Safe Drinking Water Act (SDWA) Maximum Contaminant Limits (MCL)] reflect more recent information with regard to PAH toxicity and likely provide a more comprehensive basis for evaluation of protectiveness at the Site. Further evaluation of current standards specific to carcinogenic, non-carcinogenic and individual PAH compounds should be considered.

There is no other new information that calls into question the protectiveness of the remedy, however, two issues are identified that may impact the site. First, reconstruction of the intersection at Highway 7 and Louisiana Avenue is in the planning stages. Maintaining the integrity and function of the remedial actions in this area and worker exposure impact precautions are topics for the City to consult with MPCA and EPA on before beginning work. Second, results of the vapor intrusion assessment should be evaluated to determine what risk, if any, is present at the site from this pathway.

VIII. Issues

Issues identified during the five-year review process are included in Table 5.

Table 8: Issues

Issues	Affects Current Protectiveness (Y/N)	Affects Future Protectiveness (Y/N)
Contaminant migration towards Edina from Reilly Site. Complete evaluation of groundwater elevations and flow modeling including continuous data from the Edina municipal wells and St. Louis Park wells needs to be completed.	N	Y
Institutional controls for areas of the site where UU/UE has not been achieved may not be in place. An IC Plan needs to be developed to aid in the determination of ICs that may be needed and in the implementation of such ICs.	N	Y
Vapor intrusion pathway evaluation needs to be completed.	Y	Y
Evaluation of SLP-3 with regard to vertical influence has not been conducted as recommended by the previous five-year review.	N	Y
Revised drinking water standards, based on updated toxicity data, have been developed since the time of the remedy selection.	N	Y
Vertical contaminant migration at the Site is part of the groundwater flow modeling and that has been initiated but needs additional data to be completed.	N	Y
Inspection and maintenance of the complete monitoring well network recommended in the previous five-year review has not been documented.	N	Y

IX. Recommendations and Follow-up Actions

Table 9: Recommendations and Follow-up Actions

Issue	Recommendations and Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness (Y/N)	
					Current	Future
1	Complete evaluation of groundwater elevations and flow modeling including continuous data from the Edina municipal wells should be completed. The completed evaluation should consider enhancement to the gradient control system based on increasing concentrations in downgradient municipal wells E13 and H6. Evaluate and decide on Installing three additional monitoring wells in the PDJA and begin pumping at W119, W48, and/or SLP6.	City of St. Louis Park	MPCA/EPA	9/2011, 6/2012	N	Y
2	An IC plan should be developed to evaluate existing ICs and the need for additional ICs. IC plan should also discuss the implantation and maintenance of any additional ICs.	EPA/City of St. Louis Park	MPCA/EPA	6/2012	N	Y
3	Continued evaluation of vapor intrusion pathways should be conducted	MPCA/EPA	MPCA/EPA	7/2012	Y	Y
4	Evaluation of SLP-3 should be conducted with regard to vertical influence and/or abandonment as proposed by the City of St. Louis Park	City of St. Louis Park	MPCA/EPA	6/2013	N	Y

Issue	Recommendations and Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness (Y/N)	
					Current	Future
5	Evaluation of current standards specific to carcinogenic, non-carcinogenic and individual PAH compounds should be considered.	City of St. Louis Park	MPCA/EPA	12/2012	N	Y
6	Vertical contaminant migration at the Site should be completed as recommended by the previous five-year review, evaluation should include recent continuous data collected by St. Louis Park.	City of St. Louis Park	MPCA/EPA	12/2011	N	Y
7	Inspection, documentation, and maintenance of the complete monitoring well network recommended in the previous five-year review should be completed on an annual basis.	City of St. Louis Park	MPCA/EPA	Continuous	N	Y

X. Protectiveness Statement(s)

Operable Unit 1

The remedy at OU 1 is protective of human health and the environment; exposure pathways that could result in unacceptable risks are being controlled by filtering groundwater through granulated active carbon prior to introduction into the municipal supply.

Operable Unit 2

The performance of the remedial actions selected by the OU2 ROD is substantially consistent with the intent of the decision documents. Individual components of the OU2 ROD are discussed in Section IV of this review. The following remedial actions selected by the OU2 ROD require further evaluation based on data presented during this review period (2006-2011). The status of one of the remedial actions, discussed below, affects the determination about current protectiveness of the remedy.

A protectiveness determination of the remedy at OU 2 cannot be made at this time until further information is obtained. Further information will be obtained by completing a vapor intrusion investigation. It is expected that these actions will take approximately one year to complete, at which time a protectiveness determination will be made.

Monitoring, pumping and treatment of the Ironton-Galesville Aquifer to protect the deeper Mt. Simon-Hinckley Aquifer.

This RA is being implemented as required in the CD-RAP and is protective of human health and the environment. Groundwater Well W105 is the only well screened in the Ironton-Galesville Aquifer. This well was operated as a pump and treat well until December 31, 1991 when levels of contaminants fell below cessation criteria. During this Five-Year review period, groundwater concentrations above CD-RAP cessation criteria have been reported at well W105; however, confirmation samples as required by the CD-RAP have indicated contaminant concentrations are below criteria established in the CD-RAP. Further monitoring and evaluation of concentrations at this well is recommended.

Monitoring, pumping and treatment of the Prairie du Chien-Jordan Aquifer until such time that drinking water quality is uniformly established within the area of gradient control.

The remedial action for the Prairie du Chien-Jordan Aquifer currently protects human health and the environment because groundwater flow and contaminant migration within the Prairie du Chien-Jordan Aquifer is being limited by aquifer pumping and subsequent removal of PAH from the groundwater. However, in order for the remedy to be protective in the long-term, the following actions need to be taken:

- Complete evaluation of groundwater elevations and flow modeling including continuous data from the Edina municipal wells should be completed. The completed evaluation should consider enhancement to the gradient control and monitoring systems based on increasing concentrations in downgradient municipal wells E13 and H6.
- Evaluation of vertical contaminant migration at the Site should be completed as recommended by the previous five-year review. Evaluation should include recent continuous data collected by St. Louis Park.

These studies have been started by the City of St. Louis Park, but were not completed at the time of this review.

Monitoring and contingent action for the maintenance of drinking water quality in the St. Peter Aquifer.

The remedial action for the St. Peter Aquifer currently protects human health and the environment because groundwater flow and contaminant migration within the St. Peter Aquifer is being limited by aquifer pumping and subsequent removal of PAH from the groundwater. However, in order for the remedy to be protective in the long-term, the following actions need to be taken:

- Evaluation of SLP-3 should be conducted with regard to vertical influence and/or abandonment as proposed by the City of St. Louis Park.

This study is being done in conjunction with the Prairie du Chien study, and was not complete at the time of this review.

Further subsurface investigation in the vicinity of the Site, to implement deed restrictions for current and future land use in the areas of contamination.

The remedial action regarding subsurface investigation in the vicinity of the Site has been partly completed; a 1988 study south of the Site reported no significant soil impacts in the area defined in the CD-RAP. Verification of deed restrictions, as required by the OU2 ROD and CD-RAP has not yet been completed. In order for the remedy to be protective in the long-term, evaluation, development and implementation of ICs and an IC plan should be completed. This will include the development of maps which will depict the current conditions of the site and areas which do not allow for UU/UE will be developed as part of the IC evaluation activities; determining what ICs, if any, are needed at the Site and discussing how to implement, maintain, monitor and enforce any ICs determined to be needed. Further evaluation and implementation of institutional controls for the Site and surrounding properties will be addressed by an IC Plan to be developed by the Agencies and the City of St. Louis Park, in consultation with Vertellus.

More subsurface investigation to evaluate the vapor intrusion exposure pathway is needed to assess current remedy protectiveness and also inform the implementation of appropriate deed restrictions. Further information will be obtained by completion of the vapor intrusion investigation.

Operable Unit 3

The remedy at OU 3 is protective of human health and the environment, and in the interim, exposure pathways that could result in unacceptable risks are being controlled. At the specified pumping rate, gradient control wells are limiting contaminant migration in the northern area Drift Aquifer.

Operable Unit 4

The remedy at OU 4 is protective of human health and the environment, and in the interim, exposure pathways that could result in unacceptable risks are being controlled. Groundwater pumping in the St. Peter Aquifer continues to limit contaminant migration in the vicinity of the Site and is removing PAH contaminants from the aquifer.

Operable Unit 5

The remedy at OU 5 is protective of human health and the environment, and in the interim, exposure pathways that could result in unacceptable risks are being controlled. PAH concentrations and are generally below drinking water criteria established by the CD-RAP.

Site Wide Protectiveness Statement

The remedial actions at OUs 1, 3, 4, and 5 are protective in the short term. Granular activated carbon treatment of PAH-impacted municipal wells controls exposure and provides water which meets drinking water criteria established for the Site. A gradient control network is limiting contaminant migration in the vicinity of the Site and generally contains the spread of PAH-impacted groundwater; however, groundwater modeling and data collected to date indicate potential downgradient risk to other municipal wells in the area. Because a protectiveness determination of the remedy at OU2 cannot be made at this time, the Site-wide determination on remedy protectiveness of human health and the environment is deferred. The determination is deferred at OU 2 because of the current lack of information on the vapor intrusion exposure pathway. Based on issues and recommendations of this five-year review, the following actions need to be taken in order to achieve long-term protectiveness:

- Complete the evaluation of groundwater elevations and flow modeling, including continuous data from the Edina municipal wells. While the City has begun this work it will not be completed in time for this review. The completed evaluation should consider enhancement to the gradient control and monitoring systems based on increasing concentrations in downgradient municipal wells E13 and H6.
- Conducting an IC plan for the evaluation, development and implementation of any additional ICs.
- Evaluation of vapor intrusion pathway should be completed. While the MPCA and EPA have begun this work it will not be completed in time for this review. It is expected this action will take approximately one year to complete, at which time a protectiveness determination will be made. This determination will be made in an addendum to the fourth five-year review in 2012.
- Evaluation of SLP-3 should be conducted with regard to vertical influence and/or abandonment as proposed by the City of St. Louis Park
- Evaluation of current standards specific to carcinogenic, non-carcinogenic and

individual PAH compounds should be considered.

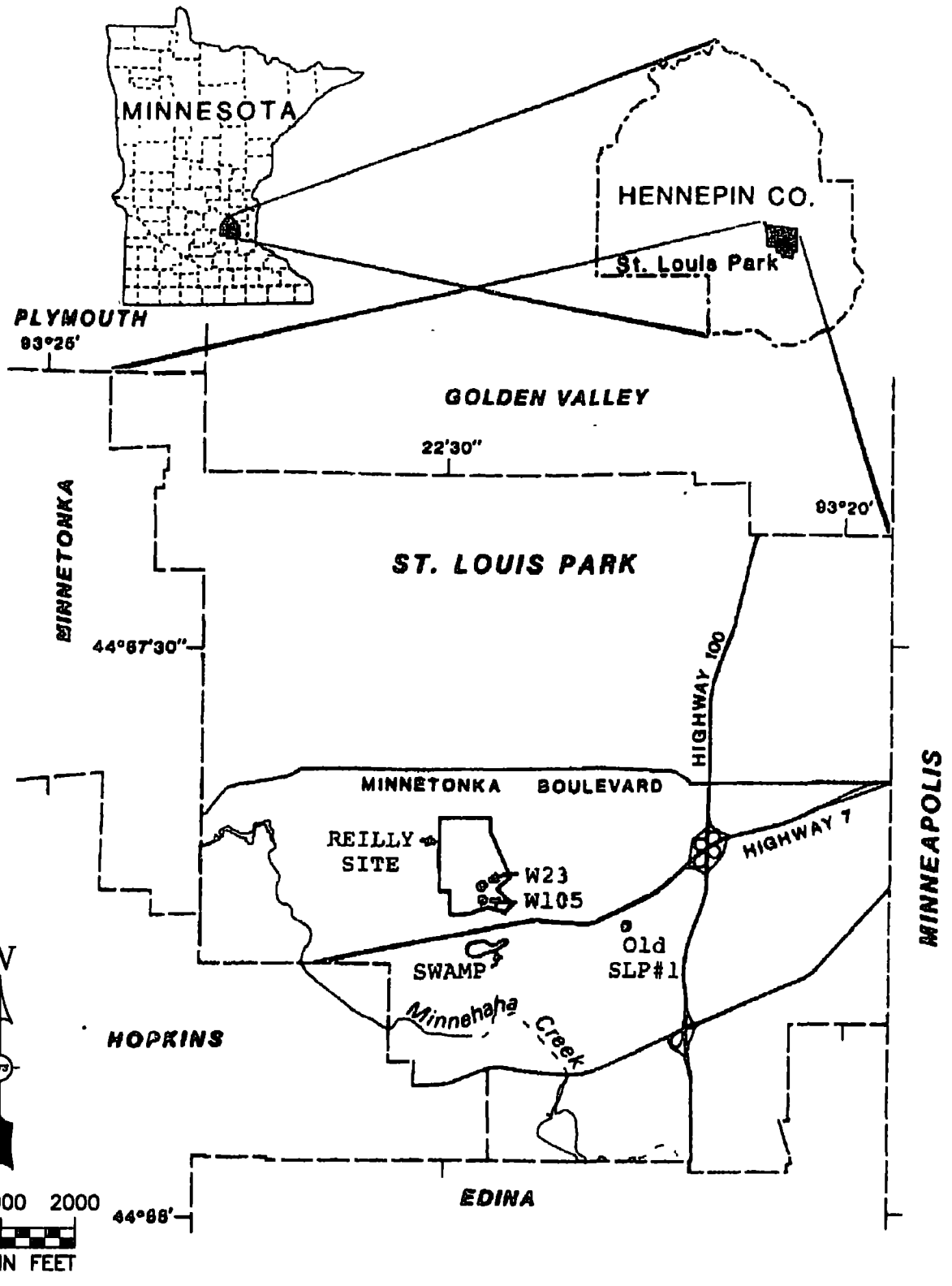
- Vertical contaminant migration at the Site should be completed as recommended by the previous five-year review; evaluation should include recent continuous data collected by St. Louis Park.
- Inspection and maintenance of the complete monitoring well network recommended in the previous five-year review should be completed on an annual basis.

XI. Next Review

An addendum to the fourth five-year review will be completed in 2012 in order to make a protectiveness determination. Hazardous substances or contaminants will remain at the Site and do not allow for unlimited use or unrestricted exposure. The presence of hazardous substances will require additional five-year reviews of the Site. The next five-year review is scheduled for completion five years from the signature date of this review.

Figures

Figure 1 – Site Location Map



LOCATION MAP
REILLY TAR SITE
ST. LOUIS PARK, MINNESOTA
FOR: MINNESOTA POLLUTION CONTROL AGENCY

Drawn	TAK	8/01/2006
Checked	AJ	8/01/2006
Approved.	RLD	8/01/2006
PROJECT NUMBER	200604690	
FIGURE NUMBER	1	

X:\PROJECTS\200604690\G200604690-MAPS-01.dwg, FIG , 8/2/2006 2:18:53 PM, STS_PLOTSTAMP,STS_PLOTSTAMP

Figure 2 – Site Map

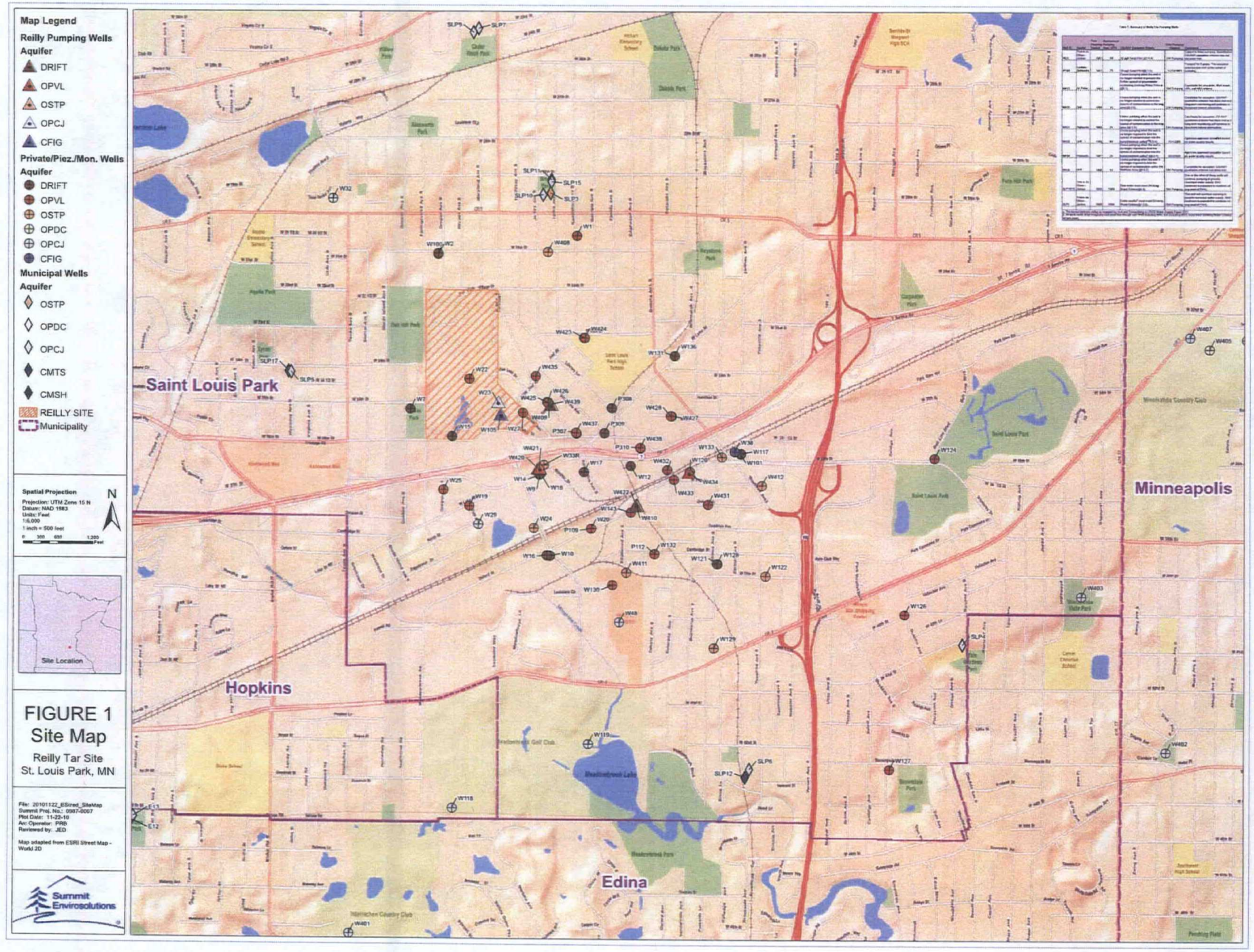
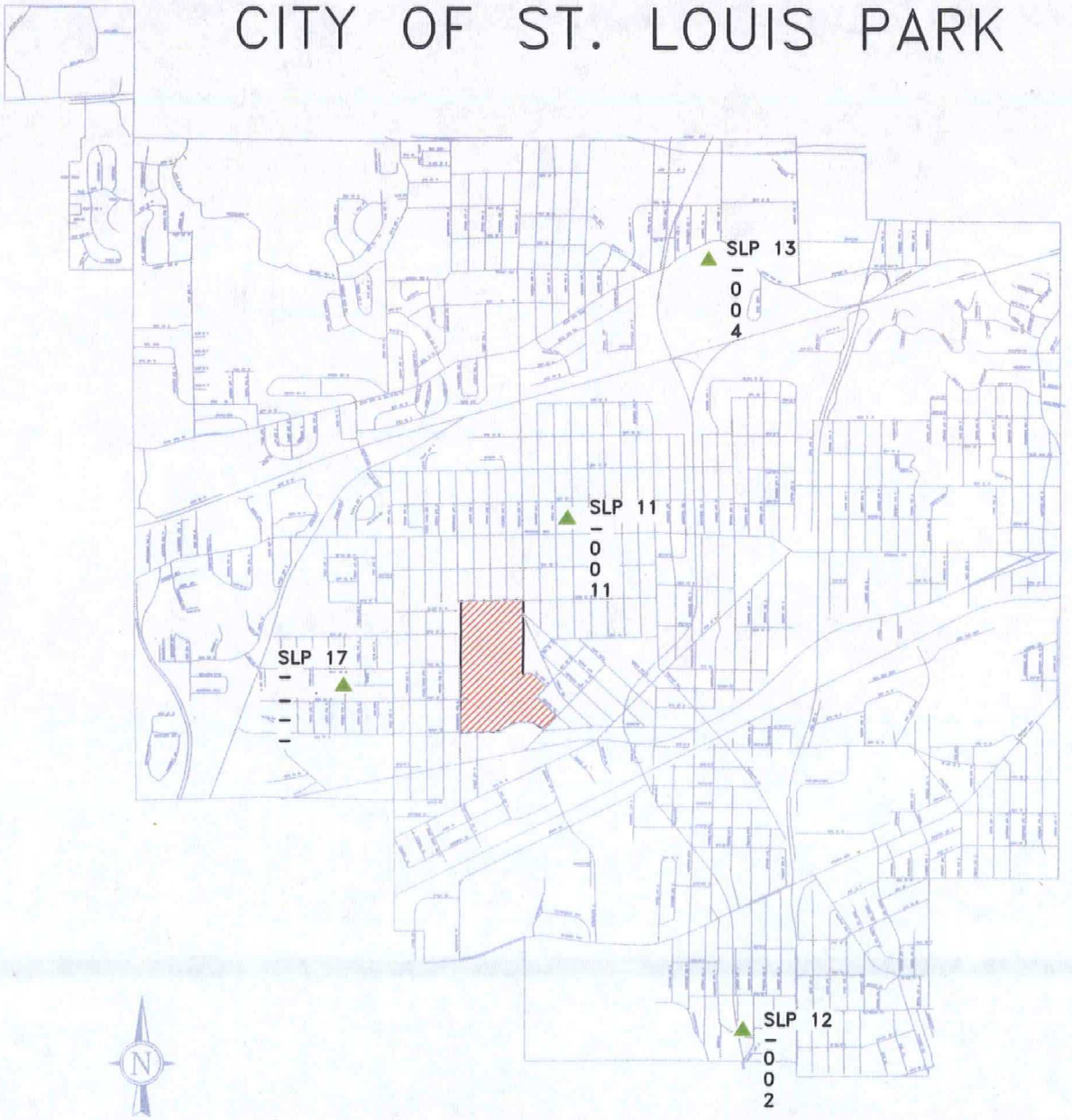

Map Legend
Reilly Pumping Wells
Aquifer
DRIFT
OPVL
OSTP
OPCJ
CFIG
Private/Piez./Mon. Wells
Aquifer
DRIFT
OPVL
OSTP
OPDC
OPCJ
CFIG
Municipal Wells
Aquifer
OSTP
OPDC
OPCJ
CMTS
CMSH
REILLY SITE
Municipality
Spatial Projection
Projection: UTM Zone 15 N
Datum: NAD 1983
Units: Feet
1:6,000
1 inch = 500 feet
N
Site Location
FIGURE 1
Site Map
Reilly Tar Site
St. Louis Park, MN
File: 20101122_ESIred_SiteMap
Summit Proj. No.: 0987-0007
Plot Date: 11-22-10
Arc Operator: PRB
Reviewed by: JED
Map adapted from ESRI Street Map - World 2D
Summit Envirosolutions
Saint Louis Park
Hopkins
Edina
Minneapolis

Figure 3 – Mt. Simon-Hinckley Wells

CITY OF ST. LOUIS PARK



REILLY SITE

▲ WELL LOCATION
SLP 17 WELL IDENTIFICATION
— WATER LEVEL
– SUM–BENZO(a)PYRENE & DIBENZ(a,h)ANTHRACENE (PPT)
– SUM–CARCINOGENIC PAH (PPT)
– SUM–OTHER PAH'S (PPT)

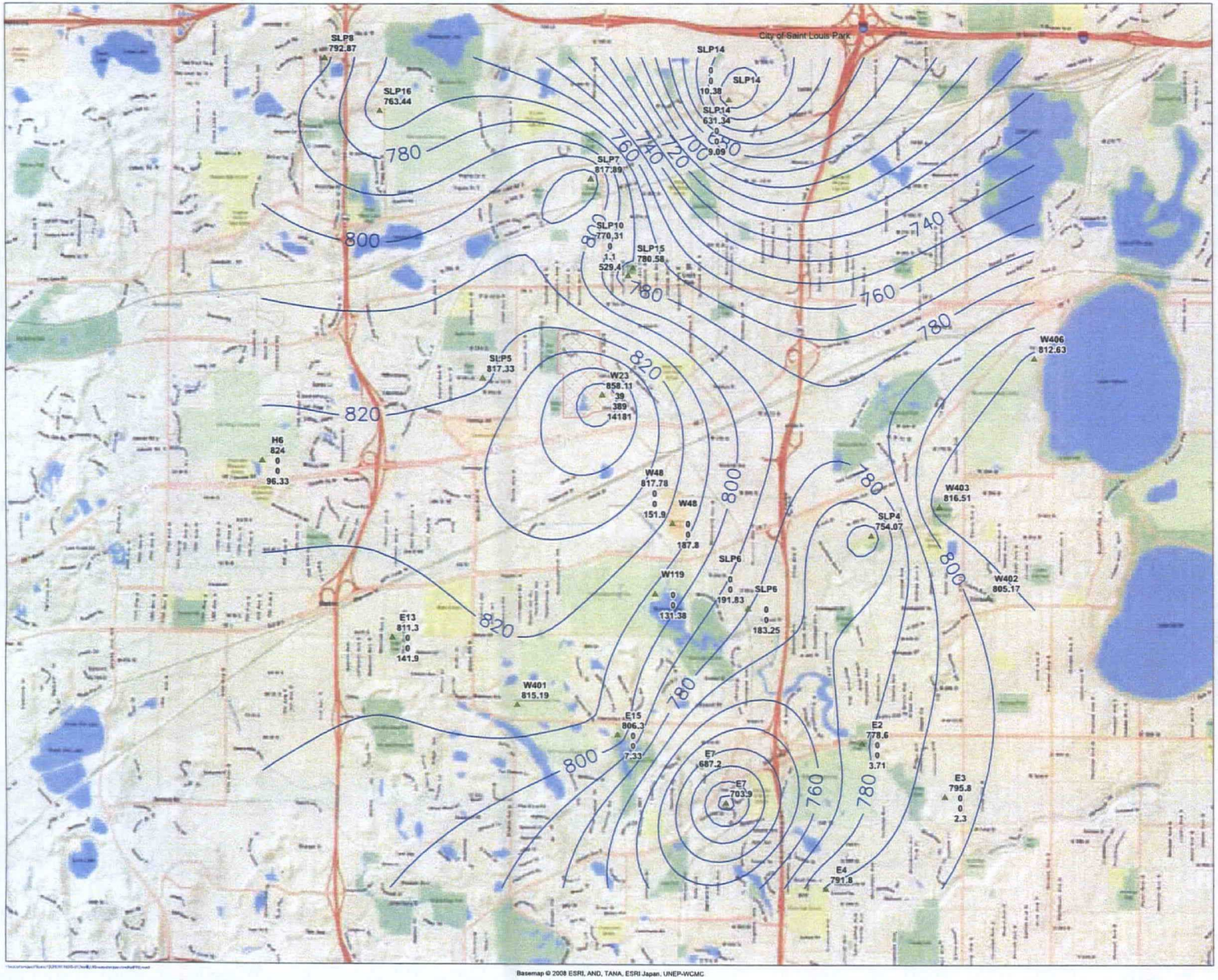
Concentration in nanograms per liter equivalent to parts per trillion

FIGURE 2–1

SUMMARY OF GROUNDWATER MONITORING RESULTS FOR MOUNT SIMON HINKLEY AQUIFER 2010

DRAWN:	A. TARARA	DATE:	03/08/11	REV:
CHECKED:	WMG	PROJECT:	60145681	AECOM

Figure 4 – Prairie du Chien-Jordan Wells



Well	WL	Bap + Dbaha	CPAH	OPAH
E13	811.3	0	0	141.9
E15	806.3	0	0	7.33
E2	778.6	0	0	3.71
E3	795.8	0	0	2.3
E4	791.8	--	--	--
E7	687.2	--	--	--
E7	703.9	--	--	--
H6	824	0	0	96.33
SLP10	770.31	0	1.1	529.4
SLP14		0	0	10.38
SLP14	631.34	0	0	9.09
SLP14		--	--	--
SLP15	780.58	--	--	--
SLP16	763.44	--	--	--
SLP4	754.07	--	--	--
SLP5	817.33	--	--	--
SLP6	--	0	0	191.83
SLP6	--	0	0	183.25
SLP7	817.89	--	--	--
SLP8	792.87	--	--	--
W119	--	0	0	131.38
W23	858.11	39	389	14181
W401	815.19	--	--	--
W402	805.17	--	--	--
W403	816.51	--	--	--
W406	812.63	--	--	--
W48	--	0	0	187.8
W48	817.78	0	0	151.9

Well ID
Water Level (ft)
Sum of Benzo(a)Pyrene and Dibenz(a,h)anthracene (ppt)
Total Carcinogenic PAH (ppt)
Total Other PAH (ppt)
0 = Not detected
- = Not sampled

10 Foot Groundwater Level Contour

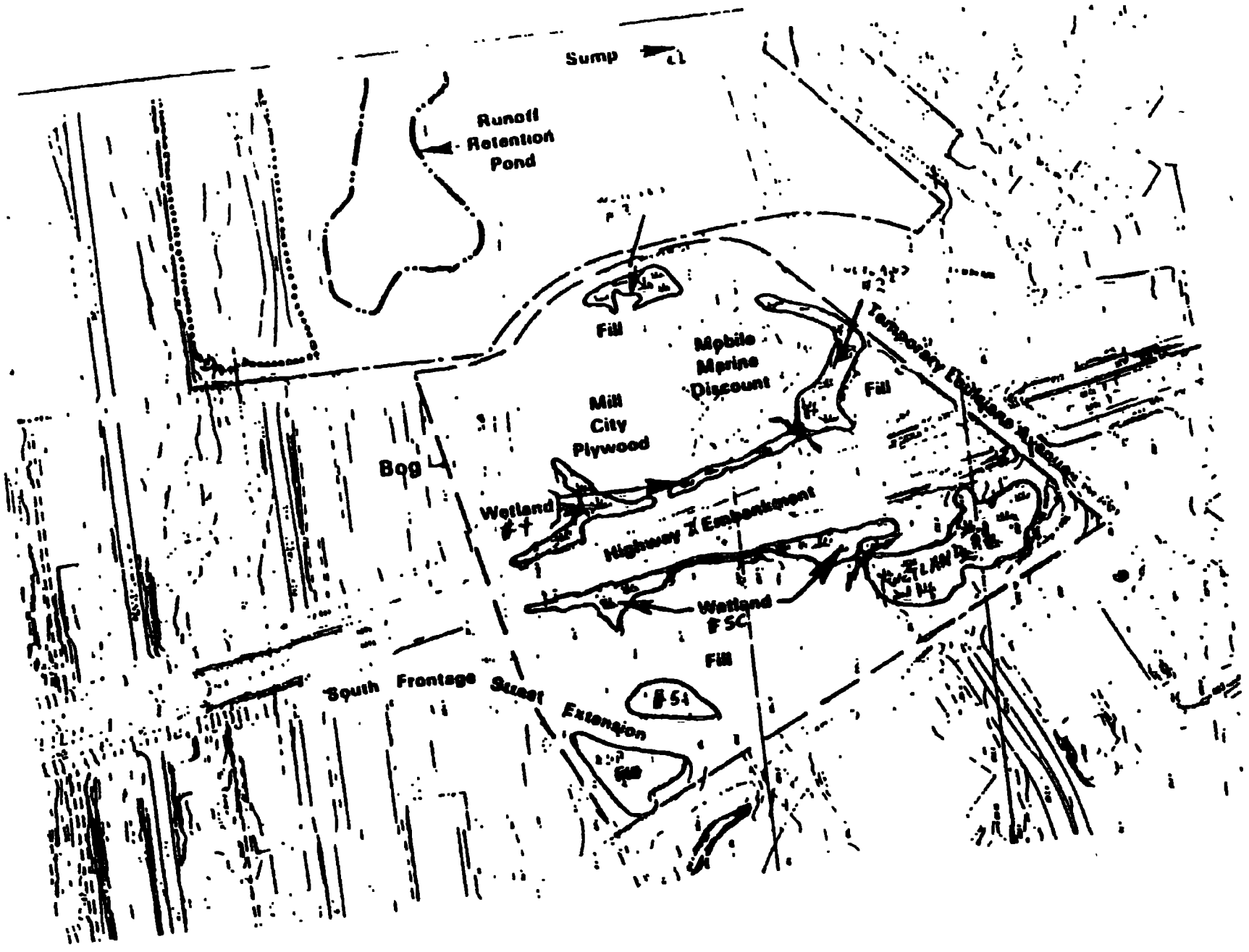
Reilly Site

0 1,000 2,000 4,000 6,000 Feet

Figure 4-2
Summary of Groundwater Monitoring Results
Prarie du Chien-Jordan Aquifer
Second Half, 2010

AECOM

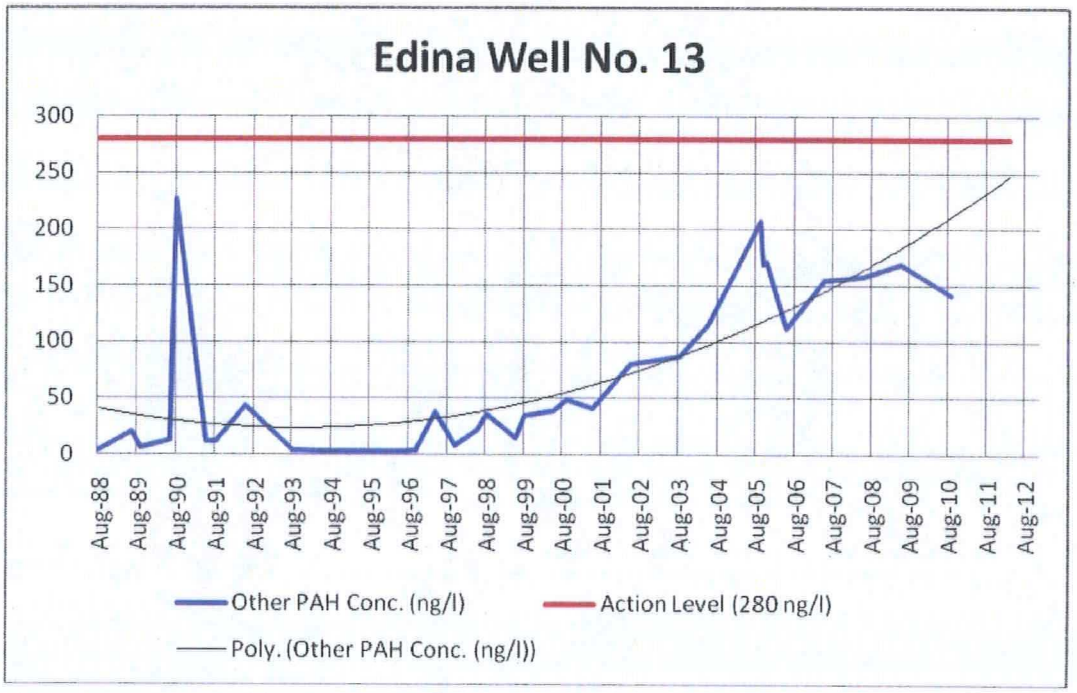
Figure 5 – Bog Area Location



APPENDIX B

WETLANDS MAP

Figure 6 – Projection of PAH Contamination in Well E13



Appendices

Appendix A – Site Inspection Checklist and Interview Documentation

Site Inspection Checklist

I. SITE INFORMATION	
Site name: Reilly Tar and Chemical Corp.	**Date of inspection: 10/29/10**
Location and Region: St. Louis Park, MN/ Region 5	**EPA ID: MND 980609804**
Agency, office, or company leading the five-year review: MPCA	**Weather/temperature: Sunny/45°F**

Remedy Includes: (Check all that apply)

- X Landfill cover/containment
- Access controls
- Institutional controls
- X Groundwater pump and treatment
- Surface water collection and treatment
- Other_____

- Monitored natural attenuation
- Groundwater containment
- Vertical barrier walls

Attachments: X Inspection team roster attached Site map attached

II. INTERVIEWS (Check all that apply)

1. **O&M site manager** _Scott Anderson_____ ___Utilities Superintendant ___10/29/10__
   Name Title Date
   Interviewed **X** at site at office by phone Phone no _____
   Problems, suggestions; _____

2. **O&M staff** _____ _____ _____
   Name Title Date
   Interviewed at site at office by phone Phone no. _____
   Problems, suggestions; _____

3. **Local regulatory authorities and response agencies** (i.e , State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc) Fill in all that apply.

Agency __MPCA_____
Contact __Nile Fellows_____ __Project Leader_ _10/29/10_ _651.757 2352__
Name Title Date Phone no.
Problems; suggestions; _____

Agency _____
Contact _____ _____ _____ _____
Name Title Date Phone no.
Problems; suggestions, _____

Agency _____
Contact _____ _____ _____ _____
Name Title Date Phone no.
Problems; suggestions; G Report attached _____

Agency _____
Contact _____ _____ _____ _____
Name Title Date Phone no.
Problems; suggestions; G Report attached _____

4 **Other interviews** (optional) Report attached

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)

1. **O&M Documents**

X O&M manual	X Readily available	Up to date	N/A
As-built drawings	X Readily available	Up to date	N/A
Maintenance logs	X Readily available	Up to date	N/A

Remarks_____

2 **Site-Specific Health and Safety Plan** X Readily available Up to date N/A
Contingency plan/emergency response plan Readily available X Up to date N/A
Remarks_____

3. **O&M and OSHA Training Records** X Readily available Up to date N/A
Remarks__OSHA, HAZWOPER, Water Treatment_____

4. **Permits and Service Agreements**

Air discharge permit	Readily available	Up to date	X N/A
X Effluent discharge	Readily available	Up to date	N/A
Waste disposal, POTW	Readily available	Up to date	N/A
Other permits_**DNR, MCES, MDH, NPDES**	Readily available	Up to date	N/A

Remarks_____

5 **Gas Generation Records** Readily available Up to date X N/A
Remarks_____

6. **Settlement Monument Records** Readily available Up to date X N/A
Remarks_____

7. **Groundwater Monitoring Records** X Readily available Up to date N/A
Remarks_____

8 **Leachate Extraction Records** Readily available Up to date X N/A
Remarks_____

9. **Discharge Compliance Records**

Air	Readily available	Up to date	N/A
Water (effluent)	X Readily available	Up to date	N/A

Remarks_____

10. **Daily Access/Security Logs** X Readily available Up to date N/A
Remarks___Security systems and locks on potable water system buildings, locks on non-potable wells and well houses. _____

IV. O&M COSTS

1. **O&M Organization**

State in-house Contractor for State
PRP in-house Contractor for PRP
Federal Facility in-house Contractor for Federal Facility
X Other City of St. Louis Park for PRP – O&M in House

2. **O&M Cost Records**

X Readily available X Up to date
Funding mechanism/agreement in place
Original O&M cost estimate _____ Breakdown attached

Total annual cost by year for review period if available

From _____ To _____ _____ Breakdown attached
Date Date Total cost
From _____ To _____ _____ Breakdown attached
Date Date Total cost
From _____ To _____ _____ Breakdown attached
Date Date Total cost
From _____ To _____ _____ Breakdown attached
Date Date Total cost
From _____ To _____ _____ Breakdown attached
Date Date Total cost

3. **Unanticipated or Unusually High O&M Costs During Review Period**

Describe costs and reasons: Nothing

V. ACCESS AND INSTITUTIONAL CONTROLS Applicable X N/A

A. Fencing

1. **Fencing damaged** Location shown on site map Gates secured X N/A

Remarks

B. Other Access Restrictions

1. **Signs and other security measures** Location shown on site map N/A

Remarks Buildings Locked

C. Institutional Controls (ICs)

1. **Implementation and enforcement**

Site conditions imply ICs not properly implemented — Yes — No — **X** N/A

Site conditions imply ICs not being fully enforced — Yes — No — **X** N/A

Type of monitoring (*e g.*, self-reporting, drive by) _____

Frequency _____

Responsible party/agency _____

Contact _____ _____ _____ _____

Name — Title — Date — Phone no.

Reporting is up-to-date — Yes — No — N/A

Reports are verified by the lead agency — Yes — No — N/A

Specific requirements in deed or decision documents have been met — Yes — No — N/A

Violations have been reported — Yes — No — N/A

Other problems or suggestions.

__Buildings and monitoring wells observed were locked_____

2. **Adequacy** — ICs are adequate — **X** ICs are inadequate — N/A

Remarks___IC Plan needs to be developed_____

D. General

1. **Vandalism/trespassing** — Location shown on site map — No vandalism evident

Remarks_____Minor Vandalism to some transducers_____

2. **Land use changes on site** — N/A

Remarks__Sam's Club and West Oaks Apartments built in the vicinity of the Site in the past five years

3. **Land use changes off site** — N/A

Remarks_____

VI. GENERAL SITE CONDITIONS

A. Roads — **X** Applicable — N/A

1. **Roads damaged** — Location shown on site map — **X** Roads adequate — N/A

Remarks___Public Streets at the Site are Maintained_____

B. Other Site Conditions

Remarks ___W105, W23 need to replace sample tubing. Paint cans drying inside W105 well house. W33R needs grout at ground surface. _____

VII. LANDFILL COVERS X Applicable N/A

A. Landfill Surface

1. **Settlement** (Low spots) Location shown on site map **X** Settlement not evident
   Areal extent_____ Depth_____
   Remarks_____

2. **Cracks** Location shown on site map **X** Cracking not evident
   Lengths_____ Widths_____ Depths_____
   Remarks_____

3. **Erosion** Location shown on site map **X** Erosion not evident
   Areal extent_____ Depth_____
   Remarks_____

4 **Holes** Location shown on site map **X** Holes not evident
   Areal extent_____ Depth_____
   Remarks_____

5. **Vegetative Cover** **X** Grass **X** Cover properly established No signs of stress
   Trees/Shrubs (indicate size and locations on a diagram)
   Remarks___Fill added over playing surface of soccer fields in last five years. _____

6. **Alternative Cover (armored rock, concrete, etc.)** **X** N/A
   Remarks_____

7. **Bulges** Location shown on site map **X** Bulges not evident
   Areal extent_____ Height_____
   Remarks_____

8.	**Wet Areas/Water Damage**	X Wet areas/water damage not evident		
	Wet areas	Location shown on site map	Areal extent_____	
	Ponding	Location shown on site map	Areal extent_____	
	Seeps	Location shown on site map	Areal extent_____	
	Soft subgrade	Location shown on site map	Areal extent_____	
	Remarks_____			
9.	**Slope Instability** Slides	Location shown on site map	**X** No evidence of slope instability	
	Areal extent_____			
	Remarks_____			
B. Benches	Applicable	**X** N/A		
	(Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)			
1.	**Flows Bypass Bench**	Location shown on site map	N/A or okay	
	Remarks_____			
2.	**Bench Breached**	Location shown on site map	N/A or okay	
	Remarks_____			
3.	**Bench Overtopped**	Location shown on site map	N/A or okay	
	Remarks_____			
C. Letdown Channels	Applicable	**X** N/A		
	(Channel lined with erosion control mats, riprap, grout bags, or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)			
1	**Settlement**	Location shown on site map	No evidence of settlement	
	Areal extent_____	Depth_____		
	Remarks_____			
2	**Material Degradation**	Location shown on site map	No evidence of degradation	
	Material type_____	Areal extent_____		
	Remarks_____			
3	**Erosion**	Location shown on site map	No evidence of erosion	
	Areal extent_____	Depth_____		
	Remarks_____			

4. **Undercutting** Location shown on site map No evidence of undercutting
Areal extent_____ Depth_____
Remarks_____

5. **Obstructions** Type_____ No obstructions
G Location shown on site map Areal extent_____
Size_____
Remarks_____

6 **Excessive Vegetative Growth** Type_____
No evidence of excessive growth
Vegetation in channels does not obstruct flow
Location shown on site map Areal extent_____
Remarks_____

D. Cover Penetrations Applicable **X** N/A

1. **Gas Vents** Active Passive
Properly secured/locked Functioning Routinely sampled Good condition
Evidence of leakage at penetration Needs Maintenance
N/A
Remarks_____

2. **Gas Monitoring Probes**
Properly secured/locked Functioning Routinely sampled Good condition
Evidence of leakage at penetration Needs Maintenance N/A
Remarks_____

3. **Monitoring Wells** (within surface area of landfill)
Properly secured/locked Functioning Routinely sampled Good condition
Evidence of leakage at penetration Needs Maintenance N/A
Remarks_____

4. **Leachate Extraction Wells**
Properly secured/locked Functioning Routinely sampled Good condition
Evidence of leakage at penetration Needs Maintenance N/A
Remarks_____

5. **Settlement Monuments** Located Routinely surveyed N/A
Remarks_____

E. Gas Collection and Treatment Applicable X N/A

1 **Gas Treatment Facilities**
Flaring Thermal destruction Collection for reuse
Good condition Needs Maintenance
Remarks_____

2 **Gas Collection Wells, Manifolds and Piping**
Good condition Needs Maintenance
Remarks_____

3 **Gas Monitoring Facilities** (*e.g.*, gas monitoring of adjacent homes or buildings)
Good condition Needs Maintenance N/A
Remarks_____

F. Cover Drainage Layer Applicable X N/A

1. **Outlet Pipes Inspected** Functioning N/A
Remarks_____

2. **Outlet Rock Inspected** Functioning N/A
Remarks_____

G. Detention/Sedimentation Ponds Applicable X N/A

1. **Siltation** Areal extent_____ Depth_____ N/A
Siltation not evident
Remarks_____

2 **Erosion** Areal extent_____ Depth_____
Erosion not evident
Remarks_____

3. **Outlet Works** Functioning N/A
Remarks_____

4 **Dam** Functioning N/A
Remarks_____

H. Retaining Walls Applicable X N/A

1. **Deformations** Location shown on site map Deformation not evident
   Horizontal displacement_____ Vertical displacement_____
   Rotational displacement_____
   Remarks_____

2. **Degradation** Location shown on site map Degradation not evident
   Remarks_____

I. Perimeter Ditches/Off-Site Discharge Applicable X N/A

1. **Siltation** Location shown on site map Siltation not evident
   Areal extent_____ Depth_____
   Remarks_____

2. **Vegetative Growth** Location shown on site map N/A
   Vegetation does not impede flow
   Areal extent_____ Type_____
   Remarks_____

3. **Erosion** Location shown on site map Erosion not evident
   Areal extent_____ Depth_____
   Remarks_____

4. **Discharge Structure** Functioning N/A
   Remarks_____

VIII. VERTICAL BARRIER WALLS Applicable X N/A

1 **Settlement** Location shown on site map Settlement not evident
   Areal extent_____ Depth_____
   Remarks_____

2. **Performance Monitoring** Type of monitoring_____
   Performance not monitored
   Frequency_____ Evidence of breaching
   Head differential_____
   Remarks_____

IX. GROUNDWATER/SURFACE WATER REMEDIES X Applicable N/A

A. Groundwater Extraction Wells, Pumps, and Pipelines X Applicable N/A

1. **Pumps, Wellhead Plumbing, and Electrical**
   X Good condition X All required wells properly operating Needs Maintenance N/A
   Remarks_____

2. **Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances**
   X Good condition Needs Maintenance
   Remarks_____

3 **Spare Parts and Equipment**
   X Readily available Good condition Requires upgrade Needs to be provided
   Remarks_____Obtained as necessary_____

B. Surface Water Collection Structures, Pumps, and Pipelines Applicable X N/A

1. **Collection Structures, Pumps, and Electrical**
   Good condition Needs Maintenance
   Remarks_____

2. **Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances**
   Good condition Needs Maintenance
   Remarks_____

3 **Spare Parts and Equipment**
   Readily available Good condition Requires upgrade Needs to be provided
   Remarks_____

C. Treatment System X Applicable N/A

1 - **Treatment Train** (Check components that apply)

Metals removal Oil/water separation Bioremediation
Air stripping X Carbon adsorbers
Filters_____
Additive (*e g* , chelation agent, flocculent)_____
Others_____
X Good condition Needs Maintenance
X Sampling ports properly marked and functional
X Sampling/maintenance log displayed and up to date
X Equipment properly identified
Quantity of groundwater treated annually: SEE ANNUAL REPORTS___
Quantity of surface water treated annually____NA_____
Remarks_____

2. **Electrical Enclosures and Panels** (properly rated and functional)

N/A X Good condition Needs Maintenance
Remarks_____

3. **Tanks, Vaults, Storage Vessels**

N/A X Good condition Proper secondary containment Needs Maintenance
Remarks_____

4. **Discharge Structure and Appurtenances**

N/A X Good condition Needs Maintenance
Remarks_____

5 **Treatment Building(s)**

N/A X Good condition (esp roof and doorways) Needs repair
Chemicals and equipment properly stored
Remarks_____

6. **Monitoring Wells** (pump and treatment remedy)

X Properly secured/locked X Functioning X Routinely sampled X Good condition
All required wells located Needs Maintenance N/A
Remarks___W33R needs surface grout_____

D. Monitoring Data

1. Monitoring Data

X Is routinely submitted on time X Is of acceptable quality

2. Monitoring data suggests:

Groundwater plume is effectively contained Contaminant concentrations are declining

D. Monitored Natural Attenuation Applicable X NA

1. **Monitoring Wells** (natural attenuation remedy)
Properly secured/locked Functioning Routinely sampled Good condition
All required wells located Needs Maintenance N/A
Remarks_____

X. OTHER REMEDIES

If there are remedies applied at the site which are not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed Begin with a brief statement of what the remedy is to accomplish (i e , to contain contaminant plume, minimize infiltration and gas emission, etc.).

____Remedy is intended to contain plume, Treat drinking water and cap contaminated soils. _____

B. Adequacy of O&M

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

__O&M is critical to remedy performance and may present opportunities to cut costs (reconditioning carbon, closing unnecessary wells). IC work will be to long-term protectiveness. Managing migration of COCs (operation) is important to short and long term protectiveness_____

C.	**Early Indicators of Potential Remedy Problems**
	Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs, that suggest that the protectiveness of the remedy may be compromised in the future.

D.	**Opportunities for Optimization**
	Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy Abandonment of unnecessary wells.

St. Louis Park
MINNESOTA

REILLY 5-YEAR REVIEW DATE: October 29, 2010

NAME	AGENCY	PHONE	E-MAIL
Mark Henson	PW - OPS	952 924 2186	mhanson@stlouispark.
John Estes	Delta	651-697-5245	jestes@deltaenv.c
Jacob Knauff	Delta	651-697-5253	jknauff@deltaenv.a
Scott E. Anderson	St. Louis Park	952-924-2557	sanderson@stlouispark.g
Mike Randlin	SLP	952-924-2551	mrandlin@stlouispark.
Bill Gregg	AECOM	651-367-2328	bill.gregg@aecom.com org
Dave Scheer	MPCA	651 757 2693	dave.scheer@state.mn.us
Michelle Keer	US EPA	312.886.8961	keer.michelle@epa.gov
Scott Merkley	SLP	952-924-2181	smerkley@stlouispark
Nile Fellows	MPCA	651-757-2352.	nile.fellows@state.mn.u

INTERVIEW RECORD

Site Name: Reilly Tar & Chemical	**EPA ID No.:** 0506
Subject: FYR	**Time:** 315pm **Date:** 10/29/10
Type: 9 Telephone (9) Visit 9 Other **Location of Visit:**	9 Incoming 9 Outgoing

Contact Made By: MPCA w/

Name: Nile Fellows	**Title:** Project Mgr	**Organization:** MPCA

scott Anderson - City **Individual Contacted:**

Name: Bill Gregg - AECOM	**Title:**	**Organization:**

Telephone No: **Fax No:** **E-Mail Address:**	**Street Address:** **City, State, Zip:**

Summary Of Conversation

Overall impression
pumping too much H_2O
criteria too stringent
Edina blames SLP for problems. Hopkins "strong silent type", Minnetonka allows well sampling, SLP shares data on request.
Community interest - activity onsite = interest but ∅ worry.
Incidents? - nothing noteworthy
Citizen input? - questions related to H_2O quality in 12/yr.
Re: ICs - City interested also in cautionary notice/ordinance re: geothermal. Nothing in place, but MDH can allow flexibility for SLP to develop one

St. Louis Park
MINNESOTA
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www.stlouispark.org

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Building
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www aecom com

Memo: MPCA

Date: February 7, 2011

RE: Conference call 12/16/10; Reilly Tar 5 year review

Attendees:

Michelle Kerr, USEPA

Nile Fellows, MPCA

John Jones, Vertellus

Tom Mesevage, Vertellus

Vertellus was appreciative for the opportunity to comment on the 5 year –review process.

A part of the discussion centered on the report update on containment and vertical migration that the city of St. Louis Park is working on. It was indicated that the SCADA system in Edina was not working and that this is delaying the completion of the city modeling.

Vertellus indicated that they thought the pump-out system was controlling the gradient and was working properly. They agreed that you need the right information for the model to give the best information possible.

Michelle discussed the plans for the vapor sampling. Vertellus wanted to be kept informed on the status of this sampling.

It was indicated that Institutional Controls would be needed for this site.

Vertellus asked about seeing a draft and for the opportunity to provide comments. It was indicted that the agencies would try to do this.

Appendix B – Site Photographs

Photo ID	Description: Approximate Center of the Site looking West	Direction
1	**Date:** 10/29/10	W

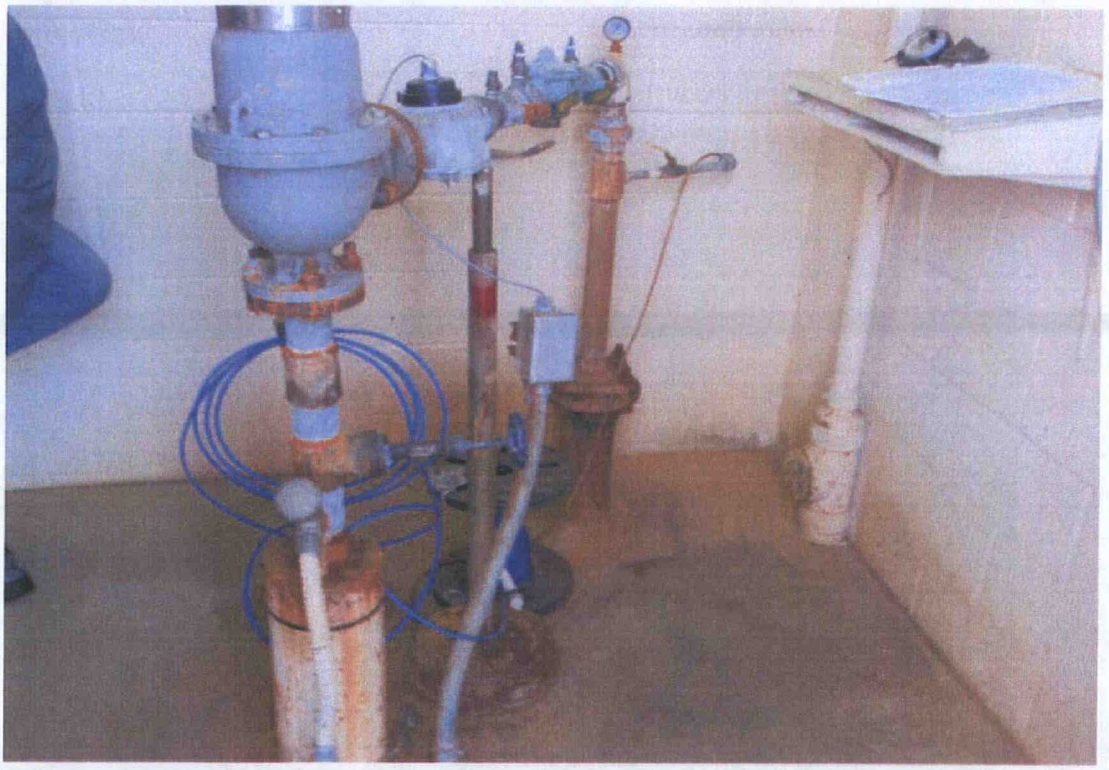

Photo ID	Description: Well W23	Direction

2	**Date:** 10/29/10	NA

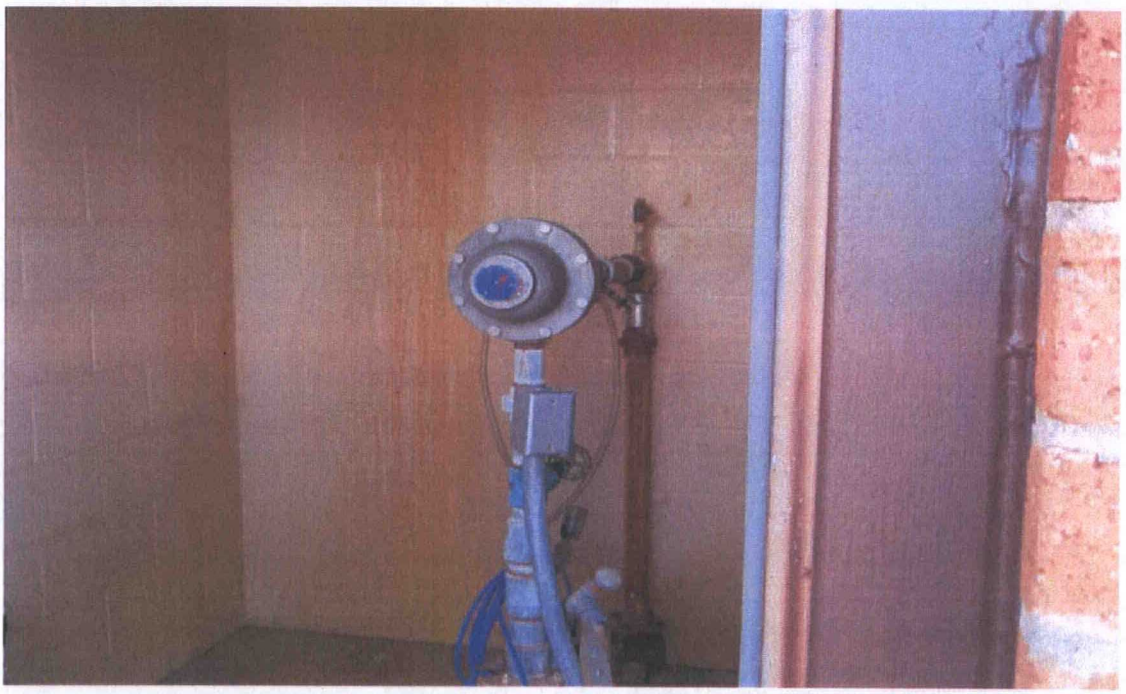

Photo ID	Description: W105	Direction
3	**Date:** 10/29/10	NA

Photo ID	Description: W15	Direction

4	**Date:** 10/29/10	

Photo ID	Description: South west corner of site looking north	Direction
5	**Date:** 10/29/10	N

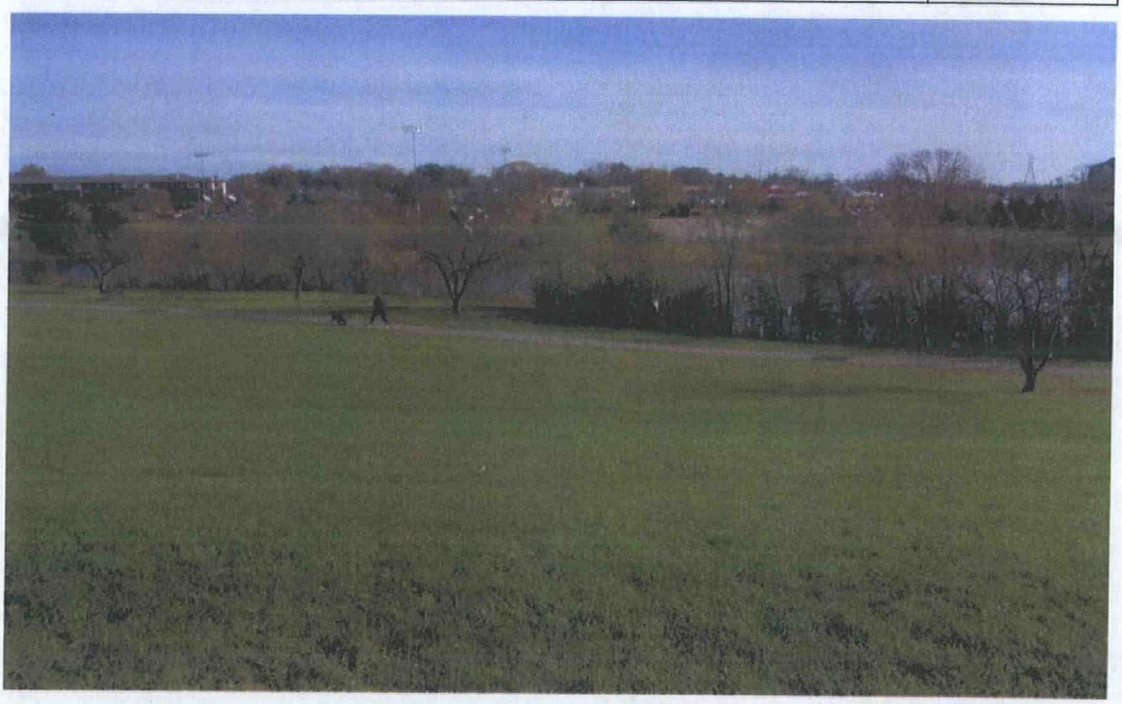

Photo ID	Description: West side of site looking East	Direction
6	**Date:** 10/29/10	E

Photo ID	Description: Housing development at north end of site	Direction
7	**Date:** 10/29/10	NW

Photo ID	Description: Housing development at north end of site	Direction
8	**Date:** 10/29/10	N

Photo ID	**Description:** Housing development at north end of site	Direction
9	**Date:** 10/29/10	NE

Photo ID	**Description:** North end of site looking at residential development near center of site	Direction
10	**Date:** 10/29/10	S

Photo ID	Description: Left: SLP 10 builiding, Center; SLP 15 SLP 11 building, Right SLP 3 and municipal reservoir	Direction
11	**Date:** 10/29/10	N

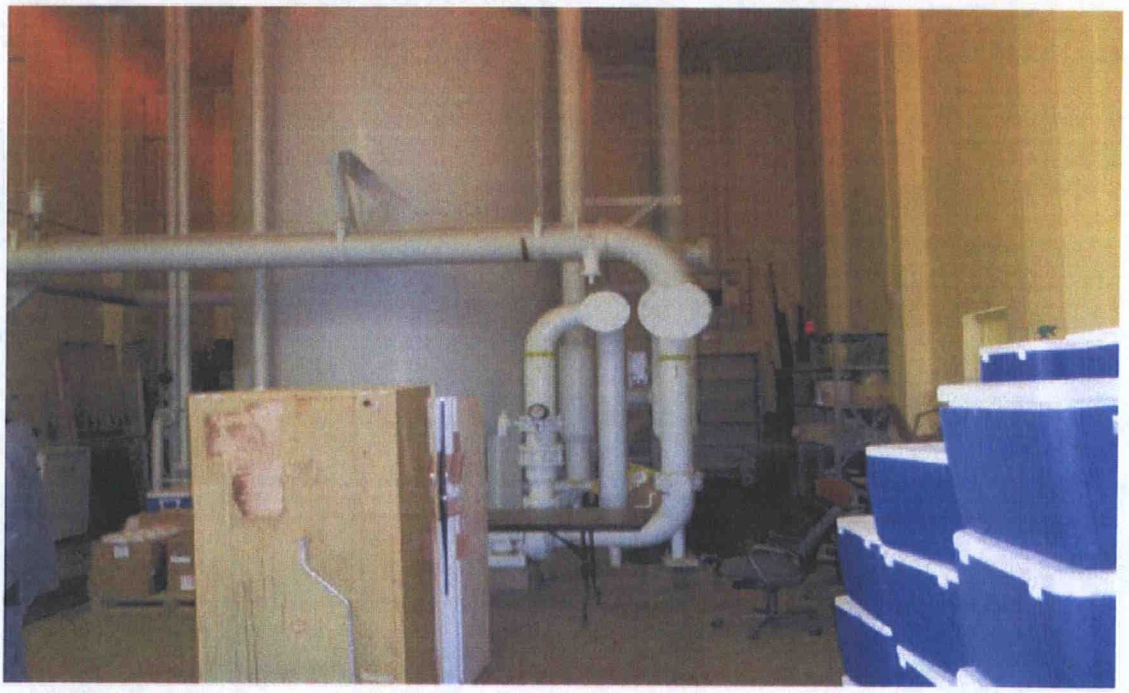

Photo ID	Description: GAC 1 Building	Direction
12	**Date:** 10/29/10	NA

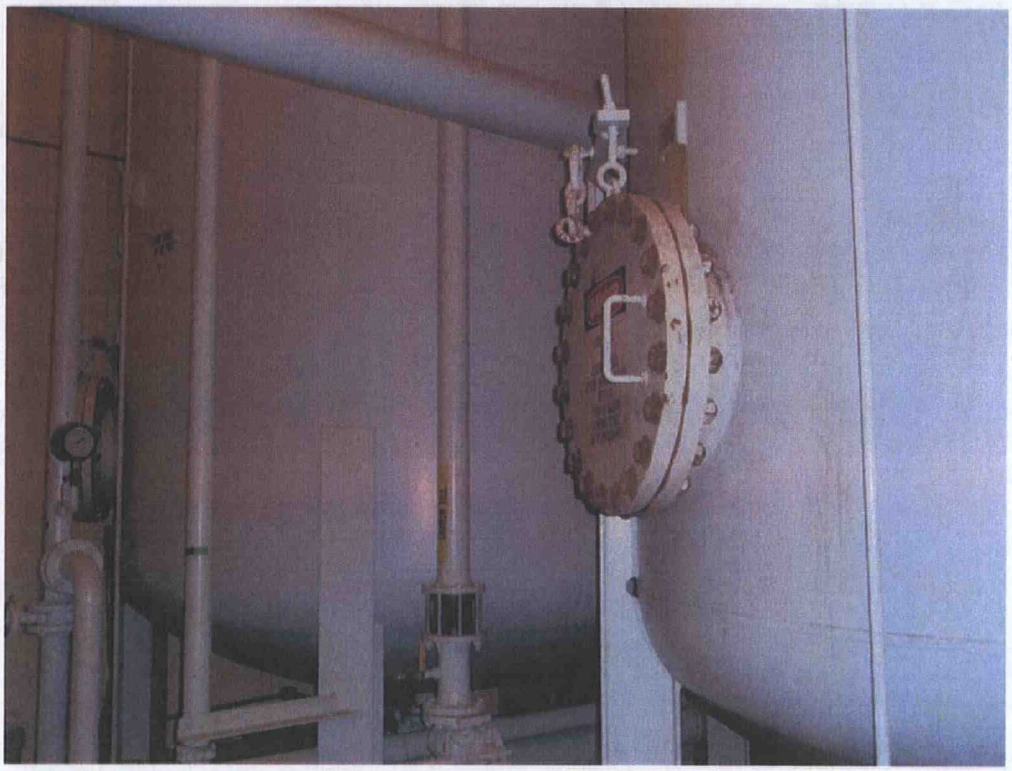

Photo ID	Description: GAC Tanks at GAC 1 building	Direction
13	**Date:** 10/29/10	NA

Photo ID	Description: Sand filters prior to treatment at GAC 1	Direction
14	**Date:** 10/29/10	NA

Photo ID	Description: SLP 10	Direction
15	Date: 10/29/10	NA

Photo ID	Description: W33R Note: grout at surface needs repair	Direction
16	Date: 10/29/10	NA

Photo ID	Description: GAC 2 treatment building	Direction
17	**Date:** 10/29/10	NA

Photo ID	Description: W421 and drums containing DNAPL	Direction
18	**Date:** 10/29/10	NA

Photo ID	Description: W420	Direction
19	Date: 10/29/10	NA

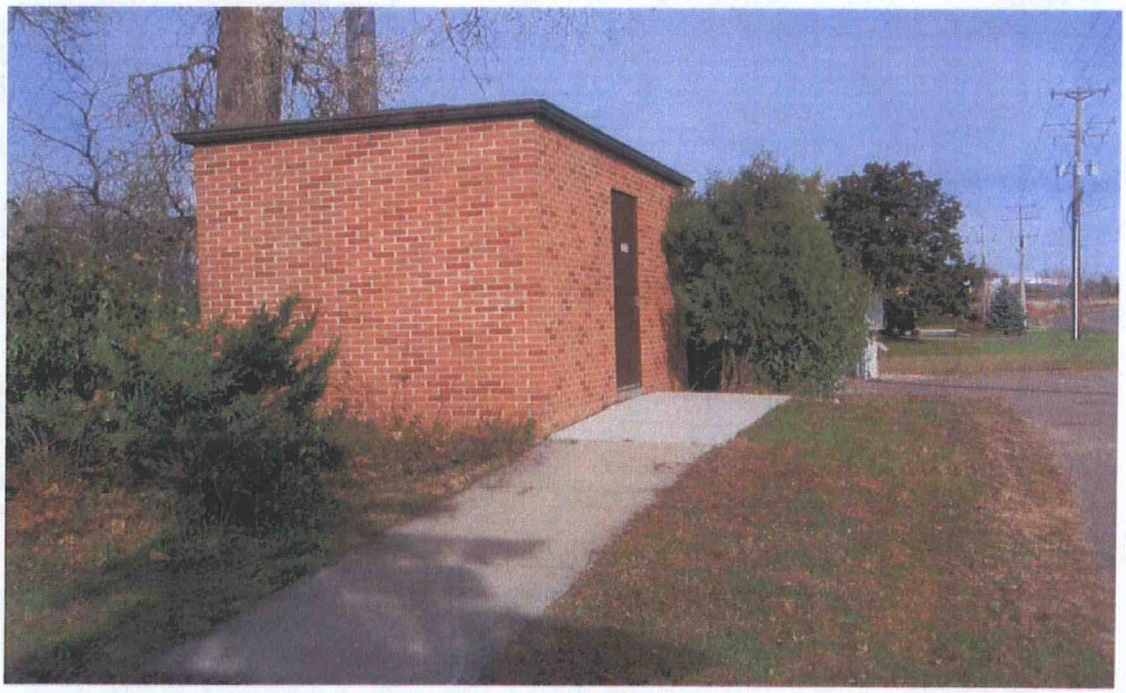

Photo ID	Description: W421/W420 building	Direction
20	Date: 10/29/10	E

Appendix C – Public Notice

SUN newspapers

AFFIDAVIT OF PUBLICATION

STATE OF MINNESOTA)
) ss.
COUNTY OF HENNEPIN)

Richard Hendrickson, being duly sworn on an oath, states or affirms that he is the Chief Financial Officer of the newspaper(s) known as

St. Louis Park Sun-Sailor

and has full knowledge of the facts stated below:

(A) The newspaper has complied with all of the requirements constituting qualification as a qualified newspaper as provided by Minn. Stat. §331A.02, §331A.07, and other applicable laws as amended.

(B) The printed public notice that is attached was published in said newspaper(s) once each week, for one successive week(s); it was first published on Thursday, the 4 day of November, 2010, and was thereafter printed and published on every Thursday to and including Thursday, the _____ day of _____, 2010, and printed below is a copy of the lower case alphabet from A to Z, both inclusive, which is hereby acknowledged as being the size and kind of type used in the composition and publication of the notice

abcdefghijklmnopqrstuvwxyz

BY: _____
CFO

Subscribed and sworn to or affirmed before me on this 4 day of November, 2010.

_____
Notary Public

JULIA I HELKENN
NOTARY PUBLIC - MINNESOTA
My Commission Expires Jan 31 2015

Public Notice

(Official Publication)

Announcement of a Five-Year Review
For the
Reilly Tar and Chemical Corp. Superfund Site

The U S Environmental Agency (EPA) and the Minnesota Pollution Control Agency (MPCA) are reviewing the effectiveness of the cleanup at the Reilly Tar and Chemical Corp Superfund site (Site) in St Louis Park Superfund law requires reviews of sites where the cleanup is in progress or completed but some hazardous material remains on site Five-Year Reviews ensure that cleanup remains effective and protects human health and the environment This is the Fourth Five Year Review for this Site

The 80 acre Site is located north of the intersection of Louisiana Avenue and Walker Street in St Louis Park, *Minnesota* The property was operated by Reilly Industries (Reilly), as The Republic Creosoting Company (Republic), as a coal tar distillation and wood preserving facility between 1917 and 1972. Waste disposal practices and site operations occurring during this time period have resulted in polynuclear aromatic hydrocarbon (PAH) impacts to soil and groundwater at and near the Site In 1972 the Site was purchased by the City of St Louis Park and is currently utilized for residential, commercial and recreational purposes

The current remedy for the site includes groundwater monitoring, pumping and treatment of PAH impacted groundwater from aquifers underlying the area of the Site Five-Year Reviews look at

- Site information
- How the cleanup was done
- How well the cleanup is working
- Any future actions needed

In the most recent Five-Year Review conducted in 2006 the MPCA and EPA concluded that remedial actions at the Site provided short term protection to human health and the environment and that long term protectiveness would be achieved once recommendations identified in the 2006 Five-Year Review have been completed

EPA and MPCA invite public questions and comments on the Site Comments will be accepted until December 9, 2010, and should be directed to the Site Project Leaders listed below

Mr Nile Fellows
Minnesota Pollution Control Agency
520 Lafayette Road North
St Paul, MN 55155

Or

Michelle Kerr
U S Environmental Protection Agency
77 W Jackson Blvd (SRF-6J)
Chicago, IL 60604
312 886 8961
Kerr michelle@epa gov

The Site's EPA fact sheet is located at www epa gov/region5/superfund/npl/minnesota/index html Site records are available for review Monday through Friday at the St Paul MPCA office, 520 Lafayette Road North, St Paul, MN 55155 from xx am to xx pm, and at EPA Region 5 Record Center, 77 W Jackson Blvd , 7th Floor, Chicago, IL 60604 from 8 am to 4 pm

(Nov 4, 2010) A3 Reilly 5 Yr Review

Appendix D – Documents Reviewed

Fourth Five-Year Review
Reilly Tar and Chemical Corp.
Documents Reviewed

2009 Sampling Plan, City of St. Louis Park, October 31, 2008

2010 Analytical Data through September 2010, Provided by St. Louis Park

2010 Sampling Plan, City of St. Louis Park, October 30, 2009

Annual Monitoring Report for 2006, City of St. Louis Park, March 15, 2007

Annual Monitoring Report for 2007, City of St. Louis Park, March 15, 2008

Annual Monitoring Report for 2008, City of St. Louis Park, March 15, 2009

Annual Monitoring Report for 2009, City of St. Louis Park, March 15, 2010

Annual Monitoring Report for 2010, City of St. Louis Park, March 15, 2010

Annual Performance Report, Granular Activated Carbon Treatment System for 2006, City of St. Louis Park, March 15, 2007

Annual Performance Report, Granular Activated Carbon Treatment System for 2007, City of St. Louis Park, March 15, 2008

Annual Performance Report, Granular Activated Carbon Treatment System for 2008, City of St. Louis Park, March 15, 2008

Annual Performance Report, Granular Activated Carbon Treatment System for 2009, City of St. Louis Park, March 15, 2009

Annual Performance Report, Granular Activated Carbon Treatment System for 2010, City of St. Louis Park, March 15, 2010

Annual Performance Report, Granular Activated Carbon treatment System 2010, City of St. Louis Park, March 15, 2011

Annual Progress Report for 2006, City of St. Louis Park, March 15, 2007

Annual Progress Report for 2007, City of St. Louis Park, March 15, 2008

Annual Progress Report for 2008, City of St. Louis Park, March 15, 2009

Annual Progress Report for 2009, City of St. Louis Park, March 15, 2010

Annual Progress Report for 2010, City of St. Louis Park, March 15, 2011

City of St. Louis Park Reilly Costs, email correspondence from St. Louis Park to MPCA, January 14, 2011

Consent Decree: United States of America and State of Minnesota vs. Reilly Tar and Chemical Corporation, Housing and Redevelopment Authority of St. Louis Park, Oak Park Village Associates, Rustic Oaks Condominium Inc. and Philips Investment Company, September 4, 1986

Hydrogeological Analysis for 3rd Five Year Review – Reilly Tar and Chemical Superfund Site, Technical Memorandum, STS Consultants LTD, August 2, 2006

Preliminary Close Out Report, United States Environmental Protection Agency, June 30, 1997

Record of Decision EPA Superfund – OU1, United States Environmental Protection Agency, June 6, 1984

Record of Decision EPA Superfund – OU2, United States Environmental Protection Agency, May 30, 1986

Record of Decision EPA Superfund – OU3, United States Environmental Protection Agency, September 30, 1992

Record of Decision EPA Superfund – OU4, United States Environmental Protection Agency, September 28, 1990

Record of Decision EPA Superfund – OU5, United States Environmental Protection Agency, June 30, 1995

Reilly Tar and Chemical Corp. Superfund Site, USEPA Fact Sheet, United States Environmental Protection Agency, Last Updated September 2010 http://www.epa.gov/region5superfund/npl/minnesota/MND980609804.htm,

Reilly Tar and Chemical Corp. Superfund Site, USEPA Region 5 Reuse Fact Sheets, United States Environmental Protection Agency, Last Updated August 2007 *http://www.epa.gov/region5superfund/redevelop/pdf/ReillyTar&ChemicalCorp.pdf*

Reilly Tar Site/Meadow Brook Groundwater Model Update, STS-AECOM, June 30, 2008

Remedy Evaluation and Optimization Reilly Tar and Chemical Corporation, S.S. Papadopulos & Associates, Inc. July 2010

Soil Vapor Survey – 2008, STS-AECOM, June 30, 2008

Third Five Year Review Report for Reilly Tar and Chemical Corporation Superfund Site, Minnesota Pollution Control Agency, September 2006

United States of America, et al. vs. Reilly Tar and Chemical Corporation, et al. File No. Civ 4-80-469; CD-RAP Section 7.4, Prairie du Chien – Jordan Aquifer Gradient Control Plan, AECOM on behalf of St. Louis Park, January 20, 2011

Appendix E – PAH Compounds to be Monitored (Appendix A of CD-RAP)

APPENDIX A

PAH COMPOUNDS TO BE MONITORED

A.1. List of Compounds To Be Monitored on a Routine Basis

A.1.1. Carcinogenic PAH

Whenever this RAP specifies Monitoring for Carcinogenic PAH, the analysis shall include the following PAH compounds and those Additional Carcinogenic PAH compounds added pursuant to Part D.1. of the Consent Decree:

benz(a)anthracene	(56-55-3)*
benzo(b)fluoranthene	(205-99-2)
benzo(j)fluoranthene	(205-82-3)
benzo(ghi)perylene	(191-24-2)
benzo(a)pyrene	(50-32-8)
chrysene	(218-01-9)
dibenz(a,h)anthracene	(53-70-3)
indeno(1,2,3-cd)pyrene	(193-39-5)
quinoline	(91-22-5)

A.1.2. Other PAH

Whenever this RAP specifies Monitoring for Other PAH, the analysis shall include the following PAH compounds:

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* Chemical Abstracts Service registry number.

acenaphthene	(83-32-9)
acenaphthylene	(208-96-8)
acridine	(260-94-6)
anthracene	(120-12-7)
benzo(k)fluoranthene	(207-08-9)
2,3-benzofuran	(271-89-6)
benzo(e)pyrene	(192-97-2)
benzo(b)thiophene	(95-15-8)
biphenyl	(92-15-8)
carbazole	(86-74-8)
dibenzofuran	(132-64-9)
dibenzothiophene	(132-65-0)
2,3-dihydroindene	(496-11-7)
fluoranthene	(206-44-0)
fluorene	(86-73-7)
indene	(95-13-6)
indole	(120-72-9)
1-methylnaphthalene	(90-12-0)
2-methylnaphthalene	(91-57-6)
naphthalene	(91-20-3)
perylene	(198-55-0)
phenanthrene	(85-01-08)
pyrene	(129-00-0)

A.2. Extended List of Carcinogenic PAH

The following PAH are suspected human carcinogens, but have not

been detected routinely to date in samples of drinking water supply aquifers in the St. Louis Park area. The following PAH, therefore, shall be included in the calculation of Carcinogenic PAH if they are detected in any special analysis required by this RAP, but shall not be analyzed under routine Monitoring for PAH required by this RAP:

benzo(c)phenanthrene	(195-19-7)
dibenz(a,c)anthracene	(215-58-7)
dibenzo(a,e)pyrene	(192-65-4)
dibenzo(a,h)pyrene	(189-64-0)
dibenzo(a,i)pyrene	(189-55-9)
7,12-dimethylbenz (a)anthracene	(57-97-6)
3-methylcholanthrene	(56-49-5)

A.3. Non-Detected Values

Whenever the PAH compounds listed in this Appendix are analyzed for the purposes of determining compliance with any of the Drinking Water Criteria, Advisory Levels, or cessation criteria defined by this RAP, non-detected values shall not be counted in any way when calculating the sum of Carcinogenic PAH, Other PAH or Total PAH concentrations.