414 Nicollet Mall
Minneapolis, Minnesota 55401

June 18, 2010

—VIA ELECTRONIC FILING—

Burl W. Haar
Executive Secretary
Minnesota Public Utilities Commission
121 7th Place East, Suite 350
St. Paul, MN 55101

RE: SITE PERMIT COMPLIANCE FILING
ASSESSMENT OF THE TRITIUM MONITORING PROGRAM AND COMPREHENSIVE SURFACE INVESTIGATION OF WELLS FOR THE EXTENDED POWER UPRATE - PRAIRIE ISLAND NUCLEAR GENERATING PLANT - DOCKET NO. E002/GS-08-690

Dear Dr. Haar:

Northern States Power Company, a Minnesota corporation ("Xcel Energy" or the "Company") submits this filing in compliance with the Minnesota Public Utilities Commission (the "Commission") December 18, 2009 *ORDER APPROVING THE SITE PERMIT ISSUED BY THE COMMISSION IN DOCKET NO. E002/GS-08-690*.

In this filing, we provide our assessment of the tritium monitoring program, including background on the evolution of the program as well as a discussion of the current program - including historical data and graphs. The filing also provides a comparison of Prairie Island's Special Tritium Monitoring Program to the Nuclear Energy Institute's Groundwater Protection Initiative Guidelines, and discusses recent modifications to the program. The filing also addresses recommendations for future modifications to the program.

Copies of this filing have been served on the attached service list. If you have any questions or would like to discuss this filing in greater detail, please call me at: 612-330-5641 or brian.r.zelenak@xcelenergy.com.

Sincerely,

/s/

Brian R. Zelenak
Manager, Regulatory Administration

Attachment
cc: Service List

STATE OF MINNESOTA
BEFORE THE MINNESOTA PUBLIC UTILITIES COMMISSION

David Boyd	Chair
J. Dennis O'Brien	Commissioner
Thomas Pugh	Commissioner
Phyllis Reha	Commissioner
Betsy Wergin	Commissioner

In the Matter of the Application of Northern States Power Company, a Minnesota Corporation, for an LEPGP Site Permit for the Prairie Island Nuclear Generating Plant Extended Power Uprate

Docket No. E-002/GS-08-690

XCEL ENERGY'S COMPLIANCE FILING: ASSESSMENT OF THE TRITIUM MONITORING PROGRAM AND COMPREHENSIVE SURFACE INVESTIGATION OF WELLS AT THE PRAIRIE ISLAND NUCLEAR GENERATING PLANT

INTRODUCTION

Northern States Power Company, a Minnesota corporation ("Xcel Energy" or the "Company") submits to the Minnesota Public Utilities Commission (the "Commission") this compliance filing in the above-referenced matter. This filing is being made pursuant to the December 18, 2009 Order and Site Permit issued by the Minnesota Public Utilities Commission ("Commission") in Docket No. E002/GS-08-690.

Paragraph 5.B.d of the above referenced Order approves the Large Energy Power Generating Plant Site Permit for the proposed extended power uprate of the Prairie Island Nuclear Generating Plant ("PINGP") on the condition the Company conduct a comprehensive surface investigation in and around wells P-10, MW-7 and MW-8, and consider the installation of other monitoring wells in and around the area of wells MW-7 and MW-8. Paragraph IV.H of the Site Permit expands on condition specified in Paragraph 5.B.d of the Order. Paragraph IV.H directs Xcel Energy to file within 6 months of the date of the Order (June 18, 2010) an

assessment of the existing tritium monitoring program at the PINGP. The paragraph indicates the assessment shall include, at a minimum:

1) a description of the current PINGP Tritium Monitoring Program and historic data;
2) a comparison relative to the NEI guidelines;
3) the PINGP's involvement and participation in industry initiatives regarding tritium monitoring;
4) a discussion of the discharge of sump water to the land-locked area; and
5) proposed modifications to the existing program.

Paragraph IV.H goes on to state that the assessment is to address issues on monitoring technology, the number of wells to be monitored, the location of the wells, the frequency of the sampling of the wells, field and laboratory methodologies, detection limits, and that the assessment should also address opportunities to increase/improve the availability of public information and public relations regarding the tritium testing program and results. Lastly, the paragraph states that the Company shall involve the Minnesota Department of Health ("MDH") in developing its plan and shall provide MDH a copy of its compliance filing to the Commission.

This filing is organized as follows:

Section 1 – Description of the Current Tritium Monitoring Program and Historical Data
Section 2 – A Comparison of Prairie Island's Tritium Monitoring Program to the NEI Groundwater Protection Initiative Guidelines (including a discussion of PINGP's involvement and participation in industry initiatives)
Section 3 – Discharge of Sump Water to the Land-Locked Area
Section 4 – Proposed Modifications to the Tritium Monitoring Program

Section 1 - Description of Current Tritium Monitoring Program and Historic Data

Since the early 1970's, Xcel Energy has been actively monitoring and sampling for tritium as required by the NRC guidelines. The tritium monitoring results are reported to the Nuclear Regulatory Commission ("NRC") in our annual Radiological Environmental Monitoring Program ("REMP") report. The REMP

program monitors the levels of radioactivity in the air, terrestrial and aquatic environments in order to assess the impact of the plant on its surrounding communities. Copies of all REMP reports since 1973 were provided in Response to Information Request No. 6 in Docket No. E002/CN-08-509.

In addition to the REMP monitoring program at Prairie Island, which includes aquatic monitoring for tritium, in 1989 a special tritium monitoring program was established following the detection of tritium in a residential well south of the plant. Our special/current tritium monitoring program at Prairie Island, as well as the programs at other nuclear reactors in the U.S., has continued to develop and evolve over time. Changes have included strategically locating new wells to monitor the progression of ground water, increasing the sampling frequency of select existing wells and utilizing different laboratories with enhanced tritium detection capabilities. The most recent changes to the current tritium monitoring program were the addition of additional on-site sampling points as a result of our implementation of the Nuclear Energy Institute's (NEI") Groundwater Protection Initiative ("GPI") and the increased sampling frequency of 7 on-site wells as a result of concerns expressed in the above mentioned Commission docket and the GPI.

In addition to the tritium monitoring conducted by the PINGP for the Annual REMP report and our special tritium monitoring report, which is included as an Appendix to the REMP report, both the State of Minnesota and the State of Wisconsin maintain radiation monitoring programs that include monitoring for tritium near the plant. Both of these State programs are further discussed later in this report.

Current Special Tritium Monitoring Program

A. Sampling Methodology

The methodology employed in the special tritium monitoring program is to take grab samples at various locations, e.g. wells, rain water run-off, snow, and to send the samples to off-site independent lab for analysis. The results of the analyses are provided to Xcel Energy by the independent labs and the Company incorporates those results in the REMP report. Figure 1 of Appendix A identifies the on-site well locations.

B. Location of Sampling Points

The Special Tritium Monitoring Program at Prairie Island has 53 sampling points for tritium including on-site ground water wells, off-site ground water wells, surface water and storage tank sampling points. The Company currently monitors 24 on-site wells (Table 1), 13 off-site wells (Table 2) and 11 surface water and 5 storage tank sample points (Table 3) for tritium levels. Figures 1 through 4 of Appendix A indicate the current on and off-site well monitoring locations.

C. Frequency of Sampling

The frequency of sampling the various tritium monitoring sample point locations varies by well: it can be monthly, quarterly[1], seasonally, or annually. Tables 1 through 3 identify the current frequency of sampling at each well. Generally given the slow speed of groundwater flow beneath the surface of the Prairie Island site (50 feet per year) an annual frequency is adequate to detect the progression of elevated levels of tritium if a leak or a spill occurs. The frequency of sampling at a particular well can be modified based on a number of factors including, the level of tritium detected, the site hydrology (which direction ground water is flowing) and the potential for elevated levels to be detected.

D. Lower Limit of Detection

The on-site laboratory at the PINGP has the ability to detect tritium levels as low as approximately 1,000 pCi/L. We also utilize two independent off-site test facilities with differing lower levels of detection. The Environmental, Inc. lab in Illinois can detect tritium levels as low as approximately 180 pCi/L and the University of Waterloo Laboratory in Canada can detect tritium levels as low as approximately 19 pCi/L. Per the requirements of our Off-Site Dose Calculation Manual, ("OCDM") the Environmental Lab is utilized for the testing associated with the REMP and we use the Waterloo lab with its lower level of detection to analyze the samples reported in our Special Tritium Monitoring Program.

[1] Quarterly samples equate to 3 times per year. The "winter" season was dropped due to weather and ice conditions.

Table 1: On-Site Wells
Special Tritium Monitoring Program

SAMPLE POINT CODE	LOCATION	FREQUENCY OF SAMPLING	LOWER LIMIT OF DETECTION
P-10	See Figure 1	Monthly	19 pCi/L
MW-7	See Figure 1	Monthly	19 pCi/L
MW-8	See Figure 1	Monthly	19 pCi/L
P-9*	Plant well # 2	Quarterly	180 pCi/L and 19 pCi/L
P-5	See Figure 1	Quarterly**	19 pCi/L
P-11	See Figure 1	Annually	19 pCi/L
P-2	See Figure 1	Quarterly**	19 pCi/L
P-3	See Figure 1	Quarterly**	19 pCi/L
P-6	See Figure 1	Quarterly**	19 pCi/L
P-7	See Figure 1	Annually	19 pCi/L
PZ-1	See Figure 1	Annually	19 pCi/L
PZ-2	See Figure 1	Annually	19 pCi/L
PZ-4	See Figure 1	Annually	19 pCi/L
PZ-5	See Figure 1	Annually	19 pCi/L
PZ-7	See Figure 1	Annually	19 pCi/L
PZ-8	See Figure 1	Quarterly**	19 pCi/L
MW-4	See Figure 1	Quarterly**	19 pCi/L
MW-5	See Figure 1	Quarterly**	19 pCi/L
MW-6	See Figure 1	Annually	19 pCi/L
P-26	Prairie Island Training Center well	Annually	19 pCi/L
P-30	Environmental lab well	Annually	19 pCi/L
SW-3	Condensate Transfer pump well	Annually	19 pCi/L
SW-4	New Administration Building well	Annually	19 pCi/L
SW-5	Plant Screenhouse well	Annually	19 pCi/L

* Well P-9 is monitored as part of the REMP and the Special Tritium Monitoring Program. REMP program uses a lower level of detection of 180 pCi/L and the Special Tritium Monitoring Program has a lower level of detection of 19 pCi/L.
** Well monitoring frequency was recently changed from Annually to Quarterly.
Quarterly designation is 3 times per year (Spring, Summer & Fall)

Table 2: Off-Site Wells
Special Tritium Monitoring program

WELL CODE	LOCATION	FREQUENCY OF SAMPLING	LOWER LIMIT OF DETECTION
P-43*	Peterson Farm(Control)	Monthly	180 pCi/L and 19 pCi/L
SW-1	Hanson Farm (Control)	Monthly	19 pCi/L
P-24D*	Suter residence	Monthly	180 pCi/L and 19 pCi/L
P-8*	Prairie Island Indian Community Well	Quarterly	180 pCi/L and 19 pCi/L
REMP P-6	Lock & Dam #3 well	Quarterly	180 pCi/L
REMP P-11	RW Drinking Water well	Quarterly	180 pCi/L
PIIC-02	2077 Other Day Road	Annually	19 pCi/L
PIIC-20	2158 Holmquist Rd	Annually	19 pCi/L
PIIC-22	1773 Buffalo Slough Rd	Annually	19 pCi/L
PIIC-23	2.7 miles NW of plant	Annually	19 pCi/L
PIIC-26	1771 Buffalo Slough Rd	Annually	19 pCi/L
PIIC-28	1960 Larson Lane	Annually	19 pCi/L
SW-2‡	Shift Technical Advisor House	Annually	19 pCi/L

* Wells P-43, P-24D, and P-8 are monitored as part of the REMP and the Special Tritium Monitoring Program. REMP program uses a lower level of detection of 180 pCi/L and the Special Tritium Monitoring Program has a lower level of detection of 19 pCi/L.

Table 3: On-Site and Off-Site Surface Water & On-Site Storage Tanks
Special Tritium monitoring Program

SAMPLE POINT CODE	LOCATION	SAMPLING FREQUENCY	LOWER LIMIT OF DETECTION
ON-SITE SURFACE WATER			
REMP P-5	Mississippi River Upstream	Quarterly	180 pCi/L
REMP P-6	Mississippi River Downstream	Quarterly	180 pCi/L
S-6	Storm Water Runoff	Seasonal	19 pCi/L
S-7	Parking Lot Runoff	Seasonal	19 pCi/L
S-8	P-10 area snow	Seasonal	19 pCi/L
S-9	MW-7/8 area snow	Seasonal	19 pCi/L
OFF-SITE SURFACE WATER			
S-1	Mississippi River upstream	Annually	19 pCi/L
S-2	Recirculation/Intake canal	Annually	19 pCi/L
S-3	Cooling water canal	Annually	19 pCi/L
S-4	Discharge Canal (end)	Annually	19 pCi/L
S-5	Discharge Canal (midway)	Annually	19 pCi/L
ON-SITE STORAGE TANKS			
Septic System	Storage tank	Monthly	19 pCi/L
11 CST	Storage tank	Seasonally	19 pCi/L
21 CST	Storage tank	Seasonally	19 pCi/L
22 CST	Storage tank	Seasonally	19 pCi/L
Unit 1 Demineralizer Header	Storage tank	Seasonally	19 pCi/L

Tritium Monitoring History of Prairie Island

A. Prairie Island Plant Monitoring

Since approximately 1973, Xcel Energy has been actively monitoring and sampling for radiological releases, including tritium, as required by the NRC guidelines. In addition, Xcel Energy collected three years of data prior to the start up of Prairie Island in order to establish a baseline of already existing levels of radionuclides. Background tritium levels prior to the plant being built (from 1970 to 1973) decreased from an annual average of 1,020 pCi/L to 490 pCi/L. Background tritium levels are primarily due to atmospheric fallout from weapons testing. From the period from 1973 to 1988 tritium levels remained at normal background levels.

In 1989 elevated tritium levels were detected in a nearby residential ("Suter") well south of the plant. In response, a special tritium monitoring program was implemented and Xcel Energy began collecting special well and surface water samples in December 1989. The purpose of the sampling was to assess the impact of any tritium possibly leaching into the environment and ground water from the Plant – presumably the discharge canal - which is south of the plant between the plant and the Suter well. See Figures 5 and 6 of Appendix A for the 1989 to present on-site and off-site tritium sampling results from the special tritium monitoring program.

In 1991, we modified how liquid waste was discharged from the plant so that liquid waste would be released closer to the end of the discharge canal and into the Mississippi River after it passed through the sluice gates. This change prevented any contaminated water from lingering for prolonged periods of time in the discharge canal and leaching into the ground water. After this modification, the Suter well experienced declining tritium levels which are now consistent with background levels. Since the special sampling began in 1989, annual average tritium levels have shown a downward trend.

In conjunction with the added liquid discharge pipe, we drilled 3 additional monitoring wells in 1991; the locations include wells in the vicinity of the reactor building and the discharge canal. Tritium sampling of well P-10 resulted in higher than expected levels of tritium (1360 pCi/L), but significantly less than Environmental Protection Agency ("EPA") drinking water standards (20,000 pCi/L). Although no leaks were discovered in the existing piping, the Company nonetheless replaced the discharge piping from the Auxiliary Building in 1992 with a double walled pipe that is constantly monitored for leakage.

In 1994, the Prairie Island Indian Community ("Community") expressed concern over tritium contamination and at their request; the US Geological Survey ("USGS") conducted a review of the water resources near the Community's land. The USGS concluded that "tritium in precipitation, both natural and from nuclear-devised testing most reasonably explains the tritium in most of the samples." The report also stated that the tritium concentrations in monitoring wells P-4, P-7 and P-10 could not be explained by natural phenomena and that the tritium may have been released from the Plant.

REMP Monitoring Results Summary

As part of the REMP, river water is collected weekly at two locations; one upstream of the plant (P-5) and one downstream at Lock and Dam #3 (P-6). Monthly composites are analyzed for gamma-emitting isotopes and quarterly composites are analyzed for tritium. In 2008 and 2009, the gamma-emitting isotopes were below detection limits for all samples and no measurable tritium level was detected above the concentration level of 178 pCi/L in 2008 and 159 pCi/L in 2009.

Drinking water is also collected from the City of Red Wing's drinking water well weekly and monthly composites are analyzed for gross beta, iodine-131, and gamma-emitting isotopes and quarterly composites are analyzed for tritium. In addition, water is collected at a control well (P-43) and three indicator wells (P-8, PIIC Community Center), ((P-9), Plant well No. 2), and ((P-24), Suter well). In 2008 and 2009, the gamma-emitting isotopes were below detection limits for all samples and no measurable tritium level was detected above the concentration level of 181 pCi/L in 2008 and 161 pCi/L in 2009.

Special Tritium Monitoring Results Summary

Overall, and as depicted in Figures 7, 8 and 9 in Appendix A, the results of the current wells in the special tritium monitoring program have shown that annual tritium level averages have steadily decreased since the special sampling began in 1989; including all off- and on-site samples, which have remained within range of expected background tritium levels - except for samples drawn from wells P-10 and MW-8.

While there are short-lived increases in tritium concentrations in certain areas and at certain times (e.g. levels in well P-10, have shown a range of fluctuation from 0.2% to 10.3% of the EPA drinking water limit), these brief increases are well within EPA standards. The Final Environmental Impact Statement estimates an annual whole body dose of approximately 0.04 mrem/yr from tritium, and concludes that health risks from this dose are not anticipated to be significant. In addition, the results of ground water monitoring by Xcel Energy, the Minnesota Department of Health, and the Wisconsin Department of Health Services indicate that tritium concentrations in ground water and well water near the Plant are within EPA standards and average less than 1 percent (200 pCi/L) of the standard.

In addition to ground water monitoring contained in the REMP and our special tritium monitoring program that is performed as part of the REMP, in 2005, Xcel Energy began a voluntary implementation of NEI's Ground Water Protection Initiative.[2]

Maintenance Dredging Project

In addition to the historic tritium monitoring efforts described above, in November 2009, Xcel Energy completed an Environmental Assessment Worksheet ("EAW") in support of the Prairie Island Maintenance Dredging Project. During the public review period, comments were received pertaining to radiological analysis of sediment within and upstream of the project.

As required by our National Pollutant Discharge Elimination System ("NPDES') Permit, we had analyzed the sediment in the planned dredge area. However, we had not performed a radiological analysis for tritium as part of that analysis. To address concerns raised during the EAW comment period, we subsequently developed a plan to conduct additional sediment sampling from the intake approach canal and background locations for radiological analysis (tritium) in the dredge area. We provided a summary of the results in a letter to the MDH on March 24, 2010.

Six sediment sampling locations were identified: 2 from Prairie Island plant Approach Canal; 2 from lower end of Sturgeon Lake; 1 near Treasure Island Marina; and 1 from Main River channel near Diamond Bluff. Surface water samples were also collected from the approach canal, the lower end of Sturgeon Lake near Treasure Island Marina, and from the main river channel near Diamond Bluff. See Figures 10 and 11 of Appendix A. We used the Sturgeon Lake and Diamond Bluff samples as control locations.

Sediment (grab) samples were collected from selected locations by Xcel Energy Environmental Services on November 19, 2009. Approximately one gallon of sediment was collected for sample processing at the Prairie Island plant. The Plant conducted a gamma isotopic on the sample and 50 mL of water was decanted from the sample. The 50 mL sample was sent the University of Waterloo for independent testing of tritium.[3]

[2] Prairie Island's implementation of the NEI – GPI is discussed more fully in Section 2 below.
[3] The Waterloo Lab test level is to 19 pCi/L.

Sediment samples and surface water radioactivity results are presented below in Table 4.

Table 4: Dredging Analysis

Sample	Isotope	Activity (uCi/sample)	Activity (uCi/g)	H-3 (Tritium) Activity (pCi/L)
SLUDGE*				
PI Marina	Be-7 Cs-137 K-40 H-3	9.04E-4 1.69E-4 1.69E-2	4.80E-8	48
Approach Canal #1	K-40 H-3	3.22E-2		91
Approach Canal #2	Be-7 K-40 H-3	1.23E-3 2.39E-2		50
Sturgeon Lake 1	K-40 H-3	2.07E-2		33
Sturgeon Lake 2	Cs-137 K-40 H-3	1.06E-4 2.42E-2	2.52E-8	43
Diamond Bluff	Be-7 K-40 H-3	8.44E-4 3.59E-2		22
SURFACE WATER*				
PI Marina	H-3			20
Approach Canal	H-3			28
Sturgeon Lake	H-3			42
Diamond Bluff	H-3			27

* Water samples were counted in a liter bottle for 2000 seconds for gamma emitters.
** Sludge samples were counted in a 3 liter marinelli for 2000 seconds for gamma emitters.

As shown in Table 4, the isotopes found vary among sample locations. Be-7 and K-40 are both naturally occurring, and the levels found were consistent with background levels. Where found, the levels of Cs-137 were consistent with expected background levels. Tritium levels in the dredging sediment and surface water samples were all consistent with background levels.

B. Department of Health Monitoring Programs

In addition to Xcel Energy's tritium monitoring program, both the Minnesota

Department of Health ("MDH") and Wisconsin Department of Health Services ("WDH") conduct their own independent radiation monitoring and analyses and publish the results. The lower limits of detection for tritium utilized by the MDH and WDH are in the 180 to 200 pCi/L range.

The MDH has maintained a radioactivity monitoring program since 1953, when measurements of radionuclides were initiated in response to atmospheric testing of nuclear weapons. The program was expanded to include monitoring around nuclear generating facilities. The Prairie Island nuclear generating plant was added in 1973. The results for Prairie Island can be found at MDH Radiation Monitoring Report. The 2009 results are summarized below.

Wisconsin Public Health Statues 254.41 mandates the Department of Health Services to conduct environmental radiation monitoring around the nuclear power facilities that impact Wisconsin. The results of Wisconsin's environmental monitoring program for Prairie Island can be found at WI DHS Radiation Monitoring when available. However, the 2009 results are not yet available.

Summary of MDH Environmental Monitoring Report 2009

The MDH's Environmental Monitoring Program samples river water quarterly from the Mississippi River downstream from the Prairie Island nuclear generating plant.

Tritium results from surface water samples from Table 7 of the MDH report are presented below.

Table 5: Surface Water
(Table 7 of MDH's 2009 Environmental Monitoring Report)

Date Collected	Gross Alpha[1]	Gross Beta	Tritium[1]	Sr-89[1]	Sr-90[1]	K-40[1]
1/6	1.0	3.6	226	2.0	2.0	51.7
4/14	1.0	3.4	238	2.0	2.0	46.1
7/7	1.0	2.5	238	2.0	2.0	48.7
10/13	1.0	2.7	200	2.0	2.0	70.4

[1]All data (except those values underlined) represent the gamma counting system lowest detection concentrations. Samples measured had values below the detectable concentrations.

Table 5 above shows that all of the quarterly tests from 2009 indicated tritium levels lower than the lowest level of detection. This results in all surface water

sample for 2009 being within the EPA and MDH standards and guidelines.[4]

In addition to the surface water sampling, the MDH tests nearby well water as part of the monitoring program. Table 6 below shows that all of the quarterly tests from 2009 indicated tritium levels lower than the lowest level of detection.

Table 6: Well Water
(Table 12 of MDH's 2009 Environmental Monitoring Report)

Date Collected	Gross Alpha[1]	Gross Beta[1]	Tritium[1]	K-40[1]
2/10	1.0	5.7	221	43.9
5/5	1.0	5.0	238	70.7
8/10	1.0	16.4	238	50.9
11/3	1.1	4.7	200	65.2

[1]All data (except those values underlined) represent the gamma counting system lowest detection concentrations. Samples measured had values below the detectable concentrations.

All well water sample results for 2009 were within the EPA and MDH standards and guidelines.[5]

Section 2 - A Comparison of Prairie Island's Tritium Monitoring to the NEI Groundwater Protection Initiative Guidelines (including a discussion of PINGP's involvement and participation in industry initiatives)

In response to elevated levels of tritium in wells near some U.S. nuclear power plants the Nuclear Energy Institute announced a Groundwater Protection Initiative in 2005. Every U.S. nuclear operator voluntarily committed to the Nuclear Regulatory Commission to implement the NEI GPI. Xcel Energy has been actively engaged in the implementation of the NEI's GPI since 2006.

In 2006, NEI implemented the "Interim Industry Ground Water Protection Initiative" and later defined and developed the current Ground Water Protection Initiative in order to enhance programs and build stakeholder confidence and trust. Under the interim initiative, each site was to develop a site-specific/company ground water protection program and implement voluntary communication programs by July 31, 2006. In addition to the assessment and collection of data on ground water monitoring programs for the NRC, the Company voluntarily established stricter reporting guidelines for any unplanned radiological releases.

[4] *2009 Environmental Monitoring Report*, Minnesota Department of Health, March 23, 2010, page 4.
[5] *2009 Environmental Monitoring Report*, Minnesota Department of Health, March 23, 2010, page 6.

In August 2007, NEI released its Industry Ground Water Protection Initiative – Final Guidance Document, NEI 07-07.[6] NEI Guidance Document 07-07 identifies actions to improve utilities' management and response to instances where the inadvertent release of radioactive substances may result in low but detectable levels of plant-related materials in subsurface soils and water. It also identifies the actions necessary for a utility to implement a timely and effective ground water protection program. Finally, the Guidance Document specifies objectives to accomplish each action and the acceptance criteria to demonstrate that the objectives have been met.

By August 2008, the GPI was unanimously approved by a formal vote of the NEI member utility chief nuclear officers. The GPI provided three areas of focus: 1) Ground Water Protection Program; 2) Communication; and, 3) Program Oversight. For each of the three areas, actions, objectives and acceptance criteria were defined as shown in Part A below. Part B summarizes the actions the Company has taken to comply with the NEI's GPI and discusses the NRC's assessment of our compliance.

PART A: NUCLEAR ENERGY INSTITUTE GROUND WATER PROTECTION INITIATIVE GUIDELINES

AREA 1: GROUND WATER PROTECTION PROGRAM

ACTION 1 - Improve management of situations involving inadvertent radiological releases that get into ground water.

Each licensee shall develop a written Ground Water Protection Initiative program that describes their approach to assure timely detection and effective response to situations involving inadvertent radiological releases to ground water to prevent migration of licensed radioactive material off-site and to quantify impacts on decommissioning. The GPI program shall specify the frequency at which and/or conditions under which each program element is performed to ensure that the licensee's understanding of the site, the potential for leaks or spills to occur, or for equipment to degrade over time accurately reflect actual conditions.

The Electric Power Research Institute ("EPRI") is sponsoring development of a technical guideline for implementation of ground water protection programs at nuclear power plants to meet Action 1. The stated objectives of the EPRI

[6] The document is publicly available on the NRC's website at http://www.nrc.gov/.

"Guideline for Implementing a Groundwater Protection Program at Nuclear Power Plants" is to demonstrate a commitment to controlling licensed material, minimize potential unplanned, unmonitored releases to the environment from plant operations, and minimize long-term costs associated with potential ground water and subsurface contamination. Other technically sound, documented approaches that meet the baseline requirements and recommendations in the EPRI Guideline may also be used.

OBJECTIVE 1.1 SITE HYDROLOGY AND GEOLOGY

Ensure that the site characterization of geology and hydrology provides an understanding of predominant ground water gradients based upon current site conditions.

Acceptance Criteria:

a. Perform hydrogeologic and geologic studies to determine predominant ground water flow characteristics and gradients.

b. As appropriate, review existing hydrogeologic and geologic studies, historical environmental studies, and permit or license related reports.

c. Identify potential pathways for ground water migration from on-site locations to off-site locations through ground water.

d. Establish the frequency for periodic reviews of site hydrogeologic studies. As a minimum, reviews should be performed whenever any of the following occurs:

- Substantial on-site construction,
- Substantial disturbance of site property,
- Substantial changes in on-site or nearby off-site use of water, or
- Substantial changes in on-site or nearby off-site pumping rates of ground water.

e. As appropriate, update the site's Final Safety Analysis Report with changes to the characterization of hydrology and/or geology.

OBJECTIVE 1.2 SITE RISK ASSESSMENT

Identify site risks based on plant design and work practices:

1.2.1 Evaluate all Systems, Structures, or Components ("SSCs") that contain or could contain licensed material and for which there is a credible mechanism for the licensed material to reach ground water.

1.2.2 Evaluate work practices that involve licensed material and for which there is a credible mechanism for the licensed material to reach ground water.

Acceptance Criteria:

a. Identify each SSC and work practice that involves or could reasonably be expected to involve licensed material and for which there is a credible mechanism for the licensed material to reach ground water. Examples of SSCs of interest include: refueling water storage tanks, if outdoors; spent fuel pools; spent fuel pool leak detection systems; outdoor tanks; outdoor storage of contaminated equipment; buried piping; retention ponds or basins or reservoirs; lines carrying steam.

b. Identify existing leak detection methods for each SSC and work practice that involves or could involve licensed material and for which there is a credible potential for inadvertent releases to ground water. These may include ground water monitoring, operator rounds, engineering walkdowns or inspections, leak-detection systems, or periodic integrity testing.

c. Identify potential enhancements to leak detection systems or programs. These may include additional or increased frequency of rounds or walkdowns or inspections, or integrity testing.

d. Identify potential enhancements to prevent spills or leaks from reaching ground water. These may include resealing or paving surfaces or installing spill containment measures.

e. Identify the mechanism or site process for tracking corrective actions.

f. Establish long term programs to perform preventative maintenance or surveillance activities to minimize the potential for inadvertent releases of licensed materials due to equipment failure.

g. Establish the frequency for periodic reviews of SSCs and work practices.

OBJECTIVE 1.3 ON-SITE GROUNDWATER MONITORING

Establish an on-site ground water monitoring program to ensure timely detection of inadvertent radiological releases to ground water.

Acceptance Criteria

a. Using the hydrology and geology studies developed under Objective 1.1, consider placement of ground water monitoring wells downgradient from

the plant but within the boundary defined by the site license.

b. Consider, as appropriate, placing sentinel wells closer to SSCs that have the highest potential for inadvertent releases that could reach ground water or SSCs where leak detection capability is limited.

c. Establish sampling and analysis protocols, including analytical sensitivity requirements, for ground water and soil. Sampling for tritium in the vadose or unsaturated zone may not be practicable and may require additional evaluation. For split or duplicate samples, analytical sensitivity levels should be discussed with and agreed to by those external stakeholders responsible for the analyses to preclude future disputes.

d. Establish a formal, written program for long-term ground water monitoring. For those ground water monitoring locations that are included in the REMP, revise the site's ODCM/ODAM.[7]

e. Periodically review existing station or contract lab(s) analytical capabilities. An important consideration is the time needed to obtain results.

f. Establish a long-term program for preventative maintenance of ground water wells.

g. Establish the frequency for periodic review of the ground water monitoring program.

OBJECTIVE 1.4 REMEDIATION PROCESS

Establish a remediation protocol to prevent migration of licensed material off-site and to minimize decommissioning impacts.

Acceptance Criteria

a. Establish written procedures outlining the decision making process for remediation of leaks and spills or other instances of inadvertent releases. This process is site specific and shall consider migration pathways.

b. Evaluate the potential for detectable levels of licensed material resulting from planned releases of liquids and/or airborne materials.

c. Evaluate and document, as appropriate, decommissioning impacts resulting from remediation activities or the absence thereof.

[7] OCDM = Off-Site Dose Calculation Manual; OCAM = Off-Site Dose Assessment Manual.

OBJECTIVE 1.5 RECORD KEEPING

Ensure that records of leaks, spills, remediation efforts are retained and retrievable to meet the requirements of 10 CFR 50.75(g).

Acceptance Criteria

a. Establish a record keeping program to meet the requirements of 10 CFR 50.75(g). Note that these records are used to determine an area's classification for purposes of performing surveys (see NRC Regulatory Issue Summary 2002-02 Lessons Learned Related to Recently Submitted Decommissioning Plans and License Termination Plans).

AREA 2: COMMUNICATION

ACTION 2 - Improve communication with external stakeholders to enhance trust and confidence on the part of local communities, States, the NRC, and the public in the nuclear industry's commitment to a high standard of public radiation safety and protection of the environment.

OBJECTIVE 2.1 STAKEHOLDER BRIEFING

Each licensee should conduct initial and periodic briefings of their site specific GPI program with the designated State/Local officials.

Acceptance Criteria

a. The licensee should discuss:
   - The background or industry events that led to the GPI.
   - If there is additional information that the State/Local officials need to better understand the issue or place it in perspective for their constituents.
   - "How" the State/Local officials will use or distribute the information.

b. Licensees should consider including additional information or updates on ground water protection in periodic discussions with State/Local officials.

c. For licensees that are in States where multiple nuclear power plants are located and multiple owner companies, it is highly recommended that the licensees coordinate their efforts and communicate with each other. The initial briefing for the State/local officials and the contents of a voluntary communication should be consistent.

OBJECTIVE 2.2 VOLUNTARY COMMUNICATIONS

Make informal communication as soon as practicable to appropriate State/Local officials, with follow-up notification to the NRC, as appropriate, regarding significant on-site leaks/spills into ground water and on-site or off-site water sample results exceeding the criteria in the REMP as described in the ODCM/ODAM.

Acceptance Criteria:

This guidance provides a threshold for voluntary communication. Some States may require different communication thresholds; the licensee shall document any agreements with State/Local officials that differ from Industry guidance.

a. Communication to the designated State/Local officials shall be made before the end of the next business day if an inadvertent leak or spill to the environment has or can potentially get into the ground water and exceeds any of the following criteria:
   i. If a spill or leak exceeding 100 gallons from a source containing licensed material,
   ii. If the volume of a spill or leak cannot be quantified but is likely to exceed 100 gallons from a source containing licensed material, or
   iii. Any leak or spill, regardless of volume or activity, deemed by the licensee to warrant voluntary communication.

To determine whether a leak or spill would trigger voluntary communication, consider the clarification in the following three text boxes in addition to 2.2.a i to iii above:

LEAK OR SPILL: The "leak or spill" represents an inadvertent event or perturbation in a system or component's performance. This event threshold is intended to ensure that State/Local officials are made aware that there has been an event of interest at the site and to keep them apprised of the licensee's action to contain and, as needed, remediate the event. "Leak or spill" events that meet the criteria shall be communicated regardless of whether or not the on-site ground water is, or could be used as, a source of drinking water.

The quantity of liquid resulting from leaks or spills of solid materials or waste or steam leaks should be evaluated with respect to 2.2.a. i to iii, inclusive.

The licensee shall document any agreement with State/Local officials that differs

from this Industry guidance as part of their record. For example some states or local authorities have indicated that they do not wish leaks/spills to be included in the voluntary communication protocol, or that the voluntary communication should be completed in a shorter timeframe.

Appendix A of the GPI Guidelines provides a flowchart for the communication protocol as it applies to leaks or spills or groundwater sample results.

SOURCE CONTAINING LICENSED MATERIAL: A liquid, including steam, for which a statistically valid positive result is obtained when the sample is analyzed to the following a priori lower limits of detection (analytical sensitivity).

The analytical sensitivity for identifying a source containing licensed material is, at a minimum, the licensee's lower limits of detection that are required for radioactive liquid effluents for all isotopes.

POTENTIAL TO REACH GROUND WATER

Spills or leaks with the potential to reach ground water:

- Spill or leak directly onto native soil or fill,
- Spill or leak onto an artificial surface (i.e. concrete or asphalt) if the surface is cracked or the material is porous or unsealed,
- Spill or leak that is directed into unlined or non impervious ponds or retention basins (i.e. water hydrologically connected to ground water).

A spill or leak inside a building or containment unit is generally unlikely to reach ground water, particularly if the building or containment unit has a drain and sump system. However, the sump and drain system should be evaluated as part of the SSC risk assessment

.

A spill or leak to a semi-impermeable or impermeable surface that is recaptured or remediated per Objective 1.4 before the close of the next business day does not trigger the voluntary communication protocol.

b. Communication with the designated State/Local officials shall be made before the end of the next business day for a water sample result
   i. Of off-site ground water or surface water that exceeds any of the REMP reporting criteria for water as described in the ODCM/ODAM, or

ii. Of on-site surface water, that is hydrologically connected to ground water, or ground water that is or could be used as a source of drinking water that exceeds any of the REMP reporting criteria for water as described in the ODCM/ODAM

The licensee shall document the basis for concluding that the on-site ground water is not or would not be considered a source of drinking water. Examples of a defensible basis are documents from the regulatory agency with jurisdiction over ground water use.

Appendix A of the NEI GPI Guidelines also provides a flowchart for the communication protocol as it applies to groundwater sample results.

c. When communicating to the State/Local officials, be clear and precise in quantifying the actual release information as it applies to the appropriate regulatory criteria (i.e. put it in perspective). The following information should be provided as part of the informal communication:
   i. A statement that the communication is being made as part of the NEI Ground Water Protection Initiative,
   ii. The date and time of the spill, leak, or sample result(s),
   iii. Whether or not the spill has been contained or the leak has been stopped,
   iv. If known, the location of the leak or spill or water sample(s),
   v. The source of the leak or spill, if known,
   vi. A list of the contaminant(s) and the verified concentration(s),
   vii. Description of the action(s) already taken and a general description of future actions,
   viii. An estimate of the potential or bounding annual dose to a member of the public if available at this time, and
   ix. An estimated time/date to provide additional information or follow-up.

d. Voluntary communication to State and/or Local officials may also require NRC notification under 10 CFR 50.72(b)(2)(xi). Licensees should perform these notifications consistent with their existing program.

e. Contact NEI by email to GW_Notice@nei.org as part of a voluntary communication event as described in Objective 2.2.

OBJECTIVE 2.3 THIRTY-DAY REPORTS

Submit a written 30-day report to the NRC for any water sample result for on-site ground water that is or may be used as a source of drinking water that exceeds any of the criteria in the licensee's existing REMP as described in the ODCM/ODAM for 30-day reporting of off-site water sample results. Copies of the written 30-day reports for both on-site and off-site water samples shall also be provided to the appropriate State/Local officials.

Acceptance Criteria:

a. All ground water samples taken for the Industry Initiative shall be analyzed and compared to the standards and limits contained in the station's REMP as described in the ODCM/ODAM. Pre-2006 ODCM/ODAM requirements specify a written 30-day report to the NRC for REMP sample results that exceed any of the REMP reporting criteria. Under the Initiative, a written 30-day NRC report is also required for all on-site sample results that exceed any of the REMP reporting criteria and could potentially reach the ground water that is or could be used in the future as a source of drinking water. If the ground water is not currently used for drinking water but is potable, each station should consider the ground water as a potential source of drinking water (see objective 2.2 acceptance criterion b for documentation needed to establish a defensible basis for determining the beneficial use(s) of ground water).

The initial discovery of ground water contamination greater than the REMP reporting criterion is the event documented in a written 30-day report. It is not expected that a written 30-day report will be generated each time a subsequent sample(s) suspected to be from the same "plume" identifies concentrations greater than any of the REMP criteria as described in the ODCM/ODAM. The licensee should evaluate the need for additional reports or communications based on unexpected changes in conditions.

b. The 30-day special report should include:
   i. A statement that the report is being submitted in support of the GPI,
   ii. A list of the contaminant(s) and the verified concentration(s),
   iii. Description of the action(s) taken,
   iv. An estimate of the potential or bounding annual dose to a member of the public, and
   v. Corrective action(s), if necessary, that will be taken to reduce the

projected annual dose to a member of the public to less than the limits in 10 CFR 50 Appendix I.

c. All written 30-day NRC reports generated under item 2.3.a are to be concurrently forwarded to the designated State/Local officials.

OBJECTIVE 2.4 ANNUAL REPORTING

Document all on-site ground water sample results and a description of any significant on-site leaks/spills into ground water for each calendar year in the Annual Radiological Environmental Operating Report ("AREOR") for REMP or the Annual Radioactive Effluent Release Report ("ARERR") for the RETS[8] as contained in the appropriate reporting procedure, beginning with the report for calendar year 2006.

Acceptance Criteria:

a. The appropriate changes to the ODCM/ODAM or to the appropriate procedures were expected to be completed in a timeframe to support the 2007 report of 2006 performance for plants that were operating or decommissioning when the GPI was adopted. For new plants, appropriate procedures that require inclusion of significant on-site leaks/spills into ground water and all on-site ground water results shall be developed and implemented prior to initial receipt of nuclear fuel.

b. Reporting of on-site ground water sample results shall be as follows:
   i. Ground water sample results that are taken in support of the GPI but are not part of the REMP program (e.g. samples obtained during the investigatory phase of the Action Plan circa year 2006) are reported in the ARERR required by 10 CFR 50.36a (a)(2).
   ii. Once the long-term monitoring sample points have been established per Objective 1.3, acceptance criterion d, the results are reported in the AREOR for those sample points that are included in the REMP as described in the ODCM/ODAM. The sample results for those long-term monitoring sample points that are not included in REMP are reported in the ARERR.

c. In addition to 2.4.b, voluntary communications shall be included in an annual report as follows:
   i. A description of all spills or leaks that were communicated per Objective

[8] RETS = Radiological Environmental Technical Specifications.

2.2 acceptance criterion a shall be included in the ARERR.

ii. All on-site or off-site ground water sample results that exceeded the REMP reporting thresholds as described in the ODCM/ODAM that were communicated per Objective 2.2 acceptance criterion b shall be included in either the ARERR and/or in the AREOR.

AREA 3: PROGRAM OVERSIGHT

ACTION 3 - Perform program oversight to ensure effective implementation of the GPI program

OBJECTIVE 3.1 PERFORM A SELF-ASSESSMENT

Perform a self-assessment of the GPI program.

Acceptance Criteria:

a. An independent, knowledgeable individual(s) shall perform the initial self-assessment within one year of implementation. For existing plants, this means no later than December 31, 2008; for new plants this means within one year after initial criticality.

b. Perform periodic self-assessment of the GPI program at least once every 5 years after initial self-assessment.

c. The self-assessment, at a minimum, shall include evaluating implementation of all of the objectives identified in this document.

d. The self-assessment shall be documented consistent with applicable station procedures and programs.

OBJECTIVE 3.2 REVIEW THE PROGRAM UNDER THE AUSPICES OF NEI

Conduct a review of the GPI program, including at a minimum the licensee's self-assessments, under the auspices of NEI.

Acceptance Criteria:

a. An independent, knowledgeable individual(s) shall perform the initial review within one year of the initial self-assessment performed per Objective 3.1.a above.

b. Periodic review of the GPI program should be performed every 5 years, subsequent to the license's periodic self-assessment performed per Objective 3.1.b. above.

PART B: XCEL ENERGY ACTIONS TAKEN

The Company has been working to adopt the GPI Guidelines since their early introduction in 2006. In adopting the NEI's ground water protection initiative at Prairie Island a number of actions[9] were taken by the plant over the years including:

- Evaluated Systems Structures and Components (SSCs) for the potential to contaminate ground water. This process risk ranks systems that contain tritiated water and the likelihood of the system leaking and contaminating the ground water.
- Conducted assessments of special tritium monitoring program.
- Installed two new monitoring wells (MW-7 and MW-8) in September, 2007.
- All wells were mapped to 1/100 of a foot in preparation for a hydrology study.
- Established planned maintenance to monitor discharge line for leakage.
- Developed an underground piping inspection program. Underground piping inspections were begun in 2009.
- Completed an updated site hydrology study in December 2009 (See Appendix B)
- Based on the updated Site Hydrology Study, reviewed number, location and frequency of existing wells to determine if additional wells were needed and/or if well sample frequencies were adequate.
- Based on review of Site Hydrology Study, we changed the sampling frequencies for 7 existing wells from annually to quarterly.

In March 2010, the NRC performed an inspection of Prairie Island's implementation of the GPI in accordance with its NRC Inspection Manual Temporary Instruction 2515/173.[1] The NRC verbally informed Xcel Energy during the inspection exit on March 26, 2010 that it determined the NEI's Ground Water Protection Initiative was effectively implemented at Prairie Island and that Temporary Instruction 2515/173 would be closed with no findings or violations. The results of this inspection were addressed in the NRC resident inspector's 1st Quarter Inspection that was issued on April 29, 2010.

[9] Examples of actions taken is not comprehensive.

Below is an excerpt from the resident inspectors April 29, 2010 report taken from page 31:[10]

> *4. (Closed) NRC Temporary Instruction 2515/173: Review of the Industry Ground Water Protection Voluntary Initiative*
>
> *a. Inspection Scope*
>
> *An NRC assessment was performed of the licensee's implementation at Prairie Island Nuclear Generating Plant of the Nuclear Energy institute - Ground Water Protection Initiative (dated August 2007 (ML072610036)). The inspectors assessed whether the licensee evaluated work practices that could lead to leaks and spills and performed an evaluation of systems, structures, and components that contain licensed radioactive material to determine potential leak or spill mechanisms.*
>
> *The inspectors verified that the licensee completed a site characterization of geology and hydrology to determine the predominant ground water gradients and potential pathways for ground water migration from onsite locations to off-site locations. The inspectors also verified that an onsite ground water monitoring program had been implemented to monitor for potential licensed radioactive leakage into groundwater and that the licensee had provisions for the reporting of its ground water monitoring results. (See http:/www.nrc.gov/reactors/operating/ops-experience/tritiUm/Plaflt-infO.html.)*
>
> *The inspectors reviewed the licensee's procedures for the decision making process for potential remediation of leaks and spills, including consideration of the long term decommissioning impacts. The inspectors also verified that records of leaks and spills were being recorded in the licensee's decommissioning files in accordance with 10 CFR 50.75(g).*
>
> *The inspectors reviewed the licensee's notification protocols to determine whether they were consistent with the Groundwater Protection Initiative. The inspectors assessed whether the licensee identified the appropriate local and state officials and conducted briefings on the licensee's ground water protection initiative. The inspectors also verified that protocols were established for notification of the applicable local and state officials regarding detection of leaks and spills.*
>
> *b. Findings*
> *No findings of significance were identified.*

[10] NRC letter to Mark Schimmel, dated April 29, 2010 titled "Prairie Island Nuclear Generating Plant, Units 1 and 2, NRC Integrated Inspection Report 05000282/2010002; 05000306/2010002 and 07200010/2010002."

On April 30, 2010 the Company made a compliance filing in Docket No. E002/GS-08-690 indicating that the Company has fully implemented the NEI's GPI at Prairie Island (Document ID# 20104-49878-01).

Section 3 – Discharge of Sump Water to the Land-Locked Area

Upon receiving the Commission's Order to discontinue the discharge of liquid waste discharge to the landlocked area at Prairie Island, the Company took the following actions:

- briefed the Site Vice President and his senior management team and provided a copy of the Commission's Order;
- provided copies of the Order to all Senior Reactor Operators, who previously signed-off on the procedure to discharge to the landlocked area prior to discharging;
- placed configuration control cards on the discharge valve to the landlocked area that preclude use; and
- modified procedures by initiating a permanent Procedural Change Requests ("PCR") that eliminate pumping into the landlocked area and initiating an Engineering Change Request ("ECR") that permanently flanged off the landlocked area line.

In addition, as part of the Company's application process to renew its NPDES Permit[11] with the Minnesota Pollution Control Agency ("MPCA") we informed the MPCA that, per the Commission's Order, the plant had discontinued discharging any liquid waste into the landlocked area. We also requested a modification be made to remove all references related to the use of the landlocked area from the NPDES permit. See Appendix C.

On April 30, 2010 the Company made a compliance filing in Docket No. E002/GS-08-690 indicating the actions taken to discontinue discharge to the landlocked area (Document ID# 20104-49880-01).

Based on the discontinuation of the discharge to the landlocked area, the location of on-site wells MW-7, MW-8 and P-10 to the landlocked area and considering the site hydrology study conducted, it was determined that no additional wells are

[11] Renewal Application filed February 26, 2010, Permit No. MN0004006.

necessary at this time. Continued monthly collection of samples from these three wells, which are the closest three wells to the landlocked area, will continue.

Section 4 – Proposed Modifications to the Special Tritium Monitoring Program

As has been discussed, the Company's Special Tritium Monitoring Program at Prairie Island has been extensively reviewed the past few years. That review has lead to program changes which included new sampling locations, changes in the frequency of sampling at certain locations, a new Site Hydrology Study, new inspection programs and system evaluations. As discussed above, the NRC's April 29, 2010 review concluded that Prairie Island had effectively implemented the GPI Guidelines with no findings or violations. Thus, no additional modifications beyond those previous explained are being proposed at this time. However, contained within the Guidelines are periodic reviews of the Special Tritium Monitoring Program (Objective 1.2, Acceptance Criteria (g)) and the systems in place to track and maintain compliance with the Guidelines. These include periodic reviews of site hydrogeologic studies (Objective 1.1, Acceptance Criteria (d)), and periodic reviews of systems, structures and components and work practices (Objective 1.2, Acceptance Criteria (g)) Them Company has incorporated these periodic reviews into its program to continually assess its compliance with the program.

Paragraph IV.H of the Prairie Island Site Permit states that this assessment is to address issues on monitoring technology, the number of wells to be monitored, the location of the wells, the frequency of the sampling of the wells, field and laboratory methodologies, detection limits, and the assessment should also address opportunities to increase/improve the availability of public information and public relations regarding the tritium testing program and results. Each of these is discussed below.

Number of Wells; Location of Wells and Frequency of Sampling

With regard to an assessment of drilling new wells, the location of the wells, or increasing the frequency of sampling, the first step was to update the hydrology study. The Site Hydrology Study conducted in 2009 provides a wealth of information related to the ground water flow net for the Prairie Island site. Xcel Energy developed this study to help identify ground water flow patterns and determine the magnitude and quantify the duration of directional changes.

The flow net can be used to identify potential areas of impacts associated with ground water movement. The flow net depicts the path ground water takes; each vector depicted, Figure 12 of Appendix A, reflects the ground water flow direction for that immediate area. Ground water passing beneath the PINGP site moves at approximately 50 feet per year and has the potential to transport and spread contaminants originating from the site. A no-flow boundary identifies the outer limits of potential impacts. Areas outside this no-flow boundary is comprised of ground water that has not originated from the site nor passed beneath the site, thus this water does not present a direct link between the Plant and a receptor.

Data received from the Mississippi and Vermillion during the period from March 2009 through December 2009 included several significant events, such as spring flooding and several large rain events. The study concluded that the general directional trend of ground water flowage was southwesterly, perpendicular to ground water elevation contours. More specifically, it demonstrated that there is no direct ground water pathway connecting the Plant to its neighbors located to the north and west.

Based on the updated hydrology study, the Company has concluded that additional wells are not justified at this time. Several wells are situated between potential plant sources and the nearest neighbors, the Prairie Island Indian Community. Due to the slow rate in which ground water travels in the area (approximately 50 feet per year), recent changes to increase the frequency of sampling of a number of (seven) strategically located wells from annually to quarterly provides greater benefit than additional wells. Figure 13 of Appendix A identifies the wells that we are now sampling quarterly instead of annually. These wells are roughly on the western side of the plant between the plant and the Prairie Island Indian Community and the southern perimeter of the plant in the direction of groundwater flow. Additionally, the hydrology study confirms the on-site system of wells is well distributed, providing a reliable flow net at this local scale.

Monitoring Technology, Detection Limits, and Field and Lab Methodologies

No change to the monitoring technology utilized in the REMP or Special Tritium Monitoring Program is recommended at this time. The current use of grab samples tested on site or sent to off-site, independent labs provides a much lower detection level than continuous monitoring equipment currently available. The equipment used at the on-site laboratory at the PINGP has the ability to detect tritium levels

as low as approximately 1,000 pCi/L and we utilize two independent, off-site test facilities with differing lower levels of detection as appropriate. The Environmental, Inc. lab in Illinois can detect tritium levels as low as approximately 180 pCi/L and the University of Waterloo Laboratory in Canada can detect tritium levels as low as approximately 19 pCi/L. The continuous tritium monitors reviewed have a lower limit of detection of 2000 pCi/L and would not be an improvement over the laboratory equipment and methodology currently being used.

Availability of Public Information and Public Relations

Improved communications was one of the three focus areas of the NEI GPI with the stated purpose being to "improve communication with external stakeholders to enhance trust and confidence on the part of local communities, States, the NRC, and the public in the nuclear industry's commitment to a high standard of public radiation safety and protection of the environment". As a result Xcel Energy has committed to:

- Conducting initial and periodic briefings of our GPI program with the designated State/Local officials. The initial briefings was conducted by presenting information on our GPI program to emergency planning representatives of state and local officials around Monticello and Prairie Island. Periodic briefings will continue to be provided in the future.

- Providing informal communication, as soon as practicable to appropriate State/Local officials, with follow-up notification to the NRC, as appropriate, regarding significant on-site leaks/spills into ground water and on-site or off-site water sample results exceeding the criteria in the REMP as described in the Offsite Dose Calculation Manual.

- Submitting written 30-day reports to the NRC for any water sample result for on-site ground water that is or may be used as a source of drinking water that exceeds any of the criteria in the licensee's existing REMP as described in the Offsite Dose Calculation Manual for 30-day reporting of off-site water sample results. Copies of the written 30-day reports for both on-site and off-site water samples shall also be provided to the appropriate State/Local officials.

- Documenting all on-site ground water sample results and a description of any significant on-site leaks/spills into ground water for each calendar year in the Annual REMP report or the Annual Radioactive Effluent Release Report, beginning with the report for calendar year 2006.

In addition to the enhanced communications described above that have resulted from the implementation of the NEI GPI; Xcel Energy remains available to provide informational presentations to the public and state and local officials as requested.

CONCLUSION

The Prairie Island Nuclear Generating Plant has had an effective tritium monitoring program over its entire operating life. The tritium monitoring program detected elevated levels of tritium in 1989 and resulted in additional wells being added with physical changes made to the Plant to reduce the potential for the introduction of tritium into groundwater. The program has further been enhanced by the voluntary implementation of the NEI Groundwater Protection Initiative beginning 2006. Over the last 4 years the Prairie Island plant tritium monitoring program has thoroughly been reviewed by Xcel Energy, its industry peers and the Nuclear Regulatory Commission. The result is a state-of-the-art groundwater protection program. Built in to the Program are periodic reviews to determine if additional enhancements are necessary. No additional changes are recommended to the program at this time.

We have consulted with the Minnesota Department of Health in the preparation of this report and appreciate this opportunity to submit for the Commission's review, our assessment of the existing tritium monitoring program and surface investigation of wells at the Prairie Island Nuclear Generating Plant as addressed in the Commission's Order regarding implementation of the approved Extended Power Uprate Site Permit Application at the Prairie Island Nuclear Generating Plant.

We have served a copy of this filing on the Office of the Attorney General-RUD and all parties on the attached service list. Please contact me at (612) 330-5641 if you have questions about this filing.

Dated: June 18, 2010

Northern States Power Company,
a Minnesota corporation

RESPECTFULLY SUBMITTED,

/s/

BRIAN R. ZELENAK
MANAGER, REGULATORY ADMINISTRATION

Attachments
cc: Official Service List

Appendices

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APPENDIX A

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Figure 6: **Current and Discontinued Off-Site Wells – Tritium Data, Sample Results**

Figure 7: **Current On-Site Wells – Tritium Data, Sample Results**

Figure 8: **Current Off-Site Wells – Tritium Data, Sample Results**

Figure 9: **Current On- and Off-Site Surface Water and On-Site Storage Tanks – Tritium Data**

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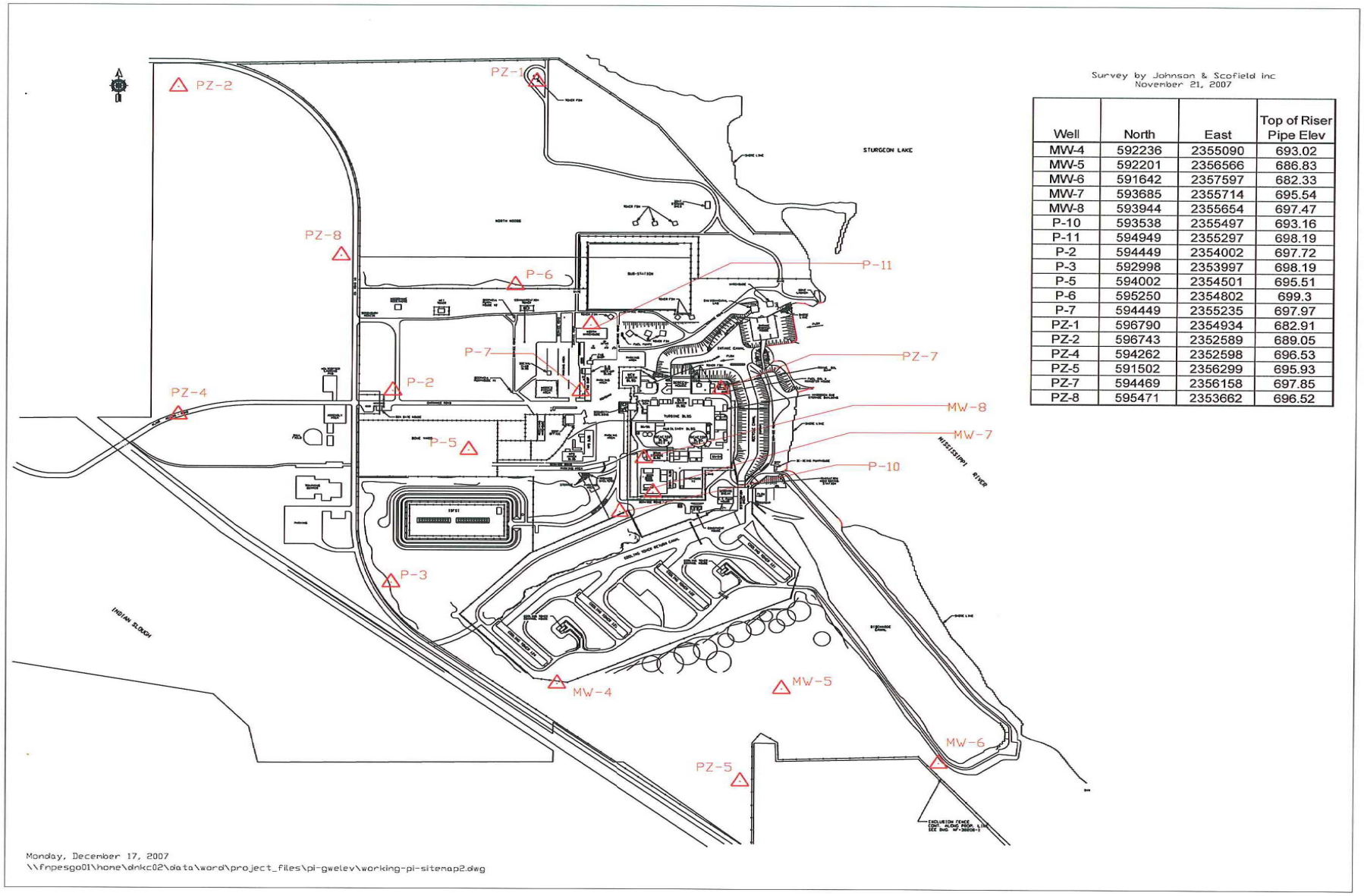
Figure 12: **Ground Water Flow Net**

Figure 13: **On-Site Well Location Map**

*** Source 2009 REMP**

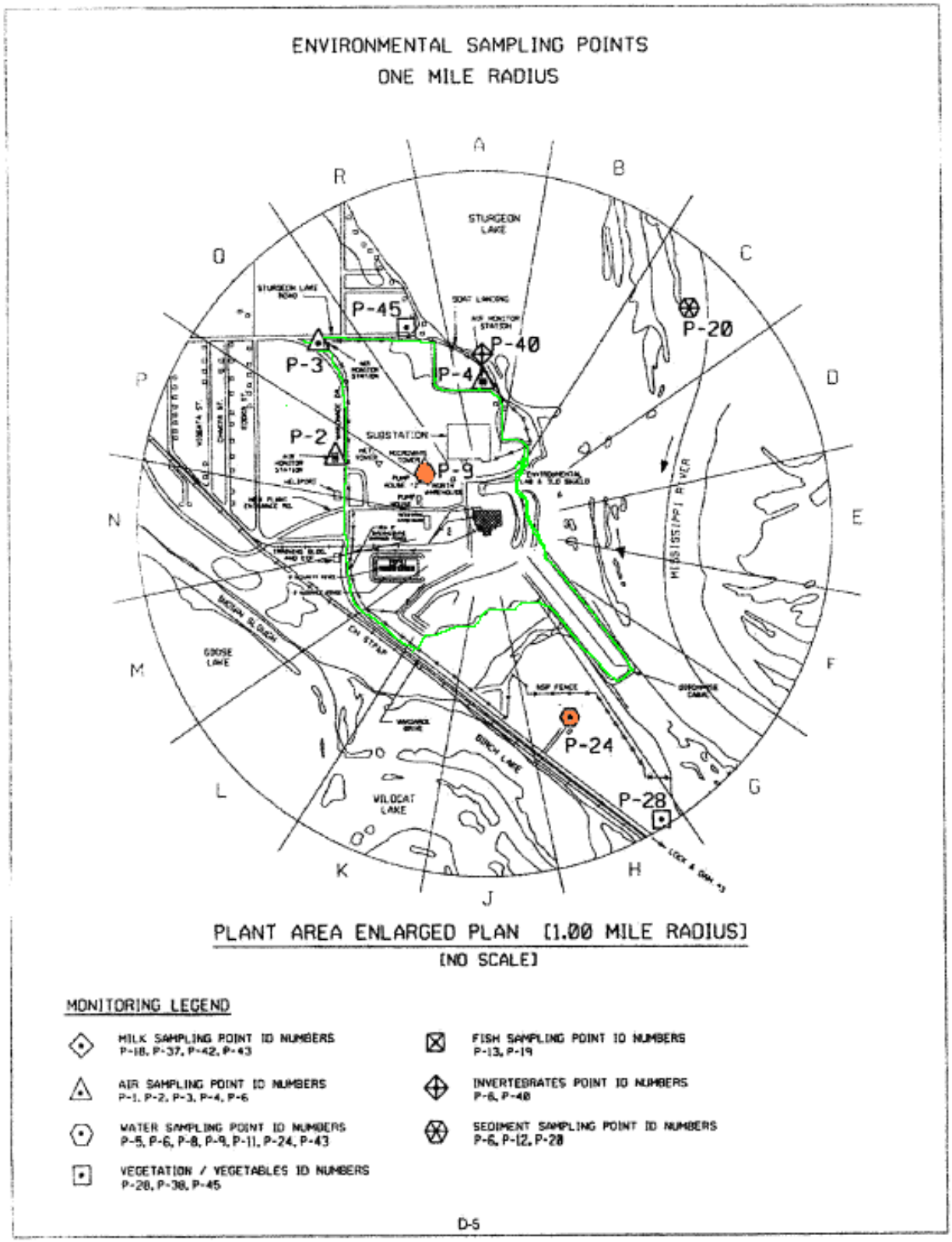
FIGURE 1
CURRENT ON-SITE WELL LOCATIONS (2009 REMP)



Survey by Johnson & Scofield inc
November 21, 2007

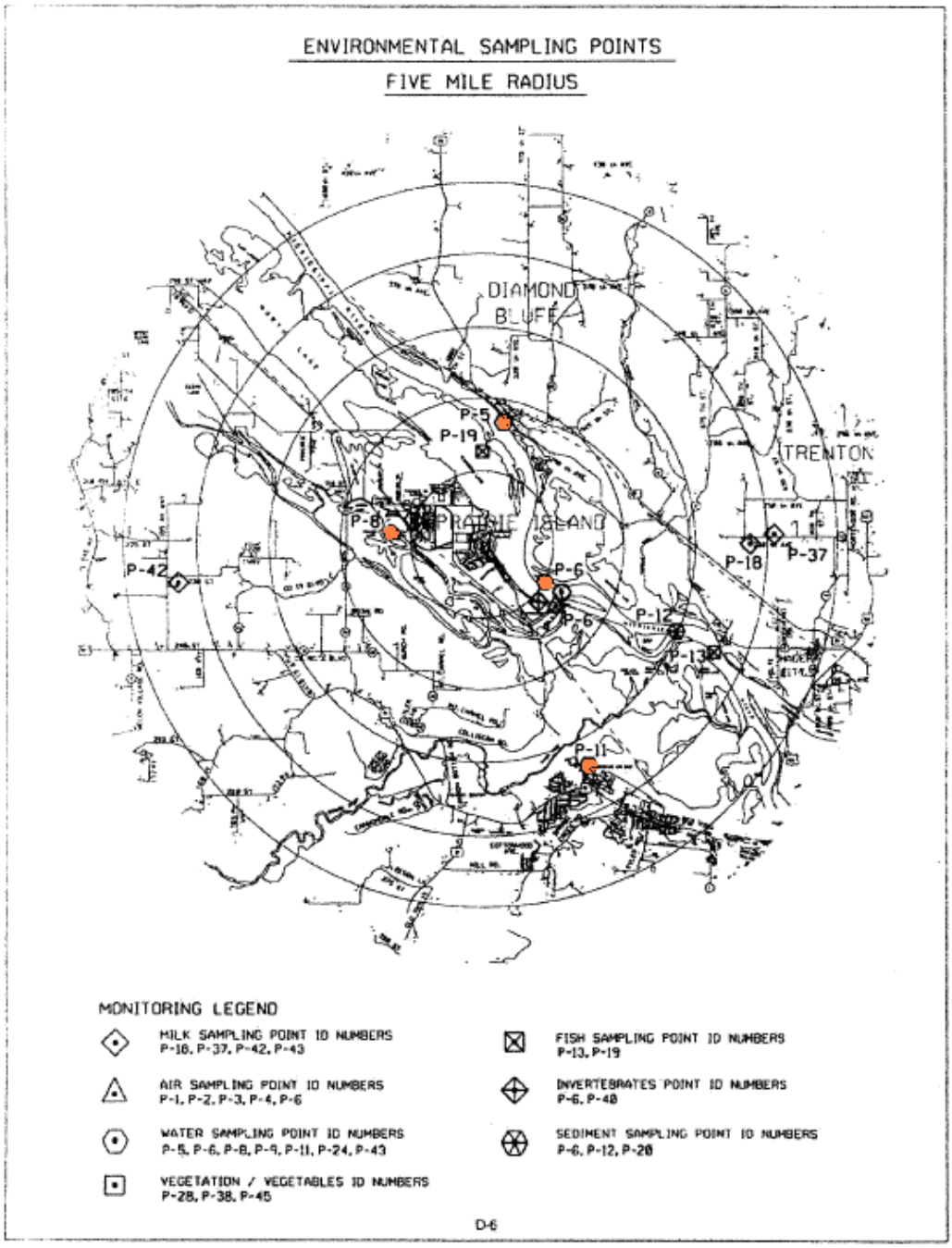
Well	North	East	Top of Riser Pipe Elev
MW-4	592236	2355090	693.02
MW-5	592201	2356566	686.83
MW-6	591642	2357597	682.33
MW-7	593685	2355714	695.54
MW-8	593944	2355654	697.47
P-10	593538	2355497	693.16
P-11	594949	2355297	698.19
P-2	594449	2354002	697.72
P-3	592998	2353997	698.19
P-5	594002	2354501	695.51
P-6	595250	2354802	699.3
P-7	594449	2355235	697.97
PZ-1	596790	2354934	682.91
PZ-2	596743	2352589	689.05
PZ-4	594262	2352598	696.53
PZ-5	591502	2356299	695.93
PZ-7	594469	2356158	697.85
PZ-8	595471	2353662	696.52

FIGURE 2
CURRENT OFF-SITE WELL LOCATIONS
P-9 and P-24 (2009 REMP)



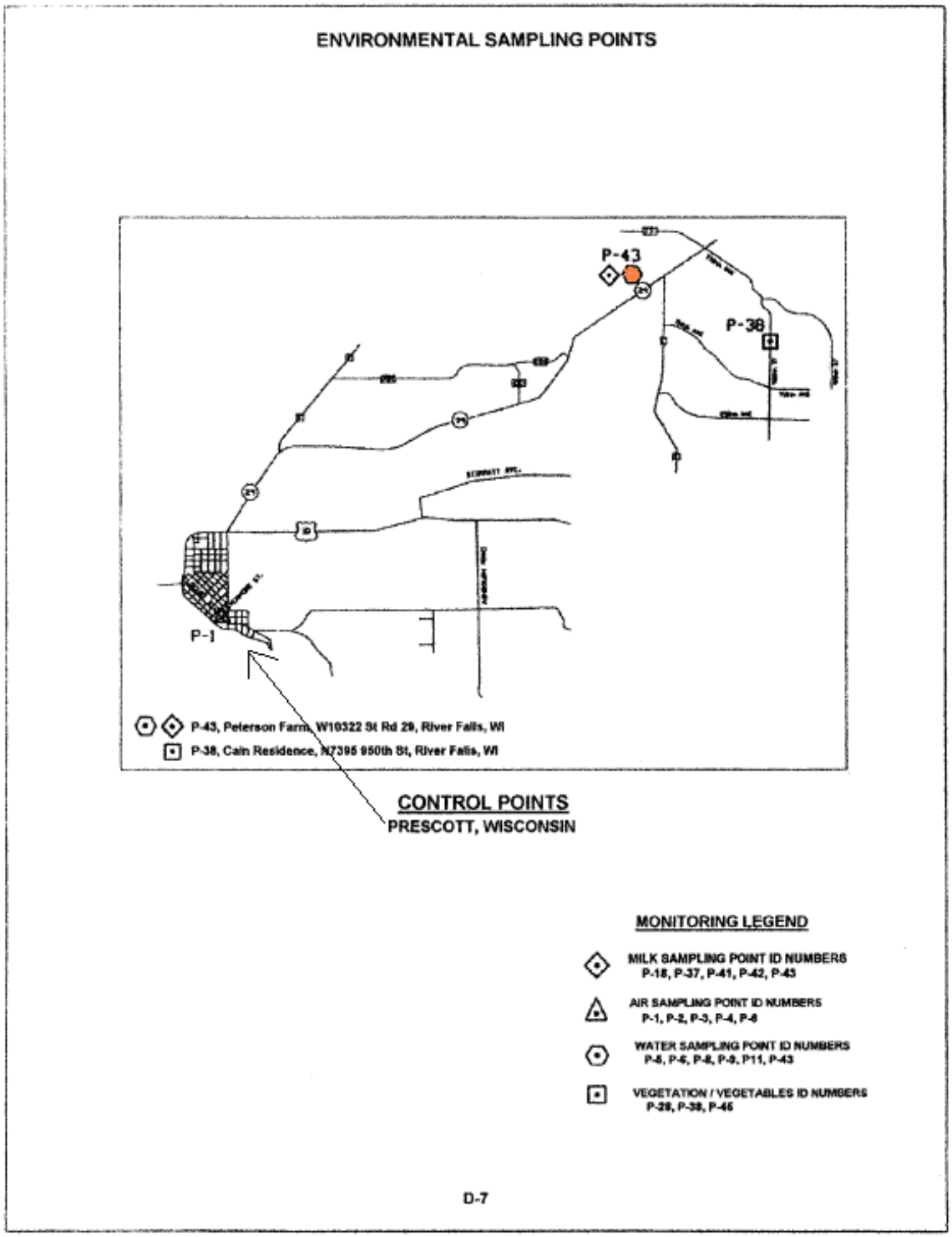
Δ Shaded Point(s) denote well location

FIGURE 3
CURRENT OFF-SITE WELL LOCATIONS
REMP P-5; REMP P-6; P-8; and P-11 (2009 REMP)



Δ **Shaded Point(s) denote well location**

FIGURE 4
CURRENT OFF-SITE WELL LOCATIONS
P-43 (2009 REMP)



Δ Shaded Point(s) denote well location

FIGURE 5

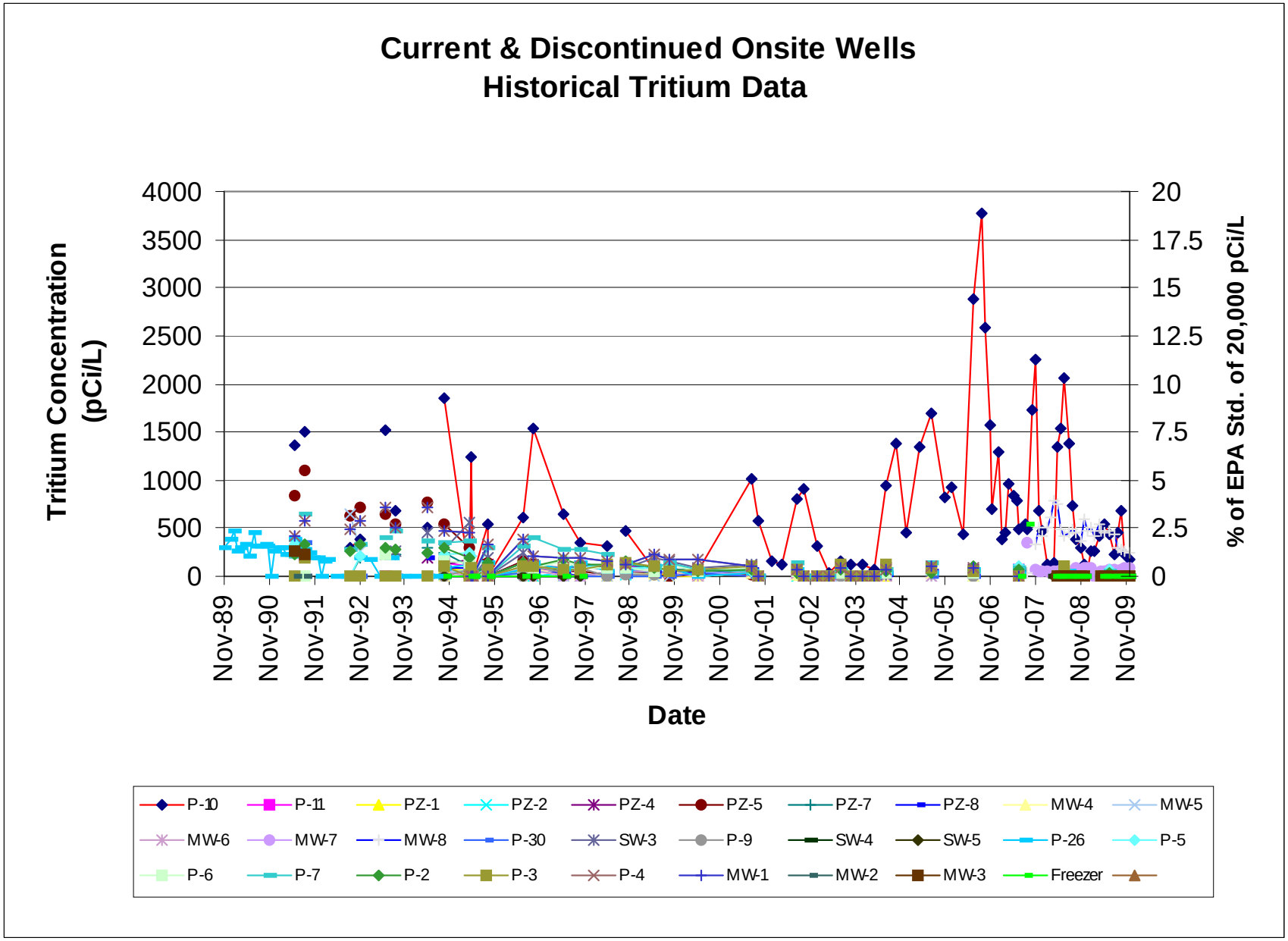

Current & Discontinued Onsite Wells
Historical Tritium Data
Tritium Concentration (pCi/L)
% of EPA Std. of 20,000 pCi/L
4000
3500
3000
2500
2000
1500
1000
500
0
20
17.5
15
12.5
10
7.5
5
2.5
0
Nov-89
Nov-90
Nov-91
Nov-92
Nov-93
Nov-94
Nov-95
Nov-96
Nov-97
Nov-98
Nov-99
Nov-00
Nov-01
Nov-02
Nov-03
Nov-04
Nov-05
Nov-06
Nov-07
Nov-08
Nov-09
Date
P-10
P-11
PZ-1
PZ-2
PZ-4
PZ-5
PZ-7
PZ-8
MW-4
MW-5
MW-6
MW-7
MW-8
P-30
SW-3
P-9
SW-4
SW-5
P-26
P-5
P-6
P-7
P-2
P-3
P-4
MW-1
MW-2
MW-3
Freezer

FIGURE 6

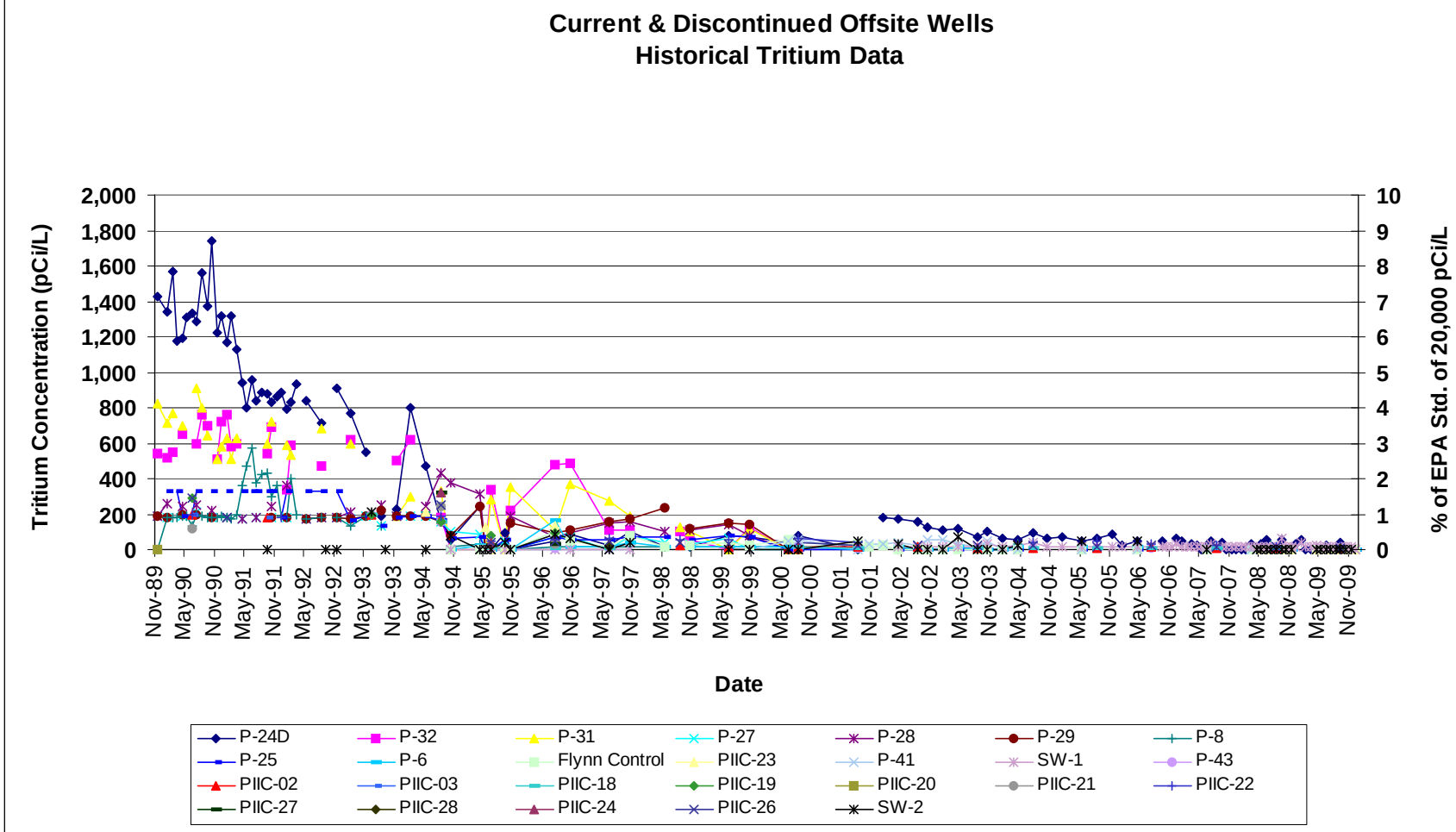

Current & Discontinued Offsite Wells
Historical Tritium Data
Tritium Concentration (pCi/L)
% of EPA Std. of 20,000 pCi/L
Date
P-24D
P-32
P-31
P-27
P-28
P-29
P-8
P-25
P-6
Flynn Control
PIIC-23
P-41
SW-1
P-43
PIIC-02
PIIC-03
PIIC-18
PIIC-19
PIIC-20
PIIC-21
PIIC-22
PIIC-27
PIIC-28
PIIC-24
PIIC-26
SW-2

FIGURE 7

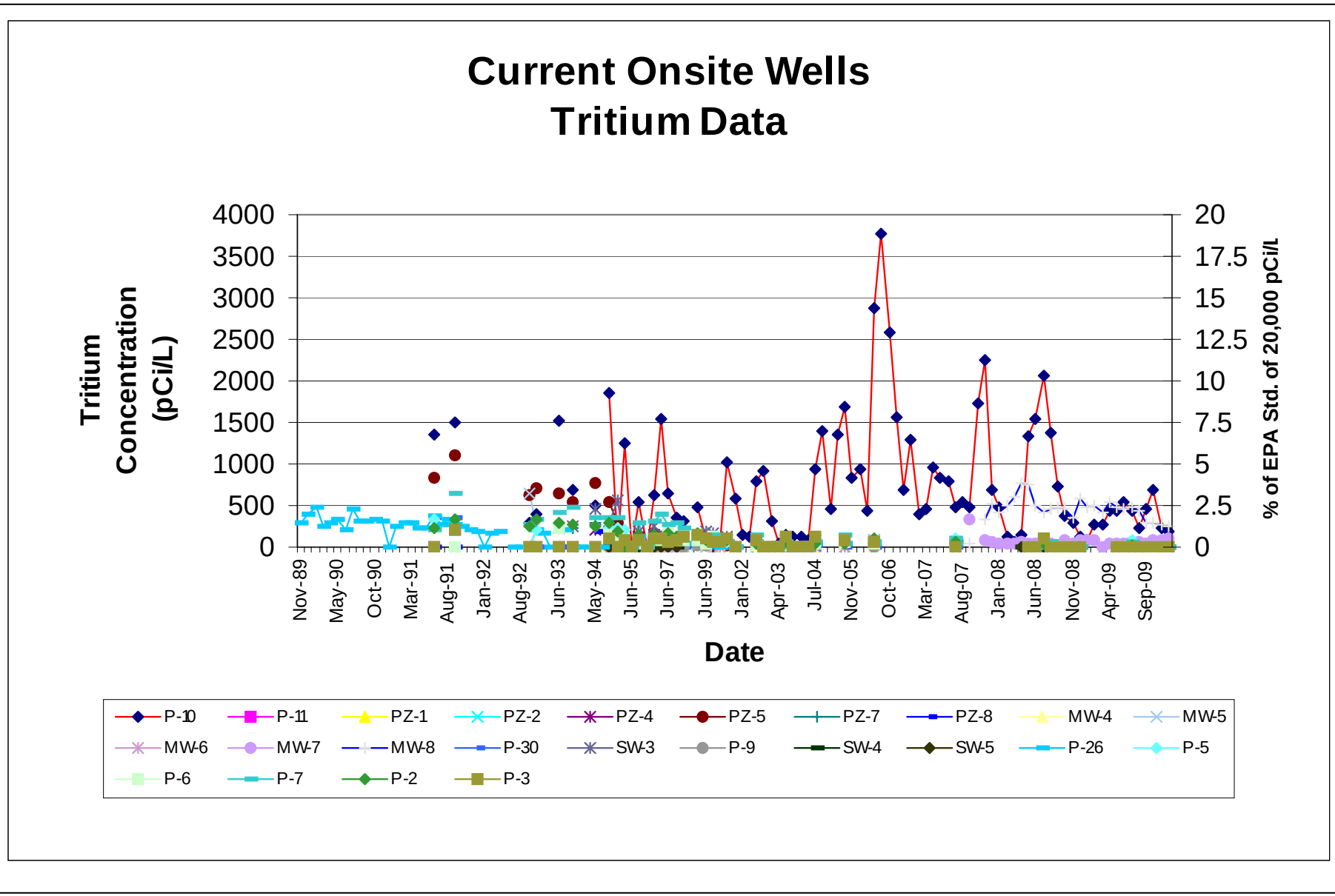

Current Onsite Wells
Tritium Data
Tritium Concentration (pCi/L)
% of EPA Std. of 20,000 pCi/L
4000
3500
3000
2500
2000
1500
1000
500
0
20
17.5
15
12.5
10
7.5
5
2.5
0
Nov-89
May-90
Oct-90
Mar-91
Aug-91
Jan-92
Aug-92
Jun-93
May-94
Jun-95
Jun-97
Jun-99
Jan-02
Apr-03
Jul-04
Nov-05
Oct-06
Mar-07
Aug-07
Jan-08
Jun-08
Nov-08
Apr-09
Sep-09
Date
P-10
P-11
PZ-1
PZ-2
PZ-4
PZ-5
PZ-7
PZ-8
MW-4
MW-5
MW-6
MW-7
MW-8
P-30
SW-3
P-9
SW-4
SW-5
P-26
P-5
P-6
P-7
P-2
P-3

FIGURE 8

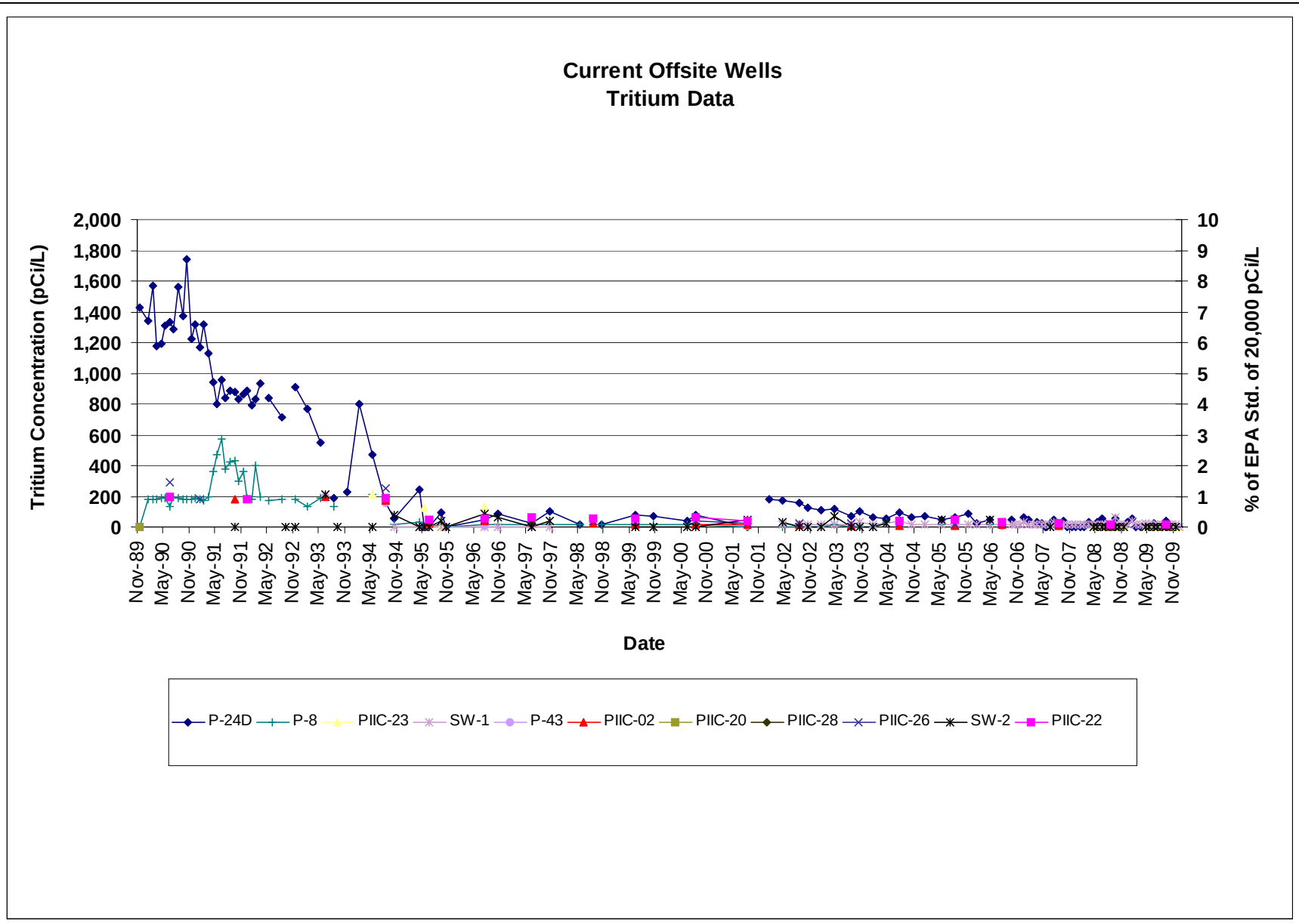

Current Offsite Wells
Tritium Data
Tritium Concentration (pCi/L)
% of EPA Std. of 20,000 pCi/L
Date
P-24D
P-8
PIIC-23
SW-1
P-43
PIIC-02
PIIC-20
PIIC-28
PIIC-26
SW-2
PIIC-22

FIGURE 9

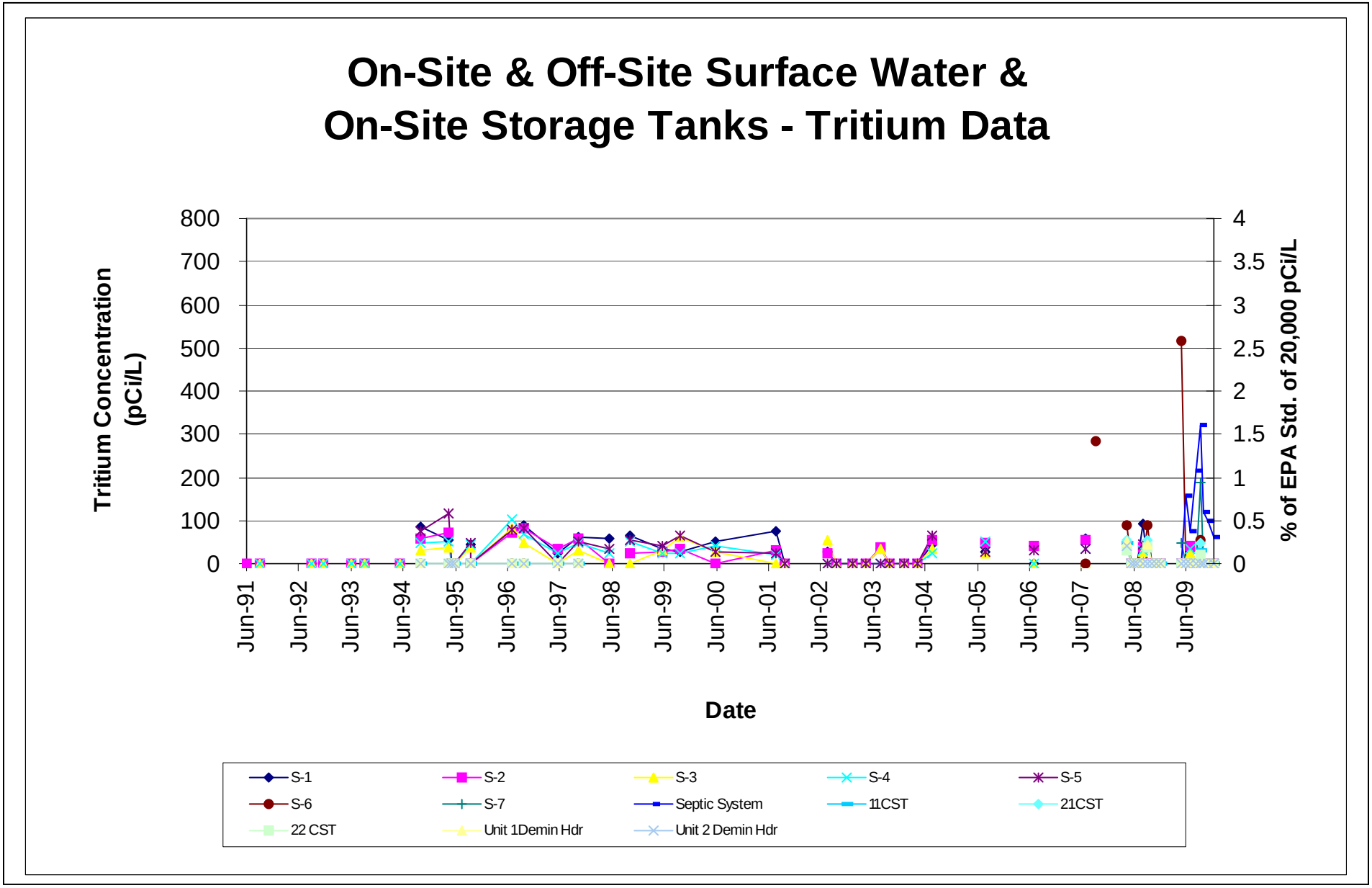

On-Site & Off-Site Surface Water &
On-Site Storage Tanks - Tritium Data
Tritium Concentration (pCi/L)
% of EPA Std. of 20,000 pCi/L
800
700
600
500
400
300
200
100
0
4
3.5
3
2.5
2
1.5
1
0.5
0
Jun-91
Jun-92
Jun-93
Jun-94
Jun-95
Jun-96
Jun-97
Jun-98
Jun-99
Jun-00
Jun-01
Jun-02
Jun-03
Jun-04
Jun-05
Jun-06
Jun-07
Jun-08
Jun-09
Date
S-1
S-2
S-3
S-4
S-5
S-6
S-7
Septic System
11CST
21CST
22 CST
Unit 1Demin Hdr
Unit 2 Demin Hdr

FIGURE 10
2009 Dredging Project Area Map

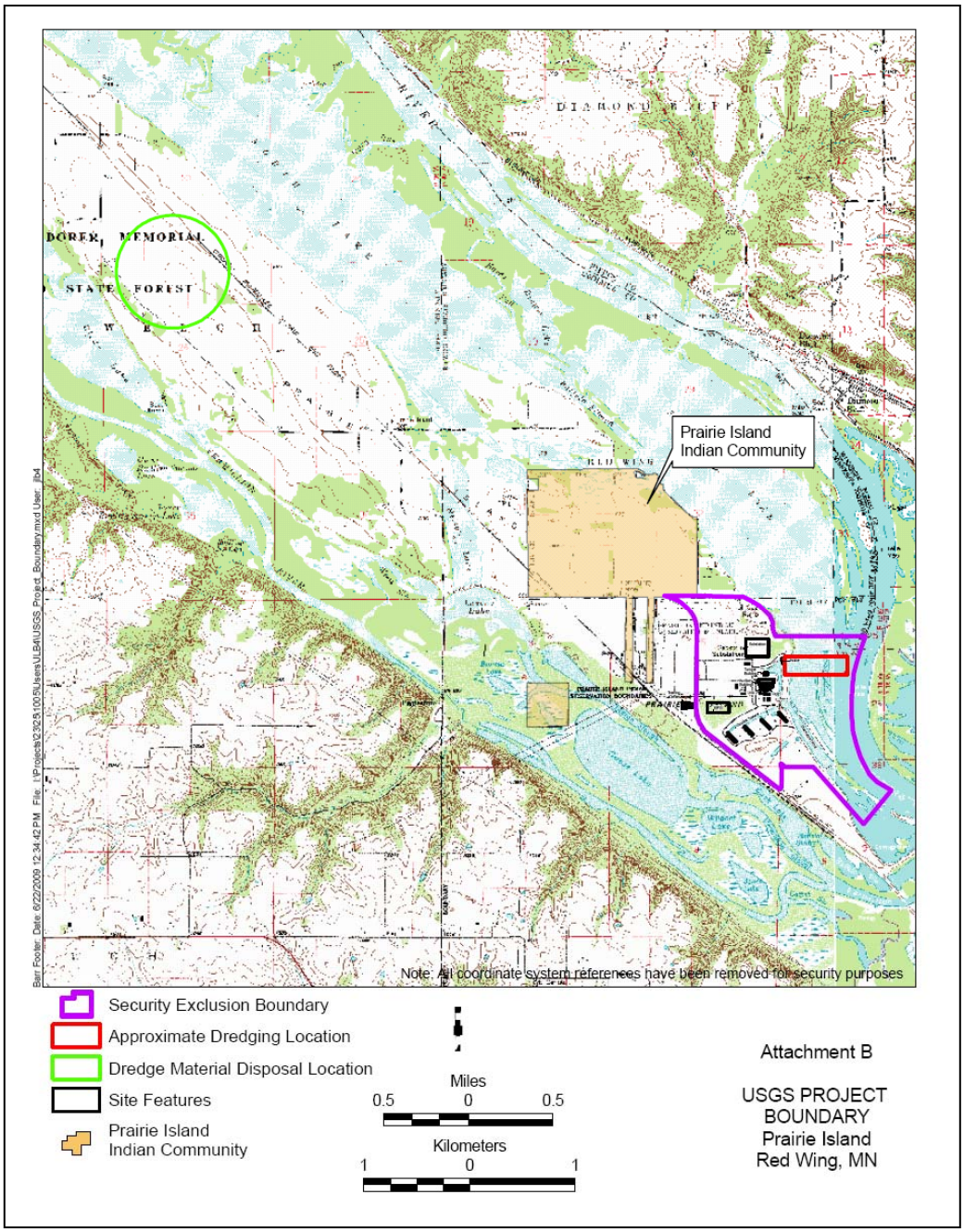


FIGURE 11
2009 Dredging Project Sample Collection Locations

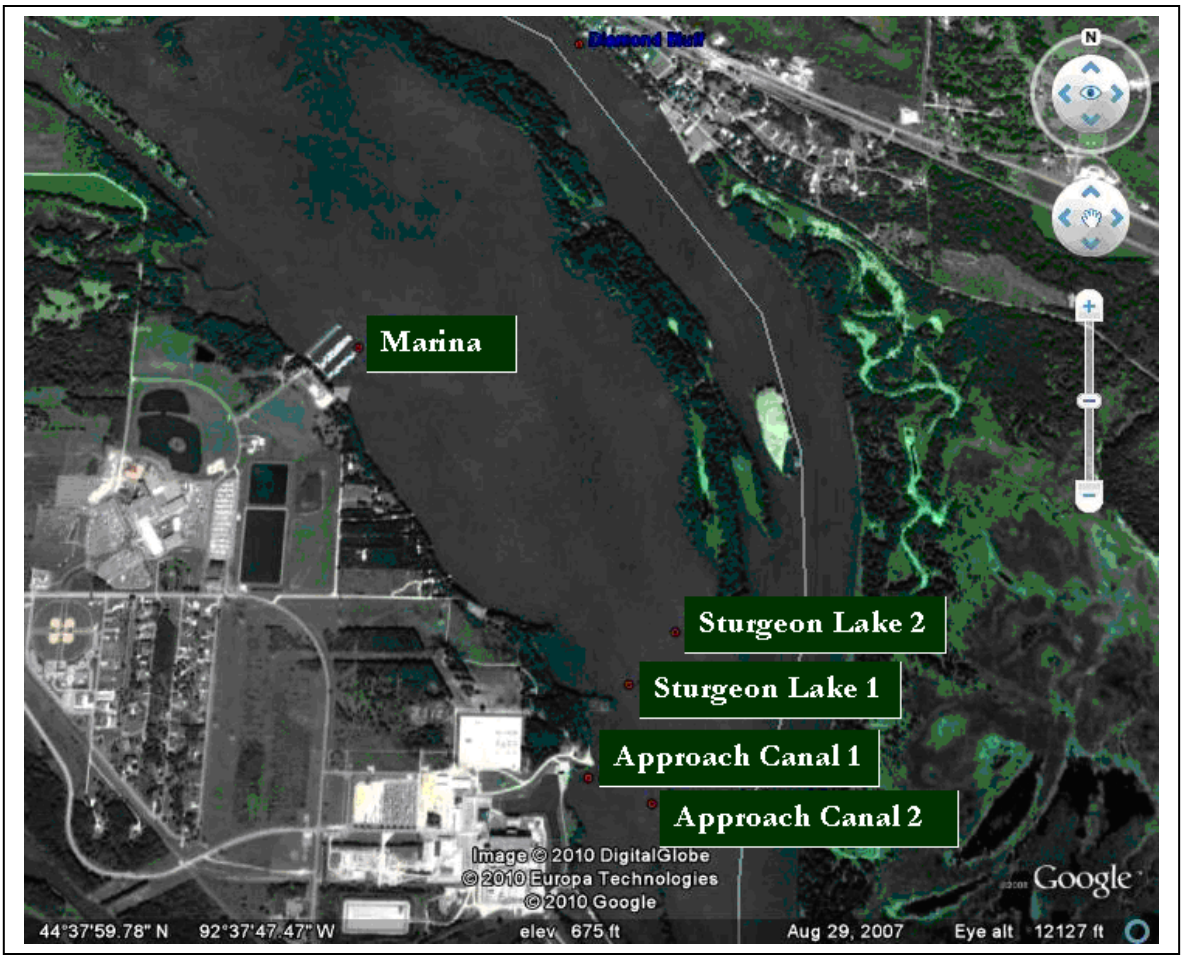
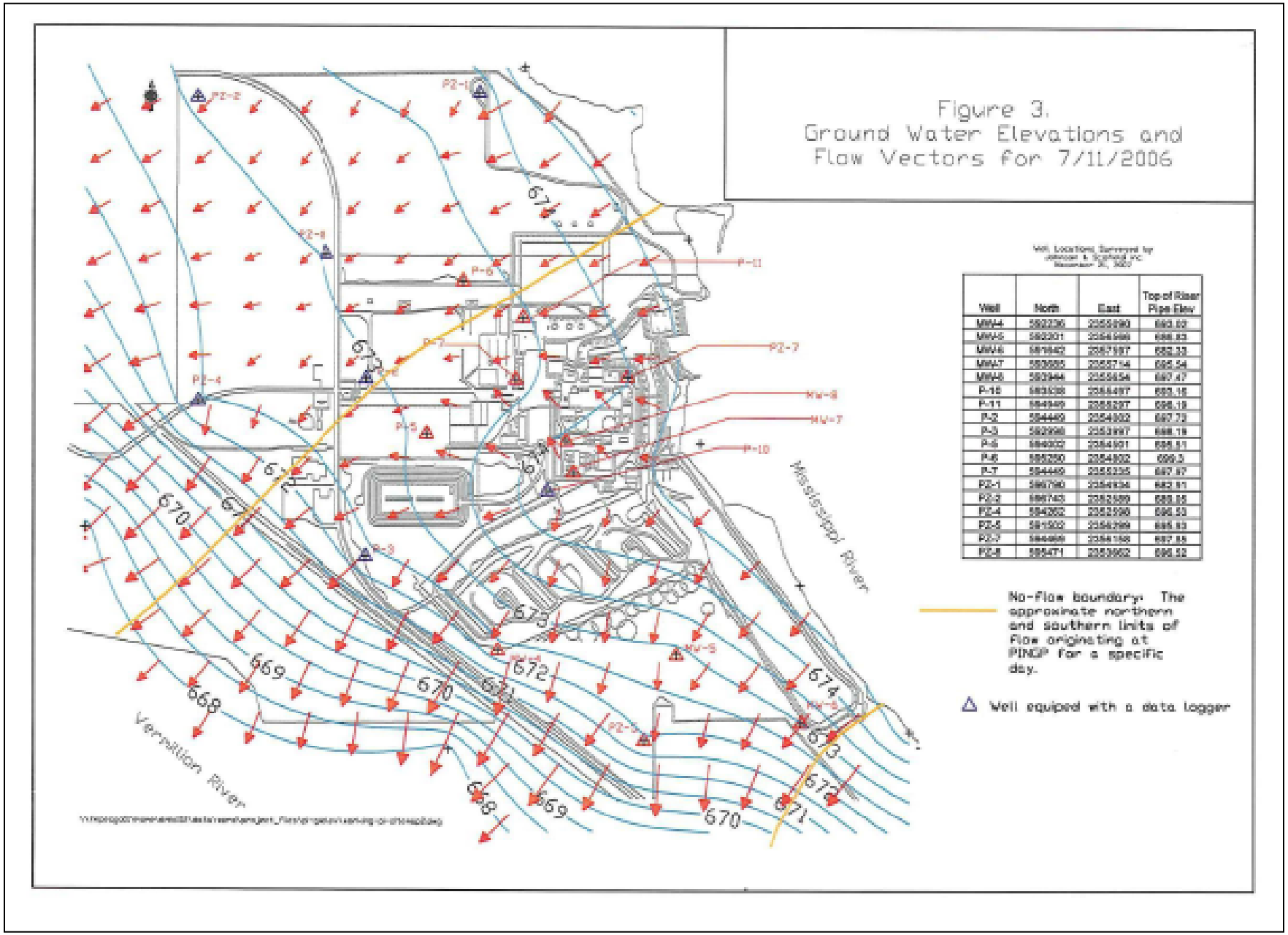
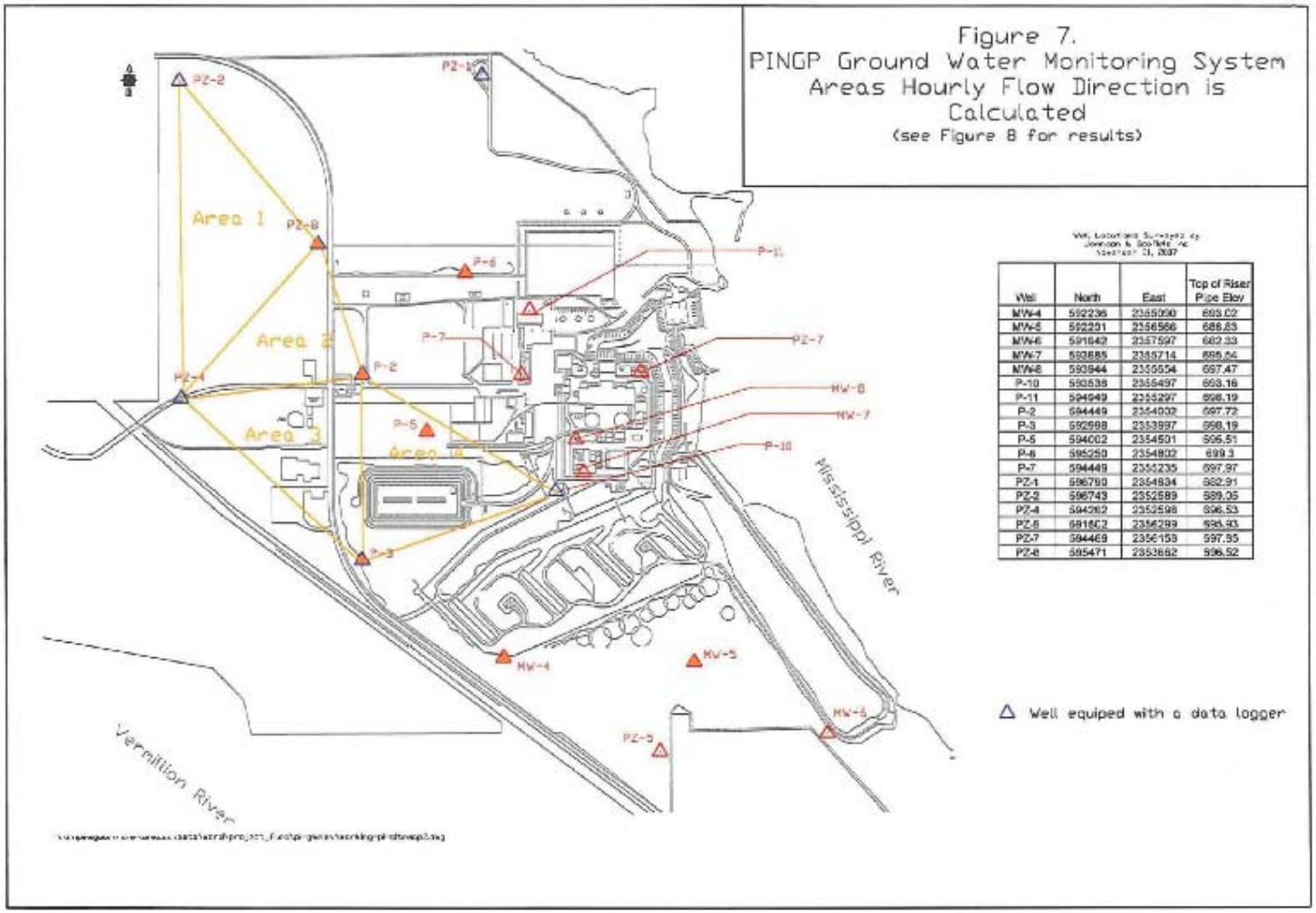


FIGURE 12
Ground Water Flow Net



Well	North	East	Top of Riser Pipe Elev
MW-4	592236	2555990	693.02
MW-5	592201	2554986	688.83
MW-6	591942	2557197	692.33
MW-7	593555	2555714	695.54
MW-8	593944	2555654	697.47
P-10	593030	2554497	693.16
P-11	594949	2555237	696.19
P-2	594449	2554302	697.73
P-3	592998	2553897	688.19
P-4	594302	2554901	695.51
P-5	595250	2554502	699.3
P-7	594449	2555335	697.67
PZ-1	596790	2554934	682.91
PZ-2	596743	2552599	685.35
PZ-4	594302	2552398	696.53
PZ-5	591500	2556299	685.53
PZ-7	594499	2554198	697.55
PZ-8	595471	2553902	696.52

FIGURE 13
On-Site Well Location Map



Well	North	East	Top of Riser Pipe Elev
MW-4	592236	2355090	693.02
MW-5	592251	2356566	686.83
MW-6	591642	2357597	682.33
MW-7	593885	2355714	695.64
MW-8	593944	2355534	697.47
P-10	593538	2355497	693.16
P-11	594949	2355297	698.19
P-2	594449	2354002	697.72
P-3	592998	2353997	698.19
P-5	594002	2354501	696.51
P-6	595259	2354802	699.3
P-7	594449	2355235	697.97
PZ-1	596799	2354934	682.91
PZ-2	596743	2352589	689.05
PZ-4	594282	2352598	696.53
PZ-5	591602	2356289	695.93
PZ-7	594469	2356153	697.95
PZ-8	595471	2353682	696.52

Δ Shaded Points denote change in frequency of well monitoring from annually to quarterly.

APPENDIX B

PRAIRIE ISLAND NUCLEAR GENERATING PLANT (PINGP) GROUND WATER INVESTIGATION: AN IMPROVED FLOW NET TO EVALUATE PATHWAYS FOR A POTENTIAL GROUND WATER RELEASE

Prepared by:

Chuck Donkers, Xcel Energy

December 2009

APPENDIX B

PRAIRIE ISLAND NUCLEAR GENERATING PLANT (PINGP) GROUND WATER INVESTIGATION: AN IMPROVED FLOW NET TO EVALUATE PATHWAYS FOR A POTENTIAL GROUND WATER RELEASE.

BACKGROUND

A flow net is one method to determine the groundwater path way between two points.

An improved flow net was sought to identify potential receptors in the event that a hypothetical ground water release were to occur at the Prairie Island Nuclear Generating Plant (PINGP). A flow net is a static 'snap shot' of a dynamic system. It is constructed using ground water elevations collected from onsite wells for a specific date. To improve upon the current flow net, perspective was needed: How representative is the "snap shot" for the entire year.

Recent studies (USGS 1997) suggested large rain events could cause short term deviations from the existing flow net. In light of this information, Xcel Energy developed a study to identify the magnitude and quantify the duration of such changes in flow direction.

PROJECT DESIGN

The premise of this investigation was to identify short term changes in flow direction due to the influence of flooding or large rain events. Seven (7) wells were equipped with water level transducers and data loggers. Hourly ground water elevations were collected in these seven wells from March 30, 2009 thru December 16, 2009. Using methodology developed by Pinder (*Velocity Calculation From Randomly Located Heads, Pinder et al. 1981)*, hourly flow directions were calculated for pre-defined areas.

To improve the PINGPs flow net, two methods were employed. Surfer, a commercially available interpolation program was used to produce a more accurate prediction of ground water flow paths but it does not lend itself to processing large amounts of time variable data. The methodology developed by Pinder lends itself to processing large volumes of data, and thus identifying short term upsets; however it is less accurate than other methods. The two methods complement each other by putting the more accurate "snap shot" in to perspective for the full year.

RESULTS

Figure 1 depicts the PINGP site, and identifies which wells were equipped with data loggers. Figure 2 presents the hydrographs for the hourly data from seven wells plus Mississippi River and Vermillion River elevations. Figures 3 thru 6 depict ground water elevation contours for the site when all wells were sampled and the approximate no-flow boundary. The no-flow boundary is the approximate

northern and western limit of flow originating from the PINGP. Figure 7 illustrates the individual flow elements(areas) that were used to calculate the hourly flow directions. Figure 8 illustrates flow direction vs. time for each area. Figure 9 is a delineation of ground water which is down gradient from the PINGP using a compilation of all data generated in this investigation.

DISCUSSION

Hydrograph Aspects

As shown on Figure 2, the study period extended from March 30, 2009 thru December 16, 2009. Stage data from the Mississippi and Vermillion Rivers were available starting on February 6, 2009. As intended, this period included several significant events including the spring flood, and several large rain events in July and August. The following observations were made:

- Typical (non-flood) flow is from Mississippi River (highest head) to the groundwater under the Prairie Island Plant to the Vermillion (lowest head). This condition occurs over about 90% of the study period.
- The hydrographs indicate ground water elevations do respond to spring flooding. There is a short lag time between flooding and the rise in ground water elevations. Ground water elevations are also slower to recede.
- Ground water elevations were higher than the Mississippi River and the Vermillion River for about four weeks during the spring flood period. This suggests that a brief reversal of flow (from groundwater toward the rivers) occurs over about 10% of the study period. Groundwater flow during this period would likely be radially outward from groundwater to surface water.
- Several large rain events (1" to2"/day) occurred in August. Ground water elevations rose several inches in response to this precipitation. However all wells responded in a similar fashion, suggesting no mounding of ground water.

Ground water Elevation Contour Maps

Ground water elevations were interpolated using Surfer for four sampling events. Mississippi River and Vermillion River elevations were included in the surfer applications; the inclusion of these data resulted in the depiction of a strong southwesterly flow direction. Because water flows from areas of higher head to areas of lower head elevation, this southwesterly flow direction appears to be a reasonable characterization of actual flow conditions throughout the majority of the study period. This characterization is also supported by the hydrograph data and the apparent higher head in the Mississippi River relative to the Vermillion River during the majority of the study period. The following observations were made:

- Ground water flow paths (flow direction is perpendicular to elevation contours) generally trend southwest as described above
- Radial flow is exhibited near P-10 due to localized mounding of the water table. The mounding influence may be due the presence of several water features such as the cooling tower canals, a

surface drainage ditch and septic drain fields. The observed mounding diminishes within a short distance from the well, returning to the predominant southwesterly flow direction.

- Ground water gradients are depicted in Figures 3-6. The length of the vector arrow tails are proportional to the gradient; the longer the tail, the steeper the gradient. Assuming similar geology, this generally indicates faster travel velocities.

Hourly Flow Directions

Flow directions were calculated hourly, for four areas. Figure7 illustrate the areas represented by theses hourly directions. Figure 8 illustrates flow direction vs. time. The following observations were made:

- The predominant flow direction, spatially and in terms of duration, is southwest (225 deg from north). The greatest deviation from this predominant trend occurred within 4-8 weeks after the spring flood.
- During the months of April and May, Area 1 and Area 4 reported westerly flows, however ground water gradients were significantly less during these times and the duration of time was short. Therefore the actual distance traveled, in a westerly direction, is small due to lower gradients and the short duration of the deviation.
- The four static flow nets depicted in figures 3-6 correspond to stable flow conditions, observed for the majority of the year. These flow nets are representative for the site throughout the year with the possible exception of 4-6 weeks after the spring flood.

CONCLUSIONS

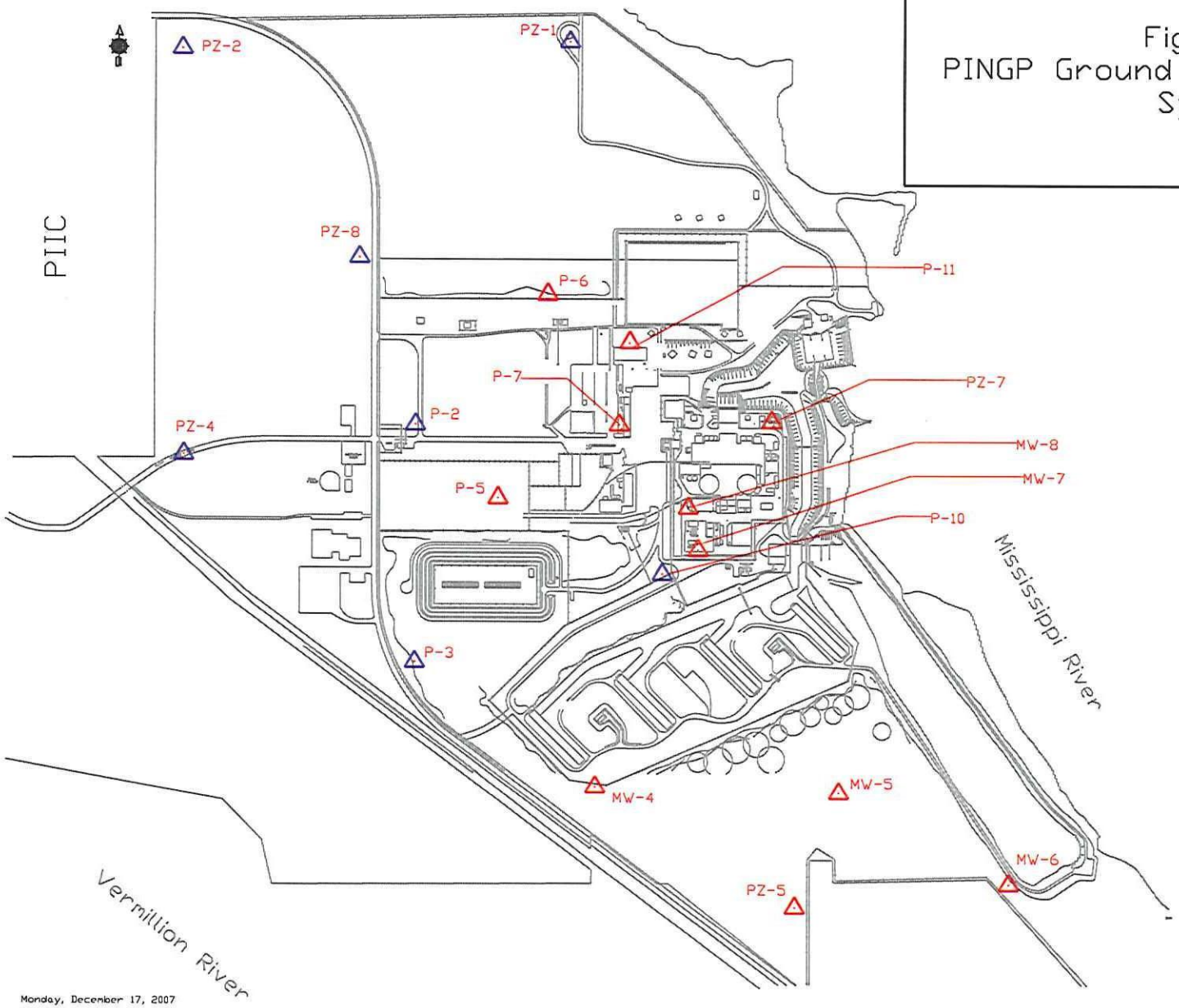
- No evidence of ground water mounding was observed which correlated to large rain events.
- Mounding was observed near P-10. Radial ground water flow was noted. The numerous infiltration sources, (septic drain fields, drainage ditch, and cooling tower canals) are believed to contribute to the mounding effect.
- The inclusion of river elevations with ground water elevations improves the interpolated ground water contours and hence the flow net.
- The spring flood demonstrated the largest influence upon ground water flow directions. Flood influences extend 4-6 weeks after the flood recedes.
- With the exception of the 4-6 weeks after the spring flood, ground water flows southwest towards the Vermillion River.
- The flow nets presented in this report (Figures 3-6) represent flow paths for approximately 10 months out of the year.
- Given the short duration and limited areal extent of the flow reversals, a hypothetical release from the Prairie Island Plant could move only a relatively short distance from the plant during a spring flood event before it would be redirected to the predominant flow direction (to the southwest).
- The data collected during this investigation suggest that there is no direct ground water pathway connecting the PINGP and neighbors to the north and west of the plant. .

APPENDIX B

- Calculating hourly flow directions identified the months of April and May as having the greatest potential for westerly flow. Although the significance of these westerly flows is considered small, it is recommended to construct additional flow nets, using all wells, during this period of flux.

APPENDIX B

Figure 1.
PINGP Ground Water Monitoring System



Monday, December 17, 2007
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Well Locations Surveyed by
Johnson & Scofield inc
November 21, 2007

Well	North	East	Top of Riser Pipe Elev
MW-4	592236	2355090	693.02
MW-5	592201	2356566	686.83
MW-6	591642	2357597	682.33
MW-7	593685	2355714	695.54
MW-8	593944	2355654	697.47
P-10	593538	2355497	693.16
P-11	594949	2355297	698.19
P-2	594449	2354002	697.72
P-3	592998	2353997	698.19
P-5	594002	2354501	695.51
P-6	595250	2354802	699.3
P-7	594449	2355235	697.97
PZ-1	596790	2354934	682.91
PZ-2	596743	2352589	689.05
PZ-4	594262	2352598	696.53
PZ-5	591502	2356299	695.93
PZ-7	594469	2356158	697.85
PZ-8	595471	2353662	696.52

△ Well equiped with a data logger

APPENDIX B

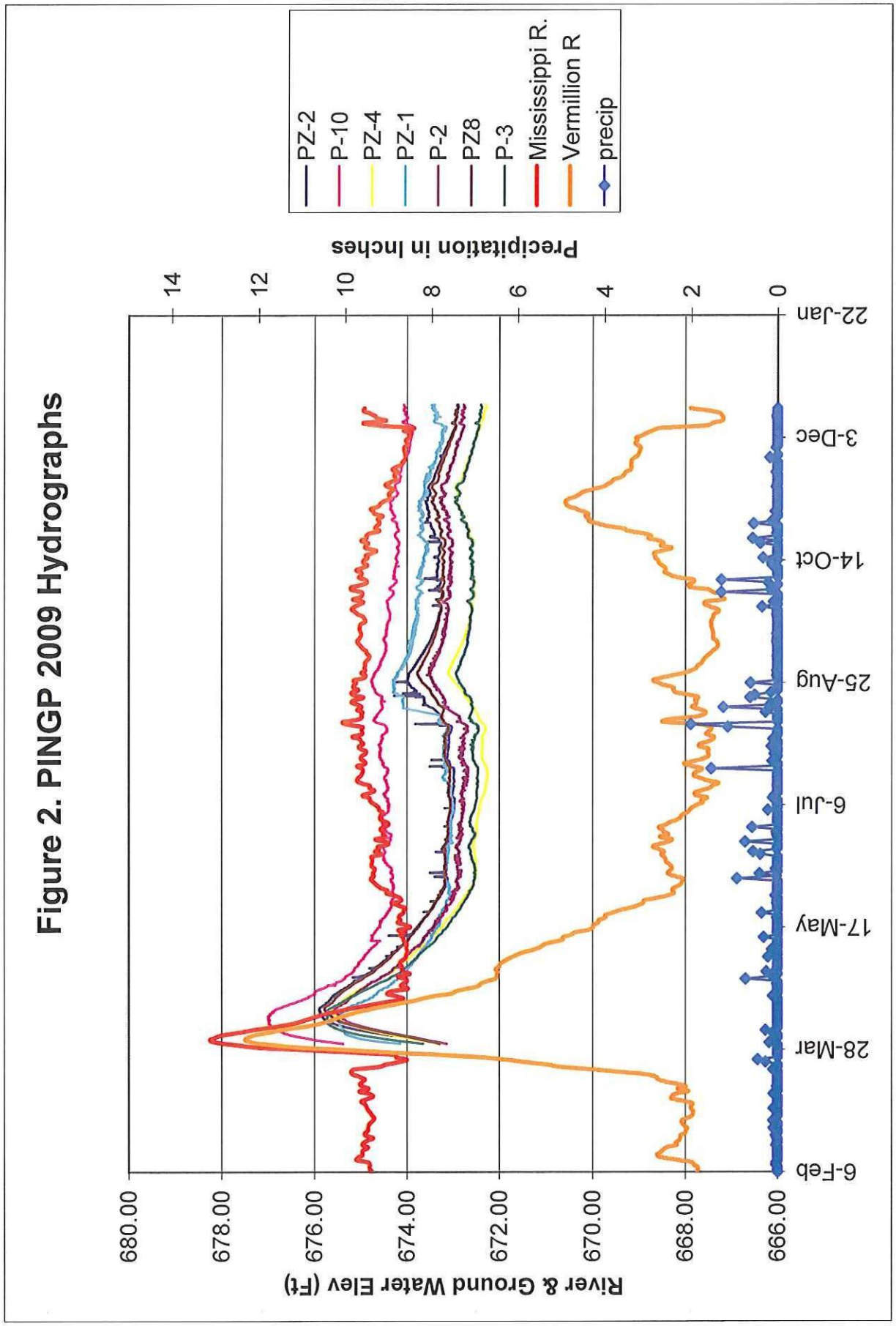
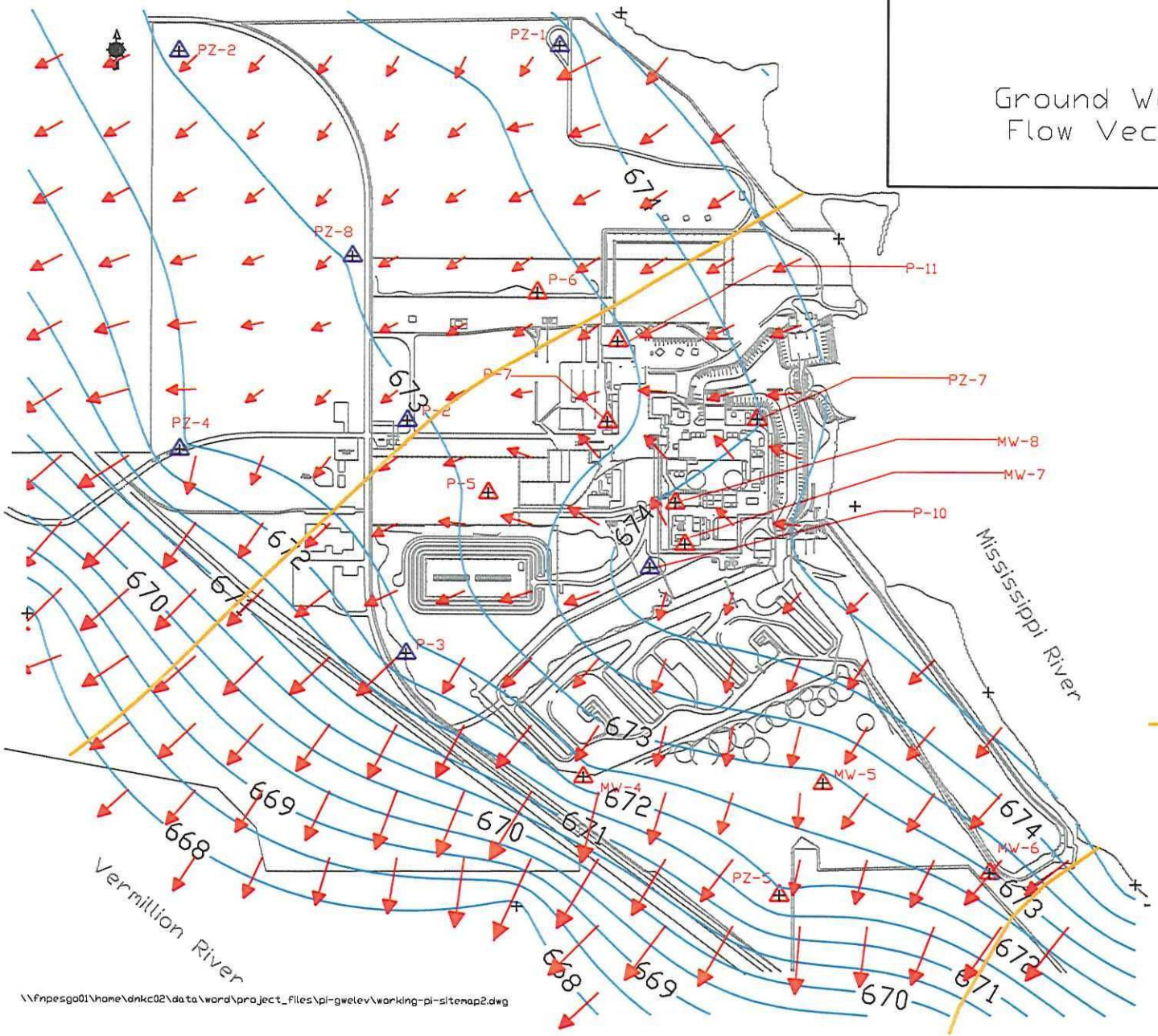


Figure 2. PINGP 2009 Hydrographs
River & Ground Water Elev (Ft)
680.00
678.00
676.00
674.00
672.00
670.00
668.00
666.00
Precipitation in Inches
14
12
10
8
6
4
2
0
6-Feb
28-Mar
17-May
6-Jul
25-Aug
14-Oct
3-Dec
22-Jan
PZ-2
P-10
PZ-4
PZ-1
P-2
PZ8
P-3
Mississippi R.
Vermillion R
precip

Figure 3.
Ground Water Elevations and Flow Vectors for 7/11/2006



Well Locations Surveyed by
Johnson & Scofield inc
November 21, 2007

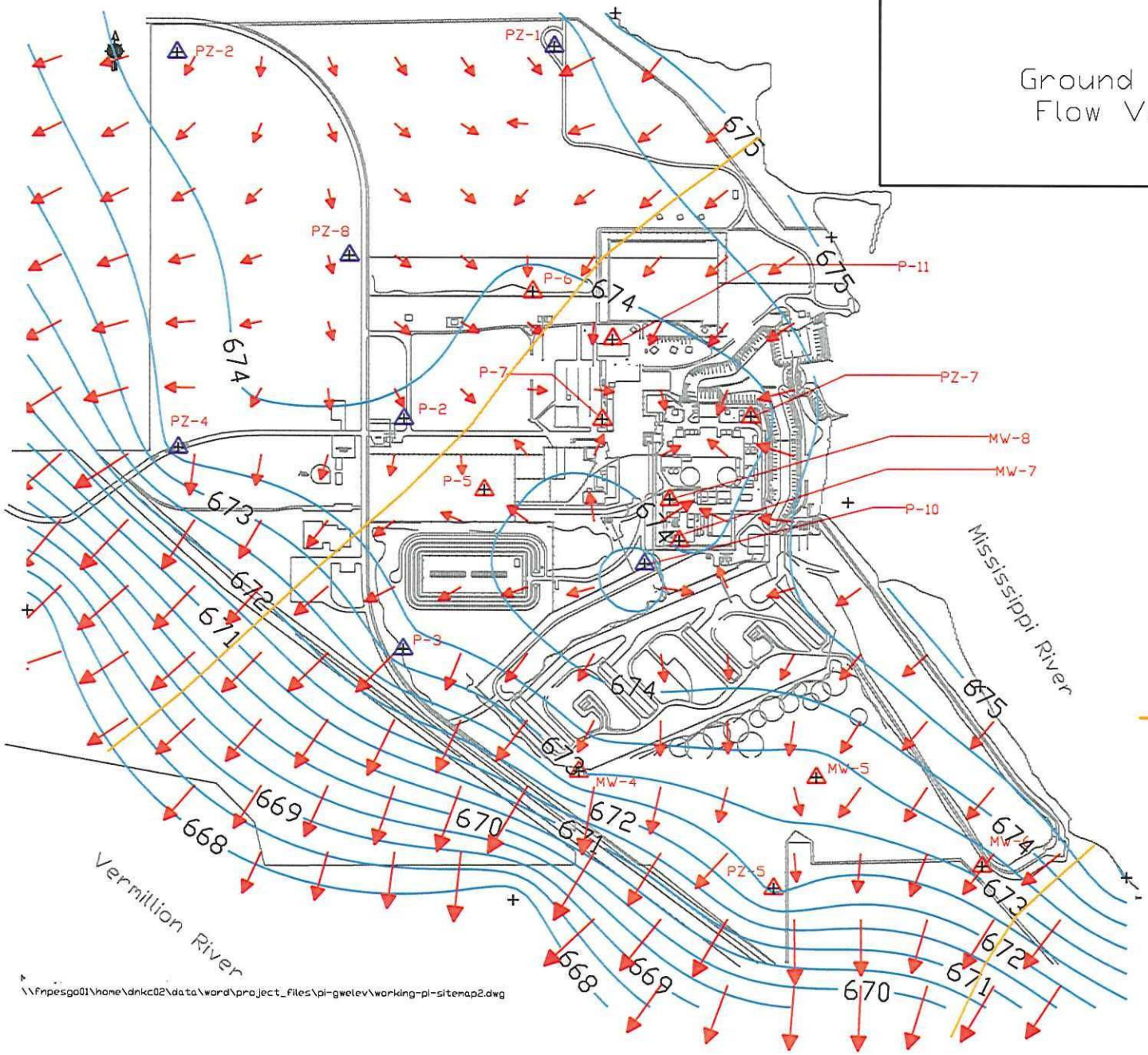
Well	North	East	Top of Riser Pipe Elev
MW-4	592236	2355090	693.02
MW-5	592201	2356566	686.83
MW-6	591642	2357597	682.33
MW-7	593685	2355714	695.54
MW-8	593944	2355654	697.47
P-10	593538	2355497	693.16
P-11	594949	2355297	698.19
P-2	594449	2354002	697.72
P-3	592998	2353997	698.19
P-5	594002	2354501	695.51
P-6	595250	2354802	699.3
P-7	594449	2355235	697.97
PZ-1	596790	2354934	682.91
PZ-2	596743	2352589	689.05
PZ-4	594262	2352598	696.53
PZ-5	591502	2356299	695.93
PZ-7	594469	2356158	697.85
PZ-8	595471	2353662	696.52

No-flow boundary: The approximate northern and southern limits of flow originating at PINGP for a specific day.

△ Well equiped with a data logger

APPENDIX B

Figure 4
Ground Water Elevations and Flow Vectors for 7/9/2008



Well Locations Surveyed by
Johnson & Scofield Inc
November 21, 2007

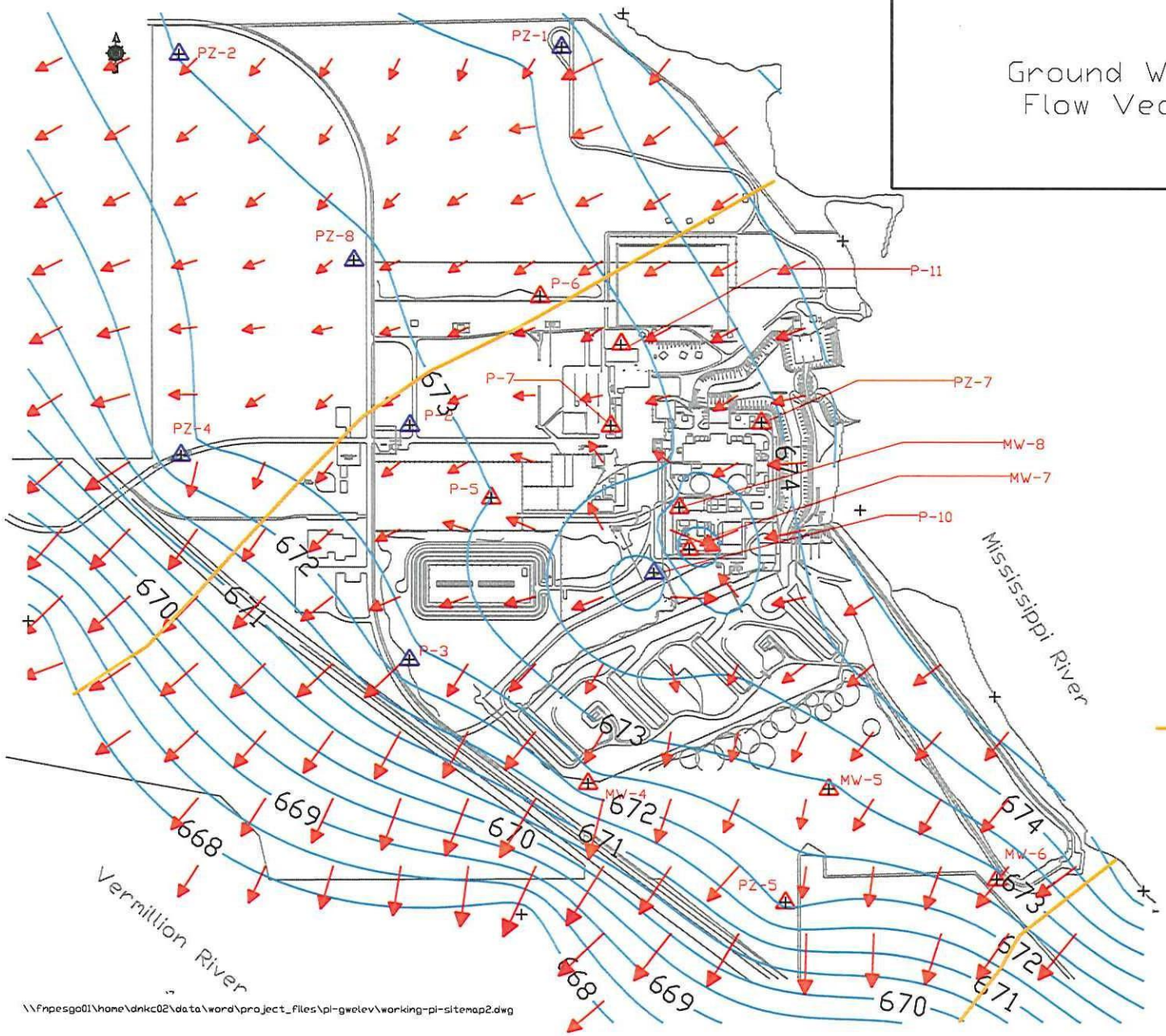
Well	North	East	Top of Riser Pipe Elev
MW-4	592236	2355090	693.02
MW-5	592201	2356566	686.83
MW-6	591642	2357597	682.33
MW-7	593685	2355714	695.54
MW-8	593944	2355654	697.47
P-10	593538	2355497	693.16
P-11	594949	2355297	698.19
P-2	594449	2354002	697.72
P-3	592998	2353997	698.19
P-5	594002	2354501	695.51
P-6	595250	2354802	699.3
P-7	594449	2355235	697.97
PZ-1	596790	2354934	682.91
PZ-2	596743	2352589	689.05
PZ-4	594262	2352598	696.53
PZ-5	591502	2356299	695.93
PZ-7	594469	2356158	697.85
PZ-8	595471	2353662	696.52

No-flow boundary: The approximate northern and southern limits of flow originating at PINGP for a specific day.

△ Well equiped with a data logger

APPENDIX B

Figure 5.
Ground Water Elevations and Flow Vectors for 7/8/2009



Well Locations Surveyed by
Johnson & Scofield Inc
November 21, 2007

Well	North	East	Top of Riser Pipe Elev
MW-4	592236	2355090	693.02
MW-5	592201	2356566	686.83
MW-6	591642	2357597	682.33
MW-7	593685	2355714	695.54
MW-8	593944	2355654	697.47
P-10	593538	2355497	693.16
P-11	594949	2355297	698.19
P-2	594449	2354002	697.72
P-3	592998	2353997	698.19
P-5	594002	2354501	695.51
P-6	595250	2354802	699.3
P-7	594449	2355235	697.97
PZ-1	596790	2354934	682.91
PZ-2	596743	2352589	689.05
PZ-4	594262	2352598	696.53
PZ-5	591502	2356299	695.93
PZ-7	594469	2356158	697.85
PZ-8	595471	2353662	696.52

No-flow boundary: The approximate northern and southern limits of flow originating at PINGP for a specific day.

△ Well equiped with a data logger

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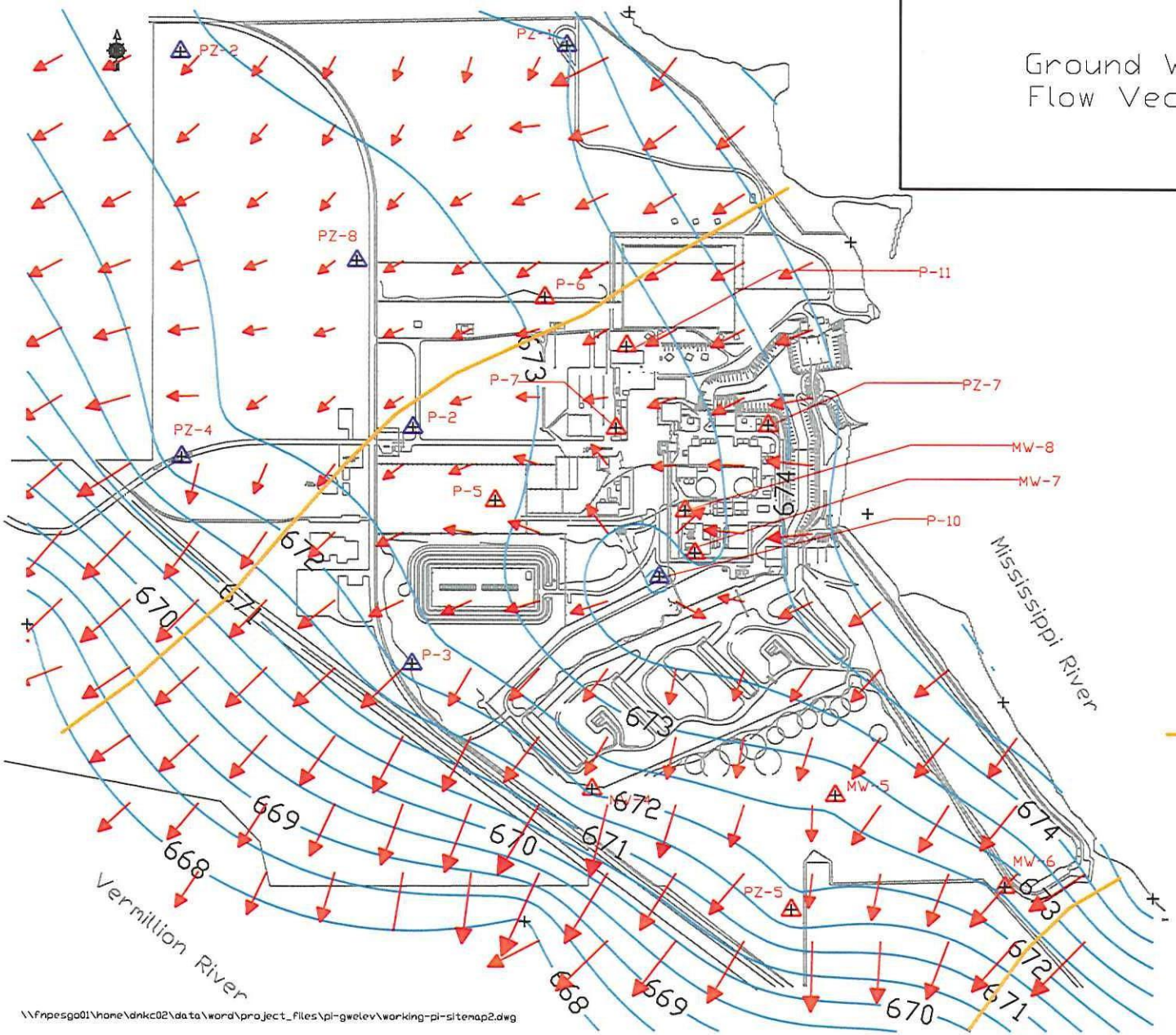
APPENDIX B

Figure 6.
Ground Water Elevations and Flow Vectors for 12/16/2009



\\fnpesga01\home\dnkc02\data\word\project_files\pi-gwelev\working-pi-sitemap2.dwg

Well Locations Surveyed by
Johnson & Scofield Inc
November 21, 2007

Well	North	East	Top of Riser Pipe Elev
MW-4	592236	2355090	693.02
MW-5	592201	2356566	686.83
MW-6	591642	2357597	682.33
MW-7	593685	2355714	695.54
MW-8	593944	2355654	697.47
P-10	593538	2355497	693.16
P-11	594949	2355297	698.19
P-2	594449	2354002	697.72
P-3	592998	2353997	698.19
P-5	594002	2354501	695.51
P-6	595250	2354802	699.3
P-7	594449	2355235	697.97
PZ-1	596790	2354934	682.91
PZ-2	596743	2352589	689.05
PZ-4	594262	2352598	696.53
PZ-5	591502	2356299	695.93
PZ-7	594469	2356158	697.85
PZ-8	595471	2353662	696.52

No-flow boundary: The approximate northern and southern limits of flow originating at PINGP for a specific day.

△ Well equiped with a data logger

APPENDIX B

Figure 7.
PINGP Ground Water Monitoring System Areas Hourly Flow Direction is Calculated
(see Figure 8 for results)

Well Locations Surveyed by
Johnson & Scofield Inc
November 21, 2007

Well	North	East	Top of Riser Pipe Elev
MW-4	592236	2355090	693.02
MW-5	592201	2356566	686.83
MW-6	591642	2357597	682.33
MW-7	593685	2355714	695.54
MW-8	593944	2355654	697.47
P-10	593538	2355497	693.16
P-11	594949	2355297	698.19
P-2	594449	2354002	697.72
P-3	592998	2353997	698.19
P-5	594002	2354501	695.51
P-6	595250	2354802	699.3
P-7	594449	2355235	697.97
PZ-1	596790	2354934	682.91
PZ-2	596743	2352589	689.05
PZ-4	594262	2352598	696.53
PZ-5	591502	2356299	695.93
PZ-7	594469	2356158	697.85
PZ-8	595471	2353662	696.52

△ Well equiped with a data logger

APPENDIX B

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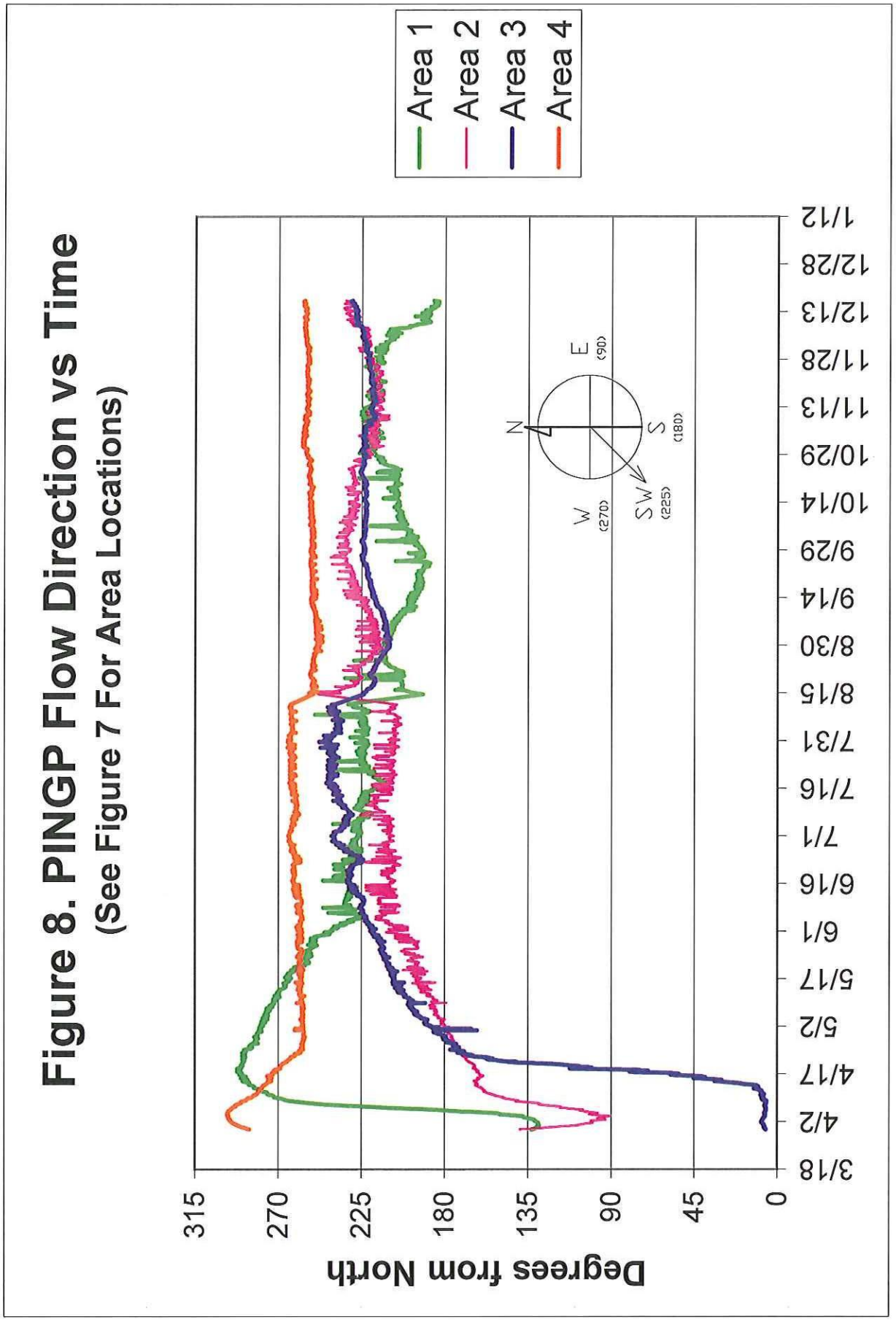
Figure 8. PINGP Flow Direction vs Time
(See Figure 7 For Area Locations)
Degrees from North
315
270
225
180
135
90
45
0
3/18
4/2
4/17
5/2
5/17
6/1
6/16
7/1
7/16
7/31
8/15
8/30
9/14
9/29
10/14
10/29
11/13
11/28
12/13
12/28
1/12
Area 1
Area 2
Area 3
Area 4
N
E
(90)
S
(180)
W
(270)
SW
(225)

Figure 9.
Composite of PINGP No-Flow Boundary Conditions.

Area which is down gradient of the PINGP Powerhouse and Canal System.

APPENDIX B

APPENDIX C

Xcel Energy®

Prairie Island Nuclear Generating Plant
1717 Wakonade Drive East
Welch, MN 55089

February 22, 2010

Ms. Beckie Olson
Minnesota Pollution Control Agency
Majors and Remediation Division
Attention: Ms. Beckie Olson
520 Lafayette Road North
St. Paul, MN 55155-4194

Subject: Prairie Island Nuclear Generating Plant
NPDES Permit – MN0004006
Application for Renewal

Dear Ms. Olson:

This application for renewal of the Prairie Island Plant's NPDES Permit (#MN 0004006) is being submitted at least 180 days prior to the expiration date of August 31, 2010 in accordance with Minnesota Rules, 7001.0040 subpart 3. The Plant's water flow diagram has been updated and is included as required with EPA Form 2C. The basic discharge points have not changed. Please utilize the attached NPDES Matrix for details of effluent characterization.

Priority pollutant sampling and analyses were conducted during November, 2009 – February, 2010. For the intake and discharges (SD001, 002, 005, 006, and 010) 24-hour composite sampling, individual samples were drawn to represent each hour of the 24-hour period as well as individual grab samples. Discharge sample point SD003 is a batch release, and therefore only grab samples are obtained when sampling. Deviations from required sampling was requested and approved by MPCA on November 23, 2009 e-mail correspondences which include:

- Delete sampling of the screen backwash and fish return line (SD012);
- Delete sampling of reverse osmosis system discharge (SD004);
- Not include sampling at cooling water discharges WS001 & WS002, as these are internal sample points and ultimately discharge at SD001 and points were not required during previous priority sampling in 2004;
- Collect only grab samples for batch release of Radwaste Treatment

APPENDIX C

Priority pollutant sampling results have been compiled under Part V of EPA Form 2C. Values reported under discharge SD001 as discharge flow were obtained from Prairie Island's PINGP 45, Rev. 41, External Circ Water Log. Winter and summer temperatures, and pH were derived from the Monthly Discharge Monitoring Reports (DMRs) for the previous 24-month period January 2008 – December 2009. Average flows reported under Part II of EPA Form 2C were derived from monthly DMRs for the previous 24 month period.

Previous negotiations with the Minnesota Pollution Control Agency (MPCA) concluded that submittal of a NPDES Limits matrix along with a cover letter and application would suffice for identifying outfalls, limits, and restrictions. Approved requests for new chemicals are included in the attached updated matrix dated February 16, 2010. This updated matrix replaces the previous NPDES Limits matrix dated November 1, 2004.

Regarding present NPDES Permit language and conditions, we request the following changes or inclusions when reissuing the permit.

1. **Land-lock Area Drainage System**

   Pursuant to the Public Utilities Commission (PUC) Order, *In the matter of the Application of Northern States Power Company d/b/a Xcel Energy for an LEPGP Site Permit for the Extended Power Uprate Project at the Prairie Island Nuclear Generating Plant*, Docket No. E-002/GS-08-690, the Commission order requires that Prairie Island discontinue permanently the discharge of any liquid waste into the landlocked area. We are requesting that all references related to the use of the landlocked area be removed from the NPDES permit. The plant has discontinued discharging any liquid waste into the landlocked area per the PUC order dated December 18, 2009.

2. **Emergency Intake Treatment**

   Parameter "Biocide" removed. The chemical treatment line has been disconnected from the Emergency Intake, biocide will not be used.

3. **Circulating Cooling Water & Condenser Cooling Water (SD001)**

   Parameter "Condenser Cleaning Balls" added. This is a previously approved and identified request. Added reporting requirements associated with condenser cleaning ball losses (Per MPCA e-mail directions received July 27th, 2006 and MPCA compliance evaluation response dated August 8th, 2008.)

4. **Steam Generator Blowdown (SD002)**

Parameter "Boric Acid" removed restriction. "Boron is added in higher concentration for steam generator crevice flushing". Boron will not be used for crevice flushing.

Parameter "Morpholine" removed. This chemical is no longer used.

Parameter "Hydrazine" updated the limit from "0-150 ppm" to "0-250 ppm" to more accurately reflect the concentration maintained in the steam generators.

Parameter "Carbohydrazide" updated the limit from "0-150 ppm" to "0-250 ppm" to more accurately reflect the concentration maintained in the steam generators.

Parameter "Methoxypropylamine" updated the limit from "0-150 ppm to "0-250" to more accurately reflect the concentration maintained in the steam generators.

5. **Radioactive Waste Effluent (SD003)**

Parameter "Boron" updated. Restrictions have been rewritten from "Concentration not to exceed 0.5-ppm ambient value at the sluice gates." to "If Mississippi River flow is less than 4200 cfs, then analyze tank for boron concentration."

Parameter "Potassium Chromate, Potassium Dichromate, Potassium Hydroxide" added and updated. Previously approved and identified request. Language to chromate restrictions include processing chromated water from normal seal leakage, system overflow, and planned system maintenance through the Liquid Rad Waste Treatment System. (Per MPCA e-mail approval received August 10th, 2009.)

6. **Reverse Osmosis System (SD004)**

Removed the reference to the land-lock drainage area. The plant has permanently discontinued the discharge of any liquid waste into the landlocked area per December 18th, 2009 PUC order.

7. **Turbine Building Sumps (TBS) (SD005 & SD006)**

   Removed the reference to the land-lock drainage area. The plant has permanently discontinued the discharge of any liquid waste into the landlocked area per December 18th, 2009 PUC order.

   Parameter "Aqueous Alkylamine" removed. This chemical is no longer used.

   Parameter "Steam Cleaning Waste Water" added. Previously approved and identified request. Waste from occasional steam cleaning of motors and equipment may be directed to the Turbine Building Sump after oil sorbents have removed oil and grease from the water.

8. **Fire Protection System**

   Parameter "Fire Protection Deluge System, Hose Stations and Accessory Equipment" added. Previously approved and identified request. The Fire Protection Deluge System, hose stations, and accessory equipment, containing river water, is flushed annually and land applied.

9. **Miscellaneous Plant Floor Drains (SD010)**

   No changes requested.

10. **Unit 1 & 2 Plant Cooling Water Outfalls (WS001 & WS002)**

    Parameter "Scale Inhibitor" added. Previously approved and identified request. Nalco 22300 added to replace NaBr as scale inhibitor (per MPCA e-mail approval received September 19th, 2007).

11. **Screen Backwash and Fish Return (SD012)**

    Parameter "Screen Size" removed.

12. Miscellaneous Use/Disposal Requests and Land Application

Removed the reference to the land-lock drainage area. The plant has permanently discontinued the discharge of any liquid waste into the landlocked area per December 18th, 2009 PUC order.

Parameter "Fish Disposal" added. Previously approved and identified request. "Fish carcasses collected from plant surface waters will be buried on site." (per MPCA approval letter dated December 18th, 1986, Don L. Kreins, Team Leader)

Parameter "Cooling Water" added. Periodically, during quarterly surveillance procedures cooling water is discharged to the ground and land applied via the cooling water return dump to grade valves.

Parameter "Insecticide" added. Previously approved and identified request. Applied by licensed applicator for spider control (per MPCA e-mail approval received Wednesday, May 6th, 2009).

Parameter "Herbicide" added. Applied by licensed applicator along fence areas, rock areas, and other areas for weed control.

Parameter "Screen Rinsing" reference removed. Reference to "Green Kleen" removed. Screens are washed with water only which may be land applied.

Parameter "Soda Blast Water" removed. This cleaning method is no longer used.

Parameter "Titanic C or Zyme" removed. This cleaning method is no longer used.

Parameter "Flush Water From Shock Chlorination of Potable Water Systems Piping and Wells" added. Previously approved and identified request. Flush water from shock chlorination of potable water systems piping and wells is drained to land application at least 50 feet from the river, and to ensure runoff does not reach the surface water.

Parameter "Non-Motorized Equipment Rinsing" added. Periodic rinsing of non- motorized equipment. Use of clean water only to rid equipment of dirt, grime and road salts accumulated doing transport.

13. Temperature Limitations

No changes requested.

14. Plant Discharge Limits

During the months of April and June the plant has two discharge limits within each month, we are requesting that the DMRs for these months be formatted to allow the entry of two total and monthly average flow values.

15. Water Conservation Measures

Prairie Island utilizes various means to minimize impact on the Mississippi River. Based on requirements of the plant's NPDES permit, Prairie Island operates cooling towers to minimize thermal discharges to the river. Prairie Island further minimizes thermal impact by recycling approximately 50% of the discharge water back to the intake during winter, and as regulated in spring by Chapter 1, Section 5.1 of the present permit thus reducing impingement impacts on early-life stages of fish.

Additionally, existing wastewater re-utilization arrangements include, providing discharge canal water to an adjacent wetland to support variable water levels and simulate seasonal fluctuations for the benefit of wildlife, in accordance with MDNR requirements. Reuse of plant systems effluent by directing discharge to the recycle canal for mixing with circulating water prior to reentering the plant, ultimately reduces overall intake of river water.

16. Ecological Monitoring

As proposed in the Verification Monitoring Plan included with the 316(b) Comprehensive Demonstration Study submitted October 27, 2006, the PINGP Annual Environmental Report should be considered as the 316(b) bi-annual status report outlined in Chapter 1, Section 5.19 of the current NPDES permit. The annual report will include data consistent with past Annual Environmental Reports.

17. Emergency Intake Bay Cleaning

Request inclusion in NPDES permit of annual cleaning and inspection of Emergency Intake Bay located in the plant screenhouse. This is a previously approved and identified request. We are requesting that approval to route decant water from this work back to the plants internal canal be included with the conditions as outlined in the below approval:

> Pursuant to the February 24, 2009 e-mail request, "the Minnesota Pollution Control Agency (MPCA) is hereby approving cleaning the Emergency Intake Bay located inside the plant screenhouse. The cleaning will be conducted by a contractor using a diver and a hydraulic pump to provide suction. The water and material will be routed to a large bag filter (Geotube) in a sealed roll off box to separate out the material. Decant water will either be routed to the intake canal or to a bay located within the plant screenhouse. Material removed during the cleaning will be disposed of in the plant's existing dredge spoils site. Storage, reuse, and/or disposal of the material removed from the intake bay must be managed in accordance with the requirements of the plant's NPDES/SDS permit."

18. Zebra Mussel Treatment

Request inclusion in NPDES permit. Prairie Island conducted its first treatment of the circulating/cooling water system in 2000 with subsequent annual treatments in 2001, 2002, 2004, 2005 and 2006. In 2007 to the present, treatments were conducted twice per year.

During this time period the zebra mussel population has also continued to increase in the river system. Prairie Island expects to continue to conduct one or two zebra mussel treatments each year to minimize the zebra mussel densities within the plants circulating and cooling water systems.

We are requesting to add the following zebra mussel treatment plan and limits to the NPDES permit based on historical data and recently utilized chemical application concentrations.

Historical Data

Date of Treatment	Amount of CL-2005 (lbs)	Amount of Clay (lbs)	Blowdown Rate (cfs)	System Demand	Ave.Temp. (Deg. F)
19-Apr-06	10,100	62,000	141	1.8	79.57
24-Apr-07	4,417	35,000	179	0.39	80.00
26-Sep-07	6,300	38,000	250	1.52	82.38
15-May-08	6,301	39,350	195	0.8	83.00
4-Sep-08	4,770	36,350	172	1.9	83.00
6-May-09	2,996	41,500	180	0.3	83.00
27-Aug-09	7,921	45,430	385	0.1	83.00

As data shows, the amount of chemical and clay is dependent on the blowdown rate, system demand and the temperature of the water. The higher the blowdown rate and system demand, the more chemical and clay is needed. The lower the water temperature, the more chemical and clay is needed. Also with lower temperatures, the treatment will take longer to complete. Ideally, the water temperature should be around 83.00°. F, the blowdown rate at less than 300 cfs and the system demand less than 1.2. However, these conditions can not always be met. Prairie Island is requesting enough chemical and clay to treat worst case conditions.

Worst Case Conditions

Amount of CL-2005 (lbs)	Amount of Clay (lbs)	Blowdown Rate (cfs)	System Demand	Ave.Temp. (Deg. F)
12,300	87,000	300 to 400	3.2 to 4.0	79

All efforts to minimize the amount of chemical and clay used will be made.

APPENDIX C

Zebra Mussel Treatment-Chemical Application

A quaternary amine (molluscicide, CL-2005) shall be applied in the recycle canal and allowed to flow through the circulation water and parts of the cooling water systems.

a. Targeted chemical concentrations shall be 4 to 5 ppm above the system demand as measured the morning of the treatment.
b. No more than 12,300 pounds of chemical will be applied.
c. A MN Licensed Aquatic Pest Control applicator shall be present during the treatment.
d. The chemical application shall last approximately 8 to 12 hours.
e. The chemical shall be allowed to naturally dissipate for 2 hours or more prior to detoxification of the entire water system.

Zebra Mussel Treatment-Clay Application

a. No more than 87,000 pounds (total) of Bentonite clay shall be used to detoxify the chemical.
b. The clay shall be applied in the discharge canal, downstream from the discharge gates, at the sluice gates and in the fish return line.
c. The discharge gate clay application system and the fish return clay application system shall start prior to the start of the chemical application.
d. The sluice gate clay application system shall start a couple hours after the start of the chemical addition.
e. At the end of the treatment, clay shall be applied to the discharge basin to detoxify the entire recycle canal, circulation water system and cooling water system.
f. The clay detoxification shall continue until all sampling points show no detection in 2 consecutive samples taken at least 1 hour apart.

APPENDIX C

Zebra Mussel Treatment-Air Sparge Systems

a. Two air sparging systems shall be installed at or near the discharge canal gates.
b. One shall be located on the clay header, and one located 10 to 15 feet downstream from the clay header.

Zebra Mussel Treatment-Monitoring

a. The sample points shall be monitored hourly and are as follows:
    - Unit 1 Intake
    - Unit 2 Intake
    - Discharge Basin
    - Discharge Canal ¼
    - Sluice Gate
b. Samples from U1 and U2 Intake shall be grabbed the day before the treatment and analyzed for system demand.
c. A Sample from the river shall be grabbed and analyzed for river demand the day before the treatment.
d. Samples from U1 and U2 Intake shall be grabbed the morning of the treatment and analyzed for system demand. The treatment application rate shall be based on this result.
e. If the system demand is 4 ppm or greater, the treatment will not occur.
f. If the system demand is less the 4 ppm, but greater than 3.2 ppm, the MPCA shall be informed.
g. If the Discharge Canal ¼ sample point result shows a residual and it is less than 1.5 ppm, THEN
    - The chemical addition shall continue.
    - Reanalysis of the sample will be initiated OR a new sample will be grabbed and analyzed.
h. If the Discharge Canal ¼ sample point result shows a residual that is greater than 1.5 ppm, THEN
    - The chemical addition shall be halted.
    - Reanalysis of the sample shall be initiated OR a new sample shall be grabbed and analyzed.
i. Continuation of the treatment may commence if no residual is seen at the sluice gates after 3 hours has elapsed from the time of the exceedance, depending on the time of day the residual was seen.
j. If the Sluice Gate sample point result shows a residual, THEN
    - The chemical addition shall be halted and not restarted.
    - Reanalysis of the sample shall be initiated OR a new sample shall be grabbed and analyzed.

APPENDIX C

Zebra Mussel Treatment-Post Job Summation Report

a. The Post Job Summation Report shall include the following information:
   - Date of treatment
   - Description of application set up
   - The amount of chemical used
   - The amount of clay used
   - System Demand results
   - Blowdown rate
   - Temperature of the water
   - Monitoring results
   - Effectiveness of treatment
   - Description of any issues

b. A Report will be provided to MPCA after each treatment.

Your review and consideration of our requests and proposals discussed above is appreciated. A check for $350.00 payable to the Minnesota Pollution Control Agency is enclosed to cover the application fee. Please forward a draft of the reissued permit for review prior to public notice. If you have questions or comments, please contact Brent Kuhl at 651-388-1121 ext. 4419, or Jeanne Tobias at 651-388-1121 ext 4626.

Sincerely,

Kevin P. Ryan
Plant Manager
Prairie Island Nuclear Generating Plant

c: Dave Gauger
Jeanne Tobias
Brent Kuhl
Pat Flowers
ES Records Center

CERTIFICATE OF SERVICE

I, SaGonna T. Thompson, hereby certify that I have this day served copies of the foregoing document on the attached list of persons.

xx by depositing a true and correct copy thereof, properly enveloped with postage paid in the United States Mail at Minneapolis, Minnesota

xx electronic filing

Docket No. E002/GS-08-690

- In the Matter of Xcel Energy's Petition for a Site Permit for the Prairie Island Nuclear Generating Plant for Extended Power Uprate

Dated this 18th day of June 2010

/s/

_____

SaGonna T. Thompson

Service List Name	First Name	Last Name	Email	Company Name	Address	Delivery Method	View Trade Secret
OFF_SL_8-690_CC-SL-7-2-09	Andrew	Moratzka	apm@mcmlaw.com	Mackall, Crounse and Moore	1400 AT&T Tower 901 Marquette Ave Minneapolis, MN 55402	Electronic Service	Yes
OFF_SL_8-690_CC-SL-7-2-09	Arshia	Javaherian	arshiajavaherian@alliantenergy.com	Interstate Power and Light.	PO Box 351 Cedar Rapids, IA 524060351	Paper Service	No
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OFF_SL_8-690_CC-SL-7-2-09	Bianca	Calatayud	calatayud@mdh-law.com	Madigan, Dahl & Harlan	N/A	Electronic Service	No
OFF_SL_8-690_CC-SL-7-2-09	Brian	Zelenak	brian.r.zelenak@xcelenergy.com	Xcel Energy	414 Nicollect Mall 7th Floor Minneapolis, MN 554011993	Paper Service	No
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OFF_SL_8-690_CC-SL-7-2-09	Carol	Overland	overland@legalectric.org	Legalectric, Inc.	P.O. Box 176 Red Wing, MN 55066	Paper Service	No
OFF_SL_8-690_CC-SL-7-2-09	David	Aafedt	daafedt@winthrop.com	Winthrop & Weinstine, P.A.	Suite 3500, 225 South Sixth Street Minneapolis, MN 554024629	Paper Service	Yes
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OFF_SL_8-690_CC-SL-7-2-09	John	Lindell	agorud.ecf@state.mn.us	OAG-RUD	900 BRM Tower 445 Minnesota St St. Paul, MN 551012130	Paper Service	Yes
OFF_SL_8-690_CC-SL-7-2-09	Julia	Anderson	Julia.Anderson@state.mn.us	MN Office Of The Attorney General	1400 BRM Tower 445 Minnesota St St. Paul, MN 551012131	Paper Service	Yes

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OFF_SL_8-690_CC-SL-7-2-09	Patricia	Silberbauer	Pat.Silberbauer@state.mn.us		Suite 1400 445 Minnesota Street St. Paul, MN 55101-2131	Electronic Service	Yes
OFF_SL_8-690_CC-SL-7-2-09	Richard C.	Luis	Richard.Luis@state.mn.us	Office of Administrative Hearings	PO Box 64620 St. Paul, MN 551640620	Paper Service	Yes
OFF_SL_8-690_CC-SL-7-2-09	Robert S	Lee	RSL@MCMLAW.COM	Mackall Crounse & Moore Law Offices	1400 AT&T Tower 901 Marquette Avenue Minneapolis, MN 554022859	Paper Service	Yes
OFF_SL_8-690_CC-SL-7-2-09	SaGonna	Thompson	Regulatory.Records@xcelenergy.com	Xcel Energy	414 Nicollet Mall FL 7 Minneapolis, MN 554011993	Electronic Service	No
OFF_SL_8-690_CC-SL-7-2-09	Sharon	Ferguson	sharon.ferguson@state.mn.us	State of MN - DOC	85 7th Place E Ste 500 Saint Paul, MN 551012198	Electronic Service	Yes
OFF_SL_8-690_CC-SL-7-2-09	Thomas P.	Harlan	harlan@mdh-law.com	Madigan, Dahl & Harlan, P.A.	222 South Ninth Street Suite 3150 Minneapolis, MN 55402	Electronic Service	No