



800 Nicollet Mall
Minneapolis, MN 55402

November 8, 2005

Minnesota Public Utilities Commission
attn: Burl Haar, Executive Secretary
121 7th Place E., Suite 350
Saint Paul, MN 55101-2147

Re: Xcel Energy Services, Inc.; High Bridge Generating Facility Gas Pipeline Routing Permit Application; PUC Docket No. G-002/GP05-1706 High Bridge

Mr. Haar:

Attached for your review is an Application to the Minnesota Public Utilities Commission for a Gas Pipeline Routing Permit and Partial Exemption from Pipeline Route Selection Procedures. We are providing fifteen (15) copies of this pipeline routing permit application for consideration and approval by the MPUC. An electronic copy on CD is also included.

The proposed gas pipeline is a 2.5 mile, 20-inch diameter pipeline designed to operate at 650 pounds per square inch gauge (psig), with a maximum allowable operating pressure of 692 psig. The pipeline will originate at the Mendota Regulator Station in Mendota Heights, and will terminate at the High Bridge generating facility. The pipeline is designed to deliver natural gas at a rate of between 76.8 and 148.8 million cubic feet per day (Mcf/d). It is to be placed in service in May of 2008 at an estimated cost of \$6.9 million.

The proposed gas pipeline route will be built using both open trench and directionally drilled construction techniques. The open trench segment accounts for approximately 1.1 miles of the route. Directional drilling is proposed at both ends of the route, including drilling under the Mississippi

River and the north west end of Pickerel Lake. Directional drilling accounts for a total of 1.4 miles of the proposed route.

We have endeavored to present the MPUC with a complete gas pipeline routing permit application. It is our hope that the MPUC will determine that the application is complete, and that MPUC acceptance of the gas pipeline routing permit application can initiate the 90-day review process. We will continue to work with Larry Hartman to coordinate the publication of legal notices and the organization of public information meetings as specified in Minnesota Rules Chapter 4415.

Questions and comments can be directed to Xcel Energy Gas Project Manager Barry Simonson at (651) 229-2510. Thank you for your consideration of this gas pipeline routing permit application.

Sincerely,

Tim Taylor
Vice President, Asset Management and Field Operations
Xcel Energy

**APPLICATION TO THE
MINNESOTA PUBLIC UTILITIES COMMISSION**

FOR A

**GAS PIPELINE ROUTING PERMIT
AND
PARTIAL EXEMPTION FROM PIPELINE ROUTE
SELECTION PROCEDURES**

**HIGH BRIDGE GENERATING PLANT
CONVERSION PROJECT**

PUC DOCKET NO. G-002/GP05-1706 HIGH BRIDGE

NOVEMBER 2005



**Application for a Gas Pipeline Routing Permit
and
Partial Exemption from Pipeline Route Selection
Procedures
High Bridge Generating Facility Conversion Project**

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Application for Gas Pipeline Routing Permit Content Requirement and Completeness Checklist

Authority	Required Information	Location of Required Content
4415.0115	GENERAL INFORMATION.	
Subp. 1.	Cover letter. Each application must be accompanied by a cover letter signed by an authorized representative or agent of the applicant. The cover letter must specify the type, size, and general characteristics of the pipeline for which an application is submitted.	Cover Letter
Subp. 2.	Title page and table of contents. Each application must contain a title page and a complete table of contents.	Title Page and Table of Contents
Subp. 3.	Statement of ownership. Each application must include a statement of proposed ownership of the pipeline as of the day of filing and an affidavit authorizing the applicant to act on behalf of those planning to participate in the pipeline project.	Cover Letter, Section 1
Subp. 4.	Background information. Each application must contain the following information:	
A.	the applicant's complete name, address, and telephone number;	1.3
B.	the complete name, title, address, and telephone number of the authorized representative or agent to be contacted concerning the applicant's filing;	1.3
C.	the signatures and titles of persons authorized to sign the application, and the signature of the preparer of the application if prepared by an outside representative or agent; and	1.3
D.	a brief description of the proposed project which includes:	Section 1
(1)	general location;	1.1
(2)	planned use and purpose;	1.2

(3)	estimated cost;	1.1, 2.6
(4)	planned in-service date; and	1.3
(5)	general design and operational specifications for the type of pipeline for which an application is submitted.	1.1
4415.0120	DESCRIPTION OF PROPOSED PIPELINE AND ASSOCIATED FACILITIES.	
Subp. 1.	Pipeline design specifications. The specifications for pipeline design and construction are assumed to be in compliance with all applicable state and federal rules or regulations unless determined otherwise by the state or federal agency having jurisdiction over the enforcement of such rules or regulations. For public information purposes, the anticipated pipeline design specifications must include but are not limited to:	2.1
A.	pipe size (outside diameter) in inches;	2.1
B.	pipe type;	2.1
C.	nominal wall thickness in inches;	2.1
D.	pipe design factor;	2.1
E.	longitudinal or seam joint factor;	2.1
F.	class location and requirements, where applicable;	2.1
G.	specified minimum yield strength in pounds per square inch; and	2.1
H.	tensile strength in pounds per square inch.	2.1
Subp. 2.	Operating pressure. Operating pressure must include:	2.2
A.	operating pressure (psig); and	2.2
B.	maximum allowable operating pressure (psig).	2.2
Subp. 3.	Description of associated facilities. For public information purposes, the applicant	2.3

	shall provide a general description of all pertinent associated facilities on the right-of-way.	
Subp. 4.	Product capacity information. The applicant shall provide information on planned minimum and maximum design capacity or throughput in the appropriate unit of measure for the types of products shipped as defined in part 4415.0010.	2.4
Subp. 5.	Product description. The applicant shall provide a complete listing of products the pipeline is intended to ship and a list of products the pipeline is designed to transport, if different from those intended for shipping.	2.4
Subp. 6.	Material safety data sheet. For each type of product that will be shipped through the pipeline, the applicant shall provide for public information purposes the material identification, ingredients, physical data, fire and explosive data, reactivity data, occupational exposure limits, health information, emergency and first aid procedures, transportation requirements, and other known regulatory controls.	Appendix A
4415.0125	LAND REQUIREMENTS. For the proposed pipeline, the applicant shall provide the following information:	2.5
A.	permanent right-of-way length, average width, and estimated acreage;	2.5
B.	temporary right-of-way (workspace) length, estimated width, and estimated acreage;	2.5
C.	estimated range of minimum trench or ditch dimensions including bottom width, top width, depth, and cubic yards of dirt excavated;	2.5
D.	minimum depth of cover for state and federal requirements; and	2.5
E.	rights-of-way sharing or paralleling: type of facility in the right-of-way, and the estimated length, width, and acreage of the right-of-way.	2.5
4415.0130	PROJECT EXPANSION. If the pipeline and associated facilities are designed for expansion in the future, the applicant shall provide a description of how the proposed	1.2

	pipeline and associated facilities may be expanded by looping, by additional compressor and pump stations, or by other available methods.	
4415.0135	RIGHT-OF-WAY PREPARATION PROCEDURES AND CONSTRUCTION ACTIVITY SEQUENCE. Each applicant shall provide a description of the general right-of-way preparation procedures and construction activity sequence anticipated for the proposed pipeline and associated facilities.	5.1
4415.0140	LOCATION OF PREFERRED ROUTE AND DESCRIPTION OF ENVIRONMENT.	
Subp.1.	Preferred route location. The applicant must identify the preferred route for the proposed pipeline and associated facilities, on any of the following documents which must be submitted with the application:	3.1
A.	United States Geological Survey topographical maps to the scale of 1:24,000, if available;	See Item C.
B.	Minnesota Department of Transportation county highway maps; or	See Item C.
C.	aerial photos or other appropriate maps of equal or greater detail in items A and B. The maps or photos may be reduced for inclusion in the application. One full-sized set shall be provided to the PUC.	Figures 1-1 and 1-2, Appendix B
Subp. 2.	Other route locations. All other route alternatives considered by the applicant must be identified on a separate map or aerial photos or set of maps and photos or identified in correspondence or other documents evidencing consideration of the route by the applicant.	3.3, Figure 3-1
Subp. 3.	Description of environment. The applicant must provide a description of the existing environment along the preferred route.	Section 4

4415.0145	ENVIRONMENTAL IMPACT OF PREFERRED ROUTE. The applicant must also submit to the PUC along with the application an analysis of the potential human and environmental impacts that may be expected from pipeline right-of-way preparation and construction practices and operation and maintenance procedures. These impacts include but are not limited to the impacts for which criteria are specified in part 4415.0040 or 4415.0100.	Section 4
4415.0150	RIGHT-OF-WAY PROTECTION AND RESTORATION MEASURES.	
Subp.1.	Protection. The applicant must describe what measures will be taken to protect the right-of-way or mitigate the adverse impacts of right-of-way preparation, pipeline construction, and operation and maintenance on the human and natural environment.	Section 4, 5.1.7
Subp. 2.	Restoration. The applicant must describe what measures will be taken to restore the right-of-way and other areas adversely affected by construction of the pipeline.	5.1.7
4415.0160	OPERATION AND MAINTENANCE. Pipeline operations and maintenance are assumed to be in compliance with all applicable state and federal rules or regulations, unless determined otherwise by the state or federal agency having jurisdiction over the enforcement of such rules or regulations. For public information purposes, the applicant must provide a general description of the anticipated operation and maintenance practices planned for the proposed pipeline.	5.2
4415.0165	LIST OF GOVERNMENT AGENCIES AND PERMITS. Each application must contain a list of all the known federal, state, and local agencies or authorities and titles of the permits they issue that are required for the proposed pipeline and associated facilities.	1.5
4415.0040, Subp.3	CRITERIA FOR PARTIAL EXEMPTION FROM PIPELINE ROUTE SELECTION PROCEDURES.	
A.	human settlement, existence and density of populated areas, existing and planned future land use, and management plans;	4.1
B.	the natural environment, public and designated lands, including but not limited to natural areas, wildlife habitat, water,	4.2

	and recreational lands;	
C.	lands of historical, archaeological, and cultural significance;	4.3
D.	economies within the route, including agricultural, commercial or industrial, forestry, recreational, and mining operations;	4.3
E.	pipeline cost and accessibility;	2.6, 1.1
F.	use of existing rights-of-way and right-of-way sharing or paralleling;	2.5
G.	natural resources and features;	4.2
H.	the extent to which human or environmental effects are subject to mitigation by regulatory control and by application of the permit conditions contained in part 4415.0185 for pipeline right-of-way preparation, construction, cleanup, and restoration practices;	Section 4
I.	cumulative potential effect of related or anticipated future pipeline construction; and	Section 4
J.	relevant policies, rules, and regulations of the state and federal agencies and local government land use laws including ordinances adopted under Minnesota Statutes, section 299J.05, relating to the location, design, construction, or operation of the proposed pipeline and associated facilities.	Section 4

Acronyms and Definitions of Terms Used in this Application

Alignment: The ground plan providing the exact placement a pipeline. For the purposes of this pipeline routing permit application, “alignment” refers to the specific path and depth that the proposed gas pipeline will follow. Compare “route”.

APE: Area of potential impact, by standard protocol an area defined by a 1 mile buffer around a proposed gas pipeline.

BMP: Best management practice(s); structural, nonstructural and managerial techniques designed to reduce the quantities of pollutants from nonpoint sources.

CFR: Code of federal regulations

DOT: Department of Transportation

LGU: Local Government Unit

Mcfg: Million cubic feet per day, a measure of pipeline capacity

MN DNR: Minnesota Department of Natural Resources

MERP: Xcel Energy’s Metro Emissions Reduction Program, a \$1 billion package of improvements at three Twin Cities coal-powered plants to significantly reduce air emissions from those facilities while increasing the amount of electricity they can produce

MNOPS: Minnesota Office of Pipeline Safety

MNRRRA: Mississippi National River and Recreation Area

MPUC: Minnesota Public Utilities Commission

MSDS: Material safety data sheets; documents prepared by the supplier or manufacturer of a product clearly stating hazardous nature, ingredients, precautions to follow, health effects and safe handling/storage information.

NRHP: National Register of Historic Places

NRCS: U.S. Department of Agriculture's Natural Resources Conservation Service

NWI: U.S. Fish and Wildlife Service's National Wetlands Inventory

Pipeline: pipe designed to be operated at a pressure of more than 275 pounds per square inch and to carry gas (Minnesota Rules Chapter 4415.0010, Subpart 26B).

Pipeline routing permit: the written document issued by the board to the permittee that designates a route for a pipeline and associated facilities, conditions for right-of-way preparation, construction, clean-up, and restoration.

psig: Pounds per square inch gauge; gas pressure that is measured against atmospheric pressure. This is a pressure gauge reading in which the gauge is adjusted to read zero at the surrounding atmospheric pressure.

Right-of-way: the interest in real property used or proposed to be used within a route to accommodate a pipeline and associated facilities (MN Rules Ch. 4415.0010, Subp. 31).

Route: the proposed location of a pipeline between two end points. A route may have a variable width from the minimum required for the pipeline right-of-way up to 1.25 miles (MN Rules Ch. 4415.0010, Subp. 32).

SHPO: State Historic Preservation Office

Study area: A 225 foot wide area, following the approximate centerline of the proposed pipeline alignment, designated for detailed natural resources inventory in support of the pipeline routing permit application. This study area also includes a 60-foot radius around proposed bore pit locations, and 3.7 additional acres to assess impacts of pipeline construction, operation and maintenance on wetlands.

USDA: U.S. Department of Agriculture

USGS: U.S. Geological Survey

1 Introduction

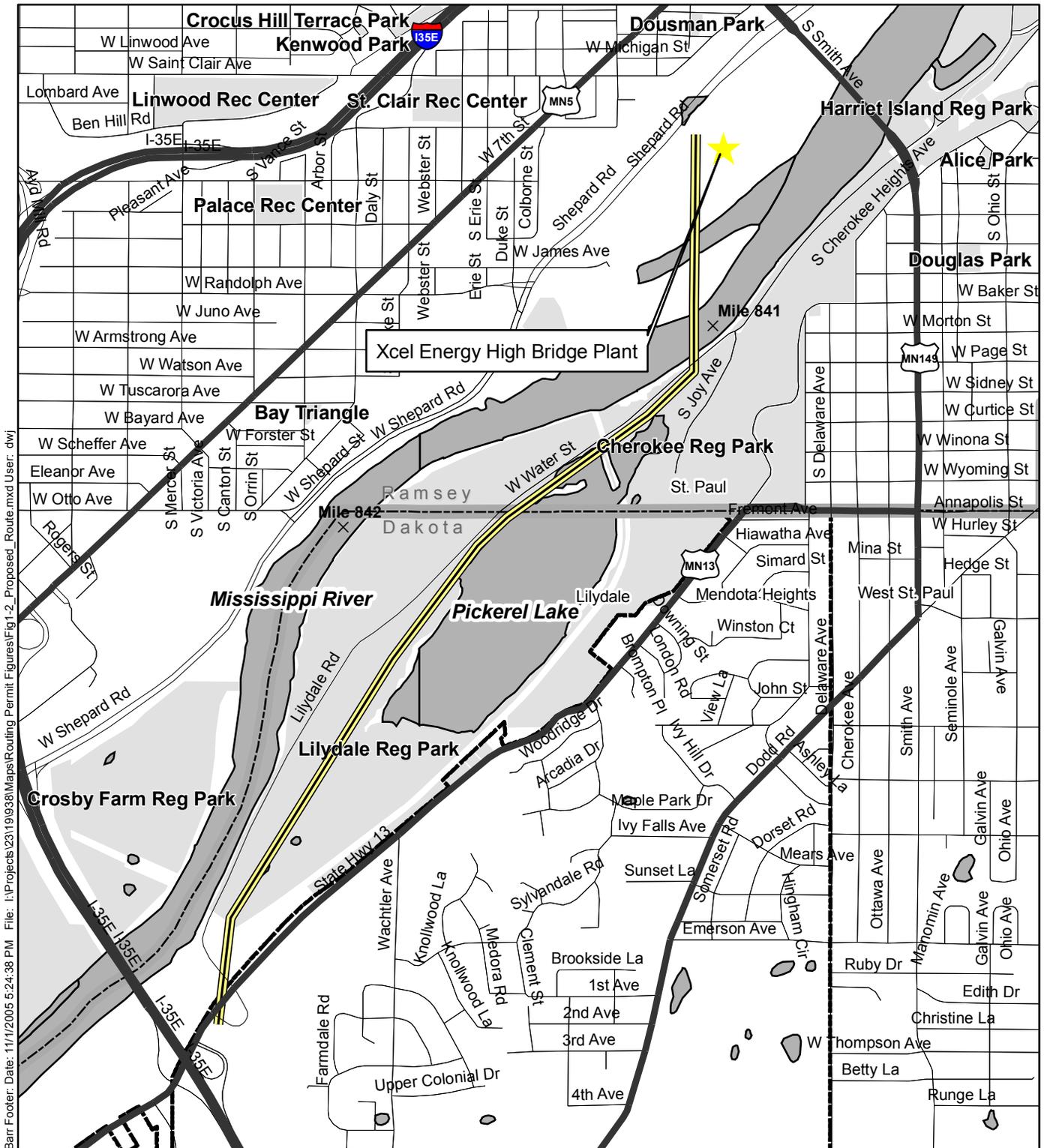
1.1 Overview

Northern States Power Company, doing business as Xcel Energy (“Xcel Energy”), is proposing to install a 2.5 mile, 20-inch diameter high-pressure (650 psig) pipeline originating at the Mendota Regulator Station and terminating at the High Bridge generating facility. The installation of a high-pressure gas pipeline is essential to the conversion of the Xcel Energy High Bridge facility (the “Plant”) from a coal-powered generating plant to a natural gas combined cycle unit. The pipeline is designed to deliver natural gas at a rate of between 76.8 million cubic feet per day (Mcf/d) and 148.8 Mcfd. The pipeline is to be placed in service May 2008 for an estimated cost of \$6.9 million.

The Mendota Regulator Station is in the southeast quadrant of the interchange between Interstate Highway 35E and Minnesota Highway 13. The High Bridge facility is on the north shore of the Mississippi River near downtown Saint Paul. (Figure 1-1, Project Location).

The proposed route will be accessed by following the existing electric transmission line. The route will require construction activities including open trenching and directional boring, including directional drilling under the Mississippi River. Directionally-drilled sections of the gas pipeline will account for approximately 1.4 miles of the total pipeline length. The remaining 1.1 miles will be open trench installation. The pipeline will be located within public right-of-way and private utility easements in the cities of Mendota Heights, Lilydale, and Saint Paul in Dakota and Ramsey Counties. The Plant site and the proposed routing of the pipeline are shown in Figure 1-2, Proposed Route and in Appendix B.

Minn. Stat. Sec. 116I.015 subd. 2 provides for the partial exemption of certain routes from the pipeline routing procedures ordinarily required for a pipeline under the statute. The rule recognizing this statutory authority is Minn. Rules pt. 4415.0020 subp. 3 whereby the “... (PUC) *may exempt a proposed pipeline from part of the pipeline routing permit procedures ... if the (PUC) determines that the proposed pipeline will not have a significant impact on humans or the environment.*” [Note: parenthetical references to PUC read “board” in Minn. Rules 4415.0020, subp. 3, referring to the Minnesota Environmental Quality Board (MEQB), which is now part of the Department of Commerce.]



Barr Footer: Date: 11/1/2005 5:24:38 PM File: I:\Projects\231191938\Maps\Routing\Permit Figures\Fig 1-2_Proposed_Route.mxd User: dwj

-  County Boundary
-  City/Twp. Boundary
-  Lakes and Rivers
-  Parks
-  Highway
-  Road



Figure 1-2

Proposed Pipeline Route
 Xcel Energy High Bridge Generating Facility
 Gas Pipeline Routing Permit Application
 Saint Paul, MN

November 2005

In accordance with Minn. Stat. Sec. 116I.015 subd. 2, as implemented through Minn. Rules, parts 4415.0035 to 4415.0040, Xcel Energy is requesting a pipeline routing permit and a partial exemption from the pipeline routing permit procedures otherwise required under Minn. Rules Chapter 4415 for the routing of a pipeline from the Mendota Regulator Station to the High Bridge Plant site. This application contains the applicable information required by Minn. Rules Chapter 4415 in support of this request.

1.2 Purpose

The primary purpose of the pipeline project is to provide a natural gas fuel supply to the High Bridge Generating Plant. The plant will provide Xcel Energy's customers with a low cost, dedicated source of electric generation and will help Xcel Energy meet electricity demands. The conversion project will consist of two combustion turbine-generators, corresponding heat recovery steam generators and a new steam turbine. The project will provide 480-665 MW of generating capacity (nominal range depending on operating conditions), a substantial increase of capacity from the existing coal-fired plant. Fuel for the combustion turbines will be clean burning natural gas.

Xcel Energy may choose to use the pipeline to serve other customers, but no specific customers or service areas have been identified at the time of this application filing. At the present time, there are no plans to expand the capacity of this pipeline.

The High Bridge generating station in downtown Saint Paul, Minnesota is one of the generating facilities included in Xcel Energy's Metro Emissions Reduction Project (MERP) project. MERP is a proposal authorized by the Minnesota Public Utilities Commission (MPUC). Through MERP, Xcel Energy proposed a nearly \$1 billion package of improvements at three Twin Cities coal-powered generating plants to significantly reduce air emissions from those facilities while increasing the amount of electricity they can produce.

MERP received broad support in the Twin Cities area and surrounding communities, reflecting a successful partnership that included lawmakers, government agencies, environmental groups, business communities, and the neighborhood groups and individuals who live near our power plants. Through MERP, Xcel Energy will be reducing air emissions from the three plants by some 80 percent, while increasing generating capacity by over 300 megawatts. MERP improvements include replacing the existing High Bridge coal-fired

facility with a natural gas combined cycle unit. The proposed gas pipeline that is the subject of this permit is therefore a necessary component of the overall MERP project.

1.3 Applicant Information

Applicant's Complete Name, Address, and Telephone Number:

Northern States Power Company d/b/a Xcel Energy
800 Nicollet Mall
Minneapolis, MN 55402
1-800-328-8226

Complete Name, Title, Address, and Telephone Number of the Authorized Representative or Agent to be Contacted Concerning this Filing:

Barry Simonson
Gas Project Manager MERP
Northern State Power Company d/b/a Xcel Energy
825 Rice Street
Saint Paul, MN 55117
651-229-2510

Signature and Title of the Person Authorized to Sign this Application:

Tim Taylor
Vice President, Asset Management & Field Operations
Xcel Energy

1.4 Schedule

Construction will begin as soon as permits and rights-of-way have been acquired. Construction activities will be scheduled to occur during the winter months of late 2006 and early 2007. This will minimize impacts to most natural resources within the project area. Xcel Energy has a target in service date of May 2008 for the pipeline.

1.5 Other Required Permits

This section addresses the requirements of Minnesota Rules 4415.0165 to list known permits required for the project.

Known government agency jurisdictions and permits/approvals required are listed below:

- The Minnesota Public Utilities Commission (PUC) requires a pipeline routing permit for the Pipeline project. Although Xcel Energy is seeking a partial exemption from the pipeline routing process, PUC will still issue a pipeline routing permit.
- Road crossing permits will be required from the Dakota and Ramsey County Highway Departments and the Minnesota Department of Transportation.
- The Minnesota Pollution Control Agency will administer the nationwide storm water permit for construction activity required due to the anticipated disturbance of more than 1 acre during construction.
- A project notification will be sent to the Minnesota Office of Pipeline Safety.
- U.S. Army Corps of Engineers Section 404 Wetland Permit, Section 10 Permit
- Minnesota Wetland Conservation Act [Note: Local Government Unit (LGU) is the City of Saint Paul.]
- MN DNR License to cross public waters (Mississippi and Pickerel Lake)

In connection with the High Bridge Generating Plant conversion project, Xcel Energy is pursuing several other permits and approvals as required for development of the Plant. The High Bridge Plant conversion was expressly exempted from certificate of need requirements by “Order Approving Xcel’s Proposed Plan, Subject to the Terms of a Settlement Agreement and Additional Conditions and Clarifications,” Docket No. E-002/M-02-633, (March 8, 2004) (order Point No. 7.)

2 Description of Proposed Pipeline and Associated Facilities

This section provides details of the design of the Project as they are known as of the date this application was prepared. To the extent that changes in design details would be subject to review by the Minnesota Public Utilities Commission, Pipeline Routing Rules, the Permittee will submit information regarding such changes and seek a permit amendment, if required, as allowed under Minn. Rules pt. 4415.0185

2.1 Pipeline Design Specifications

In accordance with Minn. Rules pt. 4415.0120 subp. 1, the following pipeline design specifications are provided for public information purposes.

- A. Nominal pipe size in inches – 20 inches
- B. Pipe type – Steel with welded joints.
- C. Nominal wall thickness in inches – 0.375 inches.
- D. Pipe design factor – the entire project is being designed to a Class 3 location design factor of 0.50.
- E. Longitudinal or seam joint factor – 1.00
- F. Class location and requirements – the entire length of the pipeline will be considered Class 3 for design and operation purposes.
- G. Specified minimum yield strength in pounds per square inch – 56,000 psig.
- H. Tensile strength in pounds per square inch – 77,000 psig.

2.2 Operating Pressure

The normal and maximum allowable operating pressures for the pipeline are:

- A. Operating pressure – 650 psig.
- B. Maximum allowable operating pressure – 692 psig

2.3 Associated Facilities

Operating pressure for an existing 26” pipeline originating at an existing Northern Natural Gas town border station located near State Highway 13 and Cedar Avenue in Eagan, MN and terminating at an existing Xcel Energy regulator station near State Highway 13 and Interstate Highway 35E in Mendota Heights, MN will be increased from 350 psig to 650 psig. The proposed pipeline route will originate at the existing regulator station near State Highway 13 and Interstate Highway 35E.

From the existing regulator station the proposed pipeline route proceeds north under State Highway 13 and Lilydale Road to an existing electric transmission line and gas pipeline right-of-way that parallels Lilydale Road/Water Street on the south side of the Mississippi River. Pipeline routing continues northeasterly past Pickerel Lake to a point directly across the river from the exist High Bridge generating facility. From this point the pipeline will continue north across the river and to the new High Bridge Generating facility.

To minimize disturbance to the environment and inconvenience to the public, installation will be done using both directional drilling and open trenching techniques. Directional drilling will be used to install piping from the existing regulator station to the existing electric transmission line right-of-way. Open trenching will be completed from the south end of the existing right-of-way to the northern third of Pickerel Lake. Directional drilling will then be used to complete installation along the west edge of the north third of Pickerel Lake and across the Mississippi River.

Isolation valving will be installed at the existing regulator station and at the High Bridge generating facility. No above ground appurtenances are to be installed along the pipeline route other than pipeline markers and cathodic test stations as required by state and federal codes.

2.4 Product Description and Capacity Information

The proposed pipeline project will be used to ship natural gas only. Material safety data sheets (MSDS) for natural gas and odorant additive are included Appendix A.

The planned minimum and maximum design capacities of the pipeline are as follows:

- A. Planned minimum design capacity – 76.8 million cubic feet of natural gas per day (76.8 Mcfd)
- B. Maximum design capacity – 148.8 million cubic feet of natural gas per day (148.8 Mcfd)

2.5 Land Requirements

Estimates of land use requirements are provided as follows:

- A. Permanent right-of-way length, average width, and estimated acreage:
 - a. The total right-of-way length is approximately 2.5 miles. The majority of the pipeline route will be in existing electric transmission line and gas pipeline right-of-way. The permanent easement width will be 30 feet. Estimated acreage within the permanent right-of-way is 8.2 acres. This total does not include the approximately 740-foot portion of the route that crosses the Mississippi River.
 - b. Additional right-of-way in the form of subterranean easements will be needed to get from the existing regulator station at State Highway 13 and Interstate Highway 35E to existing electric transmission line right-of-way. Minimal impact on landowners or encroachment on the land is expected since piping will be installed through directional drilling in these areas.
- B. Temporary right-of-way (workspace) length, estimated width, and estimated acreage:

Permission to use temporary workspace will be obtained from landowners adjacent to the permanent right-of-way. Xcel Energy plans to obtain a general right of access to the right-of-way, which would include temporary workspace. This area will vary as needed but will average approximately 35 feet. The estimated acreage of temporary workspace is 9.0 acres.

- C. Estimated range of minimum trench or ditch dimensions including bottom width, top width, depth, and cubic yards of dirt excavated:
 - a. Estimated trench bottom width - 36 inches

- b. Estimated trench depth - 72 inches
- c. Estimated trench top width - 36 inches
- d. Estimated excavation – 4,000 cubic yards

D. Minimum depth of cover for state and federal requirements: 54 inches

A typical cross-section for the open trench section of the proposed gas pipeline is shown in Figure 2-1.

E. Rights-of-way sharing or paralleling: type of facility in the right-of-way, and the estimated length, width, and acreage of the right-of-way:

The proposed pipeline route easements will parallel Lilydale Road/Water Street and are in existing electric transmission line or gas pipeline routes. Anticipated utility impacts will include passing under a sewer line on Lilydale Road and an abandoned liquid petroleum line.

2.6 Pipeline Cost

The estimated construction cost of the proposed pipeline to the Plant site is \$6.9 million.

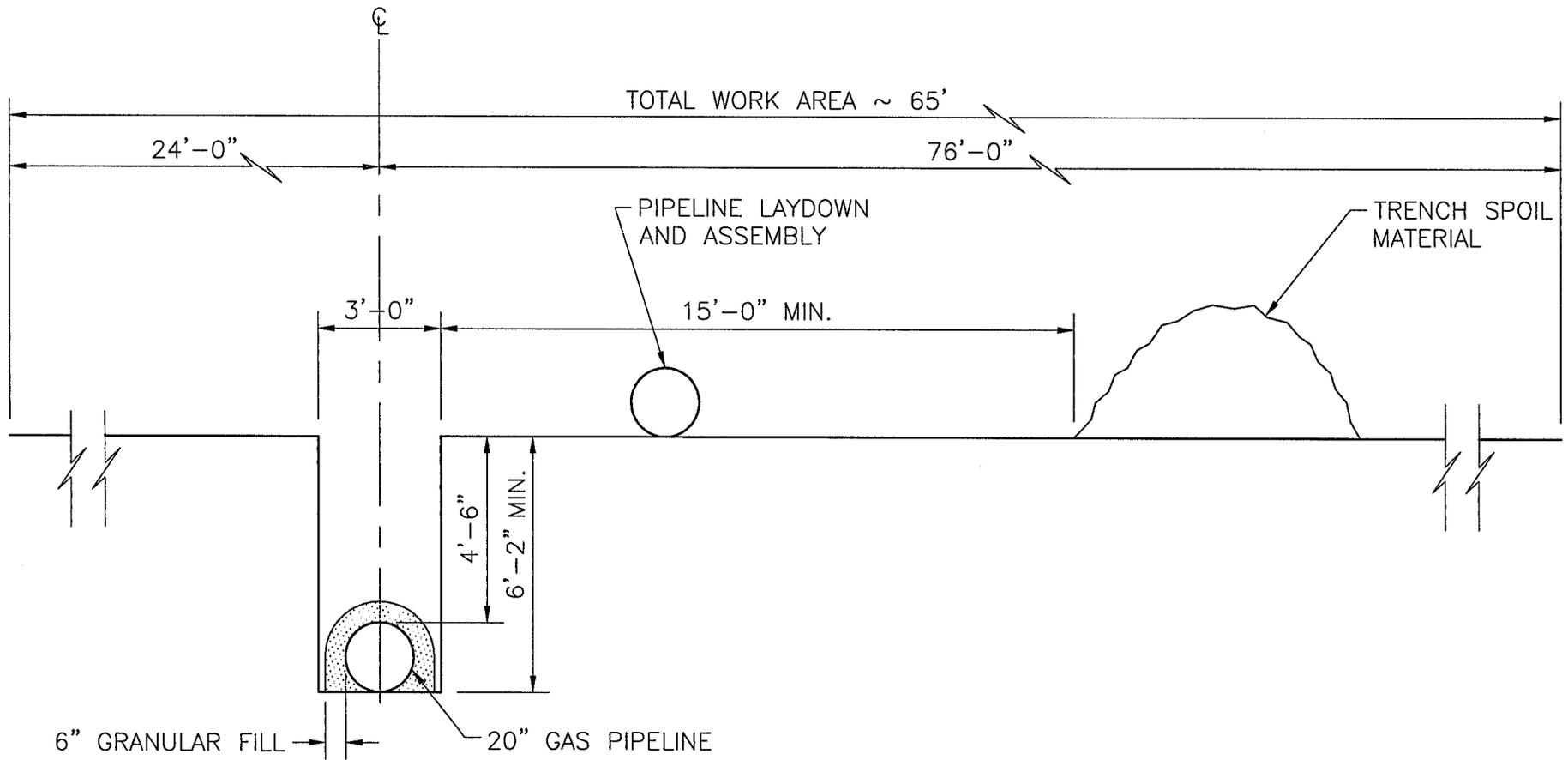


Figure 2-1

TYPICAL PIPELINE CROSS SECTION-OPEN TRENCH
Xcel Energy High Bridge Generation Facility
Gas Pipeline Routing Permit Application
St. Paul, Minnesota
November 2005

3 Proposed Route –

3.1 Proposed Route Location

The proposed gas pipeline route is shown on Figure 1-2 and in Appendix B. The gas pipeline route originates at the Xcel Energy Mendota Heights Regulator Station, which is southeast of the interchange between Interstate 35E and State Route 13 (Sibley Memorial Highway). The Mendota Heights Regulator Station is immediately northwest of the interchange ramp. From this point, the gas pipeline route would be directionally drilled down and beneath the bluff, following a generally north-northeast alignment, and emerging southeast of the Pool and Yacht Club in Lilydale, in the existing Xcel Energy electric transmission line easement.

From this point, the gas pipeline route would be open-trenched, proceeding northeast along the north edge of the electric transmission line easement to the gravel parking lot along the northwest edge of Pickerel Lake. At this point, the gas pipeline route would follow a directionally-drilled alignment northeast to a point immediately southeast of Lilydale Road and approximately 1,500 feet northeast of the Union Pacific Railroad bridge over Lilydale Road. At this point, the gas pipeline route would turn north-northwest and pass beneath the bed of the Mississippi River, emerging on the site of the High Bridge generating facility near the north edge of the existing coal storage area.

The two northernmost directionally-drilled segments will have the same entrance pit.

3.2 Right-of-Way Acquisition

Xcel Energy has already initiated contact with local government officials. We will consult with the landowners from whom right-of-way easements may be necessary, in order to discuss the Project in detail prior to conducting any necessary surveys and soil investigations. As the design detail for the line is developed, contacts with the owners of affected properties will continue and the negotiation and acquisition phase will begin to obtain the necessary temporary construction and permanent land or easement rights for the pipeline and associated facilities. The typical land requirements for construction and permanent access are described in Section 2.5.

During the acquisition phase, individual property owners will be advised of construction schedules, needed access to the site and any vegetation clearing and soil stripping required for the Project. Any vegetation that is in the way of construction equipment may have to be removed. Wood from the clearing operation will be offered to the landowner or removed from the site. Brush will be chipped and disposed of on the right-of-way.

Some locations may require soil analysis to assist with the design of the pipeline. Xcel Energy will inform the landowners at the initial survey consultation that these borings may occur. An independent geotechnical testing company will take and analyze borings.

Where possible, staging and lay down areas will be located within the right-of-way and limited to previously disturbed or developed areas. When additional property is temporarily required for construction, temporary limited easements may be obtained from landowners. Temporary limited easements will be limited to special construction access needs or additional staging or lay down areas required outside of the proposed transmission line right-of-way.

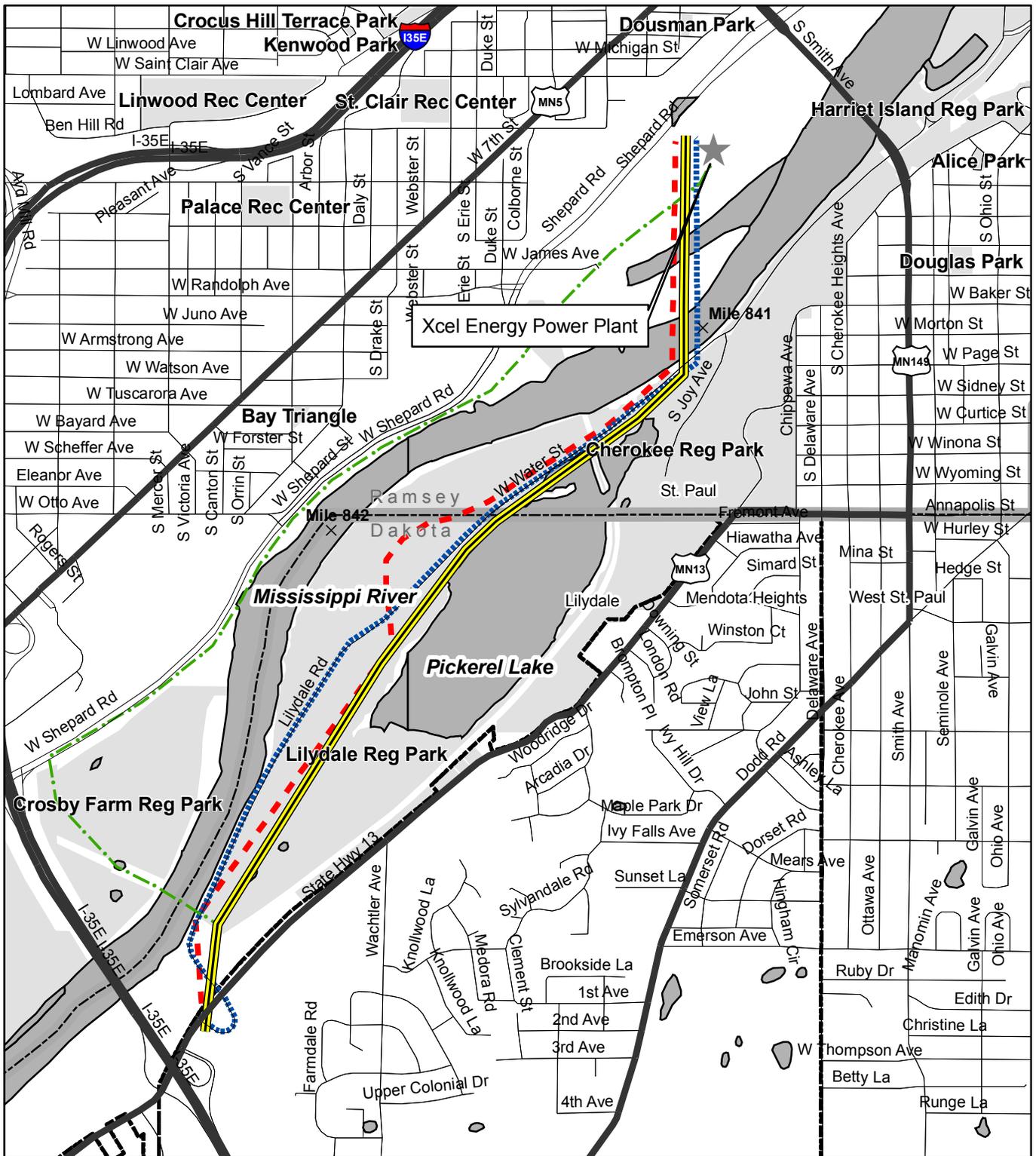
3.3 Other Considered Routes

Several alternative routes were considered along with the proposed gas pipeline route. These include three alternative alignments and a no-action alternative. The specific alternative routes and the rationales for rejecting them are shown in Figure 3-1, and are described below.

3.3.1 Alternative 1 – No Action Alternative.

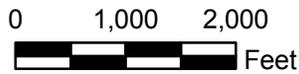
Under the No Action alternative, no new natural gas pipeline would be constructed. There would be no construction-related temporary impacts caused by open trenching or directional-drilling entrance and exit pits in wetlands. However, under the No Action alternative, there would be no high-pressure natural gas supply available to the Xcel Energy High Bridge Plant. A high-pressure natural gas supply is essential to the conversion of the Xcel Energy High Bridge facility from a coal-powered generating plant to a natural gas combined cycle unit. The conversion of the High Bridge facility is a critical component of Xcel Energy's Metro Emissions Reduction Project (MERP) project. MERP is a nearly \$1 billion package of improvements at three Twin Cities coal-powered generating plants to significantly reduce air emissions from those facilities while increasing the amount of electricity they can produce.

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-  Proposed Pipeline - Preferred Route
-  Alternative 2 - Parallel Existing Pipeline
-  Alternative 3 - Lilydale Road
-  Alternative 4 - West Side

-  County Boundary
-  City/Twp. Boundary
-  Lakes and Rivers
-  Parks
-  Highway
-  Road



1" = 1000'



Figure 3-1

Other Considered Routes
 Xcel Energy High Bridge Generating Facility
 Gas Pipeline Routing Permit Application
 Saint Paul, MN

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Thus, under the No Action alternative, Xcel Energy's program to reduce air emissions while increasing electric power generation would be reduced in scope.

3.3.2 Alternative 2 – Parallel existing gas pipeline.

Xcel Energy currently maintains a high-pressure 20" gas pipeline that parallels the southern third of the proposed route before crossing under the Mississippi River from a point approximately 1,300 feet west of the southwest corner of Pickerel Lake. The existing gas pipeline itself cannot be used as a natural gas supply source for the High Bridge plant. First, the existing line crosses the Mississippi River well south of the High Bridge plant, and has no connection to the plant. Moreover, the natural gas currently conveyed by the existing pipeline is already dedicated to other uses within the city of Saint Paul. The existing gas pipeline has sufficient capacity to meet its current dedicated use; however, it does not have the capacity to supply the High Bridge plant as well.

Under Alternative 2, a second gas pipeline would be constructed parallel to the existing line, and would then continue northeast along the north side of Lilydale Road. The pipeline would be located within public right-of-way and private utility easements in the cities of Lilydale and Saint Paul in Dakota and Ramsey Counties, respectively.

The pipeline would originate at the Mendota Regulator Site and follow the existing line southeast of Lilydale Road until crossing under the road near the entrance to the Lilydale Park Boat Ramp. From there, the pipeline would lie on the northwest side of Lilydale Road until crossing under the Mississippi River from a point approximately 1,500 feet northeast of the Union Pacific Railroad bridge over Lilydale Road. Under this alternative, the new gas pipeline would still have to be directionally-drilled under the Mississippi River at the same point as the proposed pipeline route.

The pipeline would also cross a small section (approximately 100 ft) of scrub-shrub and emergent wetland southwest of Pickerel Lake. Furthermore, portions of the existing gas pipeline now have mature floodplain forest at the surface. Dominant tree species of this floodplain forest include maple, ash, boxelder, elm and cottonwood. Construction of a new, parallel line would require the removal of an approximately 100-foot wide, 3,500-foot long swath of mature trees in mostly floodplain forested areas. While the ground impacts would be temporary, the loss of mature forested cover would not be restored for

decades, even with a comprehensive restoration plan. In addition, this alternative would require temporary closure of Lilydale Road during open trenching for the installation of the gas pipeline.

3.3.3 Alternative 3 – Installation under existing roadway

Rather than installing along an existing utility easement as identified, installation could be completed by installing under the existing Lilydale Road/Water Street. Again, the pipeline would be located in the cities of Lilydale and Saint Paul in Dakota and Ramsey Counties, respectively. The pipeline would originate at the Mendota Regulator Site and follow Lilydale Road northeast through Lilydale Regional Park. Under this alternative, the new gas pipeline would still have to be directionally-drilled under the Mississippi River at the same point as the proposed pipeline route, approximately 1,300 feet northeast of the northeast corner of Pickerel Lake, exiting near the north side of the existing coal pile on the High Bridge plant site.

This alternative would reduce temporary impacts on the floodplain vegetation but would still result in impacts to mature forested cover due to the narrow width of the roadway. Impacts to vegetation adjacent to the road would occur in floodplain forest, dominated by maple, basswood, ash and cottonwood, and temporarily flooded grassland, dominated by non-native reed canary grass. While the ground impacts would be temporary, the loss of mature forested cover would not be restored for decades, even with a comprehensive restoration plan.

More importantly, this alternative would require removal of Lilydale Road in order to construct the pipeline trench, and reconstruction of the road upon completion of the pipeline. It would cause the road to be out of service for the entire time construction is taking place, restricting use of the existing park. It also would represent a significant increase in the cost of installation and would possibly place the facility in conflict with future road improvements.

3.3.4 Alternative 4 – Installation on north side of the Mississippi River

An alternative to installing in an existing utility easement would be to install piping on the north side of the Mississippi River. As with Alternatives 2 and 3, the pipeline would be located in the cities of Lilydale and Saint Paul in Dakota and Ramsey Counties, respectively. The pipeline would originate at the Mendota Regulator Site, crossing the Mississippi River slightly east of the Pool

and Yacht Club in Lilydale and parallel to an existing natural gas pipeline crossing.

Under this alternative, the pipeline would cross northwest through Crosby Farm Regional Park to Shepard Road. From there, installation would parallel Shepard Road northeast to the High Bridge plant site. This type of installation would result in damage to floodplain forestation at the crossing site, along the south side of Shepard Road, and most importantly, in Crosby Farm Regional Park. Construction would require removal of an approximately 100-foot wide, 2,000-foot long swath of vegetation through the center of the park, consisting of mature floodplain forest and emergent and forested wetlands.

This area is designated as a site of high biodiversity significance by the Minnesota Department of Natural Resources (MN DNR) County Biological Survey. While the ground impacts would be temporary, the loss of mature forested cover would not be immediately restored and habitat fragmentation would continue for decades, even with a comprehensive restoration plan. Additionally, this would be a very difficult area to construct, as it is a sandstone shelf. Construction would require significant disruption to Shepard Road and would result in impacts to the sandstone bluff.

4 Environment Information

The right-of-way preparation, construction practices and operation and maintenance procedures of the Project along the proposed route will have little or no potential for significant impacts on the human and natural environments. The environment along the proposed routes is described in this section consistent with the considerations outlined in Minnesota Rules 4415.0140 Subp. 3. In accordance with the requirements of Minn. Rules 4415.0145 and 4415.0040, this section also presents an analysis of the potential for human and environmental impacts from the Project.

The pipeline route work involves placement of approximately 2.5 miles of 20-inch diameter gas pipeline. Construction of the pipeline will require temporarily disturbance to land and vegetation. Xcel Energy will comply fully with the pipeline routing permit conditions (Minnesota Rule 4415.0195) that will apply to right-of-way preparation, construction, cleanup and restoration. We will also comply with all other applicable regulations and permits to ensure that temporary impacts resulting from construction of the pipeline project are minimized and mitigated.

No future pipeline construction is expected except that related to maintenance of the pipeline project. Potential impacts related to maintenance activities are expected to be similar, but of lesser magnitude, to any impacts associated with the original construction.

Xcel Energy is not presently aware of any specific policies which state agencies, federal agencies, or local governmental units have adopted under Minn. Stat. Sec. 299J.05, which would affect any decisions relating to the location, design, construction, or operation of the proposed pipeline project and associated facilities. Section 1.5 of this application includes a list of known governmental permits and approvals required for the pipeline project.

4.1 Human Settlement

4.1.1 Existing Environment

The pipeline will be located within public right-of-way and private utility easements in the cities of Mendota Heights, Lilydale, and Saint Paul in Dakota and Ramsey Counties. From the south terminus of the project at the Mendota Regulator Station, the pipeline will be directionally-drilled northward to a point

approximately 400 feet northeast of the Pool and Yacht Club in Lilydale. The elevation change from the Mendota Regulator Site to the exit point near the yacht club is over 100 feet, which will necessitate a deep, curving pathway for the drill shaft. Xcel Energy is anticipating that this route selection will be approved through a pipeline routing process, however an alternative approach may be selected that would utilize an open trench following Lilydale Road's curving alignment down the bluff, a bore section under the BNSF railroad tracks, and then open trenching northeast up the existing electric transmission line easement.

From the Pool and Yacht Club in Lilydale, the pipeline will be constructed with open trenching for approximately 5,900 feet, running northeast along Lilydale Road/Water Street to a gravel parking lot west of Pickerel Lake in Lilydale Regional Park. Two remaining directional drill sections will both originate from a point approximately 1300 feet northeast of the northeast corner of Pickerel Lake. One section will be drilled due north under the Mississippi River, exiting near the north side of the existing coal pile on the High Bridge plant site. The pipeline under the river is to be installed approximately 30 feet below the river bed. The final drilled section will head southwest under the northern edge of Pickerel Lake, exiting at the northeast end of the gravel parking lot at the lake's edge.

The pipeline route passes through an area that is primarily zoned as open space, with commercial and industrial zoned areas at the termini (Figure 4-1, Zoning). The open space is primarily park and recreation areas, including Lilydale Regional Park and the Mississippi National River and Recreation Area (MNRRA). The nearest residential area is approximately 1500ft southeast of the proposed pipeline in the City of Mendota Heights. Nearby residential areas will experience minimal impacts from pipeline construction or operation.

The major traffic routes in the area are US Interstate 35-E and State Highway 13. Interstate 94 and I-494 are approximately 2 miles to the north and south, respectively, of the gas pipeline route termini (Figures 4-2, Highways, Railroads and Airports). Other important area traffic routes include West Shepard Road, West 7th Street, and Smith Avenue. The nearest airport is 2.5 miles east of the pipeline in downtown Saint Paul. The Union Pacific Railroad passes over a directionally-drilled section of the proposed pipeline route. No railroads or airports will be impacted by the pipeline.

4.1.2 Potential Impacts and Planned Mitigative Measures

There will be minimal impacts to human settlement from the pipeline. All adjacent and intersected streets and highways along the pipeline route will be kept open during construction. Lilydale Road/Water Street will be the street most affected by construction, since the pipeline will be installed immediately adjacent to the street along about one mile of its length. The pipeline will follow an existing electric transmission line and gas pipeline route adjacent to Lilydale Road/Water Street. The low traffic and relatively undeveloped nature of the area facilitates utility construction and maintenance. Horizontal drilling techniques will be used to cross Lilydale Road and the Mississippi River. In all cases, road crossing permit requirements will be followed.

Barricades, warning signs and other safety measures will be used to ensure the safety of the public during construction. Around road and driveway crossings, fencing or other types of barricading will be employed to protect public safety.

4.2 Natural Environment

4.2.1 Existing Environment

4.2.1.1 Vegetation and Wildlife

Vegetation communities within the broader region surrounding the proposed gas pipeline route originally developed within the transition between the eastern hardwood forests and the central prairies (Barbour and Billings 2000). More specific to the gas pipeline route, presettlement vegetation has been determined by local topography and the influence of the Mississippi River on the landscape. The broad, flat area adjacent to the river and below the bluffs developed presettlement vegetation communities characteristic of floodplain forest. These are dominated by cottonwood (*Populus deltoides*), silver maple (*Acer saccharinum*) and other hardwood species tolerant of periodic inundation.

Shrub thickets dominated by willow (*Salix* sp.) were likely present around the perimeter of Pickerel Lake, interspersed with pockets of emergent wetlands. At the southern end of the project, up on the bluff, presettlement vegetation was oak woodlands dominated by bur oak and pin oak. Small pockets of sugar maple-basswood (*Acer saccharum-Tilia americana*) forest and occasional prairie openings may also have been present nearby, as this area was previously characterized by transitions between grassland, savanna and hardwood forest (Wendt and Coffin 1988).

Current vegetation along the proposed project route is influenced by a combination of natural and human disturbances. These disturbances include the continued periodic flooding of the river, and the construction of roads, parking lots, trails and a transmission line route within or adjacent to the project area. Most of the proposed project route is dominated by floodplain forest, palustrine wetlands and perennial grasslands dominated by non-native species. The floodplain forest runs more or less continuously along the north and west edge of the route. Grasslands and wetlands are in the east and south portion of the route. Pickerel Lake covers most of the central portion of the proposed gas pipeline alignment.

Floodplain forest communities are dominated by cottonwood, silver maple and green ash (*Fraxinus pennsylvanica*) in the canopy, with saplings of these species in the understory. The shrub and ground layers within most of the floodplain forest have been disturbed by a combination of human activities and natural flooding cycles, and are not well developed in some areas. Dominant shrubs include red-stem dogwood (*Cornus sericea*) and willow. Dominant herbaceous species include wood nettle (*Laportea canadensis*), stinging nettle (*Urtica dioica*), creeping charlie (*Glechoma hederacea*) and tall manna grass (*Glyceria grandis*). Wild grape (*Vitis riparia*) vines are also common in the area.

The non-native grassland areas are found within the existing electric transmission line easement. This area was cleared for the construction of the transmission lines. Operation of the electric transmission lines requires maintaining the easement as grassland or in low shrubs. Dominant species include reed canary grass (*Phalaris arundinacea*), smooth brome (*Bromus inermis*), redtop (*Agrostis stolonifera*), Kentucky blue grass (*Poa pratensis*) and foxtails (*Setaria* sp.).

Most of the electric transmission line easement is palustrine emergent, scrub-shrub and open water wetland (Types 3, 4, 5 and 6 wetlands). Emergent wetlands are most prevalent, and are dominated by cattails (*Typha latifolia*, *T. angustifolia* and hybrids) and reed canary grass. Scrub-shrub wetlands are dominated by willows, especially sandbar willow (*S. exigua*). Open water areas have arrowhead (*Sagittaria latifolia*) and pickerelweed (*Pontederia cordata*) near the edges, with water lilies (*Nymphaea odorata*) further out. (Additional detail is provided below on the area and classification of wetlands present, as well as the project's wetland impacts.)

Other cover types are present near the proposed alignment, but these are all small, disjoint segments along or adjacent to the alignment. They include gravel parking areas, paved roadways and patches of non-native perennial weeds. Most of the portion of the shoreline of Pickerel Lake adjacent to the proposed gas pipeline alignment is a poorly-maintained gravel parking lot with reed canary grass along the water's edge.

The Minnesota Department of Natural Resources (MN DNR) County Biological Survey has identified two "sites of high biodiversity significance" within one-half mile of the proposed gas pipeline route (Figure 4-3, Communities of Significant Biodiversity). The first is near the southern end of the project, across the Mississippi River at Crosby Lake Regional Park in Saint Paul. The second is east of the proposed bore entrance pit near the north end of the project, and comprises the forested bluff communities that rise above the floodplain. Neither of these sites will be impacted by pipeline construction.

The proposed pipeline alignment lies entirely within MNRRA and traverses Lilydale Regional Park (Figure 4-4, Recreational Areas). Wildlife communities in Lilydale Regional Park are typical of disturbed urban parkland. Most species are common, adaptable and development-tolerant. Songbirds such as American robins, American goldfinch and indigo bunting breed in the floodplain forests of this area. Wood ducks, mallards, great blue heron and common egrets nest in the wetlands surrounding Pickerel Lake. The lake and the associated wetlands also provides habitat for snapping and painted turtles, American toads, green frogs, leopard frogs, wood frogs, gray treefrogs, sunfish and northern pike. Grasslands in the park provide habitat for snake species such as garter and fox snakes. Small mammals, including deer mice and short-tailed shrew, can also be found in the park's grassland. Other mammal species found in the park include squirrels, raccoons, fox, skunks, muskrat and whitetail deer. Big brown bats and northern myotis are known to inhabit sandstone caves in the bluffs of Lilydale Park. During migration, a variety of songbirds utilize the park's forests as stopover habitat, and many species of waterfowl and waterbirds may stopover on Pickerel Lake.

The Natural Heritage Program of the MN DNR was contacted and asked to review their database to determine if any rare plant or animal species or other significant natural features are known to occur within a one-mile radius of the proposed pipeline route. Twenty-eight occurrences of rare species or native plant communities were identified based on this search. The MN DNR

identifies only two of these occurrences, Blanding's turtles and river mussels, as having potential to be impacted by the project.

Blanding's turtle is a state-listed threatened species. The most recent record of Blanding's turtle in the project area is a 1990 sighting in Lilydale-Harriet Island Park, near Pickerel Lake. The Blanding's turtle hibernates in shallow lake sediments from November through March. Since construction of the pipeline is scheduled to occur during the winter months, when Blanding's turtles would not be present, the pipeline construction will not result in impacts to any Blanding's turtles present. The proposed winter construction schedule will also greatly reduce, if not prevent, impacts to Blanding's turtle habitat along the proposed pipeline route.

Several federally listed mussel species have been documented in the Mississippi River. Mussel populations have declined due to degradation and alternation of lake and river habitats. The use of directional boring techniques to install the pipeline under the river will protect mussels and other aquatic resources in the river. Furthermore, bore pits will be placed away from the water's edge and erosion control measures will be used to ensure that excavated material does not enter the river. Following construction, bore pits will be filled, returned to pre-construction contours, and re-seeded with native plant species.

4.2.1.2 Geology and Soils

The proposed gas pipeline route is located primarily within the Mississippi Bottomland geomorphic region (Patterson, 1992). This area is generally flat and has about 100 feet of sediment overlaying bedrock. The southern portion of the proposed route climbs the eastern bluff along the Mississippi River, where bedrock is at or near the surface.

The proposed route is located within a buried bedrock valley that was eroded and filled during a series of late- and postglacial events (Patterson, 1992). The majority of the proposed route is located within floodplain alluvium sediment, which is generally composed of silt loam to loamy sand overlying coarser grained (sand and gravel) material (Figure 4-5, Surficial Geology). South of Pickerel Lake are peat and muck deposits. The southern portion of the proposed gas pipeline passes through terrace deposits (West Campus formation) from the Glacial River Warren. This terrace is one of four terraces found along the Mississippi River and is about 125 feet above the present floodplain level (Meyer and Lusardi, 2000). Elsewhere in the region are till and

stream sediment associated with both the Des Moines Lobe and the Superior Lobe glaciation.

The unconsolidated sediment along the proposed gas pipeline route are underlain by Ordovician-aged sedimentary rocks (Figure 4-6, Bedrock Geology). Along a majority of the proposed route, the St. Peter sandstone is the uppermost bedrock unit. The St. Peter sandstone is a fine to medium grained, quartz sandstone that is generally massive to thick bedded. The lower third of the formation consists of interbedded mudstone, siltstone and shale. The St. Peter sandstone is very near or at the surface along the eastern bluff of the Mississippi River valley along the proposed route, and will be intersected at the southern end of the route (see Section 3.1). Underlying the St. Peter formation is the Prairie du Chien group, a dolostone with thin beds of sandstone and chert in the upper part of the formation.

Soils along the proposed gas pipeline route are Aquolls, Minneiska, Udorthents and Kerston (Figure 4-7, Soils). Of these, only Kerston is listed as a hydric soil (USDA/NRCS 1995). The High Bridge plant itself is on a unit of Urban Land.

4.2.1.3 Water

The proposed gas pipeline route is situated within the Upper Mississippi River Basin (USDI/USGS 2000, Figure 4-8, Rivers and Lakes). The major watershed in which the gas pipeline route lies is the Upper Mississippi River-Twin Cities Metro (major watershed number 20). The minor watershed for the northern portion of the route is #20088, which drains an area of 18.7 square miles.

There are two tributaries to the Mississippi River near the proposed gas pipeline route. One is an unnamed tributary that flows approximately 1.5 miles generally northward from a wetland complex in southeast Mendota Heights. This tributary crosses the proposed gas pipeline route at the extreme southern end, bisecting the curve of Lilydale Road as the road curves down the bluff. At this point in the project, the gas pipeline would be directionally drilled, and would cross well below the bed of the tributary.

The second tributary is the outlet stream of Pickerel Lake. It flows northeasterly for approximately 0.2 mile out of the northeast end of Pickerel Lake, following the base of the bluff before turning north-northwest to the Mississippi River. The course of this tributary stays well south and east of the proposed gas pipeline route.

There are no designated trout streams within two miles of the proposed gas pipeline route. The proposed gas pipeline route will pass beneath Pickerel Lake. Aside from Pickerel Lake, the nearest lakes are Crosby Lake, which is on the other side of the Mississippi River from the proposed gas pipeline route, and Roberts Lake, which is approximately 1.3 miles south of the southern terminus of the proposed gas pipeline route.

4.2.1.4 Wetlands and MN DNR Protected Waters

Wetlands were studied within a 225' study area around the proposed pipeline route, and a 60-foot radius around proposed bore pits. The study area extends 100' south/east and 125' north/west of the proposed pipeline route. The study area also incorporates 3.71 acres of additional extended buffer area, surrounding proposed or potential bore sites. This study area greatly exceeds the actual impact area for the project, but was chosen in order to provide some flexibility in the final pipeline alignment and to give a comprehensive evaluation of adjacent natural resources.

Wetland areas were initially identified within the pipeline route using National Wetland Inventory data. All wetland areas were then briefly inspected in the field to verify wetland boundaries and types. Wetland boundaries within this study area were determined by ground-truthing and adjusting lines on existing NWI maps. Based on this work, there are 34.1 acres of wetlands within the study area, including Types 3, 4, 6 and 7, as well as Pickerel Lake and the Mississippi River. The wetlands identified along the pipeline route are generally low quality, disturbed systems. Many of the wetlands are dominated by non-native species, such as reed canary grass. No high quality, native plant communities were identified in any of the wetlands along the pipeline route. Pickerel Lake is classified as a MN DNR Public Waters as defined by Minnesota Statutes, Section 103G.005, subd 15.

Table C-1 in Appendix C summarizes acreages of wetland types within this study area. Due to the extensive use of directional drilling on this project, over 57% of the wetland acreage within the study area will be totally avoided. The locations and types of the wetlands are shown on Figures 4-9a and 4-9b.

Wetland impacts will occur in the portions of the open-trenched sections and at the bore pit entrance pits. The impacts will include:

- Excavation of a 3'-4' wide trench approximately 6,000' long at a depth of six feet.

- Placement of a gravel pad approximately 100' x 100' about 1,300 feet northeast of the northeast end of Pickerel Lake. The pad will support the drilling machinery.
- Excavation of a 10' x 15' entrance pit adjacent to the gravel pad.
- Excavation of a 10' x 15' exit pit near the south end of the proposed pipeline route.

The total maximum area of ground-breaking impacts, based on the dimensions above, is 34,300 square feet, or approximately 0.79 acre. Actual ground-breaking impacts to wetlands will be closer to 0.5 acre, because portions of the open trench section pass through upland areas.

Moreover, these wetland impacts will be temporary, since the open trench areas and bore pits will be filled and returned to pre-construction contours. Gravel will be removed from the machinery support pad, and the area will be returned to pre-construction contours. In addition, construction will be scheduled during winter months to minimize disruption of wetland functions.

Additional temporary impacts include the movement of construction vehicles along the 6000-foot trenched section and around the bore pits, and the temporary storage of excavated soils adjacent to the trench and bore pits.

4.2.1.5 Recreational Lands

There are a number of public parks in the pipeline area (Figure 4-4). The pipeline route passes through Lilydale Regional Park and the Mississippi National River and Recreation Area (MNRRA). All pipeline construction will occur within existing utility easements in Lilydale Park. Impacts to parkland will be temporary, since the open trench areas and bore pits will be filled and returned to pre-construction contours. Gravel will be removed from the machinery support pad, and the area will be returned to pre-construction contours. Access to the park will not be limited, although construction traffic will temporarily disrupt normal traffic flow on Lilydale Road/Water Street. In addition, construction will be scheduled during winter months when park usage is minimal.

4.2.2 Potential Impacts and Planned Mitigative Measures

Construction along the pipeline route will cause temporary disturbance, and is not expected to have long term impacts in the area. No significant long term

impacts to vegetation and wildlife; geology and soils; and water resources and wetlands are expected.

Best management practices (BMPs) such as silt fencing and erosion control measures will be implemented during construction to protect adjacent wetlands and to preserve soil biota in excavated areas. Top soils (approximately the top 12”) from excavated areas will be set aside separately, so that deeper spoil material can be backfilled first. As a result, the backfilled soil column will be functionally similar to its current condition in terms of seed reservoirs and nutrient distribution. Seeding with native plant species appropriate to the hydrologic regime is planned for final restoration.

Applications for the necessary wetland permits will be submitted to the City of Saint Paul, which is the Local Government Unit administering the Wetland Conservation Act, and to the U.S. Army Corps of Engineers under Section 404 of the Clean Water Act. Construction will result in only temporary impacts to the wetlands present within the alignment, no permanent filling is planned. Wetlands crossed by the pipeline will be restored by replacing the subsoils and surface soils in a similar condition as before the project. The restoration will be conducted in accordance with any special requirements of those permits. Public Waters Work Permit will be completed for the crossing of Pickerel Lake and the Mississippi River. Directional drilling will ensure low impact crossing of the river and lake.

4.3 Cultural and Economic Resources –

4.3.1 Existing Environment

4.3.1.1 Archaeological and Historical Resources

A cultural resources assessment (Adams and Bradley 2005) was conducted in July 2005 to generate a list of previously identified archaeological sites within the gas pipeline route and to assess the potential presence of additional intact archaeological resources. The cultural resources assessment studied the project’s Area of Potential Effect (APE), which, by standard protocols, is a one-mile buffer zone around the proposed gas pipeline route. This assessment also identified historic properties within the gas pipeline route that would require further investigation in order to determine their potential eligibility for listing on the National Register of Historic Places (NHRP) and to eliminate those properties that are clearly not eligible. The cultural resources assessment included background research, a visual reconnaissance of the entire gas pipeline

route, assessment of archaeological potential within the gas pipeline route, and photographic documentation of any buildings and structures 50 years of age or older within the defined study area. The study area for archaeological resources was the same as that for architectural history resources and was comprised of approximately 91 acres (37 hectares).

Research indicated that no archaeological surveys have been previously conducted within the project APE. No sites have been recorded (confirmed) and no sites have been reported (not field checked) within the current project area. Ten sites have been recorded (confirmed) and two sites have been reported (not field checked) within one mile of the project area (see Table 4-1).

TABLE 4-1. PREVIOUSLY IDENTIFIED ARCHAEOLOGICAL SITES

Site No.	Site Name	T	R	S	¼ Section	Description
21DK19	Bluff Mounds	28	23	13, 14	SW ¼ of SW ¼ Sec13; SE ¼ of SE ¼ Sec 14	Earthwork - mounds
21DK20		28	23	23	SE ¼ of NW ¼ Sec 23	Earthwork - mounds
21RA19	Ramsey House	28	22	6		Structural ruin; artifact scatter
21 RA21	James J. Hill House	28	23	1	SE-SW-NE-NE	Structural ruin; artifact scatter
21RA32	Washington St. Residential District	28	22	6	NE/SW/SE/ NW	Artifact scatter; structural ruin
21RA37	Osborne Foundry/Old Brewery	28	22	6		Artifact scatter; structural ruin
21RA45	Harriet Island	28	22	6	SE-SW, NW-SE, SE-NW-SW	Artifact scatter
21RA47	Armstrong House Relocation 7	28	22	6	SW-SW-SE-NW	Structural ruin; artifact scatter
21RA49	Dakotah/Washington House Hotel	28	22	6	SE-NW-NW	Structural ruin; artifact scatter
21RA50	Schnelle	28	22	6	SE-NW-W	Artifact scatter; wall feature
21RAr	Fountain Cave	28	23	12		Historic documentation
21RA s	North Mississippi Brewery Caves	28	23	11		Historic documentation

Two of these sites, 21DK19 and 21DK20, are located in the immediate vicinity of the project's southern end of the APE. Site 21DK19 consists of eleven

mounds crowded close together in a linear formation along a bluff top near the south end of Pickerel Lake.

Site 21DK20 consists of twenty-two mounds, all of which are described as “circular except one with an extension to the northwest” (Roberts and Roberts 1981). These sites attest to not only precontact use of the area by early inhabitants, but to the continued cultural importance of the region as a whole. The present condition of both mound sites is not currently known.

All other previously recorded sites within a one-mile radius of the project area are historical, urban archaeology sites.

As a result of the findings of the July 2005 cultural resources assessment, additional Phase I archaeological studies were initiated in September 2005 and will continue in November 2005 to further determine and describe the presence of intact archaeological sites. Upon completion of the Phase I archaeological survey, a report on its findings will be submitted to the State Historic Preservation Office (SHPO).

The historic shorelines of both the Mississippi River and Pickerel Lake have not been fully ascertained at this time. While a review of historical maps and aerials indicates that both shorelines have been relatively stable over the past century, the nature and extent of buried Holocene surfaces along the gas pipeline route shoreline remains unknown. Such surfaces, however, may be extant in the area and are viewed as containing moderate to high potential for precontact archaeological sites in all areas adjacent to Pickerel Lake. The November 2005 continuing Phase I studies will determine the presence and extent of buried surfaces.

Based on a review of historical maps, plat maps, and aerial photographs, no potential post-contact archaeological resources have been identified within the gas pipeline route.

Two architectural properties have been inventoried within the APE (Table 4-2). The architectural history survey of Saint Paul and Ramsey County completed in 1983 included the project area (Murphy and Granger 1983). No properties in the project APE were recorded at that time. One property in the project APE, the High Bridge Power Plant, was inventoried in conjunction with the Phase I architectural history evaluation completed for the High Bridge Combined Cycle

Project (Bradley and Stark 2004). The St. Paul Gas Light Company’s Island Station Plant was proposed for listing on the NRHP in 1983 and found by SHPO to be not eligible in 1984 (Phelps 1983).

TABLE 4-2. HISTORIC PROPERTIES INVENTORIED WITHIN THE APE

Inventory No.	Property Name	T	R	S	Description
RA-SPC-3322	High Bridge Power Plant	28	23	1,12	Power Plant
RA-SPC-3322	Saint Paul Gas Light Company’s Island Station Power Plant	28	23	12	Power Plant

4.3.1.2 Economies

There are no industrial or manufacturing businesses adjacent to the proposed gas pipeline route. Commercial businesses adjacent to the gas pipeline route are limited to the Pool and Yacht Club in Lilydale, a private club with pool and restaurant facilities for members and their guests. The project will have minimal impact on this business.

The construction of the pipeline will not change existing land use or impact the operation of local businesses.

4.3.2 Potential Impacts and Planned Mitigative Measures

The pipeline will not adversely affect nearby cultural and economic resources.

The pipeline route will be immediately adjacent to established road right-of-ways and there should be minimal impacts to any buildings, including any historic structures. In order to ensure avoiding any impacts to historic and archaeological resources Xcel Energy will submit the final project plans to the SHPO office for review, with detailed maps of the project’s area of impact, and with photographs of any nearby buildings/structures built before 1950.

Construction of the pipeline route will not have any impact on the cultural values of the area. The area presently has gas pipelines, powerlines and utility towers. Since installation of the pipeline will not change land use, no change in the cultural landscape will occur.

The local economy will benefit from construction of the gas pipeline. Pipeline construction and the High Bridge Generating Plant expansion it is being built to support will require highly-skilled, highly paid construction workers

including, heavy equipment operators, pipe fitters, iron workers, millwrights, boilermakers, carpenters, electricians, and other trades who will to add significant payroll into the regional economy. Periodic major maintenance will also create local jobs.

The pipeline will contribute property taxes to the Cities of Saint Paul, Lilydale and Mendota Heights, Ramsey and Dakota Counties and local school districts. The state and counties will also benefit from income and sales taxes paid as a result of the construction of the project.

5 Construction and Operation and Maintenance

5.1 Construction

Pipeline construction projects must be carefully planned to meet construction schedules and seasonal weather conditions. Brief summaries of the phases of pipeline construction are described below. Figure 5-1 illustrates the construction sequence for a gas pipeline. The construction schedule for the proposed gas pipeline will be designed to allow for excavation, grading and directional drilling to occur during the winter months of late 2006 and early 2007. This will minimize construction-related effects on local natural resources and adjacent recreational activities.

5.1.1 Right-of-Way Preparation

The first step is to prepare the right-of-way. The right-of-way will be surveyed to assure accurate alignment and layout of the pipeline. Storage areas required for equipment, pipe, and other materials would be acquired through private permission. These areas would consist of open areas that would be fenced as deemed necessary to protect equipment and materials as well as the public.

In order to make the right-of-way into a suitable work area, a clearing and grading crew will prepare a work area approximately 65 feet wide to allow safe and efficient operation of construction equipment. Clearing will follow accepted industry practices and sound construction guidelines. The minimum amount of aboveground vegetation and obstacles will be cleared to allow safe and efficient use of construction equipment. Debris created from right-of-way preparation will be disposed of using approved methods during construction.

The majority of the pipeline route will require minimal grading since it is relatively flat. Areas do exist however where fill will need to be added to construct a base for drilling and boring equipment. Upon completion of the project, fill will be removed and ground elevations will be returned to similar pre-construction contours. Excavation and grading will only occur where necessary to increase stability and decrease the gradient of unstable slopes. In all cases, permit conditions will be followed and met to assure minimal disturbance and impact.

5.1.2 Trenching

Conventional tracked or wheeled backhoes will be used for trenching activities. Work is expected to be completed while the ground is frozen to minimize impact on vegetation. Additionally, construction mats will be employed as necessary to reduce rutting. Trench dimensions will follow normal construction techniques and all regulatory requirements. Where pipe crosses highway or road ditches, the trench will be excavated deep enough to assure a minimum of 54 inches of cover over the pipe. All surfaced road crossings will be bored so that traffic flow will not be disturbed.

In areas where there is a need to separate topsoil and subsoil, a two-pass trenching method will be used. The first pass will remove topsoil and the second pass would remove subsoil. Soils from each of the excavations would be placed in separate areas. Spoil banks would contain gaps to allow storm water to flow away from the construction area to prevent it from backing up or flooding. Any rocks discovered in the excavation soils over the size of 6 inches will be removed and disposed of in a manner agreed to by the landowner and the contractor.

5.1.3 Stringing and Bending

To facilitate construction in an efficient manner, pipe will be placed along the right-of-way either from a storage area or from the pipe mill. The pipe will be unloaded from trucks with side booms or cranes either prior to or after ditching.

After the joints of pipe are strung along the trench and before the sections of pipe are joined together, individual sections of the pipe will be bent to allow for a uniform fit of the pipeline with the varying contours of the bottom of the trench and to accommodate changes in alignment. A track mounted hydraulic pipe-bending machine is normally used when installing 20-inch pipe as is being used in this project. The number of degrees of deflection is limited to 1-1/2 degrees per foot per diameter inch. Greater bends will either be completed in a pipe manufacturing facility or be completed using standard weld fittings.

5.1.4 Line Up and Welding

Installation of the pipe continues with aligning the end bevels of the pipe with a line-up clamp to the proper spacing and alignment. The line up clamps are held until enough of the weld is completed to assure weld integrity.

Welding is the joining of the individual sections of pipe to form the pipeline. A qualified welder, in accordance with welding procedures qualified to meet applicable code requirements, must perform welding. They must be periodically tested to maintain the formidable qualifications for certification of pipeline welding.

Every weld will be inspected by radiographic examination to determine the quality of the weld. Radiographic examination is a nondestructive method of inspecting the inner structure of the welds to determine if any defects are present. Defects shall be repaired or removed as outlined in API 1104, the standard for “Welding of Pipelines and Related Facilities” which is incorporated by reference by 49 CFR 192. A certified inspection contractor unrelated to the pipeline construction contractor will perform the weld inspection.

5.1.5 Coating and Lowering-In

After welding is complete, the weld and the area around the weld will be wrapped to protect the pipe from corrosion. Side boom tractors lift the pipe and move it over the open trench. An electronic holiday detector is then used over the pipe to assure that the protective pipe coating is not damaged and will protect the pipe while underground. Any chips, gaps or other areas of inadequate coating are repaired before the pipe is lowered into the trench. When the detector determines the pipe is adequately coated, the pipe is lowered into the trench.

5.1.6 Backfilling and Testing

After the pipe has been lowered into the trench, the excavated soil will be filled back into the trench. The operation will be performed in a manner that will prevent damage to the pipe and coating from either the backfill material or the lowering equipment. Where the ditching process was used to separate topsoil and subsoil, the backfill is also installed by placing the subsoil into the trench prior to placement of the topsoil to maintain the soil segregation. The subsoil

will be compacted to as near as possible to the original density, and the topsoil will be replaced in a manner so as not to overly compact the soil. Excess backfill material will be bermed over the ditch centerline to permit natural settling, with the intent that the final ground elevations will be similar to pre-construction contours.

After backfilling, the pipeline will be tested to ensure the system is capable of withstanding the operating pressure for which it was designed. The pipeline will be filled with water and a pressure equal to 1.5 times the design pressure will be maintained for a minimum of eight (8) hours. Test water will be disposed of according to permitting requirements.

5.1.7 Clean Up and Restoration

The final phase of the pipeline construction is clean up and restoration of the right-of-way. Any surplus materials and construction debris will be removed and disposed of according to permits or local codes. Restoration of the right-of-way surface would involve smoothing by chisel plow or disc harrow or other equipment, and stabilization where necessary. The right-of-way will be re-vegetated according to agreement with the landowner or appropriate government agency. Erosion control measures will be employed in areas with ground surface grades steeper than five to one .

Xcel Energy understands that right-of-way protection, cleanup and restoration are important part of the Project and that the applicable requirements of Minnesota Rules 4415.0195 must be met. Conditions prescribed under those rules are as follows:

- A. *The permittee shall comply with applicable state rules and regulations.*
- B. *The permittee shall clear the right-of-way only to the extent necessary to assure suitable access for construction, safe operation, and maintenance of the pipeline.*
- C. *Stream banks disturbed by pipeline construction must be stabilized with vegetation by the permittee using native plant species indigenous to the area or by other methods required by applicable state or federal permits or laws.*
- D. *Precautions shall be taken by the permittee to protect and segregate topsoil in cultivated lands unless otherwise negotiated with the affected landowner.*

- E. *Compaction of cultivated lands by the permittee must be kept to a minimum and confined to as small an area as practicable.*
- F. *Precautions to protect livestock and crops must be taken by the permittee unless otherwise negotiated with the affected landowner.*
- G. *All appropriate precautions to protect against pollution of the environment must be taken by the permittee.*
- H. *All waste and scrap that is the product of the pipeline construction process must be removed or properly disposed of before construction ends.*
- I. *Cleanup of personal litter, bottles, and paper deposited by right-of-way preparation and construction crews must be done on a daily basis.*
- J. *The permittee shall repair or replace all drainage tiles broken or damaged during right-of-way preparation, construction, and maintenance activities, unless otherwise negotiated with the affected landowner.*
- K. *The permittee shall repair private roads and lanes damaged when moving equipment or when obtaining access to the right-of-way, unless otherwise negotiated with the affected landowner.*
- L. *The permittee shall replace or repair all fences and gates removed or damaged as a result of right-of-way preparation, construction, and restoration activities, unless otherwise negotiated with the affected landowner.*
- M. *Shelterbelts and trees must be protected by the permittee to the extent possible in a manner compatible with the safe operation, maintenance, and inspection of the pipeline.*
- N. *The permittee shall, to the extent possible, restore the area affected by the pipeline to the natural conditions that existed immediately before construction of the pipeline. Restoration must be compatible with the safe operation, maintenance, and inspection of the pipeline.*

5.2 Operation and Maintenance

This section addresses the requirements of Minnesota Rules 4415.0160 to provide, for public information purposes, a general description of the anticipated operation and maintenance practices planned for the proposed pipeline.

This pipeline will be built, operated and maintained under the jurisdiction of the Minnesota Office of Pipeline Safety (MNOPS). As a result, this pipeline will meet all requirements of the DOT Minimum Federal Safety Standards in Title 49 of the CFR, Part 192 (49 CFR 192). These regulations are designed to ensure adequate protection for the public from failures of natural gas pipelines and related facilities. Part 192 defines and specifies the minimum standards for operating and maintaining pipeline facilities and the establishment of an Emergency Plan, which provides written procedures to minimize hazards from a gas pipeline emergency. Key elements of the plan must include procedures for:

1. Receiving, identifying, and classifying emergency events – gas leakage, fires, explosions and natural disasters;
2. Establishing and maintaining communications with local fire, police and public officials, and coordinating emergency responses;
3. Making personnel, equipment, tools and materials available at the scene of an emergency;
4. Protecting people first and then property, and making them safe from actual or potential hazards, and
5. Emergency shutdown of the system and safely restoring service.

Specifically, the safety standards in Part 192 require each pipeline operator to:

1. Develop an emergency plan, working with local fire departments and other agencies to identify personnel to be contacted, equipment to be mobilized, and procedures to be followed to respond to a hazardous condition caused by the pipeline or associated facilities;
2. Establish and maintain a liaison with the appropriate fire, police and public officials when responding to emergencies;
3. Establish a continuing education program to enable customers, the public, government officials, and those engaged in excavation activities to recognize a natural gas pipeline emergency and report it to appropriate public officials. Xcel Energy currently operates natural gas pipeline facilities that are under the jurisdiction of the MNOPS and subject to the requirements of 49 CFR 192. Xcel Energy currently has manuals, procedures and programs in place to meet the requirements outlined above. Before placing the pipeline in service, Xcel Energy would revise its manuals, procedures and programs to include the new pipeline facilities. Xcel Energy will operate all of its pipeline facilities in compliance with applicable pipeline safety regulations.

Xcel Energy will inspect and maintain its pipeline facilities in compliance with MNOPS regulations. Semi-annual inspections of the pipeline right-of-way would be conducted for gas leak detection and cathodic protection surveys would be conducted annually. Any additional inspections or maintain that may be required do to the new Federal Pipeline Integrity rulemaking, or any other code requirements, will be performed on the pipeline facilities.

Xcel Energy is currently a member of the Gopher State Excavators One-call system that is vital in helping to prevent damage to underground pipelines by excavators and others performing underground construction.

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Figures

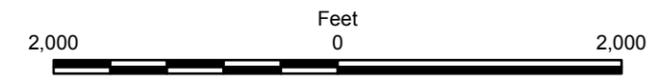
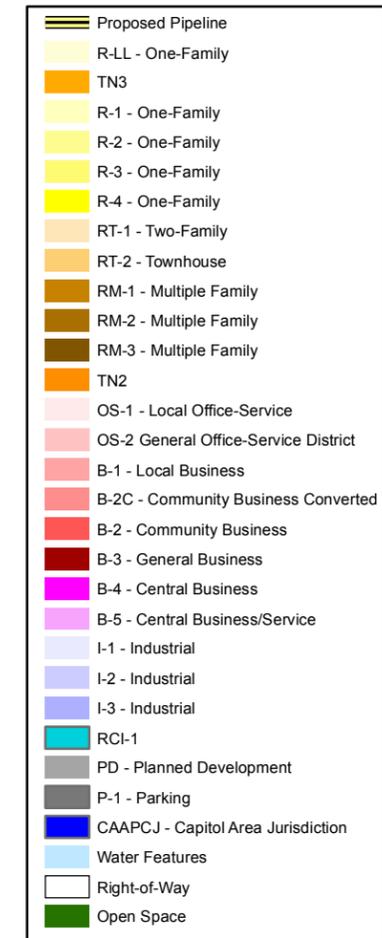
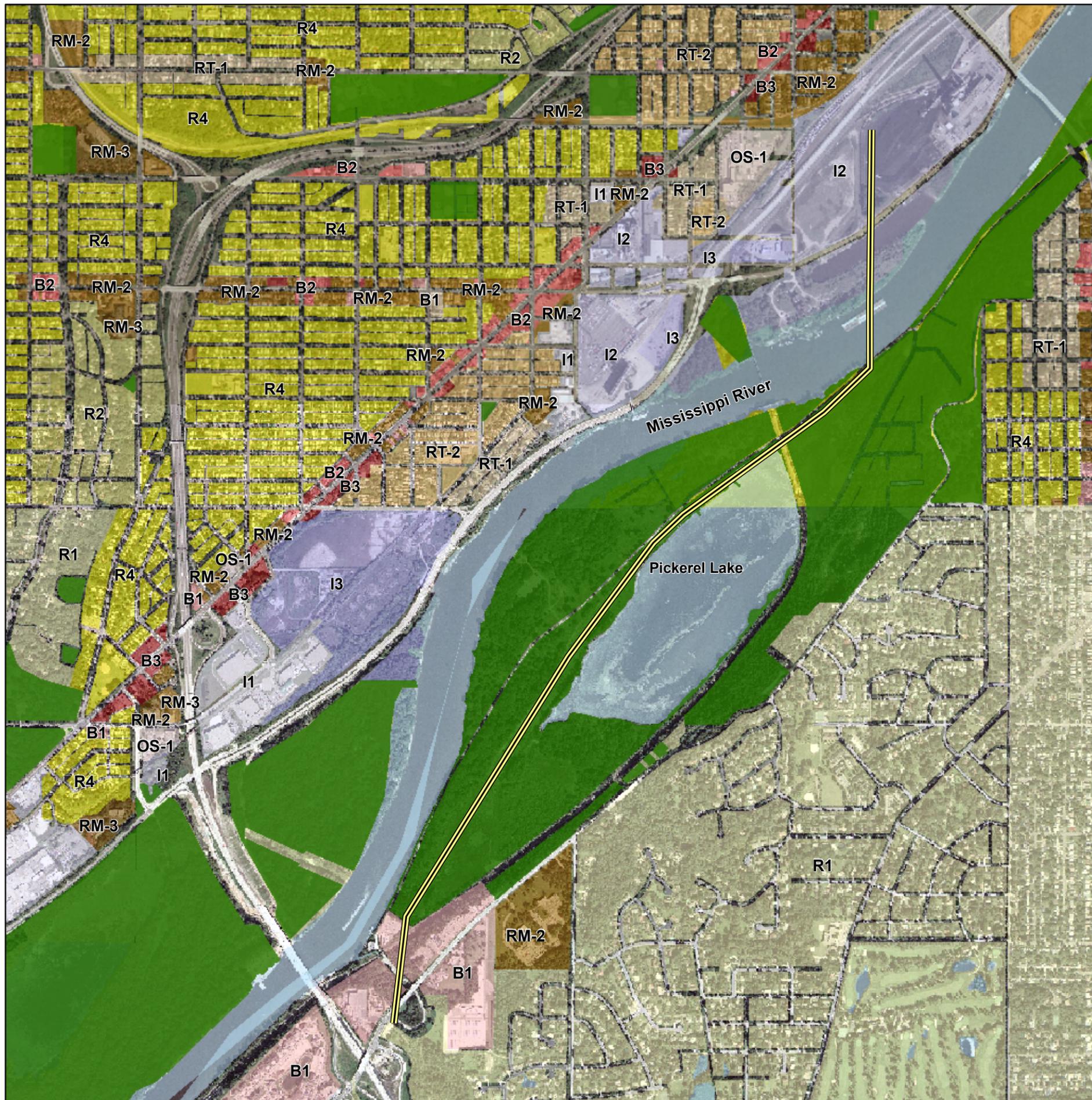
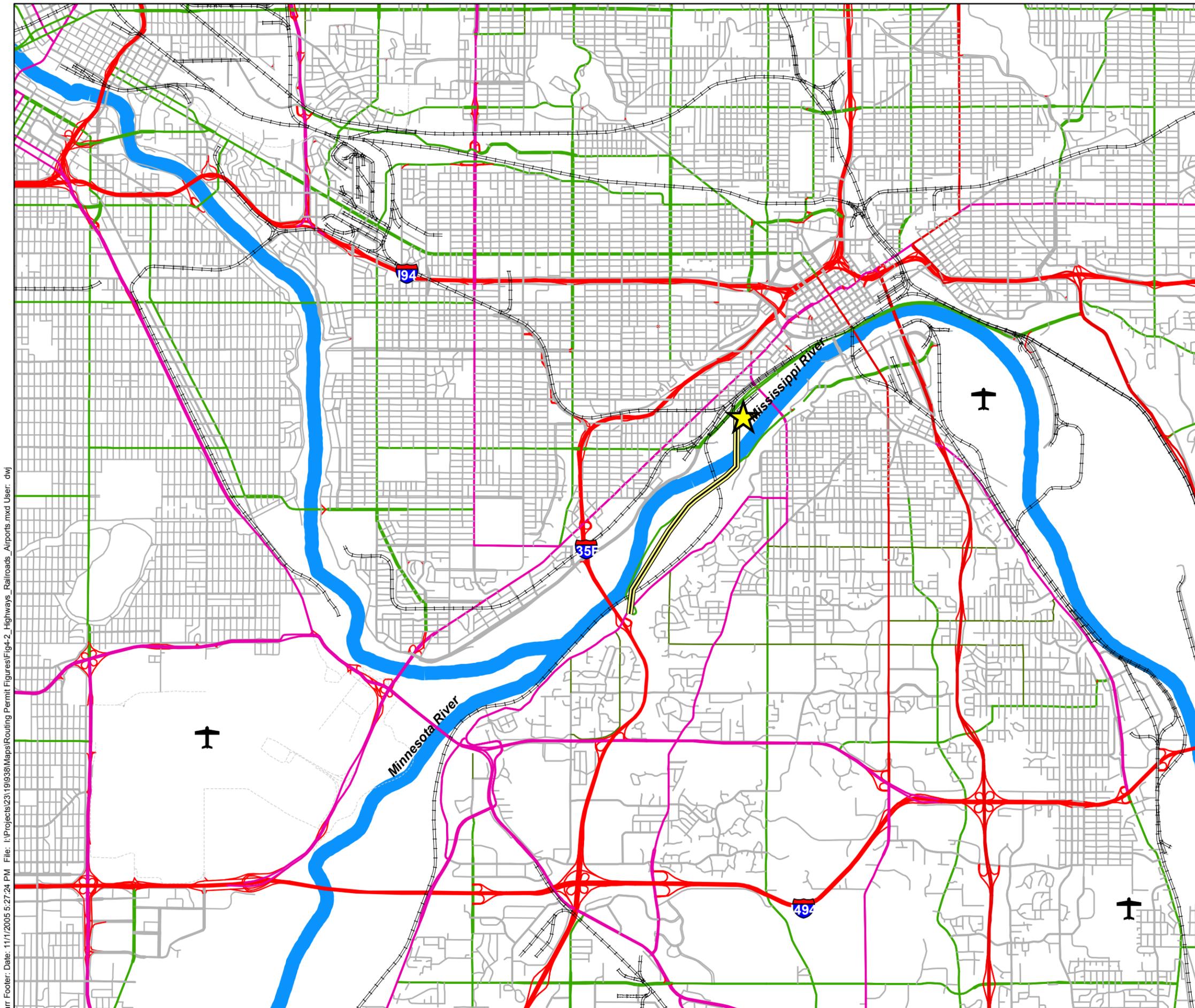


Figure 4-1
 Zoning
 Xcel Energy High Bridge Generating Facility
 Gas Pipeline Routing Permit Application
 Saint Paul, MN

November 2005



-  High Bridge Plant
-  Pipeline
-  Airport
-  Railroad
- MetroRoads**
-  Interstate Hwy
-  US Hwy
-  State Trunk Hwy
-  County State-aid Hwy
-  Municipal State-aid Hwy
-  County Road
-  Township Road
-  Municipal Street
-  State Park Road
-  Ramp
-  Private Road
-  River

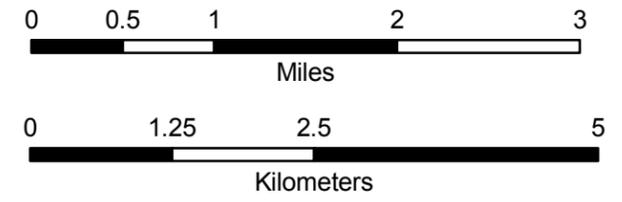


Figure 4-2
 Highways, Railroads and Airports
 Xcel Energy High Bridge Generating Facility
 Gas Pipeline Routing Permit Application
 Saint Paul, MN
 November 2005

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Data Source: Minnesota Department of Transportation and the Metropolitan Council



-  Proposed Pipeline
-  Parks
-  Trails
-  Mississippi National River and Recreation Area

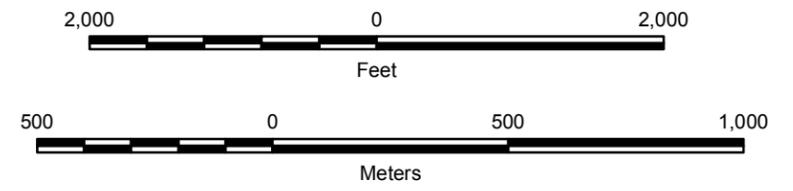
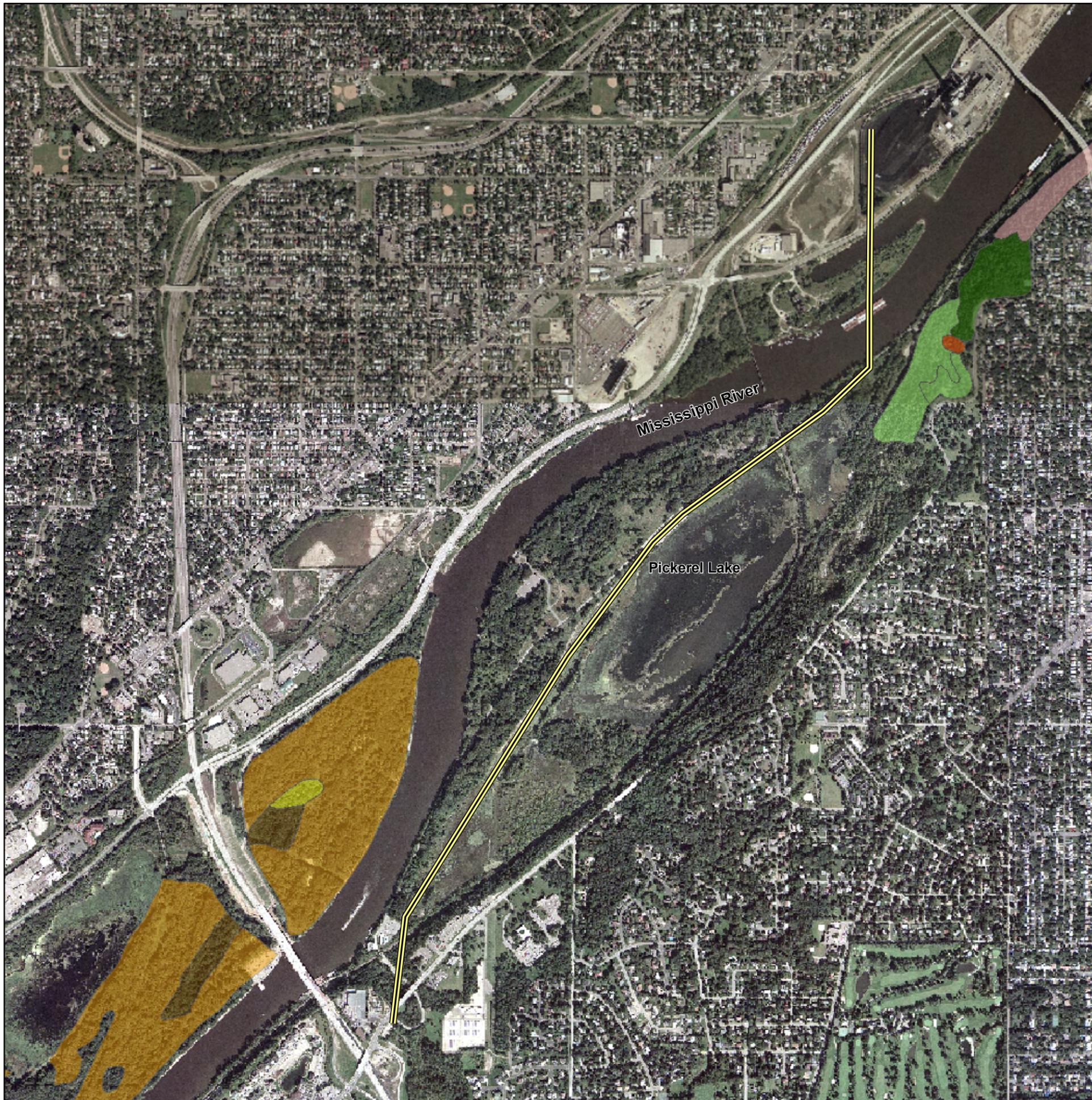


Figure 4-3
 Recreation Areas
 Xcel Energy High Bridge Generating Facility
 Gas Pipeline Routing Permit Application
 Saint Paul, MN
 November 2005



-  Proposed Pipeline
- MCBS Site of High Biodiversity Significance**
- Community Type**
-  Floodplain Forest
-  Wet Meadow
-  Willow Swamp
-  Dry Prairie - Sand-gravel Subtype
-  Maple-Basswood Forest
-  Oak Forest
-  Oak Forest - Dry Subtype

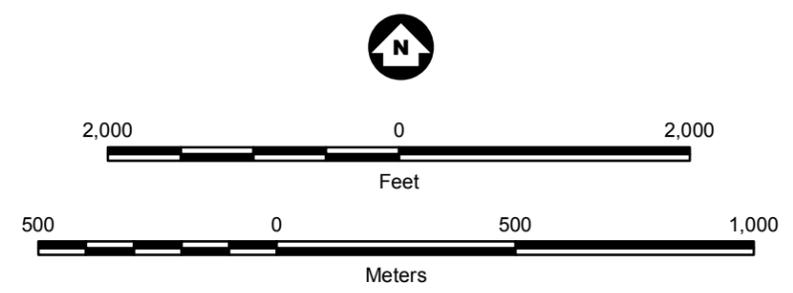
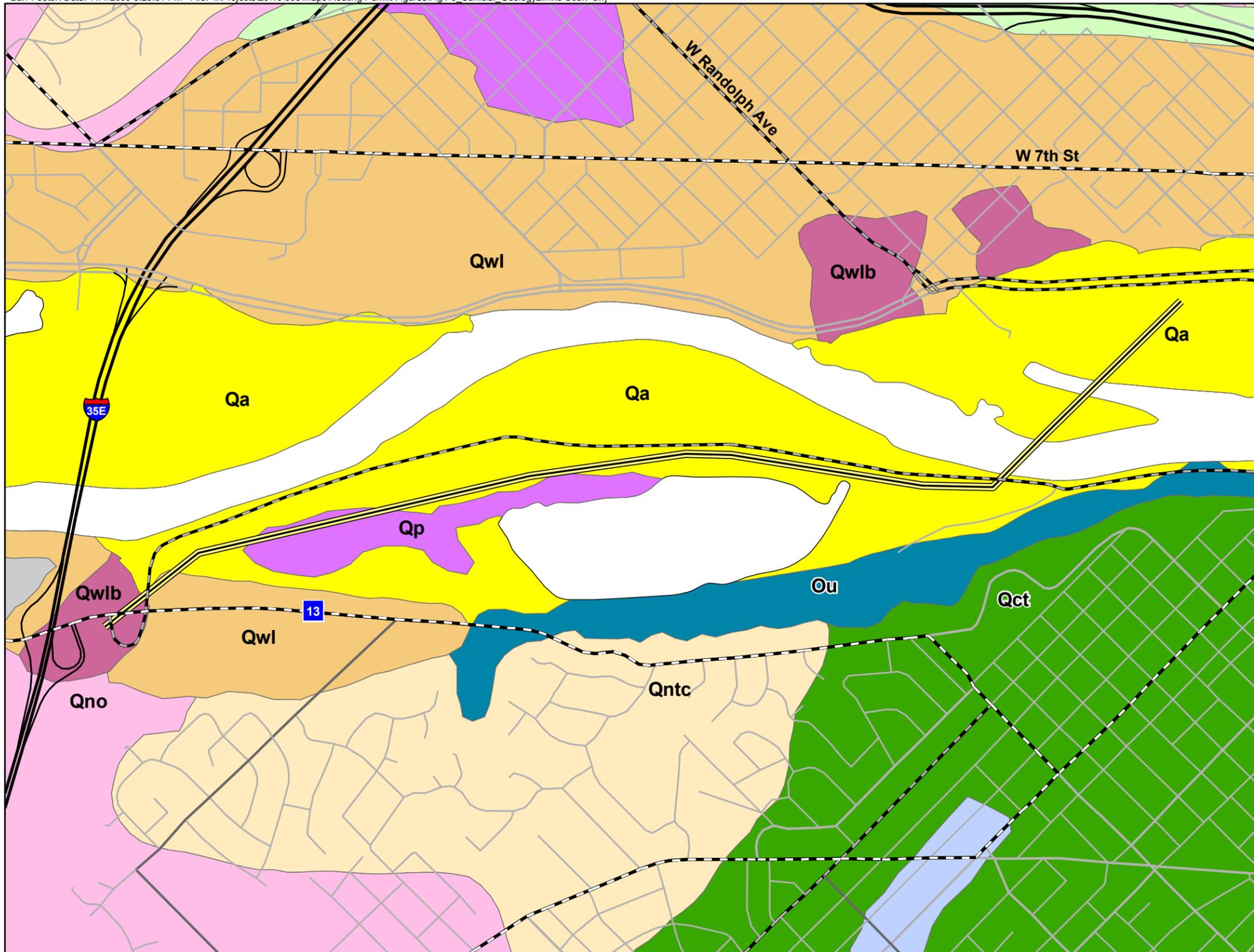


Figure 4-4
 Communities of Significant Biodiversity
 Xcel Energy High Bridge Generating Facility
 Gas Pipeline Routing Permit Application
 Saint Paul, MN
 November 2005



- QUATERNARY**
- Qp** **Peat and muck** - Partially decomposed plant matter and fine-grained organic matter deposited in marshes and ponded water, as well as marl (calcareous clay). Includes minor alluvial deposits along streams, as well as beach deposits.
 - Qa** **Floodplain alluvium** - Silt loam to loamy sand that overlies sand, gravelly sand, or cobbly gravel, and contains scattered wood and shell fragments. Some depressions have been filled with thick silty to clayey sediment. Coarser sediment may be present within the river channel. Covered by thick artificial fill in developed areas.
 - Qf** **Alluvial fan deposits** - Loam to loamy fine sand, with beds of silt loam, silty clay loam, fine sand, and gravel. Variable amounts of disseminated organic debris. Deposited at the base of steep slopes and at the mouths of deep gullies.
- WEST CAMPUS FORMATION**
- Fluvial sand and gravelly sand of mixed provenance that coarsens to cobbly gravel locally. In general, shale clast content increases upstream and at higher elevations. Deposited during early, higher stages of the Mississippi River and Minnesota Rivers, and preserved in terraces above the modern floodplain. The West Campus formation is mapped at four major terrace levels.
- Qwl** **Langdon terrace** - The main terrace level is about 125 feet above the present floodplain level. It rises in elevation from about 820 feet in the east to about 840 feet in the west. Locally this terrace is cut by prominent channels.
 - Qwlb** **Boulder facies** - Boulders and large limestone blocks mixed with silty sand and gravel. Deposited at the Langdon terrace level.
- NEW ULM FORMATION**
- Glacial, fluvial, and lacustrine sediment of Riding Mountain provenance deposited by ice and meltwater associated with the last glacial advance into the region.
- Qno** **Outwash** - Sand, gravelly sand, and gravel. Shale content decreases eastward, and clasts of Superior provenance eroded from older deposits are abundant in this portion of the map. Commonly capped by a mantle of windblown silt (loess) less than 4 feet thick.
 - Qntc** **Twin Cities member** - Complexly intermixed loam- to sandy loam-textured unsorted sediment (diamicton) ranging from yellowish-brown to gray and reddish-brown to reddish-gray. Pebbly, with cobbles and boulders. Small lenses of stratified sediment are common.
- CROMWELL FORMATION**
- Glacial, fluvial, and lacustrine sediment of Superior provenance. Where mapped in the proximity of the New Ulm formation, the Cromwell formation sediments are commonly reworked at the top, and mantled by as much as 10 feet of the New Ulm formation.
- Qct** **Till** - Chiefly sandy loam-textured, unsorted sediment (diamicton) that contains pebbles, cobbles, and boulders. Silty sand to cobbly gravel lenses are common. The upper surface may be reworked, and overlain by a few feet of fluvial or lacustrine sand in the vicinity of sand deposits. Includes small areas of thick, loamy to sandy colluvium.
 - Qcl** **Lake sand and silt** - Silt to medium-grained sand; includes interbedded silty clay to gravelly sand, sandy diamicton (mudflow sediment), and scattered drop-stones. Rhythmically layered in places. Primarily deposited in ice-walled lakes.
- ORDOVICIAN**
- Ou** **Ordovician bedrock, undivided** - includes the Decorah Shale, the Platteville and Glenwood Formations, and the St. Peter Sandstone. Individual units are too small to be shown on the map.
 - Opg** **Platteville and Glenwood Formations** - Fine-grained dolostone and limestone of the Platteville Formation is underlain by green, sandy shale of the Glenwood Formation.

Geologic data from Meyer, G.N., and B.A. Lusardi, 2000. "Surficial Geology of the St. Paul 30 x 60 Minute Quadrangle, Minnesota." Minnesota Geological Survey, Miscellaneous Map Series, Map M-106.

Proposed Pipeline

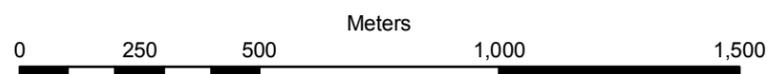
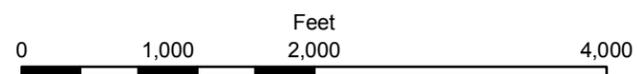
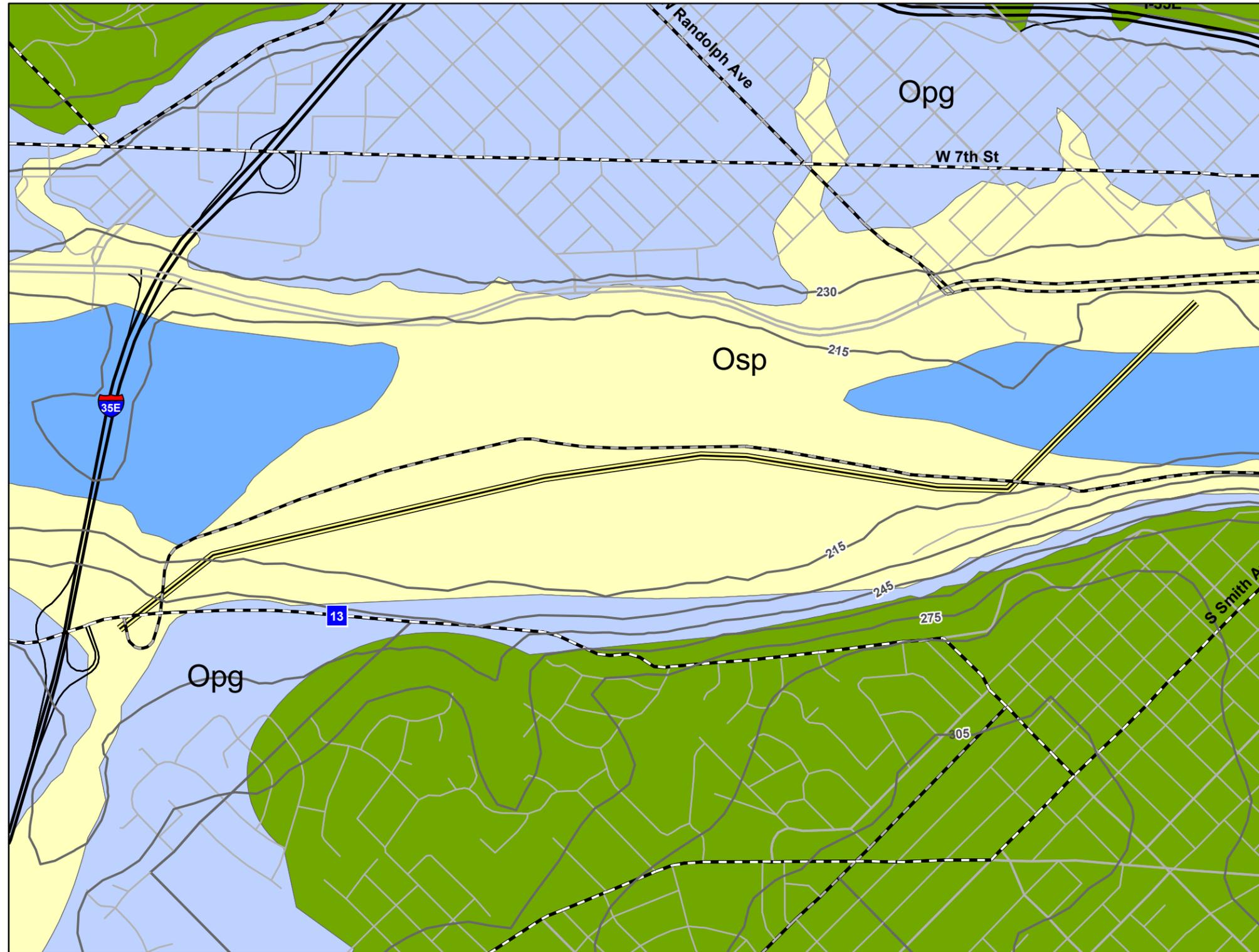


Figure 4-5
 Surficial Geology
 Xcel Energy High Bridge Generating Facility
 Gas Pipeline Routing Permit Application
 Saint Paul, MN

November 2005



ORDOVICIAN

Od

Decorah Shale - (Middle Ordovician) Green, calcareous shale; thin limestone interbeds. In a few places capped by thin (less than 20 feet) erosional remnants of limestone of overlying Galena Group (not shown on map). Largely restricted to south half of Ramsey County. Unit crops out in bluffs of Mississippi River in south and west St. Paul.

Opg

Platteville and Glenwood Formations - (Middle Ordovician) Fine-grained dolostone and limestone of Platteville underlain by thin, green sandy shale (3-5.5 feet thick) of Glenwood. Extensive outcrops in bluffs along Mississippi River in St. Paul.

Osp

St. Peter Sandstone - (Middle Ordovician) Upper half to two-thirds: fine- to medium-grained, quartz sandstone; generally massive to thick bedded. Lower part: multicolored beds of mudstone, siltstone, and shale; interbeds of very coarse sandstone. Basal contact is erosional surface. Unit crops out in bluffs along Mississippi River.

Opc

Prairie du Chien Group - (Lower Ordovician) Upper half to two thirds: commonly sandy or oolitic and thin-bedded dolostone; thin beds of sandstone and chert; thin beds of intraclastic (conglomeratic) dolostone. Lower part: generally massive or thick bedded dolostone; not oolitic or sandy, except for thin, sandy, transitional zone at base. Upper part of Prairie du Chien dolostone may contain karst solution cavities, particularly where overlying St. Peter Sandstone removed by erosion.

Proposed Pipeline

Proposed Pipeline

Surface Topography Contour

Surface Topography Contour (Contour Interval = 15 m)

Geologic data from Mossler and Bloomgren, 1992. "Bedrock Geology" in Meyer and Swanson, 1992, "Geologic Atlas-Ramsey County, Minnesota" Minnesota Geological Survey County Atlas Series Atlas C-7.

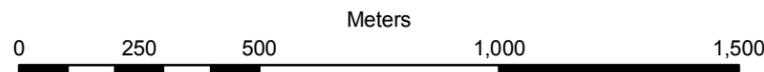


Figure 4-6
Bedrock Geology
Xcel Energy High Bridge Generating Facility
Gas Pipeline Routing Permit Application
Saint Paul, MN

November 2005



-  Proposed Pipeline
-  Lakes and Rivers

The entire length of the proposed gas pipeline route lies within the Upper Mississippi River-Twin Cities Metro major watershed of the Upper Mississippi River Basin. The minor watershed is #20088.

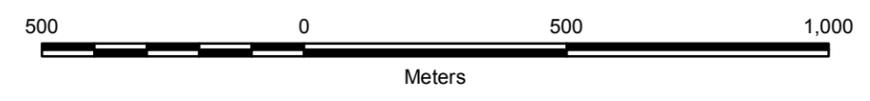
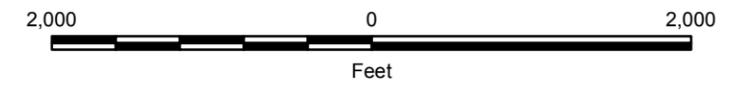
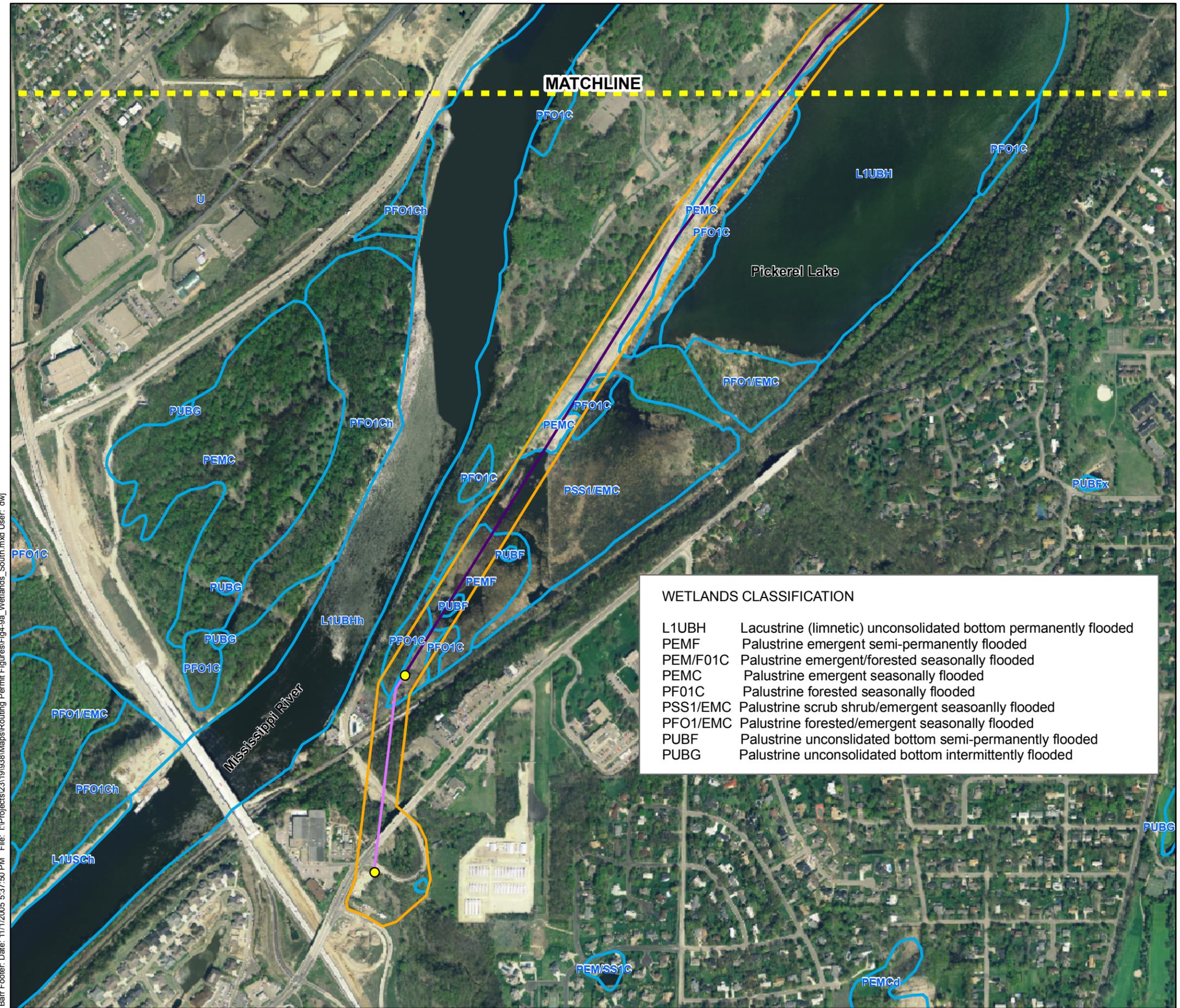
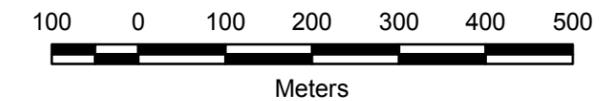
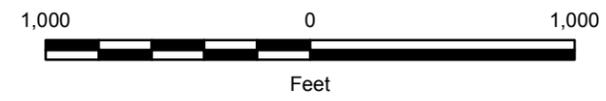


Figure 4-8
 Rivers and Lakes
 Xcel Energy High Bridge Generating Facility
 Gas Pipeline Routing Permit Application
 Saint Paul, MN

November 2005



- Proposed Pipeline - Directionally Drilled Section
- Proposed Pipeline - Open Trench Section
- Pipeline Route
- Bore Pits
- Wetlands



WETLANDS CLASSIFICATION	
L1UBH	Lacustrine (limnetic) unconsolidated bottom permanently flooded
PEMF	Palustrine emergent semi-permanently flooded
PEM/F01C	Palustrine emergent/forested seasonally flooded
PEMC	Palustrine emergent seasonally flooded
PFO1C	Palustrine forested seasonally flooded
PSS1/EMC	Palustrine scrub shrub/emergent seasonally flooded
PFO1/EMC	Palustrine forested/emergent seasonally flooded
PUBF	Palustrine unconsolidated bottom semi-permanently flooded
PUBG	Palustrine unconsolidated bottom intermittently flooded



Figure 4-9a
 Wetland Boundaries - Southern Segment
 Xcel Energy High Bridge Generating Facility
 Gas Pipeline Routing Permit Application
 Saint Paul, MN

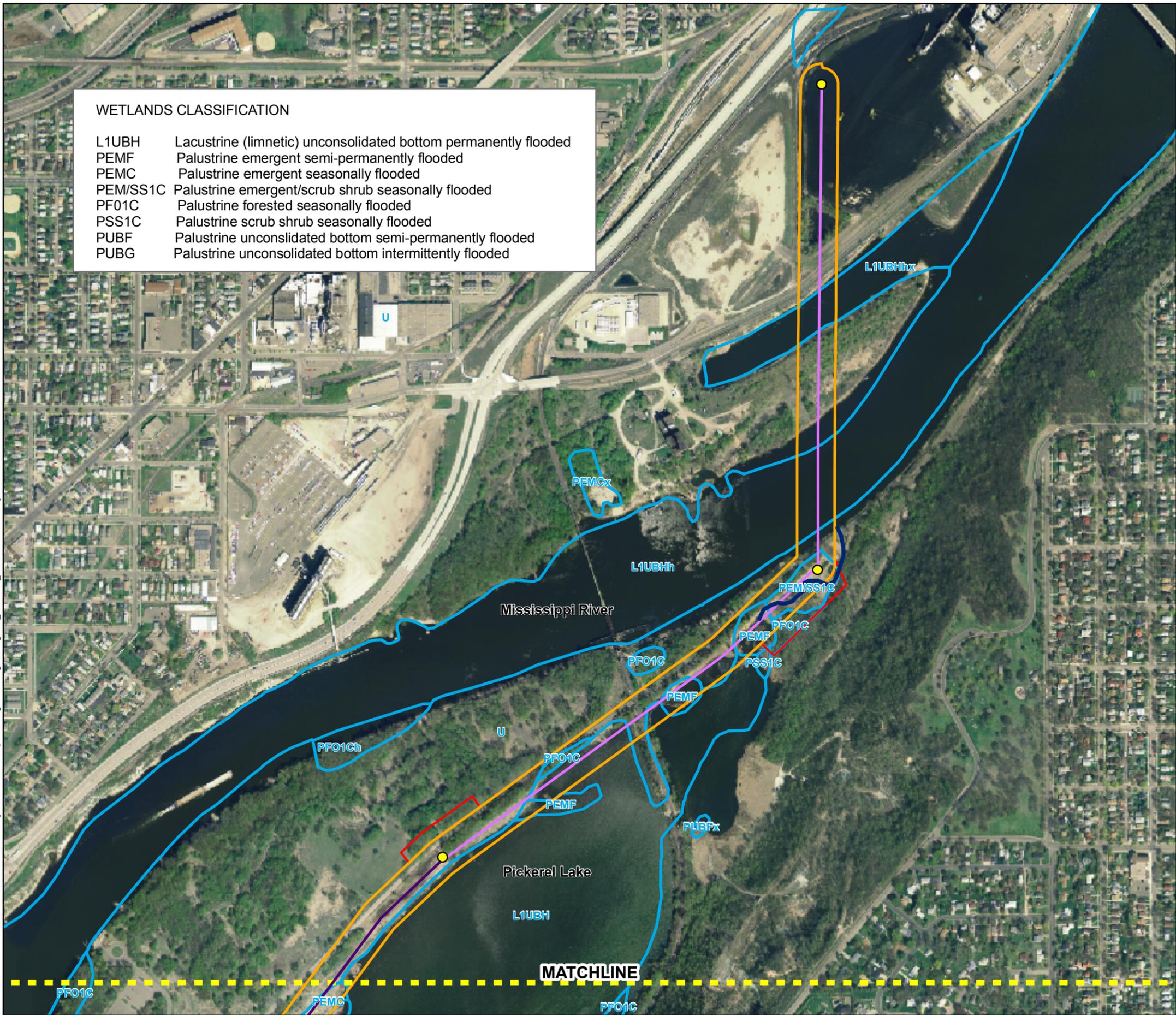
November 2005

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Data Source: USFWS National Wetlands Inventory mapping adjusted by August 2005 Barr field surveys

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WETLANDS CLASSIFICATION	
L1UBH	Lacustrine (limnetic) unconsolidated bottom permanently flooded
PEMF	Palustrine emergent semi-permanently flooded
PEMC	Palustrine emergent seasonally flooded
PEM/SS1C	Palustrine emergent/scrub shrub seasonally flooded
PF01C	Palustrine forested seasonally flooded
PSS1C	Palustrine scrub shrub seasonally flooded
PUBF	Palustrine unconsolidated bottom semi-permanently flooded
PUBG	Palustrine unconsolidated bottom intermittently flooded



- Proposed Pipeline - Directionally Drilled Section
- Proposed Pipeline - Open Trench Section
- Pipeline Route
- Additional Construction Area
- Bore Pits
- Wetland
- Stream

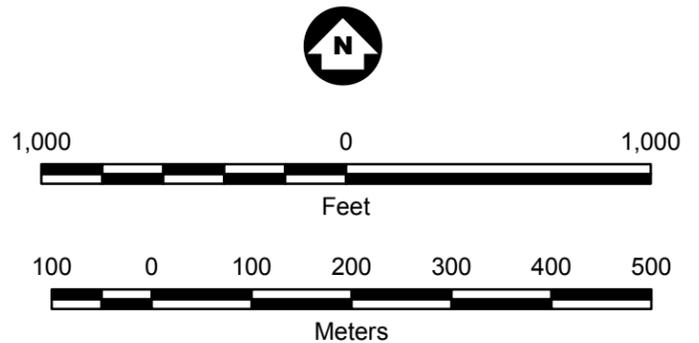


Figure 4-9b
 Wetlands Boundaries - Northern Segment
 Xcel Energy High Bridge Generating Facility
 Gas Pipeline Routing Permit Application
 Saint Paul, MN

November 2005

Data Source: USFWS National Wetland Inventory mapping adjusted by August 2005 Barr field surveys

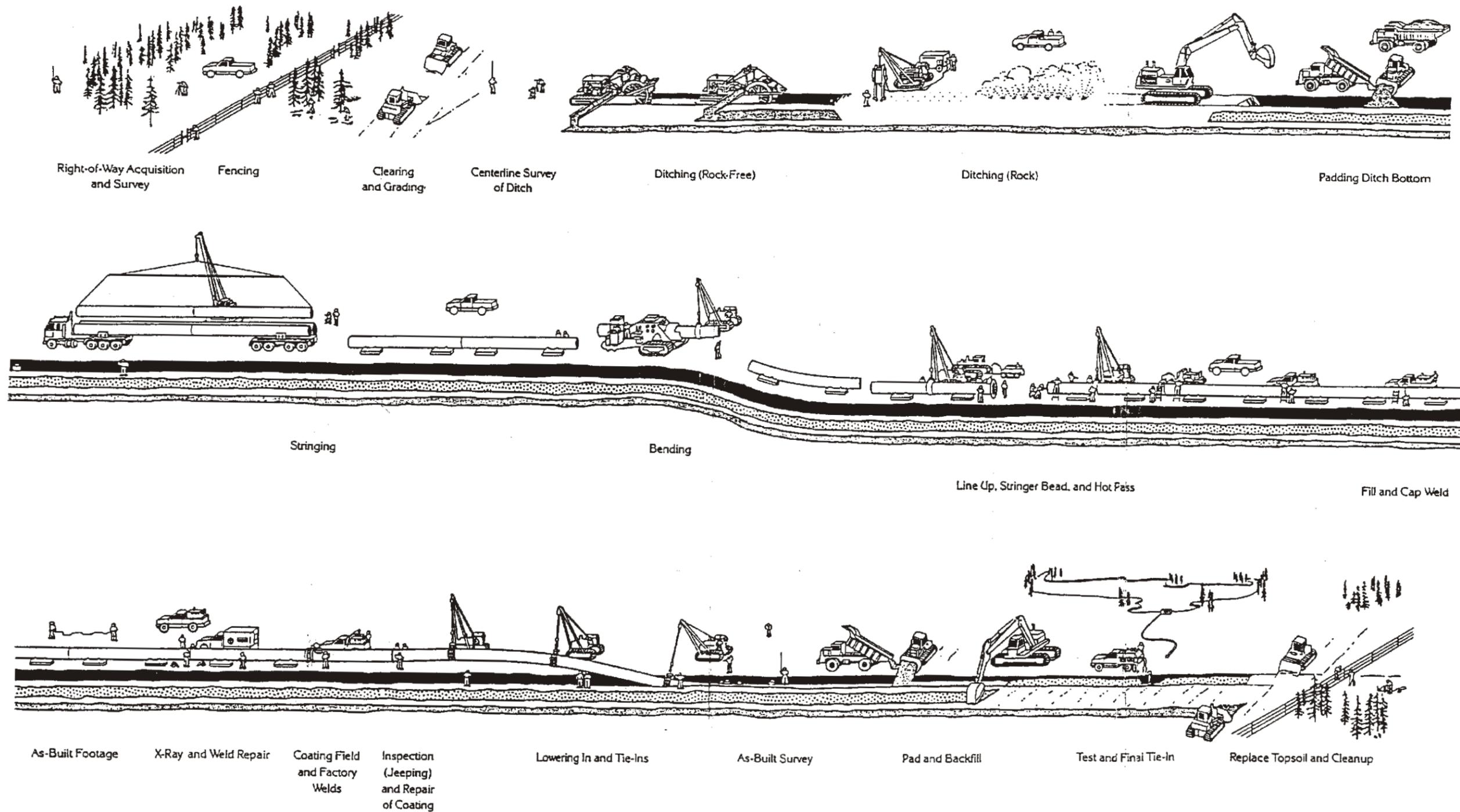


Figure 5-1

GAS PIPELINE CONSTRUCTION SEQUENCE
Gas Pipeline Routing Permit Application
High Bridge Generating Facility Conversion Project
November 2005

Appendices

Appendix A

MATERIAL SAFETY DATA SHEET

p. 1 of 5

SECTION I: PRODUCT IDENTIFICATION

NORTHWEST NATURAL GAS COMPANY

220 N.W. 2ND AVENUE
PORTLAND, OR 97209-3991

PRODUCT NAME:

NATURAL GAS

MSDS DATE:

03/08/91

EMERGENCY (24-HOUR) PHONE:

[503]-226-4211, Ext. 4513.

LABORATORY (GENERAL INFORMATION, 8-5, Mon-Fri):

Same, Ext. 4729.

TRADE NAME:

Natural gas.

SYNONYMS:

Pipeline gas, natural gas - dry.

SHIPPING NAME:

[DOT]

Flammable gas, UN1971 (if liquefied, UN1972).

[ICC]

Flammable gas, RED LABEL, limit 300 lb.

[IATA]

Flammable gas, RED LABEL.

CARGO:

Limit 140 KG.

PASSENGER:

NOT ACCEPTABLE.

NFPA RATING (Health-Flammability-Reactivity):

1 - 4 - 0 [GAS].

CHEMICAL FAMILY:

Paraffin (saturated) hydrocarbons and inert gases.

CHEMICAL FORMULA:

Not applicable. Product is a mixture.

CHEMICAL ABSTRACTS SERVICE (CAS)#:

68410-63-9

SECTION II: COMPONENTS AND HAZARDS

<u>COMPONENT</u>	<u>FORMULA</u>	<u>CAS NO.</u>	<u>VOL% (TYP.)</u>	<u>TLV (PPM)</u>	<u>DOT#</u>
Methane	CH ₄	74-82-8	93.5	N/A	UN1971
Ethane	C ₂ H ₆	74-84-0	3.8	N/A	UN1035
Propane	C ₃ H ₈	74-98-6	1.0	1,000	UN1978
i-Butane	C ₄ H ₁₀	75-28-5	0.1	N/A	UN1969
n-Butane	C ₄ H ₁₀	106-97-8	0.1	800	UN1011
i-Pentane	C ₅ H ₁₂	78-78-4	< 0.1	350 mg/M3	UN1265
n-Pentane	C ₅ H ₁₂	109-66-0	< 0.1	600	UN1265
n-Hexane	C ₆ H ₁₄	110-54-3	< 0.1	50	UN1208
Carbon Dioxide	CO ₂	124-38-9	0.3	10,000	TWA OSHA UN1013 5,000 TWA ACGIH 30,000 STEL ACGIH
Nitrogen	N ₂	7727-37-9	1.2	N/A	UN1066
t-Butyl Mercaptan	C ₄ H ₁₀ S	75-66-1	< 30 ppm	N/A	UN2347
Methyl Ethyl Sulfide	C ₂ H ₆ S	624-89-5	< 3 ppm	40,250	UN1993
Hydrogen Sulfide	H ₂ S	7783-06-4	< 5 ppm	10	UN1053

AQUATIC TOXICITY: Not applicable. Natural gas and LNG have low water-solubility.

SECTION III: PHYSICAL DATA

FREEZING POINT (760 mm Hg):		-182.6 °C (-296.7 °F)
BOILING POINT (760 mm Hg):		-161.5 °C (-258.7 °F)
GAS SPECIFIC GRAVITY	(air = 1.000):	0.55 - 0.64
LIQUID SPECIFIC GRAVITY	(water = 1.000):	0.42 - 0.46
GAS DENSITY:	[varies slightly w. composition]	0.044 lb/cf
VAPOR PRESSURE:	Gaseous at 60 °F, 1 atm. Completely volatile.	
SOLUBILITY IN WATER:	Less than 3.5 vol%. LIQUID pH: Not Applicable	
EVAPORATION RATE:	Normally a gas. Liquefied natural gas (LNG) evaporates much faster than diethyl ether.	

APPEARANCE AND ODOR:

GAS is extremely flammable, with no color, odor, or taste. If trace amounts of sulfur compounds are added as odorant, the gas has a characteristic garlic/rotten-egg/skunk odor.

LIQUID is clear, colorless, odorless, cryogenic (super-cold) and extremely flammable.

SECTION IV: FIRE AND EXPLOSION DATA

FLASH POINT	-306 °F (-188 °C)
AUTOIGNITION TEMPERATURE:	1,004 °F (540 °C)
FLAMMABLE LIMITS IN AIR:	[LEL] 4.8 vol% [UEL] 15.0 vol%
EXTINGUISHING MEDIA:	Class B: [Dry chemical, "Halon", CO ₂].

SPECIAL FIREFIGHTING PROCEDURES: Remove unnecessary personnel. Fire crews should have supplied-air respirators. Try to remove ignition sources. Use non-sparking tools to shut off the gas. Let the fire burn itself out to stop a flammable mix from forming when the flame is extinguished. Natural gas is lighter than air and will vent upward. If the gas cannot be shut off, let it burn and cool the surrounding area with water fog. If natural gas is compressed in cylinders, use water fog to cool them. If LNG has spilled, dike the liquid using non-sparking tools and disperse the vapors with water fog. Keep leaking natural gas, LNG or its vapors out of sewers or other enclosed spaces.

UNUSUAL FIRE/EXPLOSION HAZARD: Extremely flammable. NO SMOKING where natural gas is in use. Keep public away in case of leak/spill. Notify local gas utility (see Section I) immediately, plus local fire department as needed.

SECTION V: HEALTH HAZARD INFORMATION

MIXTURE TLV: Not established by OSHA or ACGIH.

EFFECTS OF ACUTE OVEREXPOSURE:

INHALATION: At high pressures and high concentrations, may cause cardiac sensitization. At high concentrations and in enclosed areas, may displace sufficient oxygen to cause dizziness, headache, lack of muscular coordination, diminished mental alertness, cyanosis, narcosis, dyspnea, or death by asphyxiation.

SKIN CONTACT: Not toxic, non-irritating. At high pressure, gas may be injected under skin, causing pain, possible tissue damage or embolism. Contact with LNG may cause immediate, severe frostbite.

SKIN ABSORPTION: Unlikely: natural gas is lighter than air.

EYE CONTACT: Not toxic, non-irritating. Pressurized gas or an LNG splash may cause physical damage to unprotected eyes.

SWALLOWING: Unlikely exposure route for gaseous or liquid products.

EFFECTS OF CHRONIC EXPOSURE: None.

NOTE TO PHYSICIAN: See "Natural Gas and Its Physiological Action", in California and Western Medicine, V. 47, #1. Light hydrocarbons (methane through butanes) are simple asphyxiants that displace O₂. CO₂ has health effects above 0.5% (vol). Nitrogen is inert.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Respiratory conditions such as emphysema may be aggravated by long exposure to high concentrations.

CARCINOGENS: None by NTP, IARC, or ACGIH.

SECTION VI: FIRST AID PROCEDURES

EYE: If physical damage occurs due to high-pressure gas release or an LNG splash, cover BOTH eyes with loose, bulky, sterile dressing and obtain immediate medical treatment.

SKIN: If gas is injected under skin, treat patient for shock and seek immediate medical treatment. If LNG has splashed skin, remove victim from contact, flush affected area with lukewarm water. Apply a loose, sterile, bulky dressing. Get immediate medical help.

INHALATION: Remove victim to fresh air quickly. Restore or support breathing as needed. Use mouth-to-mouth resuscitation or CPR as needed if asphyxiation has occurred. If available, have a trained person administer oxygen. Seek medical help immediately.

SECTION VII: REACTIVITY

STABILITY: Stable when contained and not exposed to oxidizers or heat.

CONDITIONS CAUSING INSTABILITY: Fire or other heat sources, frictional sparks, electrical arcing may cause ignition. Reacts explosively with Cl₂, BF₅, OF₂, NF₃, ClO₂. On contact with liquid oxygen (LOX) or liquid fluorine (LF₂), LNG will explode.

TENDENCY TO POLYMERIZE: None.

CORROSIVENESS: None.

HAZARDOUS DECOMPOSITION PRODUCTS: CO, CO₂, partially-oxidized combustion products of hydrocarbons (aldehydes, acids, "soot").

SECTION VIII: DISPOSAL/LEAK PROCEDURE

If leak is from a gas line, notify appropriate safety personnel. Evacuate the area. Provide explosion-proof ventilation. Use non-sparking tools to shut off the gas flow ahead of the leak. If the leak is on the Gas Company side of the gas meter, call Northwest Natural Gas immediately at 503-226-4211, Ext.4513.

If leak is on a compressed-natural-gas cylinder, cautiously remove the cylinder to an isolated outside area or to an explosion-proof hood. Vent the gas at a slow, controlled rate. When empty, tag the defective cylinder and return it to the supplier.

If leak is from an LNG container, put on proper protective clothing and dike the liquid with dirt or other nonflammable absorbent. Use water fog to disperse the vapor cloud. Keep LNG or its vapors out of sewers or other enclosed spaces.

SECTION IX: SPECIAL PRECAUTIONS

The use of flame-retardant clothing, including leather or cotton gauntlet gloves, is mandatory in any situation where pressurized natural gas or LNG vapors may ignite accidentally.

Wear goggles or a faceshield when working with any pressurized gases or LNG.

Use an explosion-proof oxygen [O₂] tester, NOT a combustible-gas detector, to check the atmosphere of any area that may be deficient in oxygen. If the oxygen reading is below 19%, use a SUPPLIED-AIR RESPIRATOR with a properly fitting face mask. Use the same type of respirator in trenches over four feet deep when a gas-air mix exists below the gas line. Using only a cartridge respirator in low-oxygen conditions may lead to asphyxiation.

Ground all equipment and hoses used in natural gas service to prevent the buildup of static and possible sparks. Where feasible, use non-sparking tools to work on and around natural gas lines and equipment.

Natural gas may be present in mains, services, hoses, or customers' equipment at pressures ranging from less than 1 psi to over 720 psi. Open and close gas valves slowly to avoid pressure surges that might cause personal injury or damage equipment.

Provide sufficient local exhaust to prevent gas buildup to 20% of LEL. Pressure-test natural gas houselines with inert gas before putting them into service for the first time, and again when taking them permanently out of service.

At least 48 hours prior to excavating in an area where gas lines are known or suspected to be, call Northwest Natural Gas [503-226-4211, Ext. 4513] for location and marking at the site. NOTE: Many communities have a one-call service that alerts all underground utilities (gas, power, telephone, TV cable, water, or sewer) to mark their lines. Check your telephone book for the local number.

If a gas line is damaged, IMMEDIATELY report the incident to Northwest Natural Gas [503-226-4211, Ext. 4513]. If the gas line is broken, evacuate the area and also call the local fire department. If a gas line has been bent or pulled out of alignment, other gas lines in the vicinity may have been damaged even if the pulled line looks intact.

If only the gas line's coating is damaged, it must still be inspected and properly repaired by the gas company before reburial, to prevent corrosion and possible leakage.

SECTION X: OTHER

ADDITIONAL REGULATORY CONCERNS:

CPSC: None

FDA: None

SARA: Title III, Sections 302, 304, 311, 312, and 313.

TSCA: None

USDA: None

OTHER FEDERAL: Department of Transportation, Office of Pipeline Safety, CFR Title 49, Parts 191-192, with all revisions.

OTHER STATE: None in either Oregon or Washington.

DISCLAIMER: The data contained in this MSDS are believed to be accurate, but are not so warranted whether or not they originated at Northwest Natural Gas Company. Recipients of this MSDS are advised to confirm ahead of time that the data are current and suitable to their needs.

SIGNED: **W. T. Amies**
(W. T. Amies)

TITLE: CHIEF CHEMIST

DATE: _____
03/08/91



1 PRODUCT AND COMPANY IDENTIFICATION

Thio and Fine Chemicals

Arkema Inc.
2000 Market Street
Philadelphia, PA 19103

EMERGENCY PHONE NUMBERS:

Chemtrec: (800) 424-9300 (24hrs) or (703) 527-3887
Medical: Rocky Mountain Poison Control Center
(866) 767-5089 (24Hrs)

Information Telephone Numbers	Phone Number	Available Hrs
Customer Service	1-800-628-4453	8:30 to 5:30 EST

Product Name SPOTLEAK 1009
Product Synonym(s)
Chemical Family Mixture
Chemical Formula Mixture
Chemical Name Blend: Butyl and Propyl Mercaptans
EPA Reg Num
Product Use Odorant for Natural Gas

2 COMPOSITION / INFORMATION ON INGREDIENTS

Ingredient Name	CAS RegistryNumber	Typical Wt. %	OSHA
tert-Butylmercaptan	75-66-1	77-80%	Y
Isopropylmercaptan	75-33-2	>16%	Y
n-Propylmercaptan	107-03-9	>2%	Y

The substance(s) marked with a "Y" in the OSHA column, are identified as hazardous chemicals according to the criteria of the OSHA Hazard Communication Standard (29 CFR 1910.1200)

This material is classified as hazardous under Federal OSHA regulation.

The components of this product are all on the TSCA Inventory list.

3 HAZARDS IDENTIFICATION

Emergency Overview

Clear, colorless liquid, gas-like odor

DANGER!

EXTREMELY FLAMMABLE LIQUID AND VAPOR. VAPOR MAY CAUSE FLASH FIRE.

MAY CAUSE EYE IRRITATION.

MAY CAUSE RESPIRATORY TRACT IRRITATION.

MAY CAUSE ALLERGIC SKIN REACTION.

MAY CAUSE NAUSEA, HEADACHE OR DIZZINESS.

Potential Health Effects

Inhalation and skin contact are expected to be the primary routes of occupational exposure to this material. Based on single exposure animal tests, it is considered to be no more than slightly toxic if absorbed through skin, practically non-toxic if inhaled, practically non-irritating to eyes and non-irritating to skin. Vapor may be irritating to the eyes and respiratory tract. Repeated or prolonged contact may cause an allergic skin reaction. This material has a strong objectionable odor that may cause nausea, headache, or dizziness.



4 FIRST AID MEASURES

IF IN EYES, immediately flush with plenty of water. Get medical attention if irritation persists.

IF ON SKIN, immediately wash with soap and plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur. Wash clothing before reuse. Thoroughly clean shoes before reuse.

IF SWALLOWED, do NOT induce vomiting. Give water to drink. Get medical attention immediately. NEVER GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON.

IF INHALED, remove to fresh air. If breathing is difficult, get medical attention.

5 FIRE FIGHTING MEASURES

Fire and Explosive Properties

Auto-Ignition Temperature	245 C		
Flash Point	<0 F	Flash Point Method	TCC
Flammable Limits- Upper	NE		
Lower	NE		

Extinguishing Media

Use water spray, carbon dioxide, foam or dry chemical.

Fire Fighting Instructions

Water may be ineffective. Use water spray or water fog to cool surrounding surfaces and prevent fire damage or rupture of containers. Fire fighters and others who may be exposed to products of combustion should wear full fire fighting gear (full Bunker Gear) and self-contained breathing apparatus (pressure demand NIOSH approved or equivalent). Fire fighting equipment should be thoroughly decontaminated after use.

Fire and Explosion Hazards

When burned, the following hazardous products of combustion can occur:
Oxides of carbon
Sulfur oxides
Thermally insulated
Vapors can travel to a source of ignition and flash back.

6 ACCIDENTAL RELEASE MEASURES

In Case of Spill or Leak

Extinguish or turn off ignition or combustion sources. Contain spill. Stop leak at source if this can be done safely. Ventilate area only if odor control is not an issue. Nonessential personnel should leave the area until cleanup is completed. Cover spill area with closed-cell foam to reduce odors (use of Aqueous Film Forming Foam (AFFF) with polymeric layer is acceptable). If foam is unavailable, absorb spill with liquid-binding material (e.g. diatomaceous earth, saw dust universal binder) and deodorize residue on ground with 3-10% hydrogen peroxide. If spill is contained within a large containment area, add 5% bleach solution (sodium hypochlorite) in a 50 parts bleach solution to one part product dilution ratio. Swimming pool chemicals (hypochlorite compounds) work effectively in deodorizing product. If these are applied to product, the crystals must be accompanied by sufficient water of dilution so that the considerable heat of reaction will be absorbed. Enzyme or bacteria based deodorizers are also acceptable for use. Place waste materials into Department of Transportation (DOT)-approved drums for disposal. Where practicable wash area down with water. Keep concentrate and wash water from entering sewers or waterways. Consult a regulatory specialist



6 ACCIDENTAL RELEASE MEASURES

to determine appropriate state or local reporting requirements, for assistance in waste characterization and/or hazardous waste disposal and other requirements listed in pertinent environmental permits.

7 HANDLING AND STORAGE

Handling

Keep away from heat, sparks and flame.
Keep container closed.
Use only with adequate ventilation.
Avoid prolonged or repeated contact with skin.
Avoid contact with eyes, skin and clothing.
Wash thoroughly after handling.

CONTAINER HAZARDOUS WHEN EMPTY. Emptied container retains vapor and product residue. Follow labeled warnings even after container is emptied. RESIDUAL VAPORS MAY EXPLODE ON IGNITION. DO NOT CUT, DRILL GRIND OR WELD ON OR NEAR THIS CONTAINER. Improper disposal or reuse of this container may be dangerous and/or illegal.

Storage

Store in well ventilated area away from heat and sources of ignition such as flame, sparks and static electricity. Ensure that all storage and handling equipment is properly rated, grounded and installed to satisfy electrical classification requirements. Static electricity may accumulate and create a fire hazard. All storage containers, including containers such as drums, cylinders and IBC's, must be bonded and grounded during filling and emptying operations. Store away from oxidizers and reactive materials. Keep container tightly closed. Observe all federal, state and local regulations and National Fire Protection Association (NFPA) Codes which pertain to the specific local conditions of storage and use, including OSHA 29 CFR 1910.106 and NFPA 30, 70, 77, and 497.

8 EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering Controls

Investigate engineering techniques to reduce exposures. Provide ventilation if necessary to minimize exposure. Dilution ventilation is acceptable, but local mechanical exhaust ventilation preferred, if practical, at sources of air contamination such as open process equipment. Consult ACGIH ventilation manual or NFPA Standard 91 for design of exhaust systems.

Eye / Face Protection

Where there is potential for eye contact, wear chemical goggles and have eye flushing equipment available.

Skin Protection

Wear appropriate chemical resistant protective clothing and chemical resistant gloves to prevent skin contact. Consult glove manufacturer to determine appropriate type glove material for given application. Wear chemical goggles, a face shield, and chemical resistant clothing such as a rubber apron when splashing may occur. Rinse immediately if skin is contaminated. Remove contaminated clothing promptly and wash before reuse. Clean protective equipment before reuse. Provide a safety shower at any location where skin contact can occur. Wash skin thoroughly after handling.



8 EXPOSURE CONTROLS / PERSONAL PROTECTION

Respiratory Protection

Avoid breathing vapor or mist. Where airborne exposure is likely, use NIOSH approved respiratory protection equipment appropriate to the material and/or its components. Full facepiece equipment is recommended and, if used, replaces need for face shield and/or chemical goggles. If exposures cannot be kept at a minimum with engineering controls, consult respirator manufacturer to determine appropriate type equipment for given application. Observe respirator use limitations specified by NIOSH or the manufacturer. For emergency and other conditions where there may be a potential for significant exposure, use an approved full face positive-pressure, self-contained breathing apparatus or positive-pressure airline with auxiliary self-contained air supply. Respiratory protection programs must comply with 29 CFR § 1910.134.

Airborne Exposure Guidelines for Ingredients

The components of this product have no established Airborne Exposure Guidelines

- Only those components with exposure limits are printed in this section.
- Skin contact limits designated with a "Y" above have skin contact effect. Air sampling alone is insufficient to accurately quantitate exposure. Measures to prevent significant cutaneous absorption may be required.
- ACGIH Sensitizer designator with a value of "Y" above means that exposure to this material may cause allergic reactions.
- WEEL-AIHA Sensitizer designator with a value of "Y" above means that exposure to this material may cause allergic skin reactions.

9 PHYSICAL AND CHEMICAL PROPERTIES

Appearance/Odor	Clear, colorless liquid, gas-like odor
pH	NE
Specific Gravity	0.812 @ 15.5 C
Vapor Pressure	6.6 psia @ 100
Vapor Density	3
Melting Point	NA
Freezing Point	<-50 F
Boiling Point	62 C
Solubility In Water	Insoluble @ 20 C
Solubility in Other Materials	Alcohols, ethyl ether
Evaporation Rate	NE
Percent Volatile	100
Viscosity	0.570 cP @ 20 C
Other Physical Data	Olfactory threshold: 0.1 ppb Refractive index: 1.425

10 STABILITY AND REACTIVITY

Stability

This material is chemically stable under normal and anticipated storage and handling conditions.

Incompatibility

Avoid contact with strong oxidizers, acids, bases, reducing agents.

Hazardous Decomposition Products

None known.



11 TOXICOLOGICAL INFORMATION

Toxicological Information

Data on this material and/or its components are summarized below.

Single exposure (acute) studies indicate:

Dermal - No More than Slightly Toxic to Rats (LD50 >2,000 mg/kg)

Inhalation - Practically Non-toxic to Rats (4-hr LC50 >5.3 mg/l; vapor)

Eye Irritation - Practically Non-irritating to Rabbits

Skin Irritation - Non-irritating to Rabbits

tert-Butylmercaptan

In rodents, acute poisoning by this material produced a pattern of central nervous system depression, muscular paralysis, and tremors. Skin allergy was observed in guinea pigs following repeated exposure. Following repeated inhalation exposures, mild to moderate liver effect (hypertrophy) and mild kidney effects (proximal tubular nephrosis in males only) were observed in rats. No birth defects were noted in the offspring of rats and mice exposed by inhalation during pregnancy. No genetic changes were observed in tests using bacteria or animals. Both positive and negative responses have been reported in tests using animal cells.

Isopropyl Mercaptan

Acute effects in rats during exposure to sublethal vapor concentrations of 18.44 mg/l or less for 4-hours were attributed to the irritant nature of the vapors.

n-Propyl Mercaptan

Acute poisoning produced a pattern of central nervous system depression and respiratory paralysis in rodents with death resulting from respiratory failure.

12 ECOLOGICAL INFORMATION

Ecotoxicological Information

Data on this material and/or its components are summarized below.

tert-Butylmercaptan

This material is moderately toxic to *Daphnia magna* (48-hr EC50 6.7 mg/l), and is slightly toxic to rainbow trout (96-hr LC50 34 mg/l) and alga (72-hr EC50 13 mg/l).

Chemical Fate Information

Data on this material and/or its components are summarized below.

tert-Butylmercaptan

The solubility of this material is 1,470 mg/l after 24-hrs. and the stability is 10 mg/l and 81.8% after 96-hrs.

13 DISPOSAL CONSIDERATIONS

Waste Disposal

Incineration is the recommended method for disposal observing all local, state and federal regulations. Note: Chemical additions to, processing of, or otherwise altering this material may make this waste management information incomplete, inaccurate, or otherwise inappropriate. Furthermore, state and local waste disposal requirements may be more restrictive or otherwise different from federal laws and regulations.



14 TRANSPORT INFORMATION

DOT Name	Mercaptans, mixture, liquid, flammable, n.o.s.
DOT Technical Name	(Butyl mercaptan, Isopropyl mercaptan)
DOT Hazard Class	3
UN Number	3336
DOT Packing Group	PG II
RQ	No

15 REGULATORY INFORMATION

Hazard Categories Under Criteria of SARA Title III Rules (40 CFR Part 370)

Immediate (Acute) Health	Y	Fire	Y
Delayed (Chronic) Health	N	Reactive	N
		Sudden Release of Pressure	N

The components of this product are all on the TSCA Inventory list.

Ingredient Related Regulatory Information:

SARA Reportable Quantities

n-Propylmercaptan
Isopropylmercaptan
tert-Butylmercaptan

CERCLA RQ	SARA TPQ
NE	
NE	
NE	

Massachusetts Right to Know

This product does contain the following chemical(s), as indicated below, currently on the Massachusetts Right to Know Substance List.

Isopropylmercaptan
n-Propylmercaptan
tert-Butylmercaptan

New Jersey Right to Know

This product does contain the following chemical(s), as indicated below, currently on the New Jersey Right-to-Know Substances List.

Isopropylmercaptan
n-Propylmercaptan
tert-Butylmercaptan

Pennsylvania Right to Know

This product does contain the following chemical(s), as indicated below, currently on the Pennsylvania Hazardous Substance List.

tert-Butylmercaptan

16 OTHER INFORMATION

Revision Information

Revision Date	11 OCT 2004	Revision Number	10
Supersedes Revision Dated	19-AUG-2004		

Revision Summary

A TOFINA Chemicals, Inc. has changed its name to Arkema Inc.



SPOTLEAK 1009
Material Safety Data Sheet

Arkema Inc.

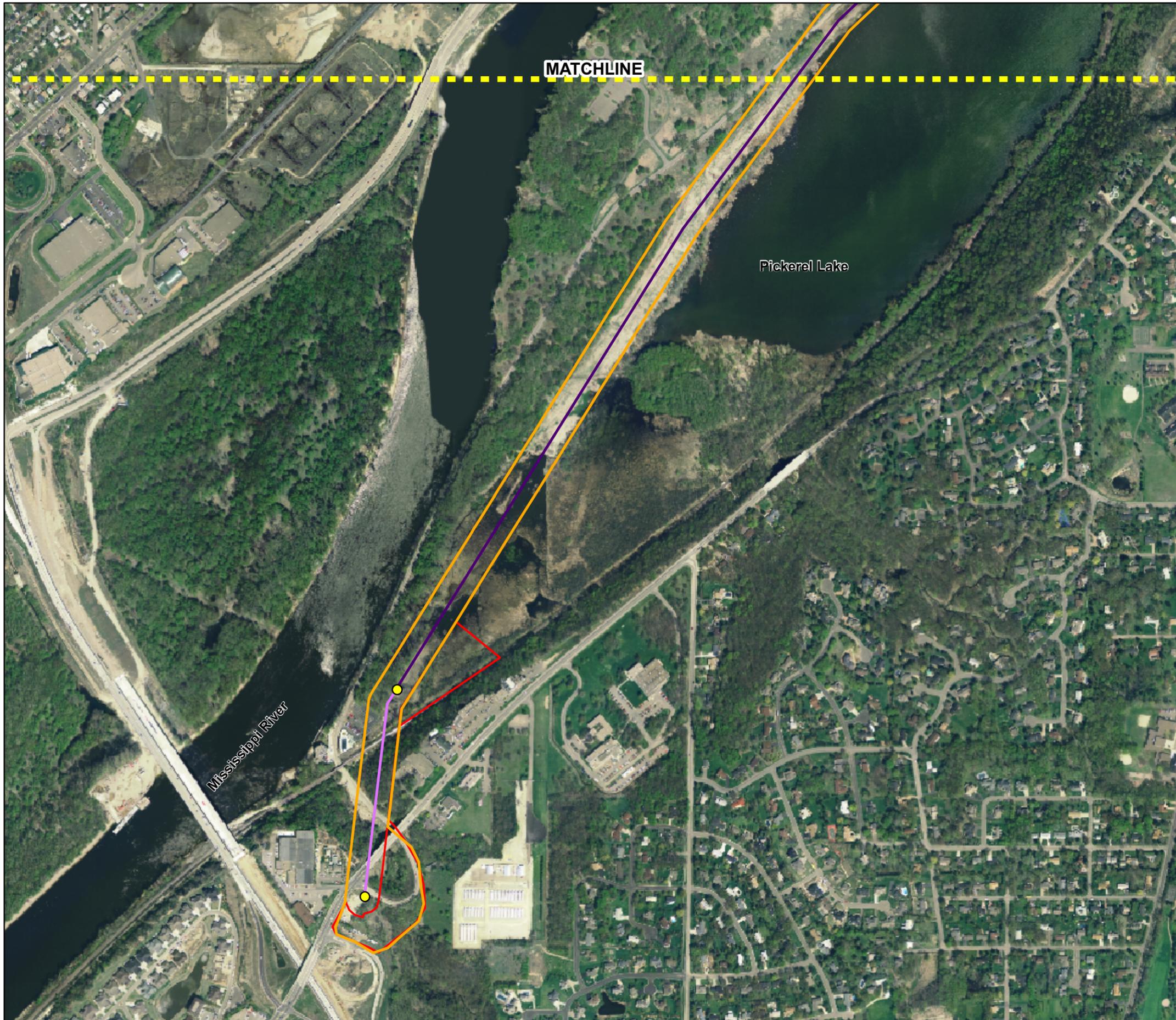
Key

NE= Not Established NA= Not Applicable (R) = Registered Trademark

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Appendix B

Barr Footer: Date: 11/1/2005 5:19:53 PM File: I:\Projects\23\19\038\MapstRouting Permit Figures\AppB_pipeline_corridor_south.mxd User: dwj



-  Proposed Pipeline -Directionally Drilled
-  Proposed Pipeline - Open Trench
-  Proposed Pipeline Corridor
-  Additional Area for Drill Rig
-  Bore Pits



1:8000

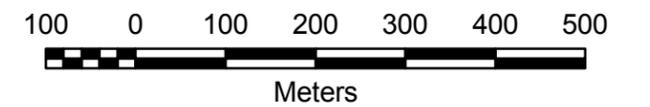
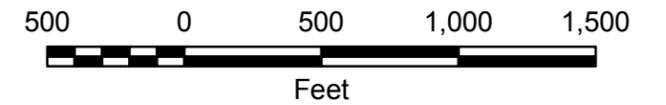
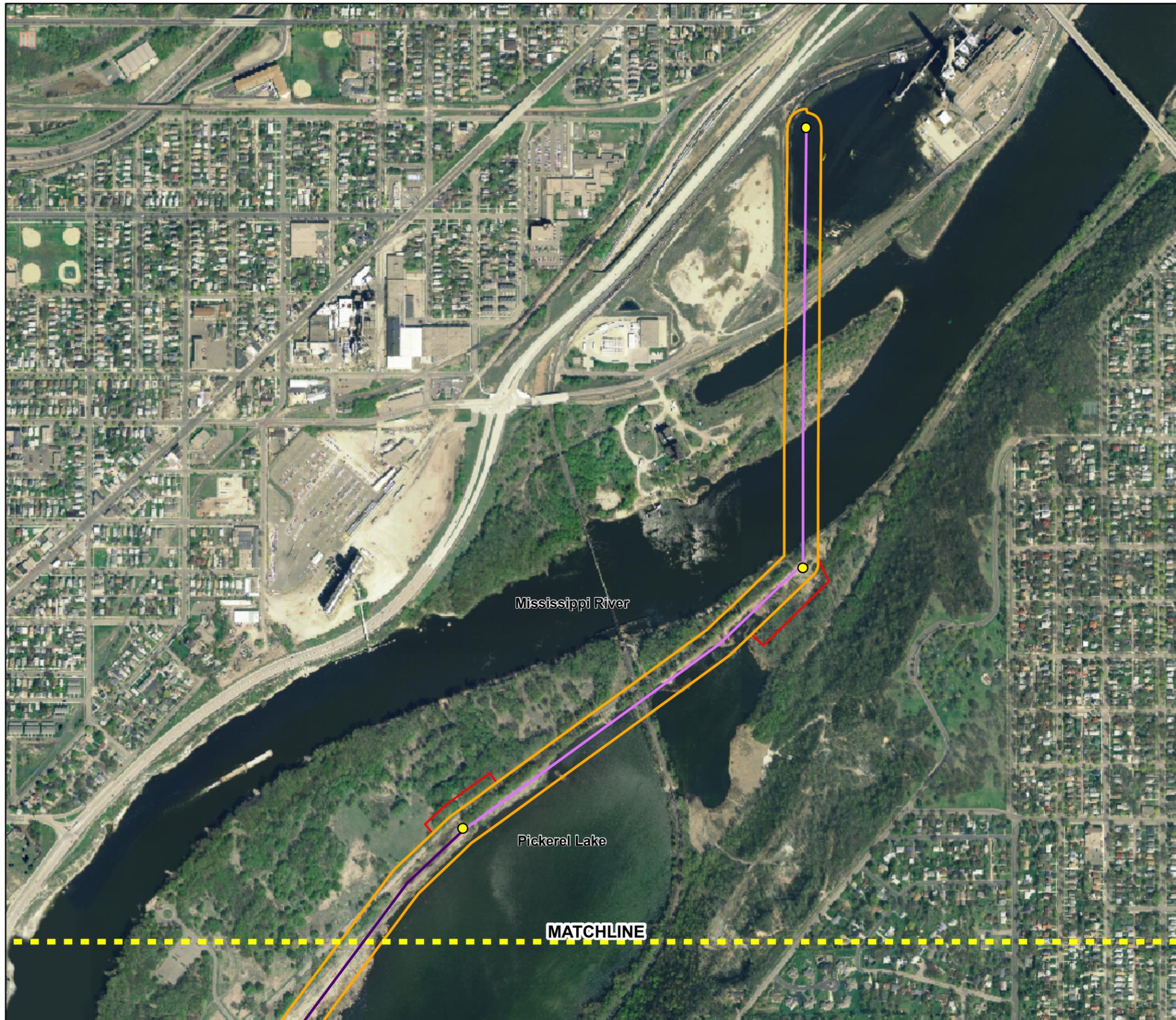


Figure B-1

Proposed Gas Pipeline Route
 Xcel Energy High Bridge Generating Facility
 Gas Pipeline Routing Permit Application
 Saint Paul, Minnesota

November 2005

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-  Proposed Pipeline - Directionally Drilled
-  Proposed Pipeline - Open Trench
-  Pipeline Corridor
-  Additional Area for Drill Rig
-  Bore Pits



1:8000

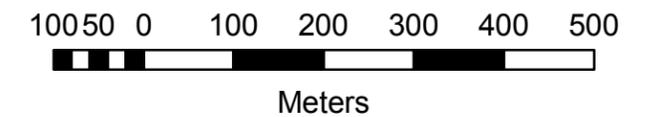
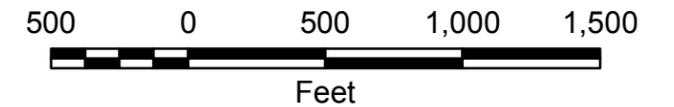


Figure B-2

Proposed Gas Pipeline Route
 Xcel Energy High Bridge Generating Facility
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 Saint Paul, MN

November 2005

Appendix C

Table C-1 Wetlands Summary

Wetland Type	Acres within study area
Mississippi River	3.88
Pickerel Lake	4.51
Emergent/scrub-shrub wetland (seasonally flooded)	5.74
Emergent wetland (seasonally flooded)	8.58
Emergent wetland (semi-permanently flooded)	7.08
Forested wetland (seasonally flooded)	4.01
Scrub-shrub wetland (seasonally flooded)	0.01
Open water wetland (semi-permanently flooded)	0.29
Total Wetland	34.10