FRIENDS OF THE HEADWATERS
RESPONSE TO THE MINNESOTA DEPARTMENT OF COMMERCE
LINE 3 DRAFT EIS - Dockets CN-14-916, PPL-15-137
JULY 10, 2017

ATTACHMENTS "K"

K-1 Smith 11.19.14 Direct Testimony SP
K-2 Smith 1.15.15 Surrebuttal Testimony SP

Record of Richard Smith's Direct Testimony and Surrebuttal Testimony for Sandpiper Pipeline Contested Case and Evidentiary Hearings

Smith Direct Testimony on Behalf of Friends of the Headwaters, Ex. 181

FRIENDS OF THE HEADWATERS

MINNESOTA PUBLIC UTILITIES COMMISSION

MPUC DOCKET NO. PL-6668/CN-13-473
OAH DOCKET NO. OAH-8-2500-31260

DIRECT TESTIMONY OF RICHARD SMITH

NOVEMBER 19, 2014

Q. Please state your name, organization, title and on whose behalf you are testifying.

A. My name is Richard Smith. I am President of the Friends of the Headwaters (FOH) organization, an Intervener in this case, on whose behalf I am testifying.

Q. Have you testified in proceedings before the Public Utilities Commission before?

A. No.

Q. What is your background, education and experience?

A. I am a professional photographer and small business owner, and have been since 1979. Between 1988 and 2008 I owned and operated a commercial advertising photography business. As part of my business, I secured extensive on the job training in design, layout, advertising, graphics, Adobe Acrobat, Photoshop, Lightroom, film and digital photography and editing. I directed production crews of up to fifty persons for major advertising campaigns for top brands and companies in the world. My clients have included 3M, BMW, American Express, Budweiser, McDonalds, Microsoft, Tourism Turkey, the Wall Street Journal, Harpers, the New York Times, Sports Illustrated, The Nature Conservancy and the Foundation for Deep Ecology to name a few.

Since 2010 I have continued my photography business, with an emphasis on environmental and nature photography and clients. Since becoming President of the Friends of the Headwaters, because of the demands or participation in this process, I have reduced the hours devoted to my business by approximately fifty per cent.

I graduated Summa Cum Laude, Phi Beta Kappa from the University of North Dakota with a degree in Psychology and a secondary emphasis on Earth Sciences, geology, ecology, biology, chemistry, geomorphology and mathematics.

I taught ecology and natural sciences at the Environmental Learning Center in Isabella, Minnesota; I also drafted the curriculum for the North Woods Resource Center, an environmental and outdoor recreational learning center near the Boundary Waters Canoe Area Wilderness in Ely, Minnesota, where I worked for four years. This curriculum centered on

natural sciences with an emphasis on ecology. I taught orienteering, map reading (USGS topographic maps), hiking, cross country skiing, snowshoeing and winter camping skills. I worked with children in grades 6 through high school. I worked for a year as Program Director at the Center. For nine years I guided canoe trips in the Boundary Waters Canoe Area Wilderness and the Quetico Provincial Park in Canada and guided extended 21 day trips in northern Ontario as well as forty-two day and a seventy day expeditions in the Northwest Territories of Canada. I did this work in pre-GPS days, so used my extensive map reading skills. I used my photographic skills for various environmental groups who were working to secure protection for the Boundary Waters Canoe Area.

I have lived in Minnesota for 42 years. For the past 14 years, I have lived outside of Park Rapids, in Hubbard County, Minnesota. I moved to my present residence from Minneapolis because of my longstanding love for Northern Minnesota and its natural resources.

Q. What is the purpose of your testimony?

A. The purpose of my testimony is to introduce maps and other materials I have prepared in response to the pipeline that is being proposed in this proceeding and to summarize the position of the Friends of the Headwaters.

Q. Please summarize the Friends of the Headwaters' position in this case.

A. FOH is not opposed to pipelines, per se, but is definitely opposed to Enbridge/NDPC's Sandpiper pipeline route as currently proposed. Rather than the Applicant telling Minnesota it *needs* this pipeline as proposed, we believe Minnesota *needs* to make that determination on what is good and safe for Minnesota, not Enbridge/NDPC. Our position is Minnesota does not need another new pipeline corridor passing through the state's most sensitive water resources. Too much is at risk environmentally, economically and culturally. Our position is also that given the large scale nature of this project and that this new corridor is already the proposed site for a second pipeline, the Line 3 Rebuild, that the state should not only conduct a full environmental impact statement (EIS) with a complete environmental and economic risk assessment of the Applicant's proposed route, but also include a number of the System Alternative Routes

proposed by citizen groups. FOH is not confident the DOC-EERA environmental review as ordered by the PUC can be completed in a thorough and comprehensive manner in the short time provided. In order to fully address the Certificate of Need in these proceedings the state must not limit its consideration only to pipeline economics, but must include environmental economics in its assessment. It is our position only a full scope EIS can determine the state's NEED for this pipeline as currently proposed.

The Friends of the Headwaters disputes Enbridge/NDPC's contention that the Sandpiper must end in Superior, Wisconsin. Enbridge has provided no rationale for needing Superior other than "We want it. We need it to connect to our existing system in Superior." SA-04 also connects to their existing system hub near Chicago. It does not prevent Enbridge from then transporting the Bakken crude either south or across Illinois, Indiana, Michigan and across the border to Sarnia, Ontario, Canada on their existing system.

In summary, the Friends of the Headwaters opposes the NEED for the Enbridge/NDPC Sandpiper Pipeline route proposal. Enbridge already has too large a footprint across Minnesota's Headwaters Country. Too much is at risk, not only with the state's clearest lakes; groundwater aquifers, fish and wildlife; wild rice; lake and riverfront homes, businesses, and communities; tourism industry; lands and forests; and Lake Superior. The people of Minnesota should not allow a Canadian corporation with its "limited liability" US subsidiary, North Dakota Pipeline Company LLC, to dictate the terms of this project. Friends of the Headwaters does not believe this proposed multiple pipeline corridor with the Sandpiper and now Line 3 can meet the Minnesota's NEED for high standards for quality, safety and sustainability of the lands and especially waters along the route.

The position of Friends of the Headwaters is perfectly summarized in Minnesota's environmental law:

> *"No state action significantly affecting the quality of the environment shall be allowed, nor shall any permit for natural resources management and development be granted, where such action or permit has caused or is likely to cause pollution, impairment, or destruction of the air, water, land or other natural resources located within the state, so long as there is a feasible and prudent alternative consistent with the reasonable*

requirements of the public health, safety, and welfare and the state's paramount concern for the protection of its air, water, land and other natural resources from pollution, impairment, or destruction. Economic considerations alone shall not justify such conduct." [MEPA 116D.04,Subd.6]

Q. Please describe the developments of your maps.

A. When I first heard about the proposed Sandpiper pipeline, friends, neighbors and other concerned citizens gathered together and formed Friends of the Headwaters. In order to educate ourselves and others about all the environmental aspects of the Applicant proposed Sandpiper route, I began to develop a series of maps using my background, interests and computer graphics ability to graphically illustrate where the proposed pipeline would go and the natural resources it would go through, across or near as it made its way to Wisconsin, and the threats is would, therefore pose to the region. After I spent hundreds of hours studying the potential environmental impact of the proposed route, I continued developing a series of maps showing other routes that were safer because emergency vehicles could more quickly reach spill sites, were less of a threat to fragile and in some cases rare ecological resources, and posed less threat to both surface and groundwater.

The maps I created were intended to inform the Commerce Department, this proceeding, and the Public Utilities Commission of the location where the risk of oil spills would be most damaging to the natural environment. According to a 2003 MPCA report to the National Transportation Safety Board, there were "nearly three dozen non-third party spills, leaks or ruptures on just one Enbridge 34 inch line between 1972 and 2003. About 87% of the petroleum gallons spilled from all Minnesota pipelines in the period 1991 to 2002 was from that Enbridge line….Included in the Enbridge 34 inch line spills are the 1.7 million gallon rupture in 1991 in Grand Rapids and the 250,000 gallon rupture on July 4, 2002 in Cohasset. 300,000 gallons of the Grand Rapids spill flowed to a river. Luck with the timing of the spill and river ice conditions kept thousands of gallons of crude from entering the Mississippi River. Oil in the Mississippi would likely have fouled the St. Cloud, St. Paul and Minneapolis drinking water intakes for months. Likewise the

Cohasset spill could have easily entered the Mississippi River if it had happened in a different segment of that 34 inch pipeline."

These maps were submitted as part of our comments to the Commerce Department in the preliminary stages of this proceeding, and have served as the basis for our presentations to the Public Utilities Commission, organizations, and other government bodies since that time. They have also served as the basis for now-designated system alternatives that are being studied by the Minnesota Department of Commerce for presentation on December 16 (target date). Each map attached to this testimony shows three routes/system alternatives: The black line shows the route the Applicant wants to use. The Red line shows a route developed by the Minnesota Pollution Control Agency, although, as I mentioned, it later stated that the third route/system alternative proposed by FOH is the best from an environmental perspective. The blue line shows FOH's preferred route, SA-04.

SA-04 was developed with a number of goals in mind. It would:

- still provide construction jobs and dollars;
- retain the pipeline's tax benefits for the state;
- remove the risks to our lakes, rivers, wetlands, wild rice lakes and drinking water sources for residents of Northern Minnesota, as well as those who depend on Mississippi River water throughout the state, including the Greater Minneapolis/St. Paul Metro area.
- protect businesses that rely on outdoor recreation, including fishing, hunting and wildlife watching, which bring in $4.3 billion in annual retail sales. (Fishing alone generates $342 million annually in tax revenue for the state.) Figures are based on a study completed during the recessionary economic period or 2007-09, which is the latest study with local and county data. (*See* http://www.exploreminnesota.com/industry-minnesota/research-reports/researchdetails/download.aspx?id=811)
- protect clear lakes, which mean high lakeshore property values, a key factor in property tax assessments;

By contrast, the maps show the serious problems with the route proposed by the Applicant. These serious problems must be addressed in the CON proceedings. FOH believes a full scope EIS comparing all the economic, environmental and cultural factors of the Applicant's route against the System Alternative routes is needed before any Certificate of Need is granted to the Applicant.

- The MPCA conducted a comparative environmental analysis for this docket of the proposed routes. A high score was least damaging to the environment; a low score the most damaging. FOH's SA-04 scored the highest. Enbridge's preferred route scored the lowest of the 8 system alternatives.

Q. Please describe the specific maps you created.

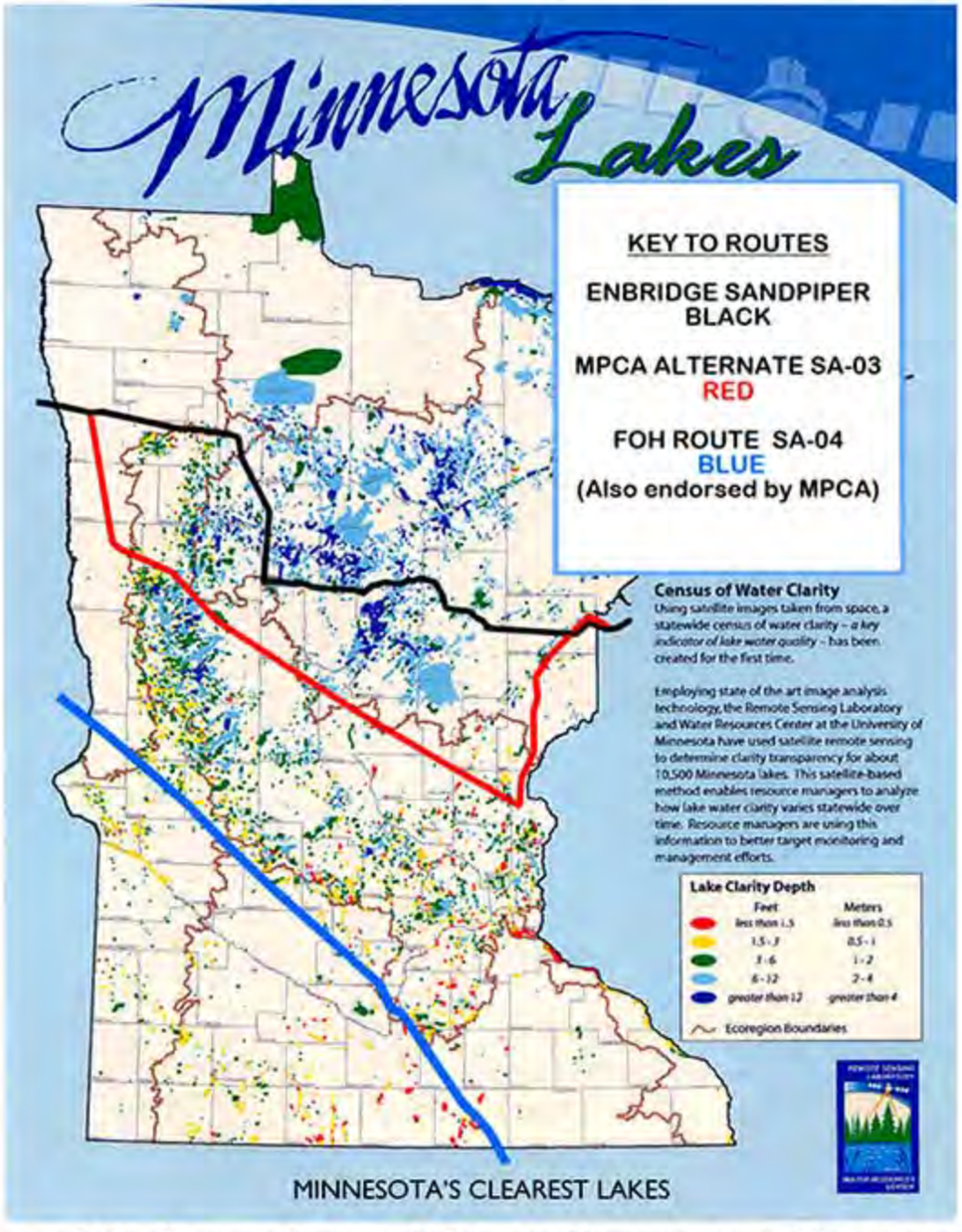
The attached pages contain the respective maps with the descriptions and graphics which were created. Although I agree these maps are primarily about routes I believe the environmental aspects of the maps presented must be addressed in these CON proceedings. The long term environmental health, economic welfare and cultural vitality of Minnesota's northern lake country and its clean water resources must be consider in the NEED for this pipeline and proposed location.

SEE ATTACHMENTS BELOW

Q. Does this conclude your testimony?

A. Yes.

Friends of the Headwaters
ROUTE COMPARISON MAP

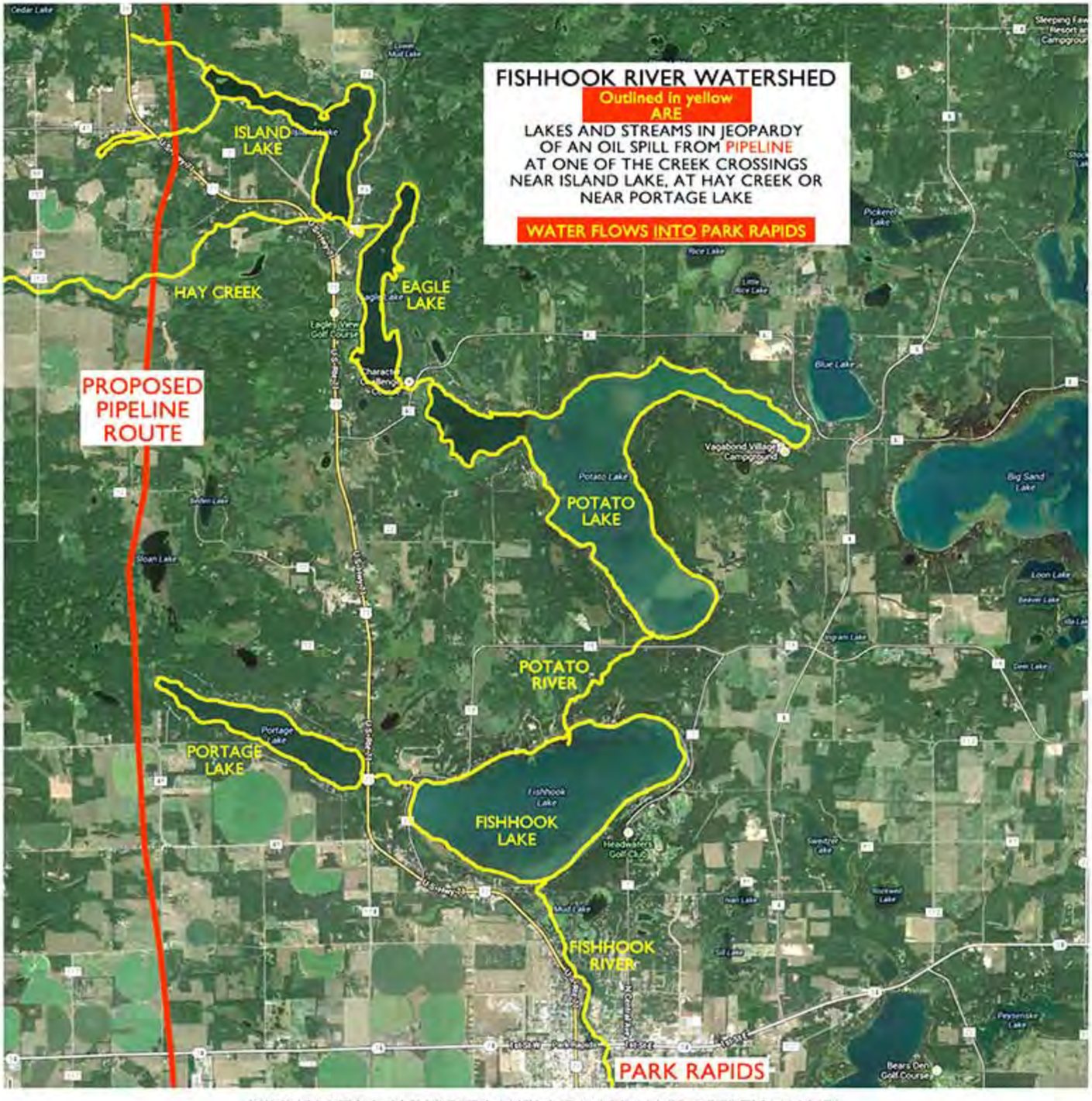


The Minnesota Water Resources Center at the University of Minnesota compiled the data on this map. Using satellite remote sensing they surveyed 10,500 lakes in the state, then ranked them for clarity. The dark blue lakes have the greatest clarity. A member of the Friends of the Headwaters found the map at a Minnesota Pollution Control Agency office. Using my Adobe Photoshop skills I scaled and overlaid the Enbridge/NDPC proposed Sandpiper route (in black) onto this map to indicate its proximity to these high value waters. I later added the two system alternative routes, SA-03 (red) and SA-04 (blue), to the map to illustrate how they compare in proximity to the state's clearest lakes.

Clear lakes are the key to Minnesota's tourism business. Fishing alone generates $342 million annually in tax revenue for the state. $4.3 billion in annual retail sales is earned from fishing, hunting and wildlife watching.*
*National Sportfishing Association

For Hubbard County tourism was $99M annually with 60% in June - Aug.
For Crow Wing County it was $150M with 49% in June - Aug.

www.exploreminnesota.com/industry-minnesota/research-reports/researchdetails/download.aspx?id=811

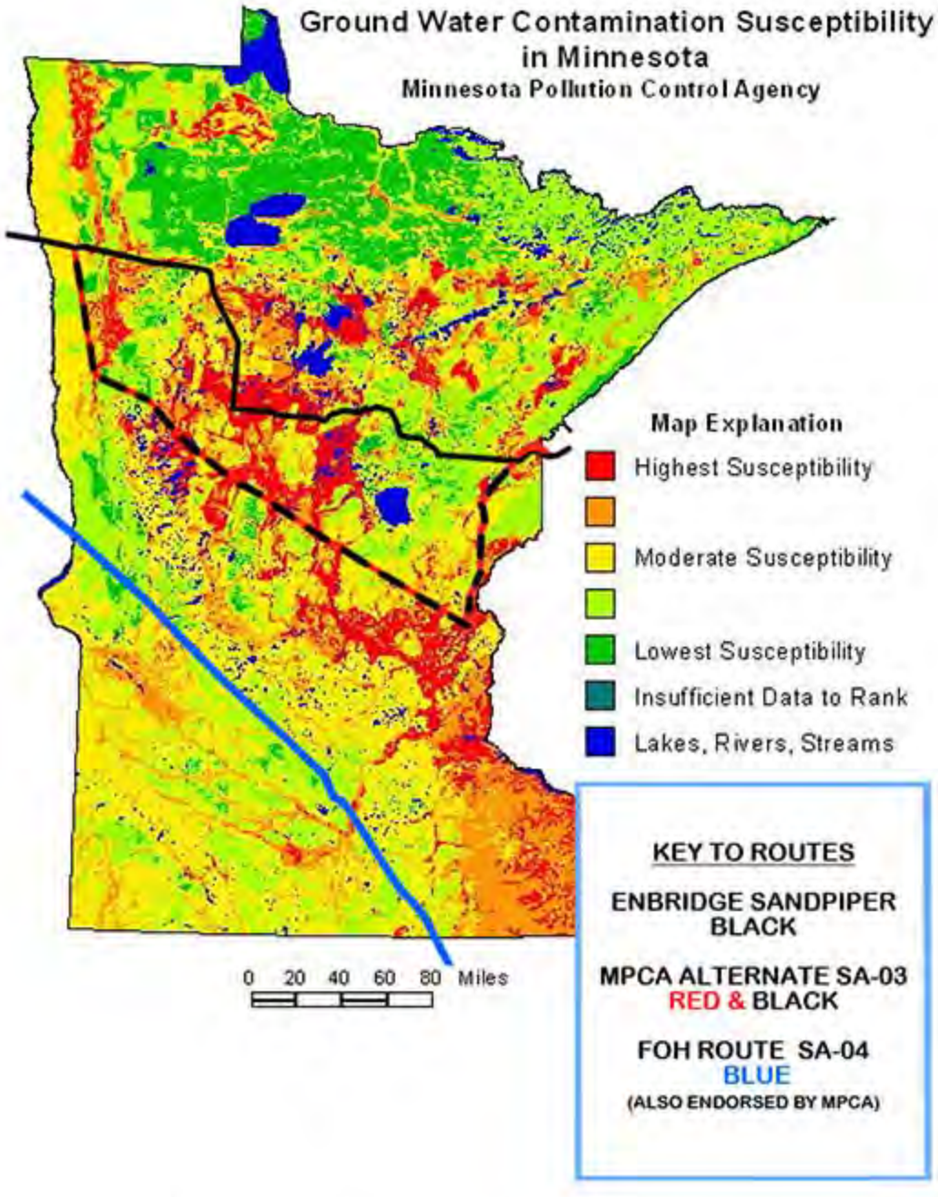


MINNESOTA'S CLEAREST LAKES MEAN HIGH PROPERTY VALUES

Clear lakes mean high lake shore property values which is a key factor in available property taxes to their respective counties.

Utilizing Google Maps I created this map of the Fishhook Watershed in Hubbard County. This map is my $2 Billion dollar map. That is the county's accessed property value of the water influenced properties along the yellow outlined shorelines of the watershed. The pipeline crosses three tributaries of this watershed as well as passing in close proximity to one of its lakes. Multiply those property values for the other lake chains and watersheds along the proposed Sandpiper route. Whitefish, Pine River, Fifty Lakes, Big Sandy, Lake Superior, and others.

Friends of the Headwaters
ROUTE COMPARISON MAP



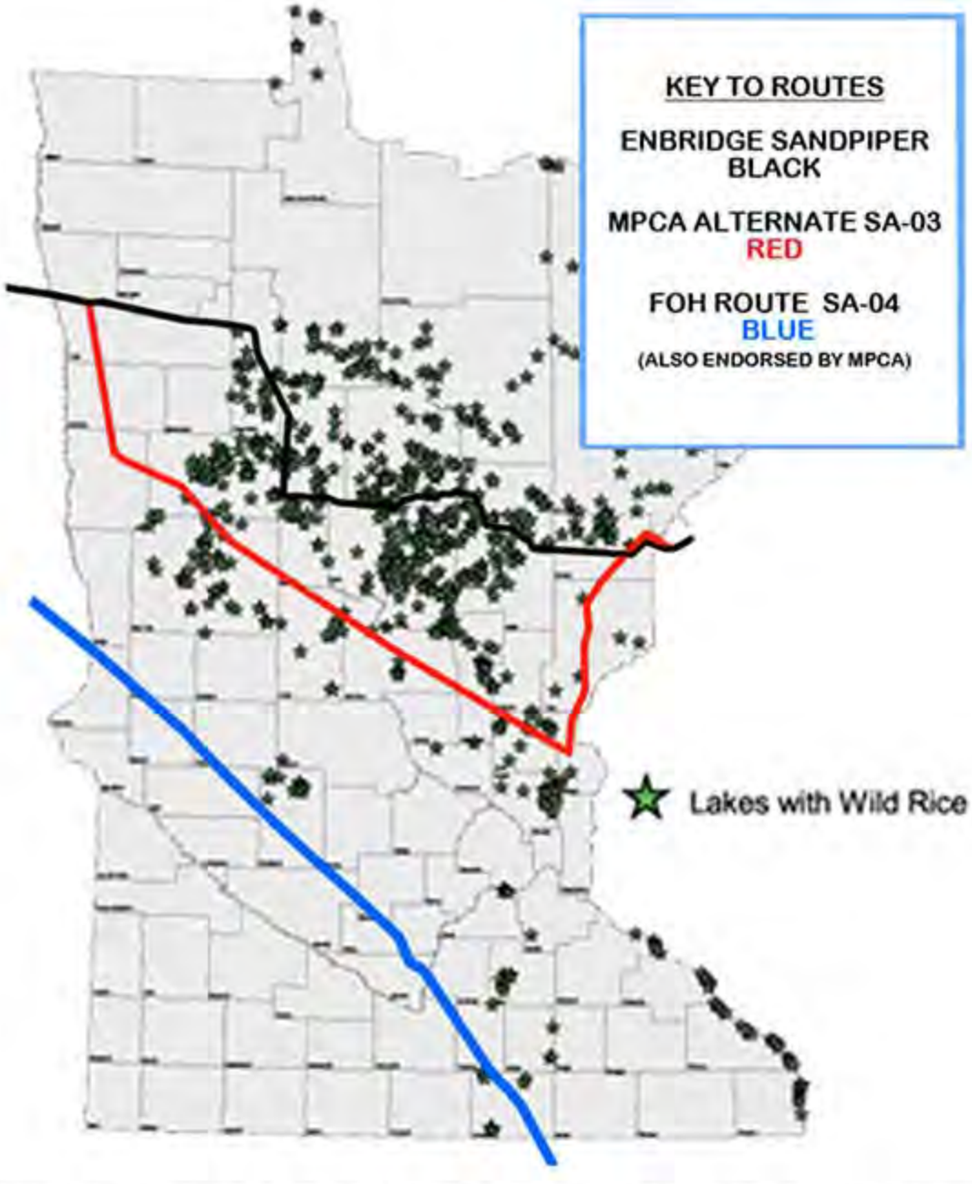
This map was found on the Minnesota Pollution Control Agency's website. Again, I overlaid the company's proposed route as well as the two system alternative routes.

Those bright red areas on the above map, besides being extremely susceptible to contamination, also just happen to be critical aquifers. Besides providing drinking water these aquifers also irrigate thousands of acres of farmland for Minnesota's farmers and the state's agri-business economy.

The Straight River aquifer supports the county's largest employer, the RDO/LambWeston Company, which grows and makes french fries for MacDonalds besides other potato products. The aquifer supplies all the drinking water for the county seat, Park Rapids and provides clear, cold water for a nationally renowned brown trout stream. All that at that right turn elbow in the Enbridge/NDPC route.

Nothing is more critical than our drinking water sources.

Friends of the Headwaters
ROUTE COMPARISON MAP

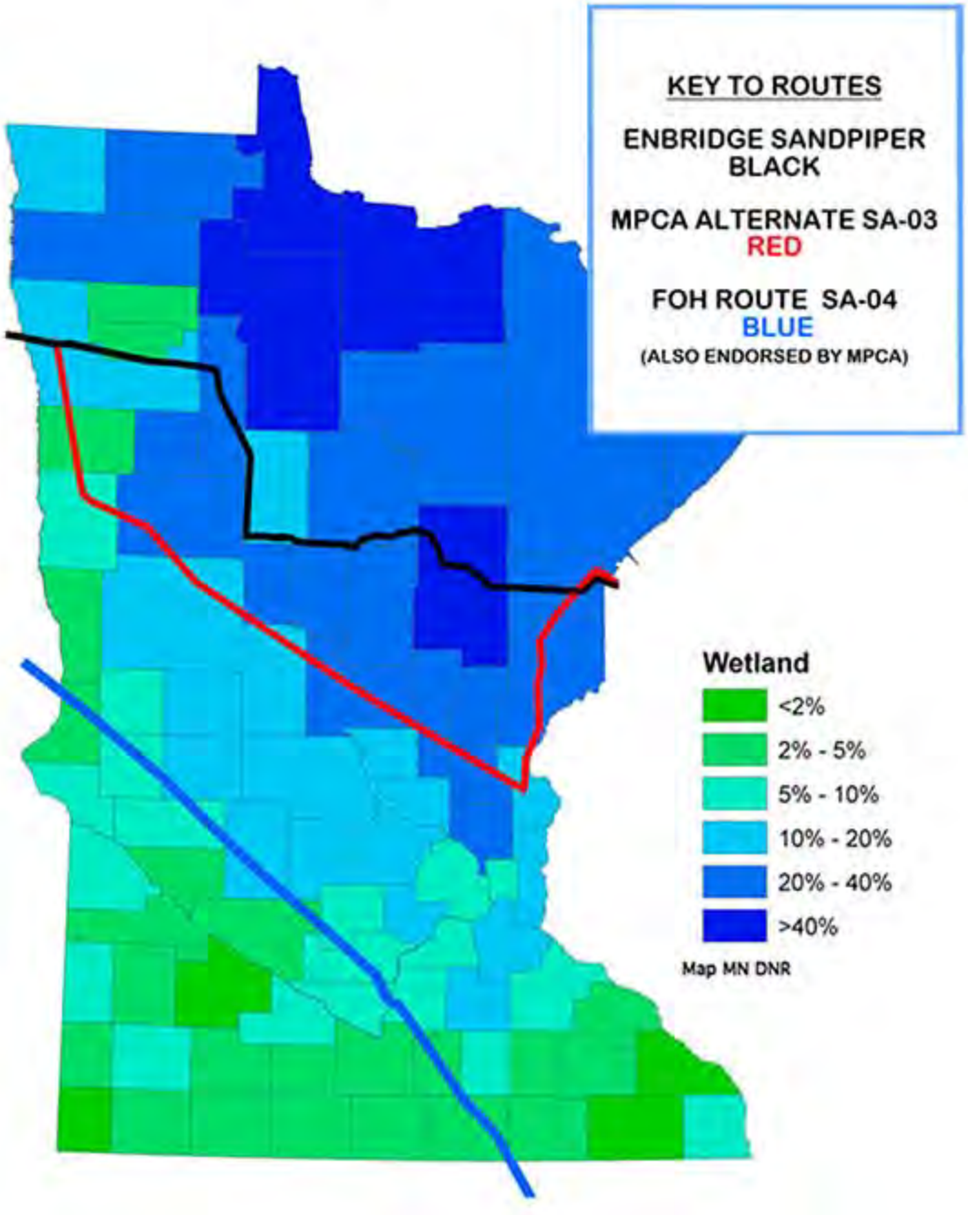


Located on the Minnesota Department of Natural Resources website, this map identifies the locations of Minnesota's wild rice lakes . Again, using my Photoshop skills I layered the company's proposed route as well as the two system alternative routes, SA-03 and SA-04. The intention was to illustrate the extreme risk to the state's wild rice waters by the proposed Enbridge/NDPC Sandpiper route. Could Enbridge have picked a worse route for jeopardizing the prime wild rice lakes and wetlands.

Wild rice is Minnesota's native grain and a part of our heritage and history. For the Ojibwe Nation it is their culture and identity. To them wild rice is priceless.

Wild rice is also critical to Minnesota's nesting and migratory waterfowl.

Friends of the Headwaters
ROUTE COMPARISON MAP



This comparative map juxtaposes the proposed Sandpiper route and the two system alternatives in relationship to the state's prime wetlands areas as identified on this map developed by the Minnesota Department of Natural Resources and found on its website. Again, the intention was to illustrate the risk to the state's wetlands. Note the correlation of this wetlands map to the previous wild rice map.

These wetlands are also critical to Minnesota's nesting and migratory waterfowl.

Friends of the Headwaters
ROUTE COMPARISON MAP

These three maps were located at various sources on the Internet. The maps identify the respective river basins and watersheds of Minnesota. Using Photoshop I wanted to show how the routes relate to these watersheds.

Enbridge's Sandpiper route has major risk exposure to the headwaters of three major watersheds, the Red River of the North, Lake Superior and the Mississippi River plus exposure to the St. Croix National Wild and Scenic River watershed.

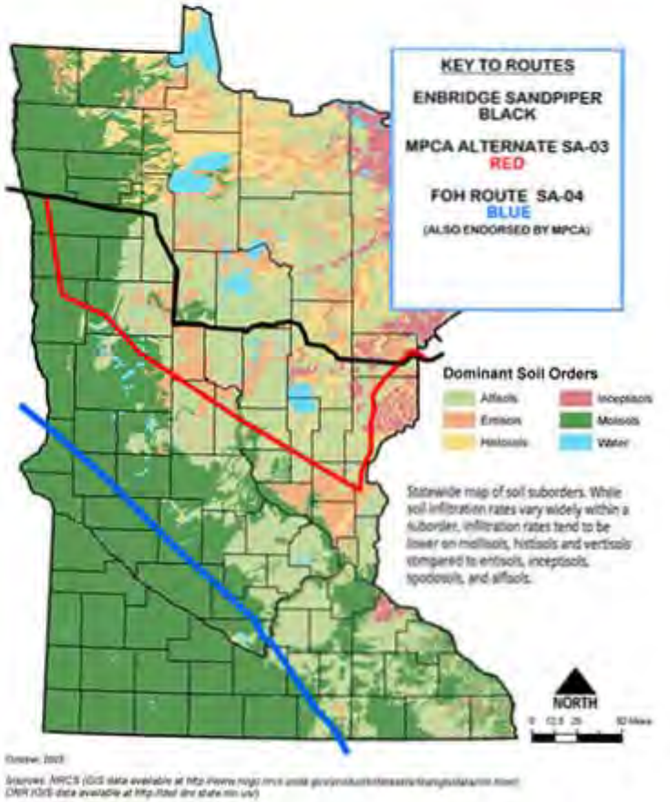
Enbridge/NDPC's proposed route will cross the Mississippi River twice. A spill on the river will expose downriver communities dependent on the river as a drinking water source to a toxic mix of carcinogenic chemicals that are present in Bakken crude such as benzene, toluene, naphalene.

The first crossing point is a few miles downstream of our oldest state park, Itasca, home to the headwaters of the river. At that crossing the daily pipeline volume, 375,000 BPD or 15.750,000 gallons per day, will exceed the average daily volume of the young river by fourfold.

Friends of the Headwaters
ROUTE COMPARISON MAP

Retrieved from the Minnesota Department of Health's website, the Class V Sensitivity map regards soils especially sensitive to the discharge of petroleum based materials. Compare those 'sensitive' areas along the Sandpiper route to the similar bright red areas indicated on the "Soils susceptible to ground water contamination" map previously on page 3. Again, overlaying the routes allowed me to illustrate the environmental risk of the Sandpiper route as compared to the system alternatives.

The second soils map illustrates various soil types. The dark green area consists of mollisols, the soil order with lower infiltration rates. FOH's SA-04 traverses the lowest risk soils to infiltration, the migration and contamination of oil spill effluents. Sources for the soil orders map were the NRCS/USDA and the Minnesota DNR.



Note: Enbridge's Mark Curwin, Senior Director for Strategic Coordination of Major Project Executions in the US, stated their construction preference is to build pipelines across farmland.

He made these remarks at a public meeting in Park Rapids on Jan. 29, 2014.

Mr. Curwin gave the reasons
of better soils,
easier construction,
easier access,
less natural habitat destruction,
cheaper and quicker.

After construction the farmland can be put back into crop production.

Access to leaks and spills is much easier.

Winter wetland construction would be at a minimum.

Friends of the Headwaters
ROUTE COMPARISON MAP

These two maps were located on the Minnesota Department of Natural Resources' website.

Besides showing the environmental risks to Minnesota's watersheds and aquifers, its soil types, I also wanted to illustrate the routes as to how they traversed the state's land cover and ecological zones. The purpose was to compare the respective routes and their potential damage to our forest lands.

The Enbridge route will dramatically involve more forest cover than the system alternatives, SA-03 and SA-04.

The MPCA conducted a comparative environmental analysis of these proposed routes. A high score was least damaging to the environment, a low score the most damaging.

FOH's SA-04 scored the highest.

Enbridge Sandpiper - the lowest.

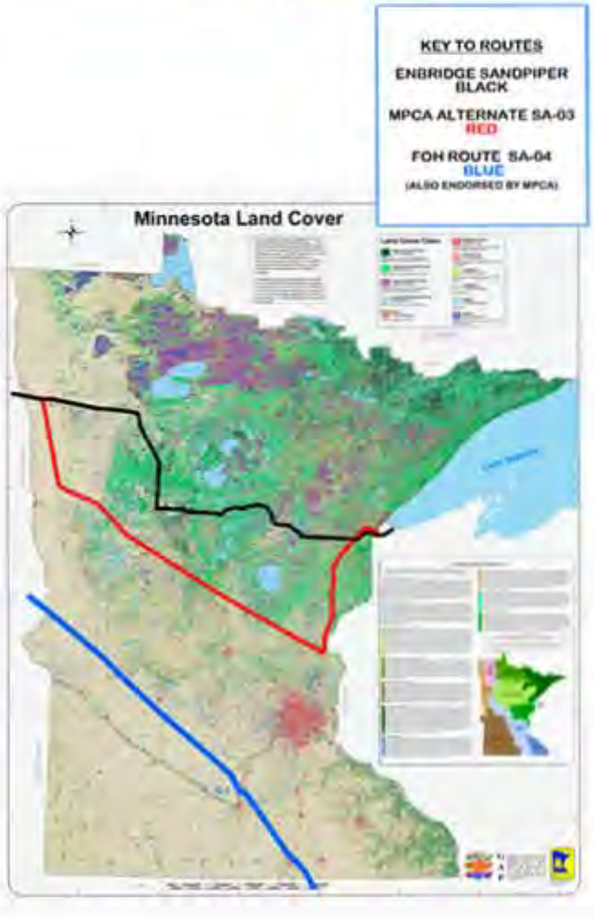
Should the state be sacrificing its natural resources to a new energy corridor when an existing corridor, the Enbridge/Alliance natural gas pipeline corridor, is already available and crosses the state at its lowest risk point to the environment and economy. The Enbridge/Alliance corridor is the proposed route of SA-04.

I produced these assembled maps because I believe Minnesota does not NEED Enbridge/NDPC's Sandpiper pipeline route as currently proposed traverse the state's northern water resources

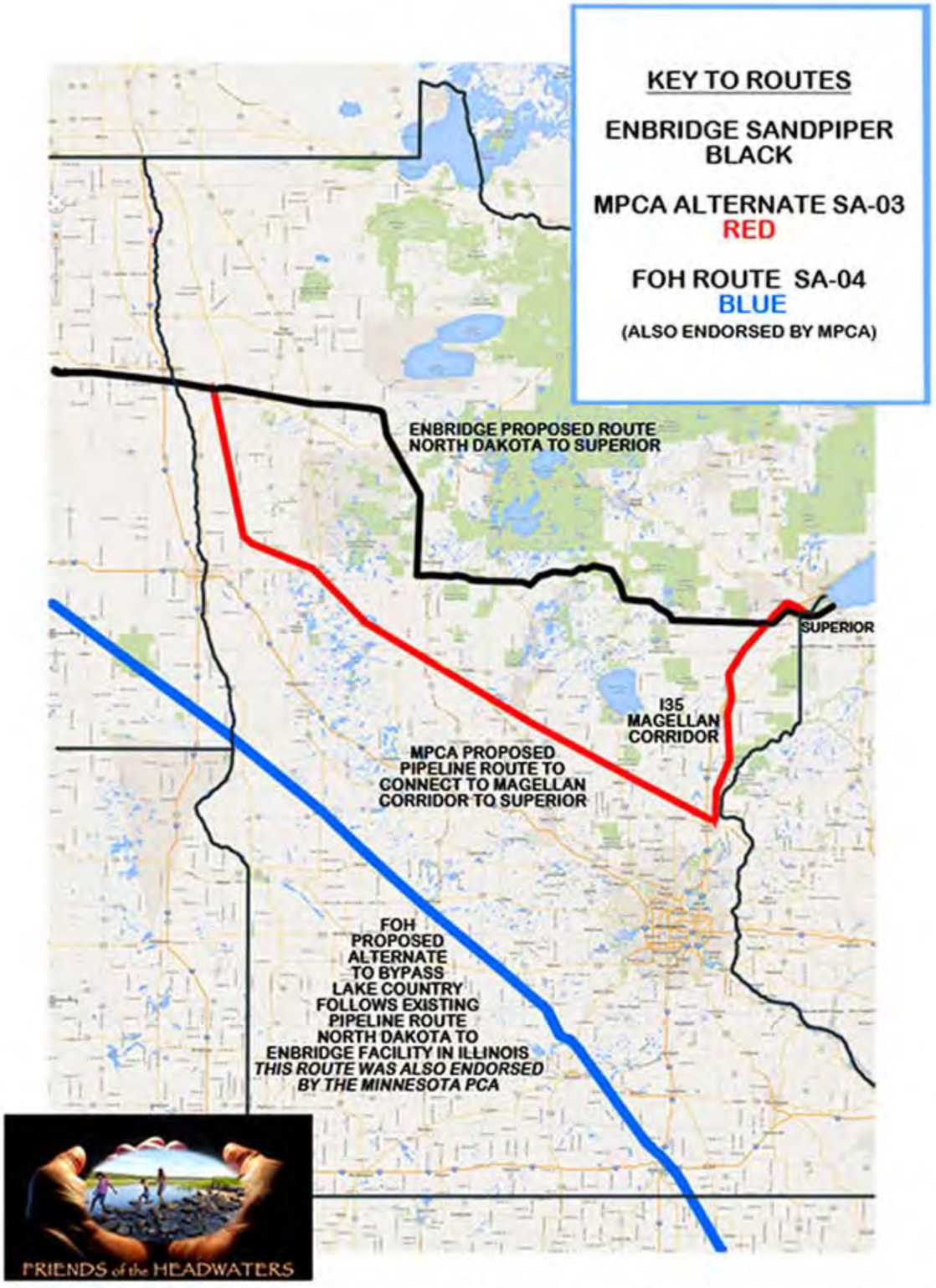
AT RISK: MINNESOTA'S

CLEAREST AND CLEANEST LAKES
GROUND WATER AQUIFERS
WILD RICE LAKES
WETLANDS
MOST SENSITIVE SOILS TO SPILLS
DIVERSITY OF VEGETATION
SENSITIVE ECOLOGICAL ZONES
THE LAKE SUPERIOR BASIN
THE HEADWATERS OF THE MISSISSIPPI RIVER AND ITASCA STATE PARK
HIGH VALUE RECREATIONAL AND RESIDENTIAL WATERS

Minnesota Ecological Sections and Subsections

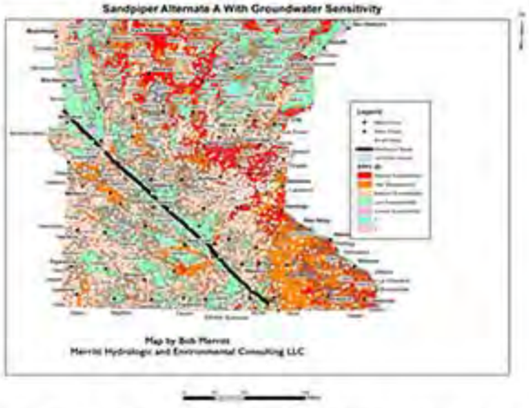


Friends of the Headwaters
ROUTE COMPARISON MAP



I produced this map to show the relationship of the Company route and the two system alternatives in relationship to a roadmap of the state. The maps on the next page provide more detail yet for SA-04 and the justification for my reasoning.

Two additional maps by Bob Merritt, hydrologist, showing FOH SA-04 in better detail.

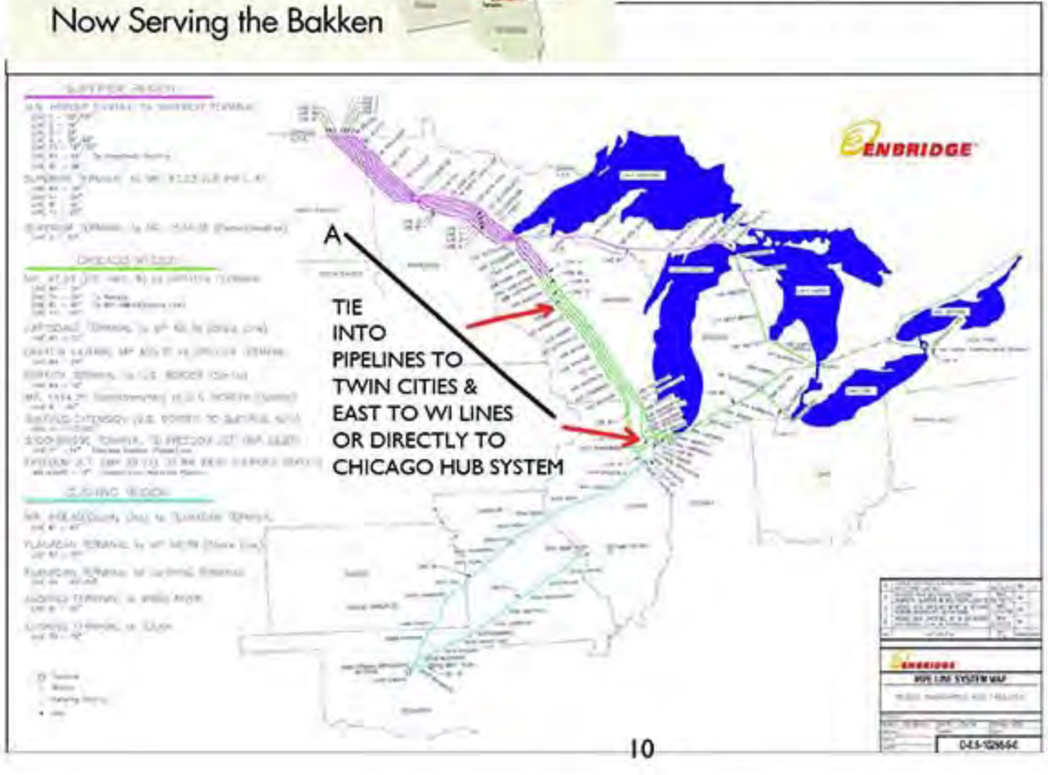


Minnesota still gets to keep jobs the construction will provide as well as North Dakota plus Iowa and Illinois.

Although the route does not end in Superior, it still ties into the existing Enbridge system in Illinois with routing options to Michigan and Ontario that avoid our greatest freshwater lakes of Lake Superior and the Mackinac Straits of Lakes Michigan and Huron.

Since it's an existing corridor the company should have access to the mapping previously done for the pipeline already there. FOH SA-04 also intersects pipelines in southern Minnesota owned and operated by other companies which provide the option of re-routing Bakken crude to the refineries in Rosemont and Saint Paul Park in the south Twin Cities Metro.

The Illinois Hub also allows Enbridge access to its pipelines to Oklahoma and points south.



Friends of the Headwaters
Exhibit _____

STATE OF MINNESOTA
OFFICE OF ADMINISTRATIVE HEARINGS
FOR THE MINNESOTA PUBLIC UTILITIES COMMISSION

In the Matter of the Application of North Dakota Pipeline Company LLC for a Certificate of Need for the Sandpiper Pipeline Project in Minnesota	**PUC Docket No. PL-6668/CN-13-473** **OAH Docket No. 8-2500-31260**

SURREBUTTAL TESTIMONY

OF

RICHARD SMITH

SUBMITTED ON BEHALF OF:

FRIENDS OF THE HEADWATERS

January 21, 2015

I. INTRODUCTION

Q: Please state your name, job title, and business address.

A: My name is Richard Smith. I am President of Friends of the Headwaters, P.O. Box 583, Park Rapids, MN 56470.

Q: For whom are you testifying?

A: I am testifying on behalf of Friends of the Headwaters.

Q: Are you the same Richard Smith who has previously had testimony filed in this case?

A: Yes, I submitted direct testimony on November 19, 2014.

Q: What is the purpose of this surrebuttal testimony?

A: I am responding to the rebuttal testimony submitted by the North Dakota Pipeline Company ("NDPC") witness Sara Ploetz submitted January 5, 2015. I also provide additional information regarding the system alternatives proposed by Friends of the Headwaters.

II. RESPONSE TO MS. PLOETZ

Q: Have you reviewed the rebuttal testimony submitted by Ms. Ploetz?

A: Yes.

Q: On pages 16-18 of Ms. Ploetz's Rebuttal Testimony, Ms. Ploetz claims she is responding to your testimony but then goes on to discuss an analysis conducted by the Minnesota Pollution Control Agency ("MPCA"). Were you involved with the MPCA's analysis of the potential impact of the Sandpiper Pipeline?

A: No.

Q: On pages 5-6 of your direct testimony you refer to the MPCA's analysis of the proposed system alternatives. How did you become aware of this analysis if you were not involved in conducting it?

A: The MPCA report with analysis of the proposed system alternatives was posted to the Sandpiper Pipeline project docket, 13-473 and 13-474, on Aug. 21, 2014. Report is attached as Schedule 1.

Q: Why is the MPCA Report valuable in terms of considering the potential environmental impacts of the proposed locations of the system alternatives being considered in this certificate of need proceeding?

A: From its first public comments filed April 4, 2014 Friends of the Headwaters ("FOH") has advocated for a full environmental impact statement ("EIS") with a complete risk analysis and assessment for not only construction impacts but also including any post installation spill and leak impacts to the environment inclusive of both natural and human resources. Such an EIS must include a qualitative analysis of the natural resources, particularly water resources, at stake from the Applicant's Preferred Route.[1] Ms. Ploetz's testimony only provides and relies upon quantitative data for analysis and comparison. That no qualitative analysis of this quantitative data is supplied affirms FOH's advocacy of a full EIS. The MPCA Report, although not a full EIS is helpful because it includes a qualitative assessment of the system alternatives.

III. ADDITIONAL SYSTEM ALTERNATIVES INFORMATION

Q: When did FOH first propose the various system alternatives being considered here?

A: FOH proposed its system alternatives for the NDPC Sandpiper Pipeline in its April 4, 2014 Comments made to the Department of Commerce EERA during the Public Comment Period. A copy is attached as Schedule 2.

Q: Was it your intent that these system alternatives would be of essentially the same size and type as the Sandpiper Pipeline?

A: Yes, I intended the proposed alternative locations for pipelines to involve pipelines of the same general diameter and with the ability to transport the same volume of oil. I recognize that the number of miles of pipeline needed varies by each proposed location.

Q: Why did FOH feel compelled to propose these system alternatives?

A: FOH filed comments in this docket on April 4 (Schedule 2), May 30 (attached as Schedule 3) and again on August 21, 2014 (attached as Schedule 4) to address the reasons that FOH decided to suggest route alternatives.

[1] Or is it Project "Sandpiper" Route? Ms. Ploetz uses both in her testimony which appears to obscure and confuse the data between the two routes.

In summary, as FOH began to study the Enbridge/NDPC Sandpiper proposal and its maps, FOH became increasingly concerned that environmental threats had not been adequately considered and would not be considered under the process that had been followed in the past. After reading the PUC's and DOC's rules we realized we had the right to suggest alternatives. At the time we did not know whether the oil *needed* to be moved, so we decided to focus on the best way to move it assuming the PUC Commissioners would make the need determination. We believed that Minnesotans, through our Public Utilities Commission, should have the right to require a company that wants to cross its state with an oil pipeline carrying 375,000 barrels per day of oil to assess the environmental sensitivity of possible locations for such a pipeline and then construct it in an area of the state best able to withstand a possible catastrophic event. We therefore tried to propose alternative locations that would be better located from an environmental perspective.

Using my general environmental background, my computer skills and the publicly available maps and information primarily from the Minnesota Department of Natural Resources, the Minnesota Pollution Control Agency, the University of Minnesota and other state agencies, I, and others, began to study whether there was a better way to move the Bakken crude oil across Minnesota while reducing the risks to Minnesota's natural resources, especially its northern waters resources, lakes, streams, aquifers, wetlands, the Mississippi Headwaters and Lake Superior. I developed the FOH maps to graphically show the environmental threats posed by Enbridge/NDPC's proposed route and offered alternatives that were illustrative of other ways it could get its oil to the markets it needed to reach.

Of course, we were encouraged the Minnesota Pollution Control Agency in its analysis found this work to be competent and useful in offering less environmental damaging solutions to the problems present in NDPC Sandpiper proposal.

Q: Does this conclude your testimony?

A: Yes.

Minnesota Pollution Control Agency

520 Lafayette Road North | St. Paul, Minnesota 55155-4194 | 651-296-6300

800-657-3864 | 651-282-5332 TTY | www.pca.state.mn.us | Equal Opportunity Employer

August 21, 2014

Mr. Burl Haar, Executive Secretary
Minnesota Public Utilities Commission
121 7th Place East, Suite 350
St. Paul, MN 55101-2147

RE: Enbridge Sandpiper Pipeline Project
Docket Nos. PL-6668/CN-13-473 (Certificate of Need) and PL-6668/PPL-13-474 (Route Permit)

Dear Mr. Haar:

This is the response of the Minnesota Pollution Control Agency (MPCA) to the Notice of Comment Period issued by the Minnesota Public Utilities Commission (Commission) on August 12, 2014, for the Enbridge Sandpiper Pipeline project (Sandpiper). The Sandpiper project includes a Route Permit and Certificate of Need proceeding. It is our understanding that the Certificate of Need decision will likely not be made for several months.

The Commission identified three topics open for comment in its August 12, 2014 Notice:

- *What, if any, of the eight system alternatives identified in the Department of Commerce Alternative Routes Summary Report should be considered further in these proceedings?*

  The MPCA evaluated system alternatives SA-03, SA-04, SA-05, SA-06, SA-07, and SA-08 using a number of criteria described below. All these system alternatives have fewer potential environmental effects than the Sandpiper proposal. At a minimum, we recommend system alternatives SA-03, SA-04 and SA-05 for further consideration in these proceedings.

- *What is the legal basis for determining whether a system alternative should be considered in the certificate of need proceeding?*

  The legal basis supporting our position is discussed on page 2 of our response.

- *What is the legal basis for determining whether a system alternative should be considered in the route permit proceeding?*

  See above.

The MPCA is the state agency with responsibilities and authorities related to the issuance of various permits that may be required for the project, including permits and regulations administered under state and/or federal programs for construction stormwater, industrial stormwater, wastewater, and spill and emergency response. A part of our mission is to protect and improve the environment. The MPCA submitted earlier comment letters and provided remarks at the August 7, 2014 prehearing meeting describing our concerns about the potential for adverse environmental effects from the proposed Sandpiper project route. Comments provided by the MPCA included system alternatives that it believes have lesser potential environmental effects.

The MPCA appreciates that the Route Permit and Certificate of Need parts of the Sandpiper proceeding are separate approval processes, each with its own requirements. Our offer of system alternatives was not intended to conflate the Route Permit process with the Certificate of Need process. The MPCA defers to the Commission regarding matters of interpretation and implementation of the Commission's specific statutory authorities and regulations, and of practice and procedure before the Commission. The MPCA's comments, in furtherance of its mission, are intended to provide information regarding the potential environmental effects from the Sandpiper route and to encourage the Commission to obtain additional environmental analysis on system alternatives to inform its Certificate of Need decision. We believe that the Commission has discretion under the Minnesota Environmental Policy Act (MEPA), Minnesota Statutes ch. 116D, to gather information it needs to include in the administrative record and to decide how to gather such information, including soliciting such analysis.

In addition, as the Department of Commerce Division of Energy Resources (DOC-DER) indicates in its August 18, 2014 letter filed in these proceedings, the Commission has authority under Minnesota Rule 7853.0130 to consider system alternatives that can better achieve the claimed need. That rule requires the applicant to meet four separate criteria before the Commission shall grant a Certificate of Need. Analysis of alternatives is governed by Subpart B of this Rule, which states in relevant part:

> A more reasonable and prudent alternative to the proposed facility has not been demonstrated by a preponderance of the evidence on the record by parties or persons other than the applicant...

As the DOC-DER states in its August 18 letter, this subpart allows a party, or individual, who proposes an alternative to provide evidence showing that its alternative can better achieve the claimed need as stated by the applicant or that the claimed need is not reasonable.

Below we provide comment with respect to the need for additional information and assessment of environmental effects to inform your decision-making on the Certificate of Need and with respect to the potential adverse environmental effects of the proposed Sandpiper route for consideration in the Route Permit process as appropriate.

Analysis of Environmental Effects - Certificate of Need

While no environmental report is expressly required by Commission enabling laws or its regulations, the Commission as a governmental entity has discretion under MEPA to investigate environmental effects. Minnesota Stat. § 116D.03. A comparative analysis of system alternatives would provide valuable information to the Commission to be weighed along with other information of record when making the need decision. Conducting environmental analysis of system alternatives in this need decision is similar to what is done in non-pipeline need decisions. The MPCA believes that certain system alternatives present lesser potential for adverse environmental effects than does the proposed Sandpiper route and that they represent more prudent and environmentally protective options. Given the potential for environmental harm from the proposed Sandpiper route noted in the MPCA's previous comments and in this letter, it is reasonable to investigate the potential environmental effects of system alternatives as part of the need decision. The MPCA respectfully requests that the Commission exercise its discretion under MEPA to ensure that environmental values are given equal consideration along with economic and technical considerations.

The MPCA agrees with the comments filed by the Department of Commerce Energy Environmental Review and Analysis (EERA) unit on August 21, 2014 concerning the Commission's authority to consider environmental impacts of system alternatives in these proceedings. EERA emphasized that MEPA requires all departments and agencies to consider environmental impacts and alternatives in their decision making. MEPA further notes in 116D.06, subdivision 2, that the requirements and goals of the act are supplementary to those set forth in an agencies' existing authorizations. MPCA supports EERA's conclusion that the Commission has the ability to determine what it needs to insure that the record

developed in the Certificate of Need proceeding, or any proceeding, is adequate for its decision making, be it through testimony from parties, supplemental reports from the applicant or an Environmental Report-like (ER-like) document prepared by EERA, as was requested in the Xcel Competitive Resource Acquisition proceeding (12-1240).

Environmental Effects - Proposed Routing Project

The MPCA seeks to provide additional comment regarding the potential for negative environmental effects and a scoring analysis of six system alternatives, known as SA-03, SA-04, SA-05, SA-06, SA-07, SA-08, and the Enbridge's Sandpiper route in the context of the criteria set forth in Minnesota Rule 7852.1900 subp. 3 and 7853.0130 as these criteria pertain to the MPCA's regulatory authority. Please note that proposed system alternative SA-02 is not addressed in the following comments because previous examination of this route showed that it did not merit further consideration based on the risk to natural resources that MPCA believes must be considered. SA-01 was also not entered in the following comparison because it would require crossing the border into Canada. This would appear to change the jurisdiction and authority over the project from the state level to federal, and would thus no longer be under Commission authority.

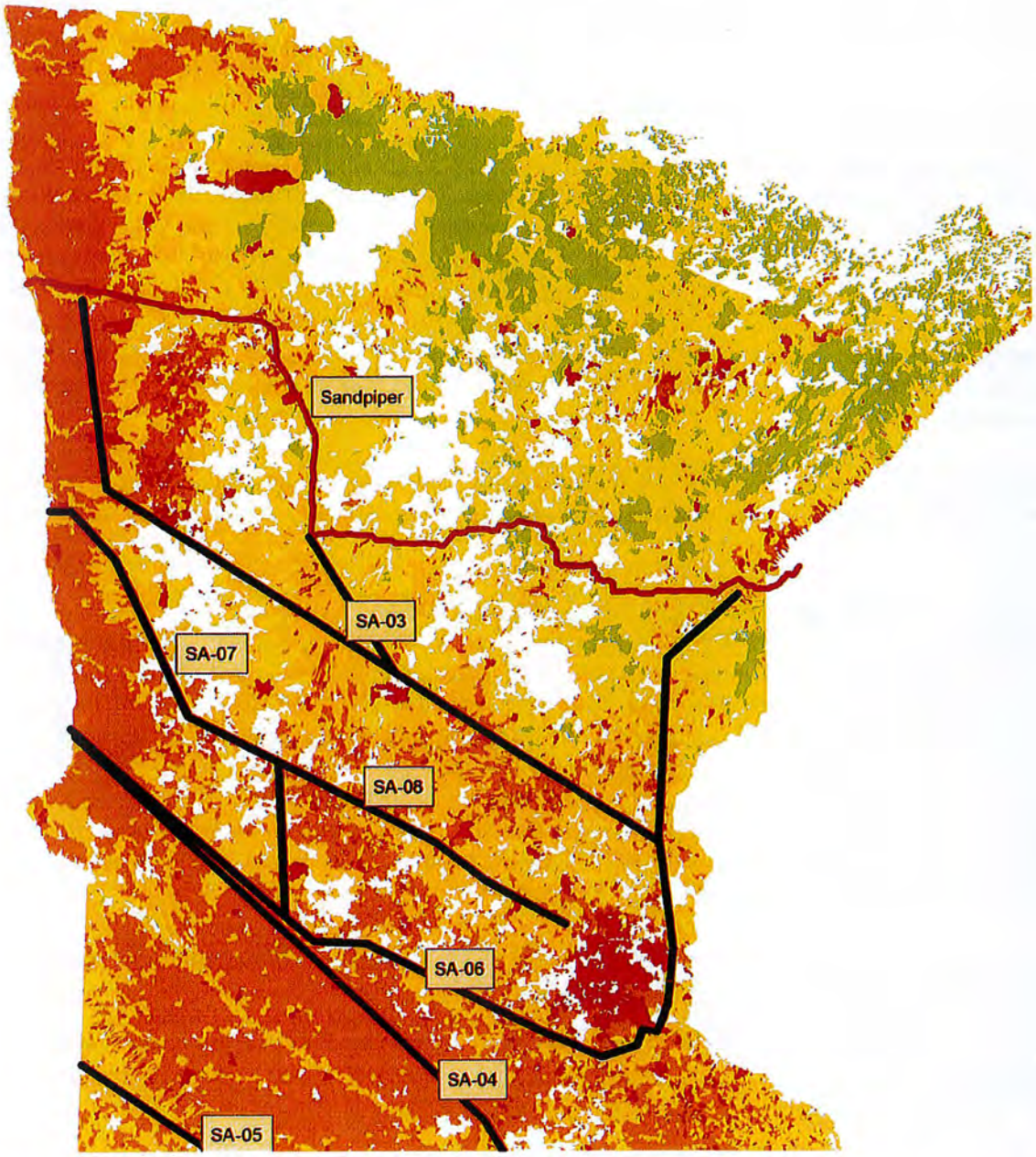
The MPCA's comments are intended to demonstrate the importance and the utility of the Commission developing an environmental effects analysis of the various system alternatives in the Certificate of Need part of this combined proceeding.

Minnesota Rule 7852.1900 Subp. 3, B, D, E, F, G, H, I and J Criteria

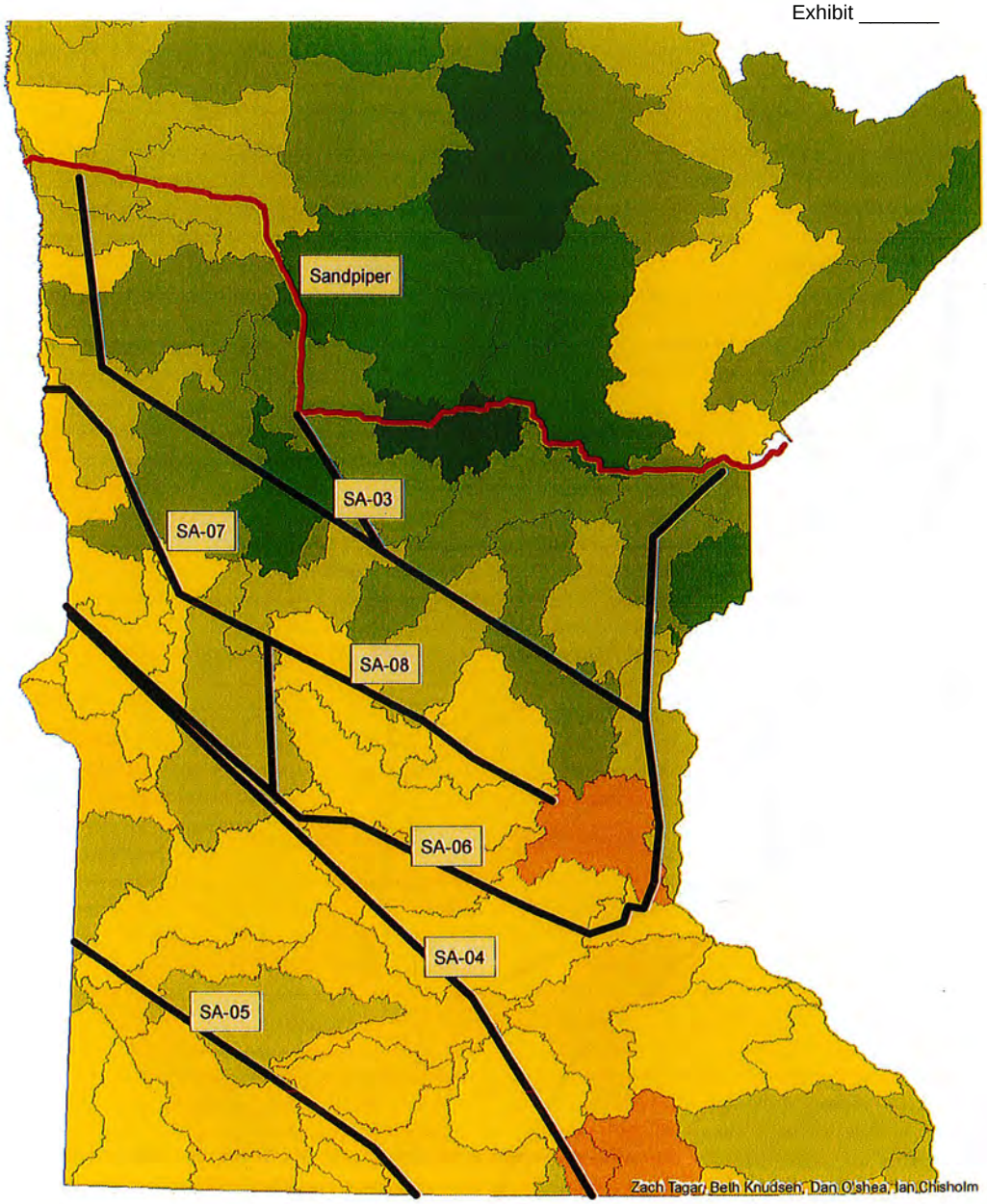
MPCA has considered the criteria in Minnesota Rule 7852.1900 Subp. 3 to compare the proposed system alternatives and the Sandpiper route by identifying corresponding Geographic Information System (GIS) layers to these criteria, and then visually examining the resulting maps. Without having access to specific locations of the proposed system alternatives, a detailed quantification is not possible; however, the MPCA presents this high level approach to help identify the system alternatives which seem to meet the required considerations most effectively. A more detailed analysis of the environmental impacts of system alternatives would be performed in an ER-like document suggested by MPCA and EERA. In the information below, lower numbers represent greater potential environmental effects, while higher numbers represent lesser environmental effects. The information is meant to illustrate one way of roughly comparing one alignment to another.

Minnesota Rule 7852.1900 Subp. 3.B. The natural environment, public and designated lands, including but not limited to natural areas, wildlife habitat, water and recreational lands.

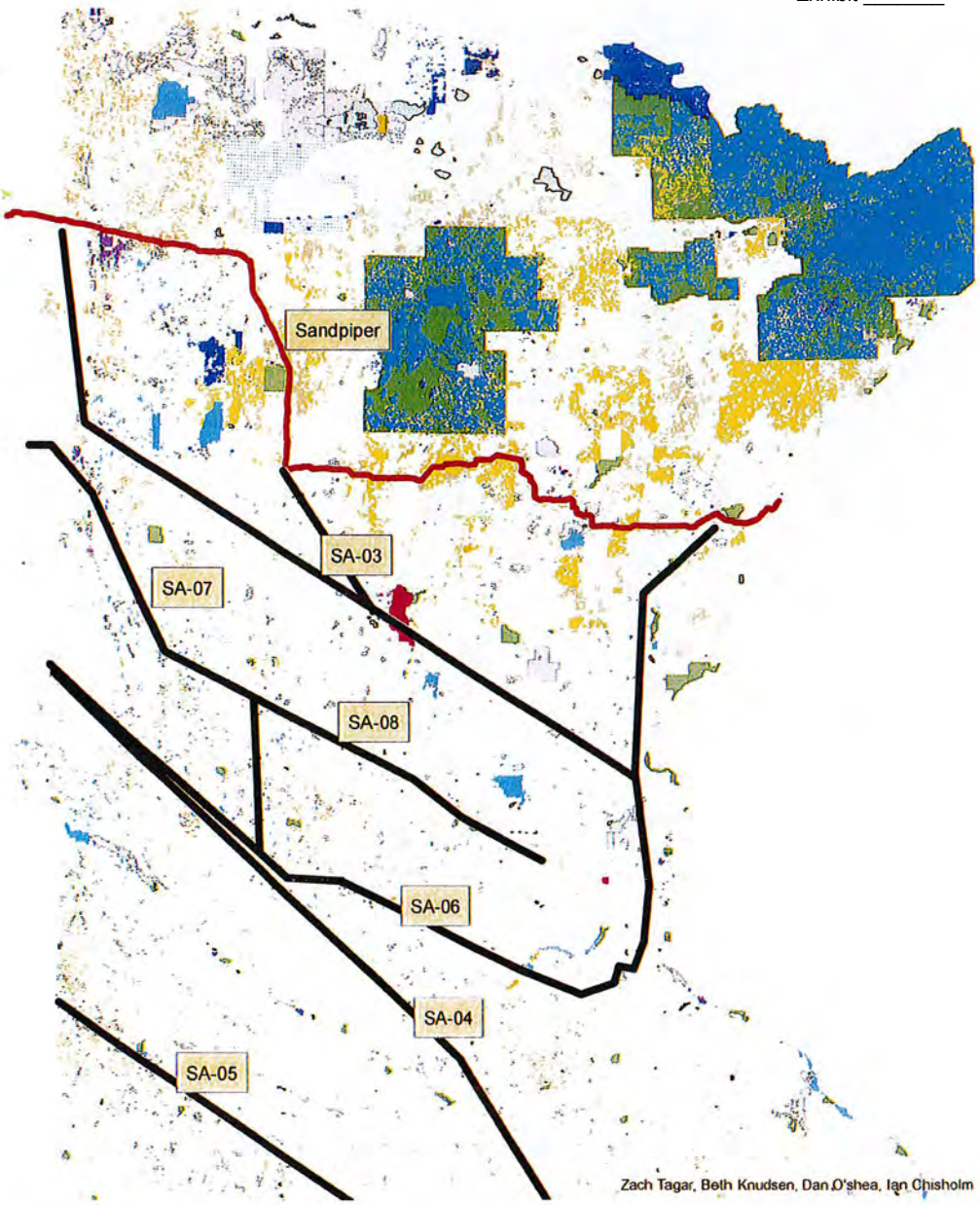
Several layers were used to depict these criteria, including Cumulative Disturbance Index (a score showing how human activity has affected the environment which could be used as an indicator of the quality of wildlife habitat), a map showing Water Quality mean score (the score for overall water quality within a watershed), and another map identifying public land ownership, state parks, and wildlife management areas.



The above map shows Cumulative Disturbance Index scores for the state. The green areas are undisturbed or minimally disturbed areas. The yellow and darker orange to red indicate areas of increasingly heavy human impact, and likely have poor habitat for wildlife; the areas in white have not been assessed. Based on this illustration, it appears that the proposed Sandpiper route has the greatest potential to impact pristine areas of the state and/or areas that have high habitat scores, while the potential for impact decreases with system alternatives located further south in the state.



This map shows mean scores for water quality in the state watersheds. Dark green identifies the best water quality in the state; yellow and orange identify areas of lesser water quality. In this depiction, the proposed Sandpiper route has the greatest potential to impact the areas of the state with the best water quality, while system alternatives SA-04, SA-05, and SA-06 traverse areas of fewer surface waters and lower water quality.



The map above identifies state and federal ownership of lands, state forests, state parks, wildlife management areas, and areas under conservation easements (Nature Conservancy). Wildlife management areas on the map are identified as light pink, darker purple areas are conservation lands, light green are state parks, dark green are national forests, yellow areas are state forests, and bright blue areas are U.S. Forest service land. Notable on this map is that the proposed Sandpiper route borders or crosses a substantial amount of state forest land, and borders several wildlife management areas and one area of nature conservancy land near the North Dakota border. SA-03 crosses near Camp Ripley. All of the proposed system alternatives encroach on some state land, but it appears from this context that the proposed Sandpiper route poses a greater risk to state forests, state parks, and wildlife management areas than any of the system alternatives.

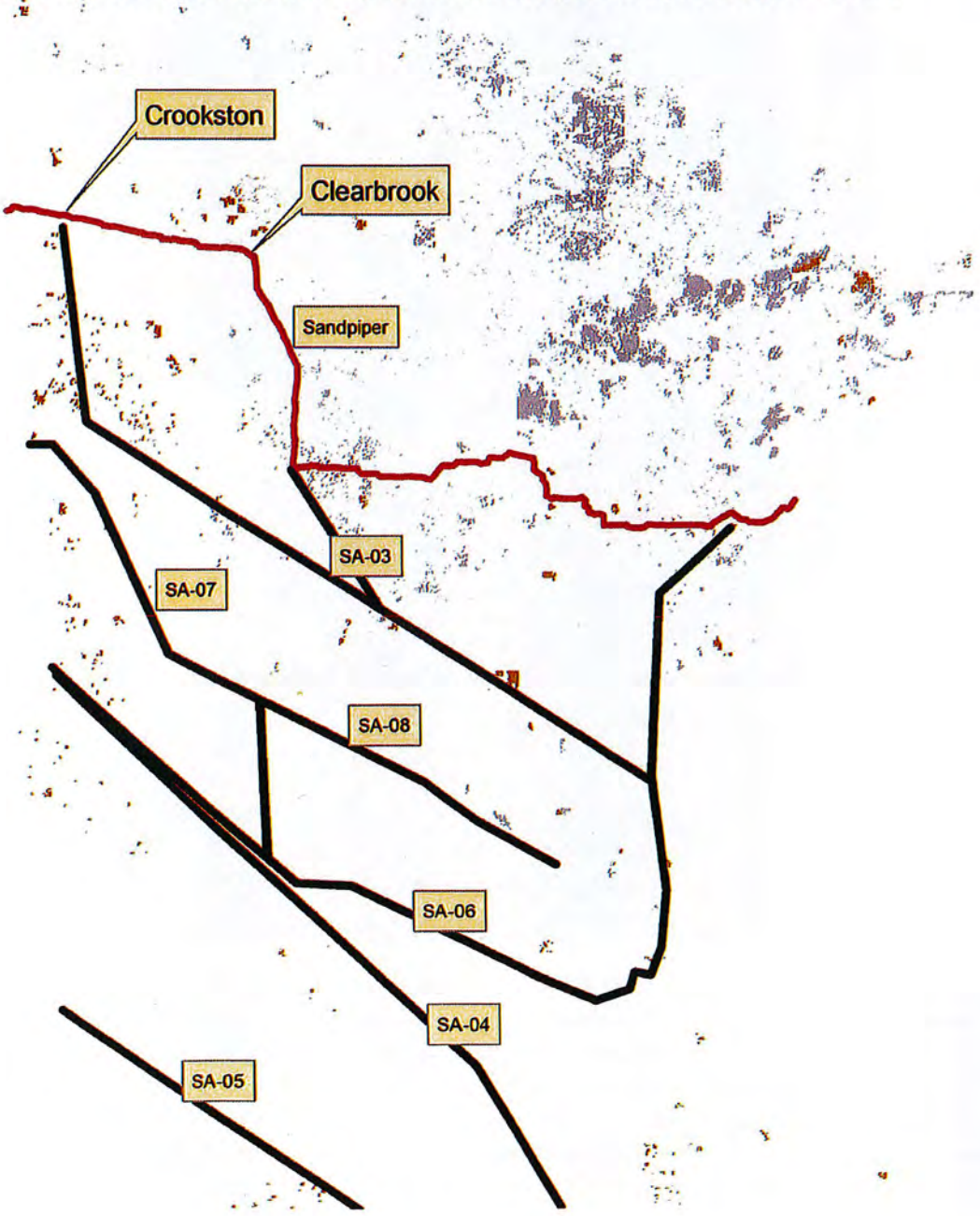
Environmental and natural resource protection and the prevention of impacts tend to be less costly and more effective than restoration; therefore, scoring in this instance is based on preventing impacts to higher quality areas. Scoring of the proposed system alternatives based on criteria in Minnestoa Rule 7852.1900 Subp. 3.B. is as follows:

- 5 points (small potential impact to criteria): SA-04, SA-05, SA-06
- 3 points- (moderate potential impact to criteria): SA-03, SA-07, SA-08
- 1 point (stronger potential to impact criteria): Sandpiper

Minnesota Rule 7852.1900 Subp. 3.D. Economies within the route, including agricultural, commercial or industrial, forestry, recreational, and mining operations.

It is noted that an Enbridge pipeline would help the Minnesota economy by creating temporary jobs and also paying property taxes; however, for the purpose of this comparison, these economic benefits would occur regardless of where the pipeline is located. Therefore, this analysis addresses other economies that may be impacted based on where the Sandpiper pipeline is located.

The following map identifies both major industrial lands (paper company lands, potato farms, mining lands, etc. in gray), major non-industrial lands (livestock operations, miscellaneous trusts, sugar beet operations, etc. in tan).



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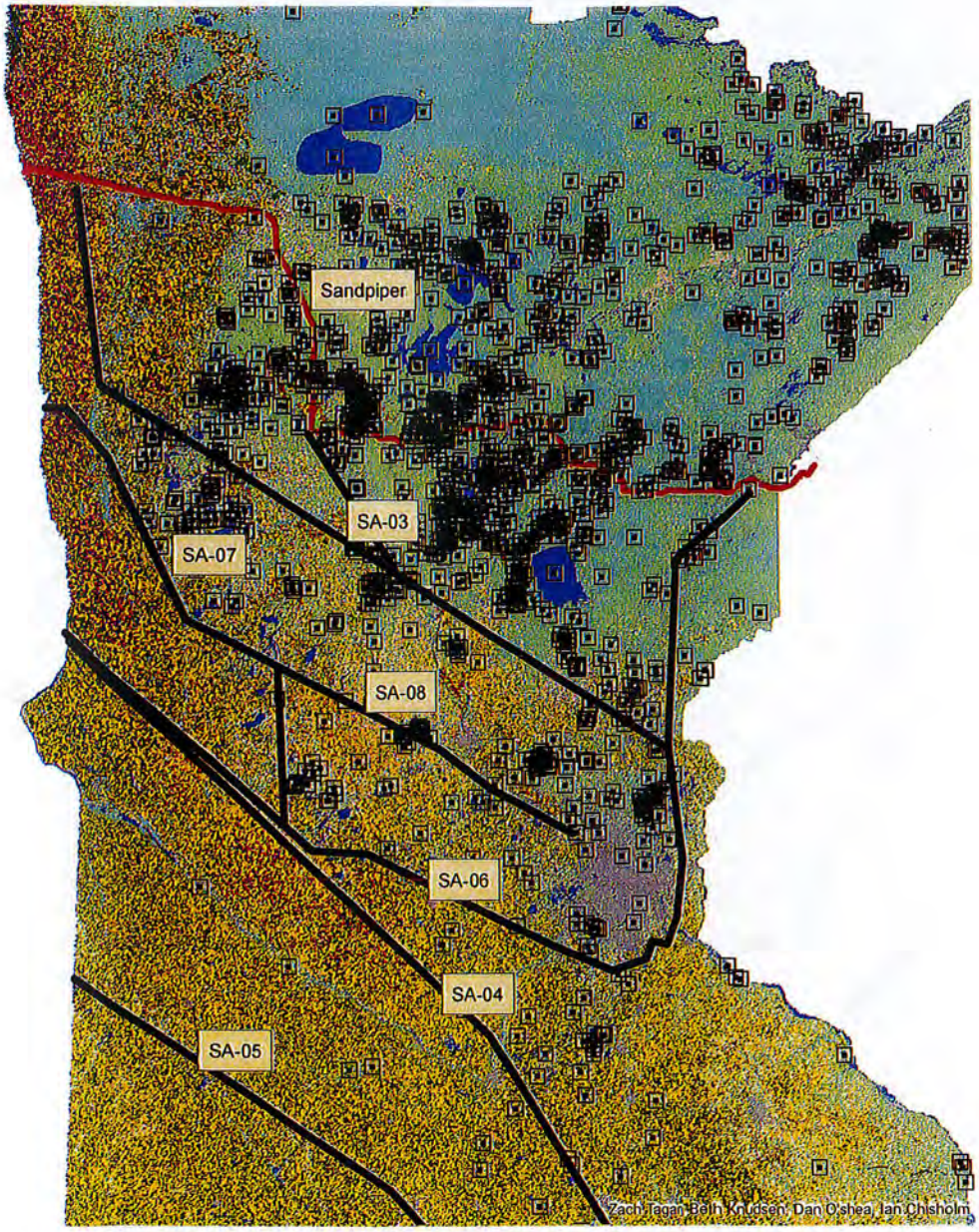
In this example, the proposed Sandpiper route encroaches on relatively few industrial-related facilities compared to SA-06 or SA-08, but the Sandpiper comes closest to or directly encroaches on a number of major industrial lands, particularly potato farms and paper company forests. SA-03 also comes near to several livestock operations. In this view, it appears that SA-04 poses the least potential impact to any of the facilities or lands depicted in this layer.



This map identifies cropland in Minnesota, and also stands of wild rice (black squares with black dots). The yellow or dark green areas are corn and soybeans, while the lighter green and blue-green are forested areas. The state appears fairly evenly divided between forest land above SA-03, and heavily cropped land (mostly corn and soybeans) below SA-03. Of special note on this map is the high concentration of stands of wild rice around the proposed Sandpiper route. Unlike corn, soybeans or other exports, stands of wild rice are uniquely sensitive to water quality and disturbance of its native habitat. Therefore, the MPCA concluded that the proposed Sandpiper route would pose a higher threat to the stands of wild rice economy than the system alternatives would pose to other crops. Other Minnesota economic

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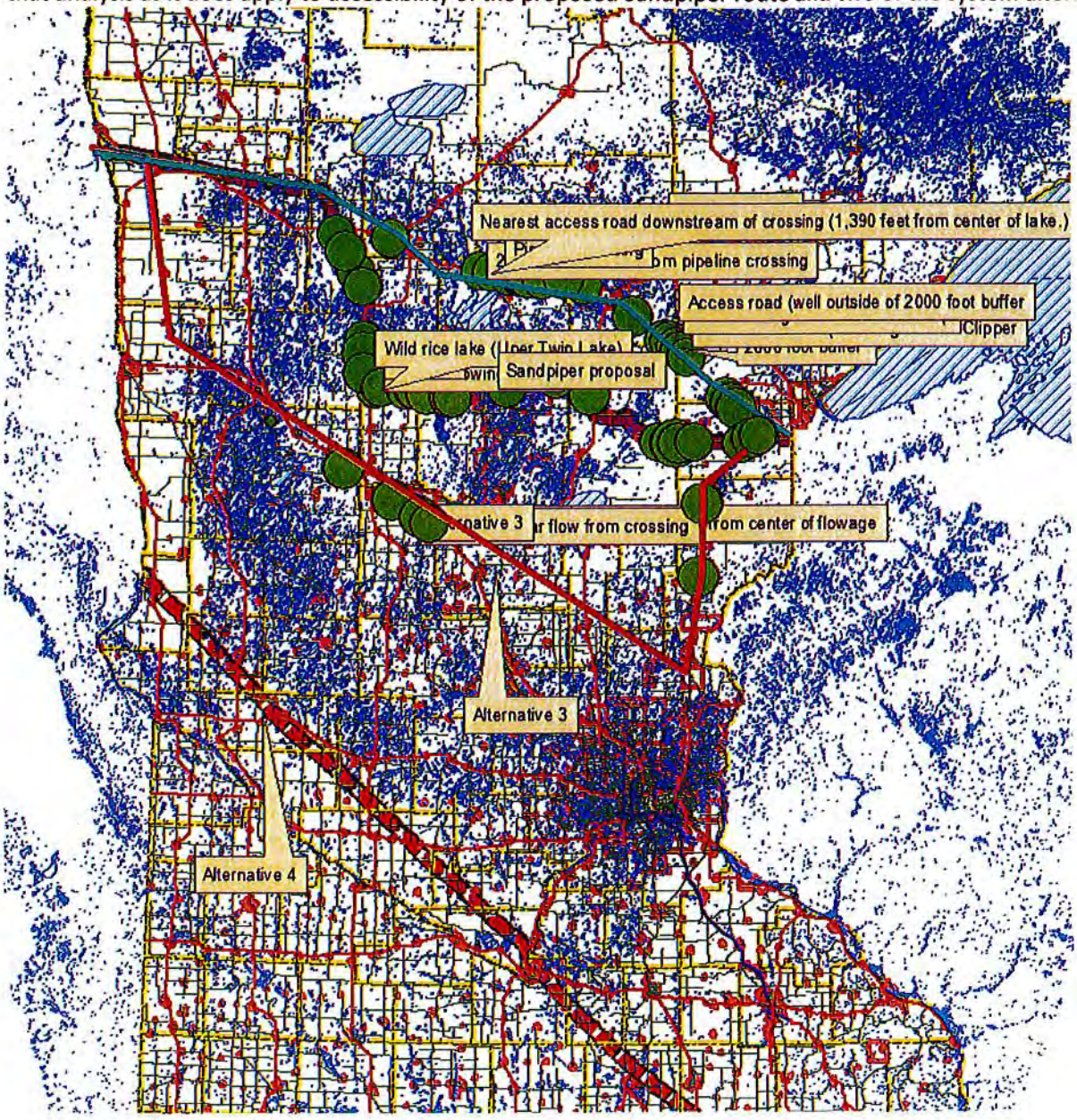
sectors, such as tourism, resorts, and recreation, are also heavily dependent on water quality, ~~thus~~ with consideration toward potential impacts to the economic sectors that significantly depend on water quality, the MPCA scored the proposed system alternatives as follows:

- 5 points (small potential impact to criteria) SA-04, SA-05, SA-07
- 3 points- (moderate potential impact to criteria) SA-03, SA-06, SA-08
- 1 point (stronger potential to impact criteria) Sandpiper

Minnesota Rule 7852.1900 Subp. 3.E. Pipeline cost and accessibility.

It was not clear whether this criterion applies to the Enbridge's cost and accessibility to route locations, or to potential cost to the State of Minnesota to access the pipeline route, especially in sensitive areas. However, as accessibility to the proposed system alternatives was a major concern of the MPCA's June 24, 2014 letter, it is worth reviewing the result of that analysis as it does apply to accessibility of the proposed Sandpiper route and two of the system alternatives.

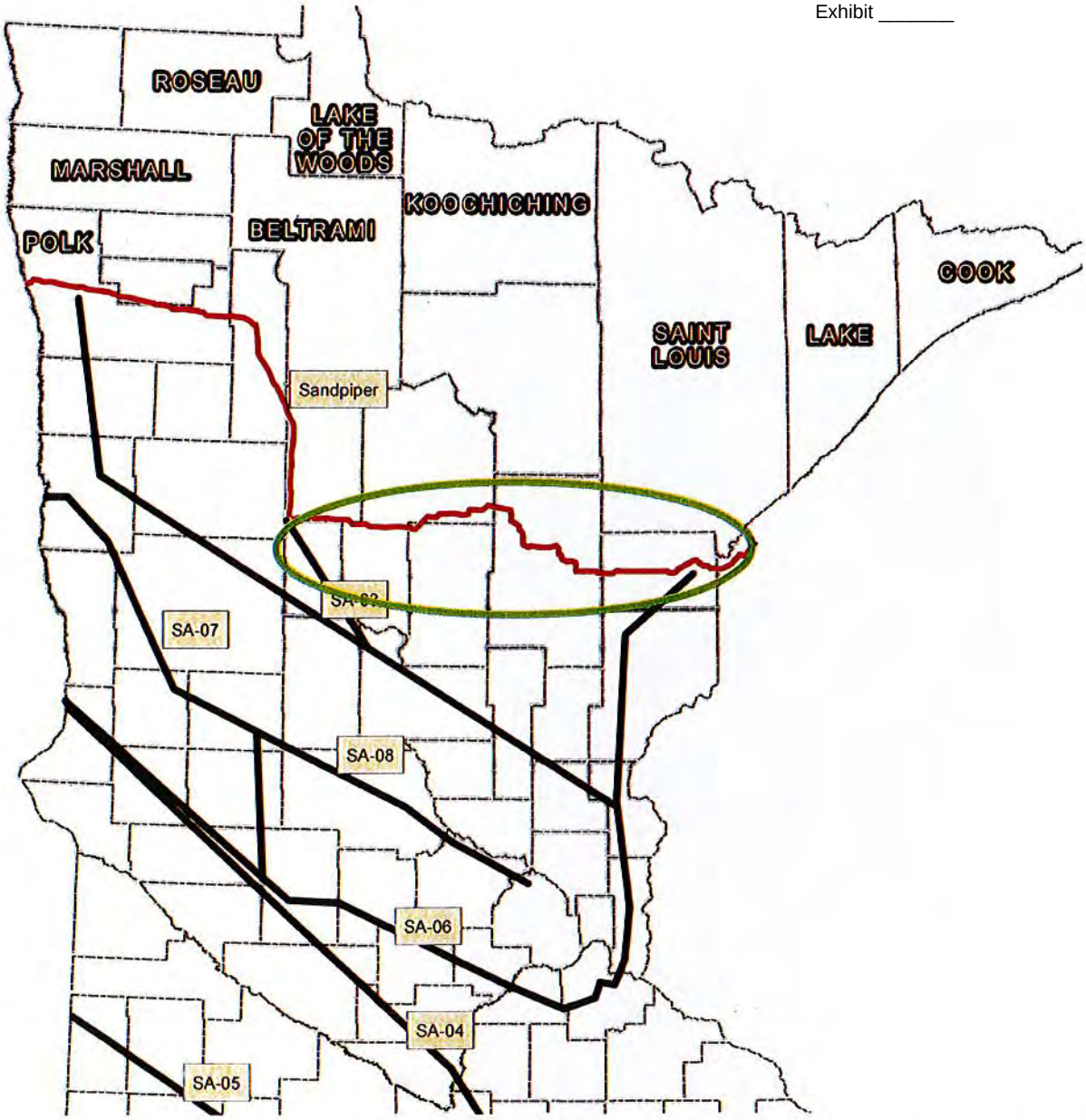


As described in the MPCA's June 24, 2014 letter, the MPCA studied the Sandpiper route proposal, SA-03, and SA-04 for accessibility downstream of water crossings. The criteria set for this study involved road access to water crossing areas within 250 feet of the center of a flowage or water body for a distance of 2,000 linear feet downstream of the crossing. One of the objectives of the analysis was to identify areas with poor or no access to water bodies being crossed by each of the proposed system alternatives, with the above described criteria used to measure this objective. The analysis indicated that SA-03 had seven water crossings with poor or no access as described, SA-04 had zero such access issues, and the proposed Sandpiper route has 28 water crossings with no access within 2000 linear feet.

Based simply on this data and without further analysis, the scoring for SA-03, SA-04 and the proposed Sandpiper route is as follows:

- S points (small potential impact to criteria) SA-04
- 3 points (moderate potential impact to criteria) SA-03
- 1 point (stronger potential to impact criteria) Sandpiper

Minnesota Rule 7852.1900 Subp. 3.F. Use of existing rights-of-way and right-of-way sharing or paralleling.
All of the system alternatives follow existing pipeline corridors except for one. The proposed Sandpiper route follows MinnCan pipeline from Clearbrook south, but does not follow any existing pipeline corridor (although some of it follows power line corridor) once it turns east near Park Rapids. Note the area circled on the following map, where the Sandpiper follows either power line corridor, or no corridor:

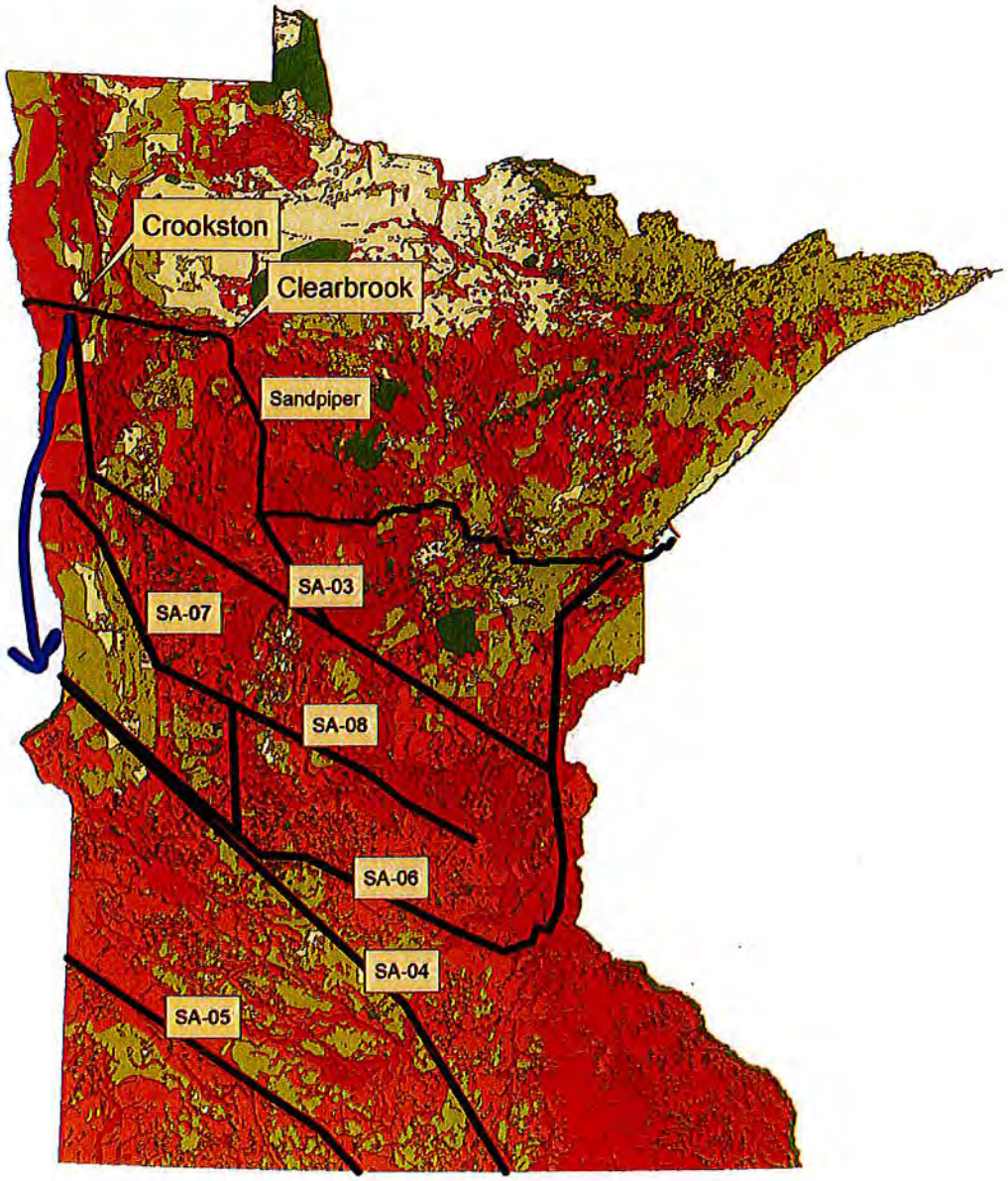


Through much of Aitkin County, and small areas of Carlton County, the Sandpiper proposal does not appear to follow any existing corridors at all. Thus, based on these criteria, the Sandpiper route and system alternatives would score as follows:

- 5 points (small or no variance from criteria) SA-03, SA-04, SA-05, SA-06, SA-07, SA-08
- 3 points- (moderate potential impact to criteria) Sandpiper
- 1 point (significant variance from criteria) not applicable

Minnesota Rule 7852.1900 Subp. 3.G. Natural resources and features.

The map below was put together by combined efforts of Minnesota State and federal agencies. It identifies ground water susceptibility to contamination based on a number of criteria. On this map, the color red identifies the highest potential for groundwater contamination, dark orange is second highest, the lighter greens are low susceptibility, and the lightest green being the least susceptible. The dark greens represent lakes.



As seen on this map, the proposed Sandpiper route crosses some of the areas of the state that are most susceptible to contamination of groundwater, especially around the Park Rapids area. SA-03 also crosses significant sensitive areas, while the system alternative that crosses the least susceptible ground water is the SA-04 proposal. Of all the proposals, the Sandpiper route appears to cover the most linear miles of susceptible groundwater, from Red Lake Falls to Clearwater, then down to Park Rapids, and east to Fifty Lakes. SA-03 appears to be a close second in terms of potential to impact susceptible groundwater areas.

The map below identifies state surface waters, including lakes and wetlands. Although all of the proposed alternatives cross some water bodies, or encroach on some, the Sandpiper again crosses or encroaches on more surface waters than does any proposed system alternative. There is also more diversity of surface water types along the proposed Sandpiper route than any system alternative.

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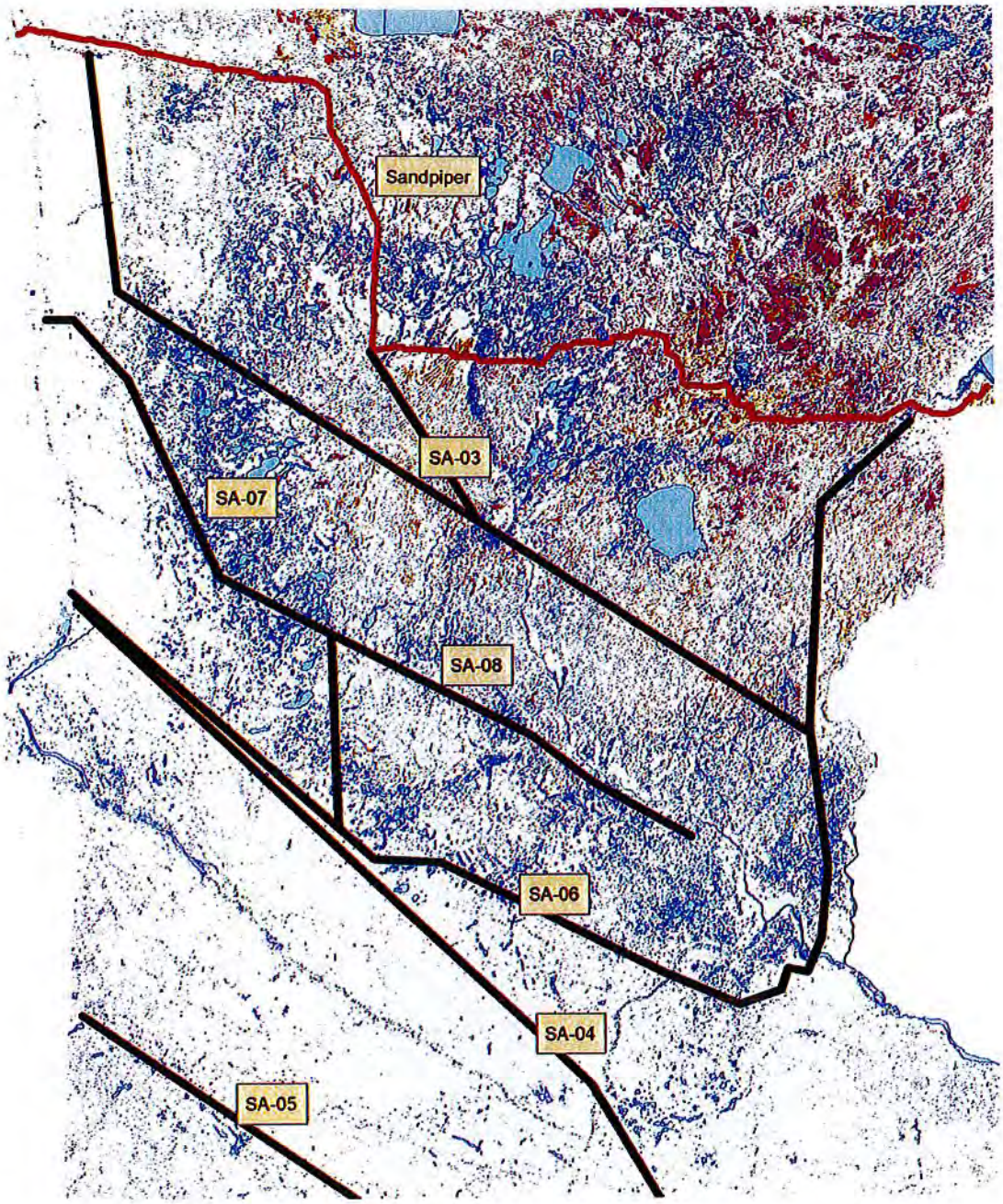

Although the proposed Sandpiper route was comparable to SA-03 with regard to potential for groundwater contamination, the Sandpiper route appears to encroach on a much higher density of surface waters. SA-07 and SA-08 also encroach on a significant concentration of surface water, although without as much diversity (i.e. rivers, lakes, streams, wetlands, etc.) as the Sandpiper route, nor as much overall surface water area. When combining the potential for impact to surface water and ground water, the proposed system alternatives average out in this manner:

- 5 points (small potential impact to criteria) SA-04, SA-05
- 3 points- (moderate potential impact to criteria) SA-03, SA-06, SA-07, SA-08
- 1 point (stronger potential to impact criteria) Sandpiper

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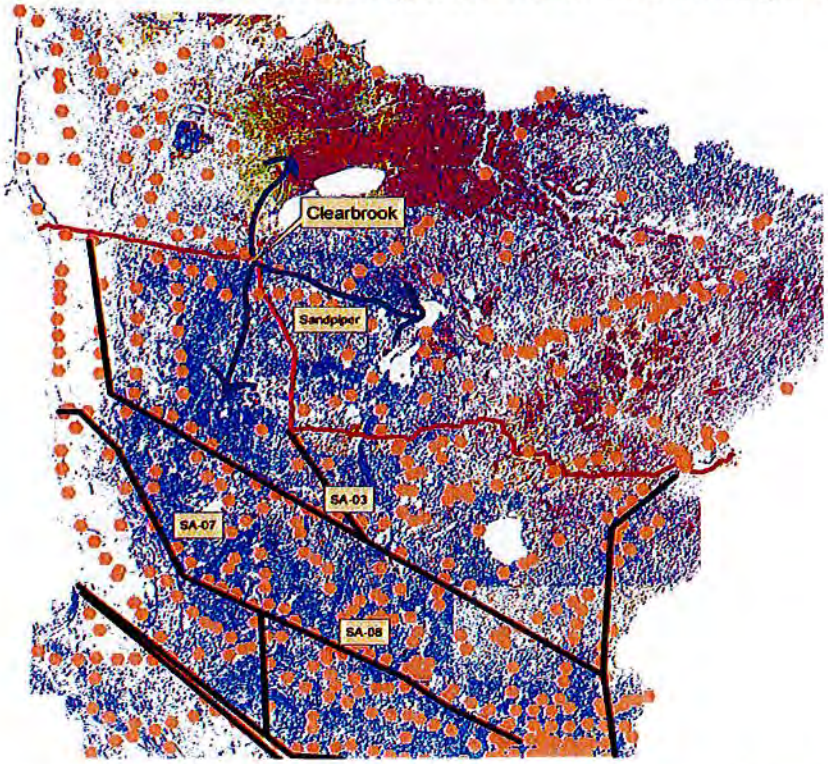
Minnesota Rule 7852.1900 Subp. 3.H. The extent to which human or environmental effects are subject to mitigation by regulatory control and by application of the permit conditions contained in 7852.3400 for pipeline right-of-way preparation, construction, cleanup, and restoration practices.

Although MPCA staff has not identified a GIS layer to correlate with these criteria, exposed sections of Enbridge pipeline in the Tamarac River have raised serious questions regarding regulatory authority to require re-burying of exposed pipe when erosion has uncovered existing infrastructure. Exposed pipe creates a greater risk of spills or injuries to people. The significant number of water crossings along the proposed Sandpiper route would appear to increase the likelihood that similar pipe exposures with their attendant risks will occur in the future.

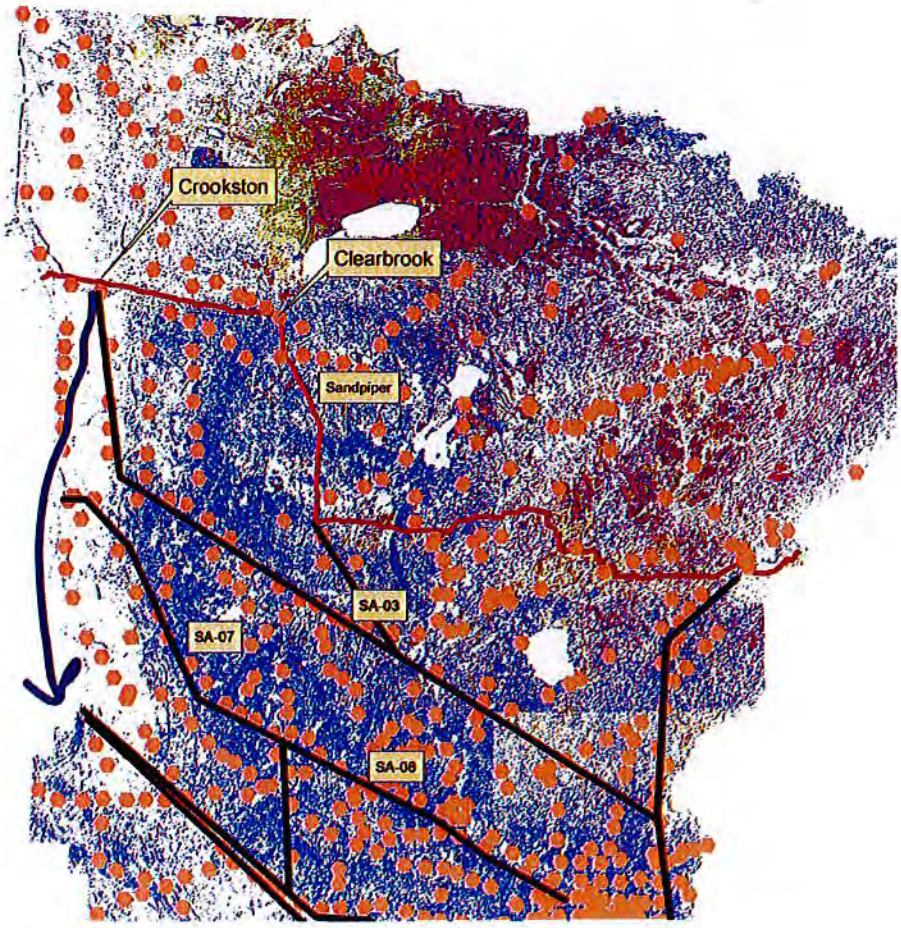
Minnesota Rule 7852.1900 Subp. 3.I. Cumulative potential effects of related or anticipated future pipeline construction.

A significant component of the Sandpiper proposal is the construction of a new terminal at the Clearbrook location. MPCA has expressed concern that with each terminal constructed at Clearbrook, the likelihood of additional or future pipeline infrastructure that will be built will come through Clearbrook. This, in turn, increases the potential for new pipeline to impact the large concentration of sensitive surface and groundwater that lies immediately to the east of Clearbrook, as demonstrated in the map below. The blue color on the map typically identifies open water, with green and purple, etc. indicating various other types of wetlands. The brownish/pink octagons represent cities.



Due to the fact that pipelines are often placed in the same corridors, it is MPCA's concern that by continuing to allow pipelines through Clearbrook, the state will enable expansion of future pipeline infrastructure expansion in areas of the state that will have an increasingly concentrated impact on the state's most valuable surface and groundwater resources. This increases the potential for natural resource impacts and degradation due to spills or releases.

The MPCA believes that cumulative potential effects associated with high-risk crude oil routes can be reduced or avoided if future terminal facilities were constructed at a location west of Clearbrook. Such facilities could be constructed along the old line 3 corridor, or near Crookston as shown on the following map. The possible benefits to reducing potential impact to our state's valuable resources are depicted below:



By relocating new terminal facilities west of Clearbrook, a corridor can be created in which potential resource impacts can be minimized, and a number of possibly less environmentally hazardous routes opened up. The Sandpiper route as currently proposed, as well as future pipelines that may use this same corridor, increase cumulative risk with consideration of most of the criteria from 7852.1900 as described above.

Minnesota Rule 7852.1900 Subp. 3.J. The relevant applicable policies, rules, and regulations of other 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.
Minnesota Statute 116.04D, Subd. 6 states: "No state action significantly affecting the quality of the environment shall be allowed, nor shall any permit for natural resources management and development be granted, where such action or permit has caused or is likely to cause pollution, impairment, or destruction of the air, water, land or other natural resources located within the state, so long as there is a feasible and prudent alternative consistent with the reasonable requirements of the public health, safety, and welfare and the state's paramount concern for the protection of its air, water, land and other natural resources from pollution, impairment, or destruction. Economic considerations alone shall not justify such conduct."

In summary, all the currently proposed system alternatives evaluated by the MPCA here are worthy of further consideration, especially when compared with the Sandpiper proposal. The MPCA recommends that at a minimum, the Commission approve SA-03, SA-04, and SA-05 for further consideration in these proceedings. Further, the MPCA urges the Commission to gather additional environmental effects information on the system alternatives through preparation of an ER-like document and is willing to assist EERA by providing additional data, comments, and review for the document that both agencies recommend here.

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The MPCA thanks the Commission for the opportunity to comment upon these issues. The agency continues to emphasize that the environmental effects of system alternatives need to be considered in the Certificate of Need process. System alternatives that will transport oil to an alternative terminal with significantly less environmental harm should be evaluated in these proceedings.

Sincerely,

Craig Affeldt, for

Bill Sierks,
Manager, Environment and Energy Section
Minnesota Pollution Control Agency

BS:bt
cc: Deborah Pile, Department of Commerce
Larry Hartman, Department of Commerce
Sara Ploetz, Enbridge

April 4, 2014

Paul Stolen
37603 370th Av SE,
Fosston, MN 56542,
218-435-1138

Mr. Larry Hartman
Environmental Review Manager
Minnesota Department of Commerce
85 67th Place East, Suite 500
St. Paul, MN 55101

Re: Comments on proposed Enbridge Sandpiper Pipeline, PUC Docket #13-474

Dear Mr. Hartman:

Enclosed are my comments on this proposed project. They concern the main topics solicited in the January 31, 2014 public notice. I suggest alternative routes and route segments, and provide answers to public notice questions "What human and environmental impacts should be studied in the comparative environmental analysis?" and "Are there any specific methods to address these impacts that should be studied in the comparative environmental analysis?"

My comments address human and environmental impacts. They identify appropriate methods of studying such impacts, based on PUC rules and standard methods used in Minnesota and elsewhere to review pipelines.

The most important point in these comments concerns the enormous quantity of oil and other hazardous product that is already flowing through multiple pipelines in one or two narrow corridors This project, and the new Line 3 Enbridge replacement and enlargement will add even larger amounts of oil and product to these corridors. These corridors cross highly valued natural resource areas that have many lakes and clean rivers,. They are often at or near the headwaters of drainages and in hilly areas, as well as being close to people and concentrations of residences.

It is time for Minnesota and federal regulatory agencies to address the problem of multiple large diameter pipelines in close proximity to each other. This concentration makes the consequences of a single site event—whether such an event is natural, accidental, or intentional—potentially catastrophic. Furthermore, my comments will show that the flow of oil and other product will be so large as to be larger than—or a significant portion of—the flow of well-known rivers crossed by the corridors.

I am submitting these comments as a citizen but also as an expert. These are my personal comments written without review or reimbursement of any party. I will be willing to provide testimony as such in legal and legislative forums, should this be necessary, depending on personal availability.

In lieu of providing a c.v. at this time, I summarize here my credentials for asserting that I have expertise regarding the Sandpiper review.

I have regulatory experience with large natural gas, carbon dioxide, water, and oil and product pipelines in Montana and Minnesota. This has involved on the order of 10-12 pipeline projects while employed at the Montana Department of Natural Resources and Conservation and the Minnesota Department of Natural Resources. In Montana, the DNRC had environmental review, locational approval, and Certificate of Need Authority for energy facilities combined in one agency. I have also supervised , and /or participated in the preparation of EISs or EAs of such pipelines. This included conducting training sessions for other regulatory personnel on how to review pipelines for impacts and on pipeline construction methods.

I have written or coordinated the writing of major environmental review regulations for fixed linear energy facilities, including pipelines and HVTL lines. This experience included reviewing specific proposed linear and fixed large energy facilities (power plants and HVTL lines), and high-level nuclear waste repositories. I have been an environmental inspector on a number of large pipeline projects, including presenting agency views at pre-construction conferences with pipeline builders and sub-contractors.

I have policy-level experience with both federal and state laws and regulations regarding environmental review, pipelines, and solid and hazardous waste topics. This includes legislative staff work, legal depositions, testimony in court, and presentations to other agencies. Finally, this experience also includes years of doing environmental reviews of many other types of projects, including experience with formal risk assessment, and supervising and/or writing scopes of work for the preparation of highly technical studies conducted by outside consultants.

Review and permitting of significant projects such as the Sandpiper project, and the 36-inch Enbridge upgrade of its old Line 3, means that there are overlapping jurisdiction with other federal and state agencies. Some of these are broader than the narrow PUC review requirements. My comments also pertain to those other agency responsibilities. It is necessary to exchange information among such government authorities as a matter of good government. Many of my comments attempt to accomplish such a goal. Therefore, I am providing copies of my comments to these other agencies.

My comments are enclosed. Thank you for consideration of them.

Sincerely,

Paul D. Stolen

C: Tom Landwehr, Commissioner, Minnesota DNR
John Stine, Commissioner, Minnesota PCA
Tamara Cameron, Regulatory Chief, Corps of Engineers
Bob Eleff, Minnesota Legislature, House Research
Ken Westlake, USEPA, Chicago Office
US State Department, Washington DC

Comments on proposed Enbridge Sandpiper Pipeline, PUC Docket #13-474
Expert Testimony of Paul Stolen, Fosston Minnesota
April 4, 2014

I. Potential oil leaks and pipeline ruptures must be addressed in the route permit, by Minnesota state agencies, and by the US Corps of Engineers and EPA.

Summary: In this section I make the case for using accepted methods of risk assessment to address the consequences of pipeline ruptures to the Minnesota environment and people from this project. A foundation principle of risk assessment is that the greater the consequences of an event, the greater the need to examine rare or unlikely events. There are five reasons why unlikely events need to be considered in this risk assessment for this project:

1) Risk assessment scenarios in Attachment 4 are roughly applicable to one of the existing and proposed pipeline corridors in Minnesota. For example, a 36-inch pipeline rupture of the "worst case" type used in the assessment, may still release on the order of 40,000 barrels of oil, even assuming the quickest reaction time of pipeline operators to close block valves(13 minutes.) If valve closure time is delayed for 30 minutes, this rises to about 70,000 barrels, and if delay is 60 minutes, the amount is 100,000 barrels.

Such releases could have extremely high consequences to the Minnesota environment, and higher releases are possible under some risk assessment scenarios.

2) The portion of the Sandpiper route between Clearbrook and Park Rapids already contains three pipelines. Enbridge is apparently planning one more 36-in line in the same corridor as the 30 inch Sandpiper route. I raise the question as to what "worst-case" scenario should be used when there are 5 pipelines in close proximity in remote areas and at least somewhat susceptible to natural or intentional damage, perhaps to all of them at one time?

3) The corridor Enbridge proposes to use traverses a landscape rich in aquatic and other natural resources, highly valued by Minnesotans, and that includes major groundwater resources.

4) The portion of the Sandpiper route between Clearbrook and Park Rapids was fraught with problems during construction of the MinnCan pipeline, which were at least partially due to the corridor being created for a small pipeline long before modern environmental laws were passed.

5) The other route likely to be considered in the Sandpiper comparative review—the Enbridge mainline corridor—suffers from very similar problems as do at least the first three listed above. There are already as much as 7 pipelines present in this corridor.

The Sandpiper project, as well as other new projects in the planning stages, will add significantly to the enormous quantity of oil and other hazardous product that is already flowing through two narrow pipeline corridors.

It is time for Minnesota and federal regulatory agencies to address this problem of multiple large diameter pipelines in close proximity to each other. This concentration makes them vulnerable to natural events, accident or intentional act—such as the Oklahoma City federal building bombing. In fact, in Comment II.A. I discuss a specific case on the Alberta Clipper route where very high flows caused by the large rainfall events

that seemed to be caused by global warming could threaten the integrity of more than one of the large pipelines in this narrow corridor.

My comments on this topic are based on my experience with pipelines in Minnesota and Montana, as well as with exposure to risk assessment concepts and methods. Enbridge may object to the use of the ORNL study in Attachment 4, and say it is not appropriate to apply to these projects. I disagree: of course it isn't directly applicable, but its methods are modifiable so that it is. Extrapolating the findings of Attachment 4 to the two corridors could be pushing things a little—but I have found no information that anyone else is considering these issues and the deadline for PUC comment is now due. It is therefore entirely appropriate to use it, and I hope to trigger a helpful debate. And, I know for certain my view this topic is important will be shared by the public.

The jurisdiction of the PUC and other Minnesota agencies regarding the scope of review as it pertains to pipeline design and location lacks clarity and confusion among regulators as well as the pipeline company personnel. This is related to the issue of pipeline "safety standards", and is discussed in detail in Comment II below. This lack of clarity and confusion should not be allowed to continue, since in my view, Minnesota's natural resources and citizens are threatened by rare but reasonably foreseeable events.

As noted in Comment II, I believe the evidence is firm that the Minnesota state agencies can effectively develop measures regarding mandatory design features related to pipeline ruptures and leaks in order to that protect people and the environment without encroaching on federal "safety standards." Such involvement is extremely important, given the magnitude of oil and product potentially moving through these corridors.

I. A. Estimates of existing and proposed pipeline oil and product flows in Minnesota as compared to selected river flows.

After burial, pipelines, when functioning correctly, are largely invisible to the public and most policy makers—such as those currently concerned with oil transport by rail. In order to make considered judgment on policy and permits—as well as allowing proper public involvement—this needs to change. It is no longer acceptable to have an "out of sight, out of mind" attitude on the magnitude of current and potential oil transport through Minnesota in restricted corridors with multiple pipelines.

It is not possible to begin to analyze potential impacts from pipeline leaks and ruptures without knowing amounts of oil and product being transported. Attachment A provides details about oil flow into and through Minnesota in the corridors relevant to the Sandpiper analysis. It thus provides a basis for analyzing socio-economic, public safety, and environmental impacts from leaks and ruptures. Pipe size and amounts of oil and product pumped are given, as is ownership and origin (for most of the lines.) Attachment 2 provides a description of most of the Enbridge pipelines.

Also included on page 3 of Attachment A is a comparison of pipeline oil and product flow and selected river flows near where corridors cross the named rivers. These data, while in cubic feet per second (cfs), are useful for both public understanding of local residents as well as resource managers. The public in these locations can at least visualize the rivers even though most do not directly understand cfs figures.

The river flow data shown are long-term median flows for April 2, not current flows. Therefore, they are indicative of long-term spring runoff conditions, and are likely substantially higher than low-flow conditions.

In addition, the percentages listed comparing oil/product flow to river flow use the highest amounts based on the proposed pipeline projects in the permitting and planning stages.

There are some caveats with respect to the numbers in Attachment 1. First, I used reliable sources for the numbers. When I used news reports, I only used those where pipeline companies were directly quoted, and checked multiple news sources. However, the amounts indicated for the Minnesota Pipeline Company older lines rely on indirect conclusions based on Citation #2 figures and subtracting known amounts from specific projects. The Enbridge figures for existing pipelines in its Mainline corridor are taken directly from them. (Attachment 2) Finally, the source of oil/product was somewhat difficult to determine in some cases.

Attachment 1 indicates the following with respect to comparison of April 2 long-term median river flows with oil flow amounts in pipelines, both expressed in cubic feet per second:

--Four of the listed rivers, Snake River above Warren, Clearwater river at Plummer, Straight River at Park Rapids, and Prairie River at Taconite, have oil/product flows substantially higher than current spring flows in the rivers. In two cases oil flow is 200 percent of water flow.

--In all cases, especially if one considers large releases during higher flow conditions resulting in rapid dispersion downstream, these rivers are important and sensitive natural resources. For instance, the Straight River south of Park Rapids is a nationally recognized brown trout fishery.

I.B. Methods of determining socio-economic and environmental impacts of pipeline ruptures The PUC public notice on Sandpiper requested advice on methods of addressing potential impacts. There are indeed methods already in place, such as:

I.B.1. *Identification of "High Consequence Areas."* Comment II.B.1. addresses this topic in detail and provides recommendations for how to use this category in the project review. These areas are also roughly described in the federal agency prepared Attachment 3, which includes somewhat useful guidance as to their possible use in the Sandpiper project.

I.B.2. *Risk Assessment with respect to potential amounts of oil/product released by ruptures.* A foundation principle of risk assessment is that the greater the consequences of an event, the greater the need to examine rare or unlikely events in the risk assessment. Attachment 4 is a clear illustration of this principle. For example, it indicates that a "worst-case" pipeline rupture needs to be used, and justifies why it is needed. Such a rupture is called a "guillotine" rupture : "Guillotine-type breaks are less common than other pipeline breaks such as fish-mouth type openings, but they can occur as a result of different causes including landslides, earthquakes, soil subsidence, soil erosion (e.g. scour in a river) and third-party damage. The guillotine-type break is the largest possible break and is therefore considered in this study as the worst case scenario. " (page 5.)

The study goes on to use this scenario in its analysis of the cost-effectiveness of installing block valves, as well as assessing (some) environmental and socio-economic damages from ruptures. It calculates hypothetical releases in different scenarios in its appendix, including those figures listed in the above summary. More detail is provided in the verbatim (except for underlining) excerpts in Attachment 4.

As noted in the above summary, the estimates of amounts spilled from "guillotine" type ruptures of just one pipeline are large—perhaps a minimum of 40,000 barrels from a 36-inch line. Magnify this by the scenario of

intentional serious efforts to damage several pipelines at one time—and this amount becomes potentially massive.

I.B.3. Actual damages from recent spills associated with rivers. Attachment 4 also describes two case studies of actual spills. (pp. 10-11.) These two case studies were used to develop a factor to increase the estimated costs according to the Attachment 4 methods by a factor of two, since both found the risk assessment method underestimated actual costs by about 50%.

a. Enbridge spill into Talmadge Creek and the Kalamazoo River in Michigan. Approximately 20,000 barrels of oil were released. The cost of that spill from a 30-inch diameter pipeline was of 2012 was $767 million.

b. ExxonMobil Pipeline company rupture under the bed of the Yellowstone River 20 miles upstream of Billings, Montana. This was caused by scour from flooding that exposed and fractured the pipeline that was trenched under the river bed. An estimated 1,509 barrels of oil were released before the pipeline was closed. Clean-up and recovery costs were $135 million. (Recent news reports indicate final costs and fines are not yet resolved.)

I.B.4. *Comparison of pipeline flow rates compared to river flows.* Attachment 1 indicates total amounts of oil/product flows in the numerous pipelines that cross these rivers. They portray possible amounts subject to the most catastrophic possible pipeline rupture event—that of an event that caused damage severe enough to rupture more than one pipeline. Some of these lines have been trenched under these rivers, in other cases they have been bored so that burial is deep and not subject to certain kinds of rupture events. Damage could conceivably occur due to river scour from unusually large flood events, or from an outside party successfully and deliberately accomplishing such a rupture.

My intent in comparing river flows to oil flows is not to imply that the worst-possible event be used in an analysis. Rather, it is to portray the magnitude of the oil/product flows in terms that the public and reviewers can understand it. Again, I am responding to normal methods of conducting risk assessments: Very high consequences deserve be paired with looking at rare events. The possible use of this information in any kind of corridor analysis or spill magnitude is subject to a number of questions being answered first. This is discussed next.

I.C. <u>Recommendations regarding pipeline rupture for analysis of impacts, corridor/route comparison, and estimates of spill magnitude based on risk assessment.</u>

I.C.1. The Sandpiper project should be analyzed with respect to potential impacts from pipeline rupture using risk assessment methods modified from those used in Attachment 1. This would:

a. Entail determining Enbridge's methods for locating such valves on the Sandpiper pipeline, and making this available for critical review, and

b. Include both estimates of spill magnitude based on ideal block valve locations and rupture scenarios, such as the "guillotine" scenario, and differential valve response times.

c. Estimate the spill magnitude (in a range of minimum spill to somewhat longer response time spills) that then should then be used to assess socio-economic and environmental impact along the existing corridor.

d. The risk assessment should take into account the larger rainfall events in recent years possibly caused by global warming, including an assessment of the possibility of increased scouring in rivers crossed by these corridors.

I.C.2. *What is the "worst case" when multiple pipelines are in close proximity to use in the risk assessment*? "A review should be undertaken with respect what should be the proper "worst-case" rupture scenario when multiple pipelines are packed close together in a corridor. This should include:

a. An assessment of whether a "worst-case" rupture on one line threatens rupture of another line, such as a large fire.

b. An assessment of whether the response to a "worst case" event on one line is slowed by the presence of other lines either on one or both sides of the ruptured line because equipment can't cross the shallowly buried other lines. This should also include a description of circumstances where all or some lines still operating need to be shut-down during the response and the practicality of doing so. (It needs to be recognized that in some locations there are "cross-overs" where one line is constructed underneath other lines because of existing facilities on one side—such as railroad tracks—prevent construction on the preferred side.)

c. Consultation with state and federal pipeline authorities as well as the authors of the Attachment 4 study as to what constitutes "worst-case" ruptures when there are multiple lines in close proximity.

d. Consultation with the ORNL authors and others regarding the vulnerability of a corridor with multiple large pipelines in close proximity to deliberate actions and how this should be addressed in socio-economic and environmental impact reviews.

I.C.3. *A process is needed whereby problems found during review of additional pipelines in any given corridor that might threaten pipeline integrity are thoroughly reviewed by government personnel*. While perhaps outside the scope of the PUC Sandpiper review, procedures should be developed whereby state agency field staff who find potential problems at significant pipeline locations could be assured that the problems are adequately responded to by government agencies rather than pipeline owners. I have personal knowledge of three such locations along these corridors, as discussed in Comment II.A below.

II. The PUC and Minnesota agencies indeed have significant jurisdiction over pipeline design issues related to oil spills and leaks and site-specific measures to prevent them.

II.A. Overview and significance of the problem. This is an important issue because a properly *designed and located* pipeline can result in the least amount of impact and be a safe way to transport petroleum products.

The central issue is that there is both federal and state jurisdiction and authority, and that it overlaps to some extent. In these comments I maintain that the PUC has clear authority to influence both pipeline *design* and location with respect to analyzing and mitigating impacts to people and the environment.

MDNR and MPCA field staff often have intimate knowledge of site specific conditions along pipeline corridors, and are trained to have such knowledge. Yet some pipeline companies, their consultants, and even some people in Minnesota government try to claim that pipeline *design* is solely the bailiwick of federal agencies and federal standards because such design pertains only to "safety standards."

On several occasions during my employment with the MDNR, and while working with other field staff, we suggested site-specific changes in design that would add more resource protection or mitigation, "pipeline safety standards" were invoked. This was strongly prevalent when DNR was trying to determine how block valve locations were selected, and why specific block valve recommendations weren't followed.

Other issues involved lack of clarity as to Minnesota Office of Pipeline Safety responsibilities regarding possible environmental damage at locations where pipe integrity was threatened. For example, during one review of the MinnCan pipeline, DNR staff (Fisheries and Ecological Resources) found a location at a proposed river crossing where a large tree had fallen into the river. This resulted in bottom scour exposing one of the older pipelines. Company officials were not interested, and indicated it was not in MDNR jurisdiction to solve this problem. A call to the State Office of Pipeline Safety only elicited a question as to whether it was brought to the attention of the pipeline company.

On another occasion during the Alberta Clipper review, an older pipeline was found to be hanging a foot or two over the surface of a designated trout stream east of Bemidji. A call to the Minnesota Office of Pipeline Safety elicited a statement that it was up to the pipeline company to correct the problem. This was likely Enbridge Line 1 because of its small size. (See attachment 2 for a description.)

The most serious problem occurred on the Alberta Clipper route on a Grant Creek crossing just west of Bemidji. I was directly involved in this site, and provided several written documentations as to what occurred. At this site, Grant Creek flows south through a narrow gap in an old railroad grade. Upstream of this gap Grant Creek flows through s a large expanse of wetland. The creek is also subject to numerous beaver dams upstream. The railroad bridge at this site had collapsed into the gap, which was also filled with segments of a five foot concrete culvert.

Immediately below the gap are 5 or 6 large pipelines, with the first being within just a few feet of the steep railroad grade. Grant Creek takes sharp turn to the east, actually following the pipeline in a parallel manner, until again turning south where it flows over the trenched pipes. I observed that bank erosion had removed 6 or 7 feet of the bank, and that this had all occurred since the previous summer. Therefore, this large pipeline was now only protected by about 5 feet of riverbank.

A large and rare rainfall event in the drainage above this site would have taken out beaver dams, and added to the flow through this narrow gap. It is likely that the first pipeline would have easily been exposed. In addition, the heavy concrete sections could have been eroded into the pipelines, threatening ruptures. Since Enbridge wanted to do something off the right of way in this location to "clean up" the site. They asked for my advice regarding permitting and repair. Since there were concrete sections available, and it looked as if there was a pipeline integrity issue present, I supplied the advice on armoring the eroding bank next to the pipeline, and moving the bank farther from the pipe. This was done by driving the 5 foot concrete sections into the stream bank, a technique I had essentially learned while employed at the DNR. I documented that this was a temporary solution

This site should be thoroughly assess at to susceptibility to scour—since it is an ideal site for down cutting caused by human activity restricting the floodplain of this river. On several other occasions, when DNR staff found exposed pipe on older—and large—pipelines in sensitive areas next to rivers, the same thing happened—staff were told it was up the pipeline company to fix the problem.

II.B. Specific PUC rules on "safety standards." The PUC rules for the route permit, in 7852.0200, Subp. 2 "Scope," has two sentences containing language pertaining to pipeline safety standards. In fact, the language is so similar as to be almost redundant:

--Second sentence: "This chapter does not set safety standards for pipelines."

--Last sentence: "The (permit) must not contravene applicable state or federal jurisdiction, rules, or regulations that govern safety standards for pipelines nor shall the permit set safety standards for the design or construction of pipelines."

I submit that the State of Minnesota has a number of clear ways it can influence Sandpiper (and any other liquid pipeline) without "setting safety standards." These are as follows:

II.B.1. Location of High Consequence Areas (HCA) is not necessarily only a "safety standard." These areas are referred to in federal safety standards for pipelines. They are areas where ". . .a release could have the most significant and adverse impact." Attachment 3 provides lots of detail concerning both human and ecologically important areas, such as "land area in which spilled liquids could affect the water supply……critically imperiled species…..areas where migratory birds congregate…..(pipelines) that pass near enough that a release could reach the area by flow over land or within a river, stream, lake, or other means, are assumed to affect (the HCA.)"

Strangely, this document doesn't mention an HCA identified by state authorities, but actually refers pipeline operators to Nature Conservancy personnel to be consulted on important areas. (A personal comment here: Might this not imply a rather over-reaching and likely unconstitutional claim of federal legal authority?)

In addition, while I was employed by the Minnesota DNR, we had a meeting with the Minnesota Office of Pipeline Safety regarding issues along the MinnCan route. The people we met with never mentioned the concept of HCAs. They were not familiar with or interested in site-specific environmental issues, in fact, and only referred to specific generic safety standards.

II.B.2. Recommendations top reduce confusion and lack of clarity among agencies with overlapping responsibilities.

a. PUC, DNR, BWSR and PCA staff consult the Minnesota Attorney General's Office to investigate the specific federal rules pertaining to HCA's to determine the ability of state authority to identify and influence the identification of both project-specific HSAs and more permanent HSAs. Examples of state-identified areas should include groundwater recharge zones, designated trout streams, canoe routes, rivers with significant fisheries or rivers leading to significant fisheries or drinking water supplies, and a number of others.

b. PUC, DNR, BWSR, and PCA should notify the federal Office of Pipeline Safety that Minnesota intends to actively propose additions to the National Pipeline Mapping System referred to in Attachment 3, based on the review of the Sandpiper proposal as well as the other Enbridge and Minnesota Pipeline company expansion plans. This should include the corridors identified in Attachment 1 as well as any other corridors and new pipelines.

c. The environmental analysis of the Sandpiper and alternatives identify HCAs along all alternative routes, including already-identified HCAs and ones identified by the public, Minnesota DNR, PCA, BWSR, federal COE during this pipeline review. The outside consultant hired by the PUC to do the analysis of impacts and the

route comparison should be charged with consulting and coordinating with Minnesota state agencies to identify these areas. The route comparisons should then include these locations in the analysis.

d. Extra care should be taken in the identification of HCAs along any corridor with multiple pipelines because of the increased magnitude of possible ruptures affecting a wider area that normal for one pipeline.

II.C. Pipeline design features that protect people and the environment are site-specific and thus need site-specific design features. It should not be necessary to have to make this point because we are many years past such knowledge based on normal and standard techniques for assessing impacts and mitigating them. Almost every environmental permit given has site-specific measure.

Large-impact projects always should have site-specific design. In fact, well-designed pipeline projects when they are finally ready to be constructed uses something often called a "line list" which identifies down to the foot what environmental mitigation measures are to be used in sensitive locations.

II. D. Support for my contention that pipeline design features such as some block valve locations are not always a "safety standards" issue. The following information clearly supports this contention:

II.D.1. Citation 8 (Attachment 4). Block valves and other related design features work to rapidly shut down and isolate pipeline segments when a sudden pressure drop indicates a pipeline rupture of enough magnitude to trigger the designated pressure drop. They can either be manual valves or remotely-operated valves.

Attachment 4 is a recent (late 2012) major study regarding improving block valve usage to reduce releases of large amounts of hazardous liquids. This was done under the auspices of an internationally known energy research institution, the Oak Ridge National Laboratory. The instigation for this study was primarily driven by the natural gas pipeline explosion in California that killed 8 people, but also seems likely that it was influenced by the large Enbridge rupture in Michigan, since it uses both as case studies. This document illustrates why features such as block valves are clearly not always a "safety standard." Here are quotes relevant to site specific pipeline design that are not "safety standards."

".. . ..site-specific parameters that influence risk analyses and feasibility evaluations often vary significantly from one pipeline segment to another and may not be consistent with those considered in this study. Consequently, the technical, operational, and economic feasibility and potential cost benefits . . . . . .need to be evaluated on a case-by-case basis." (p. 1 of Attachment 4.)

"Section 4 of the Pipeline Safety, Regulatory Certainty, and Job Creation Act of 2011 calls for the Secretary of the U.S. Department of Transportation (DOT) to require by regulation the use of automatic or remotely controlled shutoff valves, or equivalent technology, where it is economically, technically, and operationally feasible on hazardous liquid and natural gas transmission pipeline facilities constructed or entirely replaced after the final rule was issued. . . . .The Act also requires a study to discuss the ability of transmission pipeline facility operators to respond to a hazardous liquid or natural gas release from a pipeline segment located in a high consequence area (HCA)." (p. 1 of attachment 4)

"In addition, operators are required to consider installing emergency flow restricting devices such as check valves and RCVs on pipeline segments to protect a HCA in the event of a hazardous liquid pipeline release. In making this determination, an operator must, at least, consider the swiftness of leak detection and pipeline shut down capabilities and benefits expected by reducing the spill size." (p. 2 attachment 4)

II.D.2. Citation 9. This engineering study, entitled "Method determines valve automation for remote pipelines," describes methods of determining where automated block valves are to be located. The method is clearly based on site-specific design features. In addition, the following quote summarizes how block valve location is not directly based on "safety standards":

"Most pipeline codes do not stipulate requirements for block valve spacing or remote pipeline valve operations along transmission pipelines carrying low-vapor-pressure petroleum products. This requirement is generally industry driven to control hazards and reduce environmental effects of pipeline ruptures or failures causing hydrocarbon spills. . . . . This article summarizes pipeline codes for valve spacing and spill limitations in high consequence areas (HCAs). It also provides a criterion for an acceptable oil spill volume caused by pipeline leak or full rupture. The criterion is based on industry's best practice." (Introduction to the study.)

Note: This study noted at the end that the acceptable spill volume used to determine the valve spacing was about 20,000 barrels of oil. The study was done for several large pipelines in Brazil. I did not attempt to decipher the meaning of that large amount being acceptable for design of block valve location.

II.D.3. Recommendations for Sandpiper review and analysis regarding block valve locations.

a. Enbridge be required to clearly describe their method of determining block valve determinations, including identifying what HCAs they used, as well as any other factors for determining such locations, including cost factors and "minimum acceptable leaks." This information should be submitted to the MPCA, MDNR, and COE in time for them to respond appropriately, and in time for incorporation into the analysis of impacts and Comparative Route Assessment.

b. MDNR, MPCA, and/or PUC (and COE) should request information from the Office of Pipeline Safety as to whether they have provided any advice to Enbridge as to method of determining block valve locations and acceptable minimum amounts of oil at HCA locations, potential HCA locations, and other-than HCA locations, including cost-factors.

c. Minnesota state agencies and the Corps of Engineers develop a cooperative and partnership relationship regarding the potential socio-economic and environmental risks of having multiple large pipelines in close proximity to each other.

III. The PUC, other Minnesota agencies, and the US Corps of Engineers and EPA must address "corridor fatigue."

PUC pipeline rules favor following existing corridors—even when the pipelines are squeezed into environmentally and socially sensitive areas. The current rules also allow pipeline companies to use the rules to their benefit and to reduce the scope of the analysis. Clearly, this needs a legislative solution. However, there are methods that can be used in the Sandpiper review that are within the current rules that can attempt to get at the "corridor fatigue" problem. I provide some detail in these comments because of the importance of this issue. My recommendations as to how to handle this in the Sandpiper review are in III.C. below.

III.A. Background. "Corridor fatigue" is a term that has been used to talk about what happens when multiple linear facilities such as pipelines and High Voltage Power Lines reach a point where cumulative impacts,

objections from people nearby, and crowding of various sensitive areas along the edge of corridors began to be more and more apparent.

In fact, this term is inappropriate with respect to the pipeline corridors described in Attachment 1. Much more proper terms are "corridor sickness" or "corridor exhaustion."

Any resource manager with experience in environmental review of linear facilities in Minnesota (or elsewhere) knows the reasons that lead to overuse of corridors. Some of these are generic, and others are specifically relevant to the Sandpiper proposal. These are:

III.A. 1. *Original linear facility routes pre-date almost all environmental laws*. This meant the route went through high-impact locations that wouldn't otherwise be crossed under current laws and regulations. Essentially, these routes were the shortest distance between endpoints unless there were prohibitive obstacles in effect at the time of building. these original facilities were usually small pipelines. This is true of both the Enbridge Mainline corridor and the Minnesota Pipeline Corridor.

III.A.2. *Each additional facility was assessed independent of others.* Methodology to fairly assess cumulative impact of additional facilities after the second facility was usually not used. (It is often the third facility that starts to show the strain.)

III.A.3. *Large linear facilities are almost always controversial.* There was strong pressure to follow existing corridors. This then became embedded more and more strongly in either informal or formal policy, and finally made it into regulations. Unfortunately, when this was done, there was no concurrent regulation requiring an objective assessment of the pros and cons.

III.A.4. *Lack of appropriate regulations.* Policy-makers formalizing existing corridor locations as the most likely place to put new facilities didn't write corresponding policies that required a look at impacts of ever-larger corridors. Likely the best example of this I know of is the LaSalle Creek valley north of Itasca Park on the Minnesota Pipeline Corridor. This site is covered in detail below.

5. Citizens living next to corridors have little recourse to challenge expanding corridors, since the energy companies and PUC are essentially in agreement for all practical purposes. The PUC has not developed objective methodology to address this major problem. The result is that adjacent landowners are subject to the highest impact.

III. B. Known potential impacts of enlarging Minnesota Pipeline and Enbridge mainline corridors because of previous recent reviews. There are recent reviews of both of these corridors (except for the Sandpiper Green field route.) Therefore, these reviews, including comments of agencies with responsibilities for environmental protection during those reviews, are relevant to the current reviews.

II.B.1. PUC, MDNR,PCA, and COE review of the MinnCan pipeline. During the review process for the MinnCan pipeline, there were many issues raised by agencies with natural resource, wetland, and permitting authority. There was an important ALJ report prepared for this project. All of this is available in the PUC records for this project. There were also major problems identified during construction. The review of that project is recent enough so that environmental concerns raised are still relevant.

I*I.B.2. PUC, MDNR,PCA, and COE review of the Alberta Clipper/Southern Lights/LSr projects.* Even more recently, the Enbridge proposals follow its mainline corridor to Clearbrook. An alternative route to Sandpiper

follows the Mainline corridor on to Superior. Now, just 5 years later, Enbridge proposes to follow this same problematic route.

III.C. Route width for new reviews too restricted so that it exacerbates corridor fatigue. The PUC rules allow Enbridge to select the route width for their application. The rules state a route can be as narrow as the right of way required to construct the pipeline, and as wide as 1.25 miles. An examination of the Enbridge proposal indicates in many locations that Enbridge has selected a very narrow route width. It is obvious that the narrower the route width for this review along the existing Minnesota Pipeline Corridor, the more advantageous to Enbridge—because it becomes too late to adjust the right of way to avoid impacts found after finalization of the route width by the PUC.

Generally speaking, the PUC waits for others to object to this restrictive situation and propose enlargements, or other route segments or routes.

A good example concerns river and flood plain crossings. Normally, the clear standard for crossing of such environmentally sensitive features with linear facilities is perpendicular to the floodplain, and perpendicular to the river meander. In addition, as mentioned in Comment V, the MDNR does not have permit jurisdiction beyond the Ordinary High Water of the river or stream (this is the top of the bank in most cases.) The DNR has two options for influencing this—proposing a route segment change or widening, or relying on the PUC authority to require moving the centerline. Furthermore, DNR often indicates to applicants to begin preparing detailed applications for its license to cross before the environmental analysis of routes is completed.

In other areas, the 1.25 mile width is still too narrow to address the problems of pipeline corridors expanding more and more in high-impact areas.

III. D. LaSalle Creek problem area. More than any other location, this area epitomizes the landscape and regulatory issues of "corridor fatigue" and problems of following old straight-line routes. The crossing and surrounding landscape has the following characteristics:

--This location is not far north of Itasca park in a heavily forested area with steep and convoluted glacial moraine. LaSalle Creek itself is a small designated trout stream flowing in a glacial tunnel valley toward LaSalle Lake. The stream channel is deeply incised in the wetland with many meanders. Right at the crossing point, the stream and valley narrow upstream and widens out substantially downstream toward the lake. The ridges on either side of the tunnel valley are likely more than 100 feet higher than the stream.

--The existing Minnesota Pipeline Company pipelines transverse the valley at the almost the worst possible manner: a sharp oblique angle side-hilling down portions of the west hillside from the north, then side-hilling out of the valley on the east side after crossing the creek.

III.D.1. *Severe problems with the MinnCan crossing*. There were severe and numerous problems with this area. I am supplying some detail on these problems because I am proposing a re-route around this area several miles in length. The problems are as follows.

a. MDNR sent an "early-coordination" letter to the MinnCan consultant warning that this crossing was the worst site of all the locations in the Bemidji Region portion of the project. There was no response from MinnCan, and near-failure months later for MinnCan to even acknowledge such a letter. By then the PUC

process had proceeded past the point for the MDNR to effectively examine another route in this high-resource area.

b. The two old and small pipelines were closely followed with the 24-inch MinnCan line with close separation, on the order of 40 feet if I recall. The old cleared right of way was fairly narrow. This greatly expanded during construction. MDNR measured a cleared right of way over 350 feet wide on the north end of the valley. (This was necessitated by the large amount of earth moving required to construct a 50-foot wide level construction word pad.) Topsoil was generally not separated here either, so impacts are long-term.

c. MinnCan did a directionally bore deep under LaSalle Creek. It was somewhat over 3,000 feet in length and done in the winter. As they bored under the creek itself, there was a large frac-out into the creek. Drilling mud escaped from several other locations besides the creek bed, all characterized by obvious groundwater upwelling. (In spite of the very cold temperatures the ground and wetland surface was not frozen.)

Construction stopped and clean-up was complicated and protracted. Because of the lack of frost from groundwater upwelling, it was impossible to get equipment to the site so that most work need to be done by hand.

However, it was necessary to get some equipment to the site, which was a very delicate operation because of the deep, soft, water saturated organic muck at the site. There were two existing pipelines floating in this water saturated muck near the surface. These could have been threatened by heavy equipment tipping into this area. Oil/ product flow was *not* shut off during these operations taking place a few feet from the pipes.

d. A large beaver dam downstream of the crossing had backed up water right to the crossing point, and covered parts of the creek receiving drilling mud. In other words, there was thin ice over the flooded creek channel. This obscured drilling mud material and caused safety problems in minus 15 degree weather.

III.D.2. Current Enbridge plans at this site. According to maps I examined during the public meeting at Clearbrook, Enbridge is now planning a warm weather crossing of the creek itself downstream from the existing crossing out in the broader wetland that leads to LaSalle Lake. The proposed crossing location is at a more perpendicular angle to the creek itself but not perpendicular to the valley, since the centerline of the pipe makes a sharp bend after coming down into the valley from the north. After the creek crossing, the Enbridge plan is to open up a new cleared right-of-way on the east side-hill of the valley. This plan was confirmed to me by MDNR staff. Enbridge had indicated to them they would accomplish the trenched crossing in a very short time to reduce impacts. I believe this is a very bad idea for the following reasons:

a. There is wetland along very much of this centerline proposal, including as the centerline comes down the hill from the north. There are wetlands on the slopes of the west hill side caused by abundant groundwater emergence. There is deep muck in this area, as well as out in the flat valley. Trenching through this soft area will require very large amounts of construction maps which usually require firmer wetland soils than are present. Furthermore, the trying to trench in such an area will result in slumping and the necessity of removing large amounts of material.

b. I have been involved in several wetland situations with some similarities to this site—but not such as large problem area as this. None of them approach the red flags of this area. The nature of the muck soil and substrate in the other areas meant that sheet pile had to be driven in on both sides of the trench in order to remove enough material to sink a weighted pipeline. I estimate that more than 1/4 mile of wetland is

involved. Furthermore, both ends of this wetland traverse are on inclined wetland at the bottom of slopes. Attempting to excavate a temporary trench through such a location trenching could also easily open a channel so that unpredictable amounts of silt laden water—both groundwater and surface water—flows down the channel into LaSalle Creek.

c. The new right of way on the east side of the valley will also traverse groundwater emergent areas some distance before it rises far enough out of the valley to rejoin the corridor south some distance. This is also an additional impact of such a crossing.

d. I recommend that a route around LaSalle Creek and its valley be considered (see below.)

Recommendation: The route width should be expanded to the maximum 1.25 miles at every floodplain crossing that is oblique (not perpendicular to the floodplain.)

III.C. Recommendations to begin to address "corridor fatigue" concerns relative to existing corridors followed by Sandpiper.

II.C.1. *Federal EIS on Sandpiper.* The US Corps of Engineers should prepare a federal environmental impact statement for the Sandpiper project. The COE should do this for additional reasons beyond this topic, which will be contained in a separate recommendation to them.

It is clear that the PUC environmental analysis falls far short of what can be explored in an EIS. Nevertheless, Minnesota law says that the environmental analysis done by the PUC fulfils state environmental review requirements.

However, the MPCA and MDNR who are more familiar with the merits of EIS review than is the PUC, should certainly recommend to the COE that an EIS be done on this project.

III.C.2. *Incorporation by reference of the previous environmental analysis in these corridors*. I hereby incorporate by reference the PUC record of Alberta Clipper, LSr, Southern Lights and MinnCan projects into this Sandpiper review by the PUC. This should jump-start the review of "corridor fatigue" problems.

Examples of relevant documents for these four projects include: These issues and comments include:

--The ALJ report son MinnCann and the Enbridge projects
--All PCA and MDNR comments on the projects. There should be special focus on the MDNR objections to detailed and extensive comments that were ignored in ALJ findings.
--All key determinations of the US COE on all projects, and all comments on the 404 notices for the projects

III.C.3. *Any records of specific unforeseen problems and impacts that developed post-permitting on these projects.* If the records cannot be found, these topics should be addressed in the environmental analysis:

a. "Frac-outs" on the MinnCan project. Frac-out is the common term for when drilling mud escapes from the bore from directionally drilled crossings, whether they be short or deep bores. Generally, this becomes evident by mud appearing on the surface or in water bodies. There were a large number of such events on the MinnCan project. Some of which were very large. These occurred in or next to the following rivers north of the point where the Sandpiper route turns east: Clearwater River floodplain east of Bagley, Mississippi

River at the crossing north of Itasca park, LaSalle Creek floodplain and creek bottom north of Itasca Park, and the Straight river just south of Park rapids. There were other frac-outs south of Park Rapids beyond the point where Sandpiper turns east on a Greenfield route.

Frac-outs occurred during winter bores, which greatly increased the difficulty with addressing them for several reasons. Determining amount and location of material was obstructed by ice. Recovery of material was difficult due to ice. Finally, ice conditions on flowing water was a hazard to workers attempting to recover material.

All records of frac-outs that occurred on MinnCan should be carefully examined as to amounts and locations. This may help to determine if there is a pattern as to when they occur. In each of the four rivers mentioned above, landscape conditions were such that groundwater upwelling zones were either present or suspected at the site of the frac-out. If this is correct, such landscape conditions that are present in other locations are a red flag for bores in the future.

Drilling mud is primarily bentonite clay but contains additives at the discretion of the pipeline company. Additives are a two edged sword: they can increase the success of the bore and reduce frac-outs, but some additives can be toxic to aquatic life. Furthermore, MinnCan initially claimed trade secret status on the first frac-out at the Clearwater river, which became a big obstacle to resolution. Therefore, PUC should require specific listing of any constituents of drilling mud before. Some of the frac-outs were in locations subject to direct DNR permit authority, but others were outside of the OHW so were not. PUC should make it a condition of the Route permit that frac-outs be handled in essentially the same manner wherever they occur, after recommendations from the DNR and MPCA.

b. *Winter construction successes and problems on MinnCan and Alberta Clipper.* Topsoil separation is important in all areas of deep excavation, including over the trench as well as side-cuts done to prepare the 50-foot level work pad. Poor separation leads to more successful invasive species invasion, and lost productivity. Frozen ground made topsoil separation problematic. In addition, winter construction made it erosion control more difficult and led to substantially higher erosion problems during spring runoff in certain locations.

IV. PUC and Hearing Officer must address concerns of the MDNR regarding natural resources not directly subject to MDNR and MPCA permits.

Environmental impact assessment includes—by law as well as best practice—consideration of impacts not necessarily covered by permits. As noted in a letter to the ALJ on the Alberta Clipper and Southern Lights project, the MDNR said it only had direct jurisdiction on less than 0.5 percent of the route. (April 21, 2008 letter to AlJ Judge Eric Lippman, from Matt Langan, MDNR). This jurisdiction involved public land crossings and river crossings restricted to the OHW (generally the top of the riverbank.)

Subsequently, the MDNR made extensive factually supported comments regarding natural resources in their areas of expertise. Serious problems with Enbridge's data, lack of supporting information, and assessment of impacts were noted. Some of these were glaring errors, such as obvious underestimation of area of impact. The ALJ report finalized its report without discussing the merits of the DNR comments, and did not address any of them in numerous findings on the route permit conditions. At the same time, it praised Enbridge's approach. A "reasonable person" perhaps would find it troubling that an ALJ, who lacks natural resource expertise, would replace the expertise of an important state agency charged by Minnesota law with protecting its natural resources, with that of an energy company with obvious motivations for downplaying

impacts to such resources. The lack of attention to the MDNR comments is documented in three subsequent letters to the PUC staff after the ALJ report was finalized (April 25, 2008 letter to Larry Hartman from Matt Langan, MDNR; August 1, 2008 letter to Bill Haar, PUC Executive Director from Matt Langan, and November 13, 2008 letter to Larry Hartman from Matt Langan, MNDR.

Recommendation. The PUC should ensure that this does not happen again, and ensure that the ALJ for this project is charged with specifically making findings regarding potential environmental impacts found to be of concern by state agencies such as the PCA and MDNR.

V. PUC and ALJ must use accepted impact analysis methods and its own rules to proactively address the Sandpiper project and future even though its environmental report substitutes for an EIS or EA according to law and stature.

V.A. Pipeline rules available to the PUC to improve its responsibility, process ,and results. Many of the pipeline route permit rules appear on their face to restrict and narrow the environmental analysis as compared to that done under EIS rules and ;procedures for other large facilities. However, a reading of the rules indicates that the PUC has lots more authority than it used on the Alberta Clipper projects. All of the following rules allow the PUC to address **all** of the topics I have raised in these comments:

V.A.1. Rule "7852.3200, Subpart1: "When the commission issues a pipeline routing permit for the construction of a pipeline and associated facilities, the commission shall designate a route…..conditions for right of way preparation, construction, cleanup, and restoration. . . . **and any other conditions relevant to minimizing environmental and human impact.**" (emphasis added.)

Note: The PUC could have chosen to fully address the MDNR comments that were not addressed on Alberta Clipper using the highlighted language. It now needs to respond to comments by other state agencies on the Sandpiper project and use this clause.

V.A. 2. Rule "7852.0200 Authority, scope, purpose, and objectives

"Subp. 3. Purpose. Minnesota Statutes, section 216G.02, recognizes that pipeline location and restoration of the affected area after construction is important to citizens and their welfare **and that the presence or location of a pipeline may have a significant impact on humans and the environment**. To properly assess and determine the location of a pipeline**, it is necessary to understand the impact that a proposed pipeline project will have on the environment**. .. .. The purpose of this chapter is to aid in the selection of a pipeline route and **to aid in the understanding of its impacts and how those impacts may be reduced or mitigated through the preparation and review of information contained in pipeline routing permit applications and environmental review documents**.

Note: The PUC can use this clause to address pipeline rupture risk, corridor fatigue, and so forth.

"Subp. 4. Objectives. The process created by this chapter is designed to:
A. locate proposed pipelines in an orderly manner that minimizes adverse human and environmental impact;
B. provide information **to the project proposer, governmental decision makers, and the public** concerning the primary human and environmental effects of a proposed pipeline project**;**

*Note: Note that this clause contains the phrase "**to** the project proposer. . . .decision makers, and the public" concerning the human and environmental effects of the project. On the Alberta Clipper project, the PUC, and ALJ passively turned this phrase entirely on its head and accepted the Enbridge analysis of many issues rather than accept expert analysis from responsible state agencies. This must not happen on the Sandpiper project. The PUC should insist on its role of providing objective information **to** other parties. It should do so on the main topics of these comments.*

V.A. 3. "7852.1400 Route proposal acceptance.

> Subp. 2. Sources of route proposals. **The Public Utilities Commission staff and the citizen advisory committee may propose routes or route segments directly to the commission**.

Note: The PUC can use this clause to address corridor fatigue and to attempt to obtain objective comparisons of alter=natives to problem locations.

V.A. 4. "7852.1900 Criteria for pipeline route selection.

> "I. cumulative potential effects of related or anticipated future pipeline construction; . . ."

Note: The PUC can clearly address the issues of "corridor fatigue" by using this clause.

<u>V.B. PUC can use standard impact assessment methods</u> The statute governing pipelines indicates that the PUC Environmental report meets the requirements of an EIS or EA. However, this does not mean that methods of analysis of impacts do not need to reflect standard methods used in EISs.

The request to the public to propose methods of analysis in the PUC public notice actually is strange. There are effective methods for analyzing impacts to humans and the environment and methods for comparing routes for linear facilities. These methods have been in effective use for many years. All one needs to do is find an EIS that has done so effectively.

<u>V.C. PUC staff needs to acknowledge the limitations of the pipeline environmental analysis .</u> I was present at the Sandpiper public meeting Clearbrook some weeks ago. A citizen asked how the PUC environmental analysis compared to an EIS. The PUC lead person said it was essentially the same. I was taken aback, as were some others that were present. I was later informed that this same statement was made at the Park Rapids meeting. This is highly concerning since the citizen was misled. It also is concerning because it implies PUC staff is unaware of important and routine methods of analyzing impacts and alternatives in EISs on linear facilities. Such methods are an answer to the question in the Sandpiper public notice of "topics open to public discussion. . . .Are there specific methods to address these impacts. . . .?".

Here are some reasons how the PUC environmental report very much differs from an EIS:

--PUC rules on pipelines allow the project proposer to so narrowly define the project that there is a large burden to overcome to define alternatives and even to analyze impacts. Pipeline rules favor existing corridors without a specific requirement to objectively analyze impacts of concentrating facilities in environmentally inappropriate areas. This would be impossible under an EIS.

--The PUC environmental report is finalized in-house. There is no opportunity to comment on a public review draft report. On draft EISs, the preparer is bound by law and rule to address reasonable comments

supported by sound data. No such process exists for pipelines under PUC rules. With the case of Alberta Clipper, the ALJ report would have been found deeply flawed if it had been subject to the standards for responding to comments that are found in the EIS process.

--Finally, compare the PUC process for siting HVTL lines: it uses routine methods of comparing routes and alternatives that are answers to the question posed as to how

VI. Proposed alternative routes and route enlargements

The PUC public notice solicits suggestions for alternative routes or route segments. In addition, Larry Hartman, the PUC person leading the Clearbrook public meeting, received a number of questions as to the burdensome format that appeared to be required for such proposals to be successful. He indicated alternatives would be considered that left out factors apparently required by the rules, and that a simple hand-drawn line on a map would be sufficient.

Therefore, the following recommendations for analyzing additional routes are provided:

VI. A. Widen Sandpiper route width wherever it is less than 1.25 miles in width. Enbridge has in many locations along its route narrowed the route nearly its minimum required by the PUC rule. This greatly reduces the scope of analysis of impacts very early in the siting process. This very much reduces the flexibility of moving the centerline to reduce impacts as problems are discovered during site reviews. This problem was severe during the Alberta Clipper review. Therefore, the route width should be expanded to the maximum allowable along the entire proposed route, as well as any new routes or route segments accepted for study. This is 1.25 miles in width. This will more appropriately meet the PUC requirements to adequately study environmental impacts. This is especially important at all crossings of rivers and other sensitive locations.

V.B. Route segment following Enbridge's North Dakota Pipeline corridor to Clearbrook. Enbridge's web site indicates that the existing pipeline has the capacity carry 475,000 bpd, yet Citation #2 says it is carrying 210,000 bpd at this time. If this is correct, there is excess capacity in the North Dakota line so as to allow it to carry the 225,000 bpd of the Sandpiper line. Therefore, there is a question as to whether another line is needed at this time for this route segment.

This route is clearly indicated on Enbridge's application.

V.C. Enbridge Mainline Corridor, Clearbrook to Superior. This route should be studied as an alternative to Enbridge's preferred route. The study corridor should be widened to the maximum 1.25 miles. This route is clearly indicated on the Alberta Clipper PUC files, which are incorporated into this PUC record by reference.

V.D. Any route alternatives studied for the Alberta Clipper project. There were a number of alternatives studied for the Alberta Clipper project. These routes are clearly identified on maps in the PUC record of that project. These include HVTL corridors and gas pipeline corridors. They should be re-studied for the Sandpiper project.

V.E. LaSalle Creek alternative. An alternative which avoids the major problems of crossing LaSalle Creek and its valley at an angle needs to be studied. Adding two large diameter pipelines to this area—Sandpiper and the Line 3 replacement/upgrade—is extremely likely to have large off-right-of-way impacts to groundwater, Big LaSalle Lake, and LaSalle Creek. In addition, given the sub-surface conditions, it will be very hard to

predict site-specific technical engineering plans for how to construct and maintain pipelines in this area. This could lead to massive problems and impact area growth during construction. This area could well become a case study of where not to build large pipelines.

A route avoiding this feature also crosses other areas with natural resource value, other private and public lands, and opens a new corridor. However, such an alternative for study must be accomplished because of escalating consequences of adding two more pipelines. I do not have an ability to submit a map today of my proposal, since I have to submit comments electronically in order to meet today's comment deadline. I can submit this by mail later. However, based on PUC statements made at the Clearbrook public meeting, this is sufficient as long as I describe the alternative in enough detail to identify it.

Here is a verbal description of the route: It is a 1.25 mile wide route deviating from the existing corridor in section 11 of Itasca Township in Clearwater County, then goes southwest to turn south along the east side of Clearwater County 2. It then turns SE to follow the north side of state highway 92, roughly paralleling it with the south edge of the route along this highway. It then turns east to rejoin the corridor in Section 32 of Lake Hattie township in Hubbard County.

On a final note, I believe it is within the PUCs ability to widen the "route" to more than 1.25 miles in this area.

V.D. Enbridge Line #3 enlargement/replacement. PUC needs to formally include the potential routes for this project that is clearly now in the planning stage. In addition, PUC should begin entering into studies for this project to analyze the alternative of following the corridors for the Great Northern Transmission line, now under review, since this line comes from Canada, and is potentially a route to Superior.

V. Significant impacts not otherwise indicated in these comments.

Here is a list of potential important impacts that need be addressed in the review of all route proposals, initially in a generic manner, and then as the focus is on site specific areas:

1. Analyze the advantages of topsoil separation in all areas where excavation into subsoil and parent material would otherwise result in mixing of parent material with top soil. It has been clearly demonstrated that creation of such disturbed areas leads to greater success for invasive species such as spotted knapweed and other noxious weeds. This also results in lowered productivity on not only farmland, but forest land, and reduced habitat value. In addition, it is becoming standard practice for responsible pipeline companies to accomplish this.

2. Requiring accurate depiction of any areas where excavation into parent material and subsoil occurs. Such excavation is routine in non-flat terrain in order to obtain the necessary 50-foot wide work pad for construction.

3. Detailed analysis of the product shipped in order to explore the environmental and human impacts of pipeline rupture.

4. Detailed analysis of the content of drilling muds to be used, and requirements for immediate notice to appropriate agencies when frac-outs occur during bores. Route permits should require agency review of any new additives considered during construction.

5. Careful analysis of the pros and cons of winter construction vs warm season construction. Such an analysis should be entirely independent of Enbridge desires to construct on their timetable, or for solely cost reduction reasons.

6. Careful analysis of the need for deep ripping of the work pad in areas of high clay soils. Operation of very heavy equipment along the work pad—which is essentially a road during construction—can create compaction layers in clayey soils that persist for as long as a projected 200 years.

7. Careful analysis and critique of proposed extra work space areas in sensitive locations such as stream crossings. Such areas sometimes are based solely on engineering requirements rather than given a careful review to reduce environmental impacts.

8. Careful review of the project's off-right of way affected area, and a PUC requirement that Enbridge submit all such areas to agencies for review.

9. An analysis of the damages caused by encroachment on the right of way from ATVs and other off-road highway vehicles. This has been observed to be intense in some areas, according to DNR comment letters. The MDNR has no jurisdiction to respond to this use which can cause stream bank erosion, siltation, and so forth.

V. Cumulative Impacts.

As noted in the above comments, the PUC rules require that the Commission **shall** consider "cumulative potential impacts of related or anticipated future pipeline construction. . . ."

Enbridge recently announced it is planning to "replace" in the near future its Line 3 pipeline that is in now within the mainline corridor from Canada to Superior. The announcements also note that operation of the old Line 3 will continue until the new line—upgraded to 36 inches—is completed. Therefore the new line will not be in the same location as the old line. Enbridge has indicated in the announcements that it is considering both the Mainline Corridor to Superior and its preferred Sandpiper route. Therefore, the PUC needs to conduct the following analysis:

--Cumulative impacts of adding two large pipelines in these routes, including the existing corridors and the new Greenfield route east of Park Rapids, and on any alternatives to the Sandpiper project accepted for study.

--PUC needs to inform state agencies that are currently in the early stages of reviewing applications for Sandpiper, (such as the DNR and PCA) that PUC is conducting a cumulative effects analysis on these two pipelines that may result in changes in locations. This should be done under the PUC rule cited above concerning responsibilities of the PUC to provide information **to** other stakeholders and the public.

List of attachments

1. Attachment 1. Estimates of oil/product flows in proposed and alternative corridors
2. Attachment 2. Enbridge schematic of its pipeline systems
3. Attachment 3. Web page from the US Department of transportation describing HCA areas
4. Attachment 4. Verbatim excerpts from an ORNL risk assessment appropriate for the Sandpiper project

CITATIONS

#1. Enbridge. 2013. "Enbridge Pipeline System Configuration." Quarter 1, 2013. Color chart showing entire Enbridge system in the United States and Canada, including data on individual lines, pipeline size, product type, and pipeline capacities (based on annual capacities). Available from one of the Enbridge web sites, and downloaded March 2014.

#2. Minnesota House of Representatives, House research. June 2013. Bob Eleff, Legislative Analyst. "Minnesota's Petroleum Infrastructure: :Pipelines, Refineries, Terminals.

#3. Thompson/Reuters News Service. March 31, 2014. "Enbridge to expand Southern Lights Pipeline as demand rises." Reuters Business and Financial News.

#4. Reuters News Services. March 4, 2014. "Update 2—Enbridge to spend C$7 billion (Canadian) to replace pipeline to US." Reuters Business and Financial News. (Concerns Line #3) Also, at the same time, Enbridge web sites indicate this 34 inch line will be upgraded to 36 inches from 34, and the old line won't be decommissioned until the new line is in service.

#5. Forum News Services. March 5, 2014. John Myers. "Another Enbridge proposal would replace line from Canada to Wisconsin." Concerns Enbridge Line 3 upgrade as in #4, but this article quotes an Enbridge spokesperson that both the Sandpiper Route/Corridor and the Enbridge Mainline Corridor along US 2 are being looked at as possible locations.

$6. Federal Reserve Bank of Minneapolis. May 1, 2007. Kathy Cobb. "This nation's rapacious appetite for oil products and Canada's vast supply spur district pipeline projects." Newsletter. This article notes that MinnCan can be increased by 185,000 bpd to increase the Mn Pipeline Corridor to 640,000 bpd.

$7. Minnesota Public Utility Commission (PUC) public notice on Sandpiper, January 31, 2014.

#8. Oak Ridge National Laboratory 2012. "Studies for the Requirements of Automatic and Remotely Controlled Shutoff Valves on Hazardous Liquids and Natural Gas Pipelines with Respect to Public and Environmental Safety" Date Published: October 2012. Revised: December 2012. For U.S. Department of Transportation Pipeline and Hazardous Materials Safety Administration Pipeline Safety Program | East Building 2nd Floor 1200 New Jersey Avenue, S.E. Washington, DC 20590

#9. Online Oil and Gas Journal. January 17 2005. (Printed from site 3/29/2014.) "Method determines valve automation for remote pipelines."

Attachment 1

ESTIMATES OF EXISTING AND PROPOSED PIPELINE FLOWS RELATED TO PROPOSED SANDPIPER CORRIDORS AND TRANSLATED TO SELECTED RIVER FLOWS

Note: Pipeline capacities are given in barrels per day (bpd). Product flow rates are converted to cubic feet per second (cfs) in order to compare to typical river flows along the routes. Rates are calculated based on 42 gallons/barrel. A useful rule of thumb is that 100,000 bpd converts to 6.5 cfs. Product type is variable, and some information about types is given in Attachment 2.

A. Enbridge Pipelines from Minnesota border east to Clearbrook

Note: *All lines are in one corridor except for North Dakota Pipeline which joins the "Mainline Corridor" at Clearbrook which then goes on to Superior roughly along US Highway #2.; Enbridge refers to the main corridor as "Enbridge Mainline Corridor.*

A. 1. Existing Enbridge Pipelines

Note: All product flow is to the East-southeast except for the diluent line, which takes product from Illinois refineries back to Alberta for "thinning" heavy crude so it can be pumped in pipelines. Product types are listed by Enbridge in Attachment 2.

Pipeline name	Barrels per Day Amount	Flow rate cfs	Source	Pipe diameter	Citation
Line 1	236,500	15.4	Alberta	18/20 inches	#1
Line 2b	442,200	28.7	Alberta	24/26 inches	#1
Line 3	390,000	25.4	Alberta	34 inches	#1
Line 4	795,700	51.7	Alberta	36/48 inches	#1
Line 67 (Alberta Clipper)	450,000	29.2	Alberta	36 inches	#1
Line 65 (LSr)	186,000	12.1	North Dakota	20 inches	#1,#2
North Dakota Pipeline	210,000	13.6	North Dakota	?	#1, #2
Southern Lights Diluent	180,000	11.7	US refineries	20 inches	#2, #3
Totals	2,890,400 bpd	188 cfs			

A.2. Expansion proposals by Enbridge, Minnesota border east to Clearbrook

Expansions:	bpd amount	cfs		Pipe Diameter	Citation
Line 3 increase**:**	370,000	24.0	(total 760,000)	34 inches to 36	#4
Line 67 increase:	350,000	22.8	(total 800,000)	Pumps added	#2
Southern Lights increase:	95,000	6.2	(total 275,000)	Pumps added	#3
New line					
Sandpiper	225,000	14.6		24 inches	#7
Subtotal (new + expand)	1,040,000	67.6			
Grand total, existing and expanded	3,930,400	255 cfs			

B. Enbridge Pipelines from Clearbrook east to Superior

Note: There is a major facility at Clearbrook whereby some product is routed south to the Twin Cities on 3 pipelines owned by the Minnesota Pipeline Company—a different company from Enbridge. One of these, the MinnCan line, was recently constructed. (There are "loops" at a few locations, so that there may be 4 lines in place in the corridor at those locations.) According to Citation #2, currently this amount is 455,000 bpd. It is difficult to determine exact amounts in the two older lines, but it is not necessary for this level of analysis.

B.1. Existing Enbridge pipelines from Clearbrook to Superior

Note: For purposes of this analysis, it is sufficient to calculate a total of existing product flows from Clearbrook to Superior by subtracting the amount diverted south at Clearbrook from the total amount entering the Clearbrook terminal:

Total entering Clearbrook terminal: 2,890,400 bpd
Amount routed south: - 455,000 bpd
Total existing flows to Superior: 2,435,400 bpd or 158 cfs

B.2. **Expansion proposals by Enbridge, Clearbrook to Superior**
Note: An alternative route for the new proposed Sandpiper project is along this Enbridge mainline corridor. It is not listed here, but if it did follow this corridor, it would increase flows by 225,000 bpd, or 14.6 cfs. Also, the Line 3 replacement/expansion could follow the southern route, but is included here. If Line 3 would instead go south of Clearbrook, the amounts listed here should be decreased by 760,000 bpd or 49.4 cfs.

Pipeline name	bpd Amount	cfs		Pipe diameter	Citation
Line 3 increase:	370,000	24.0	(total 760,000)	34 inches to 36	#4
Line 67 increase:	350,000	22.8	(total 800,000)	Pumps added	#2
Southern Lights increase:	95,000	6.2	(total 275,000)	Pumps added	#3
Total increase:	815,000	53.0 cfs			
Grand total, existing + increases	3,250,400 bpd	211.2 cfs			

C. Pipelines routed south from Clearbrook
Note: New Enbridge proposals are to follow the existing Minnesota Pipeline Company corridor to near Park Rapids, and then create a new corridor east to Superior, Wisconsin,

C. 1. Existing Pipelines to Twin Cities, Minnesota Pipeline Company (owned by Koch Industries)

Pipeline name	Amount	cfs	Source	Pipe diameter	Citation
MinnCan	165,000	10.7	Canada	24	#2
Two older pipelines	290,000	16.9	ND, Canada?	?	#2
Total, Minnesota Pipeline:	455,000	29.6			

C.2 Expanded capacity of Minnesota Pipeline Company

Total	640,000	41.6	Adding pumps?	#2

D. New Enbridge Pipelines potentially routed to existing corridor south from Clearbrook, then east from Park Rapids to Superior on new corridor

Note: Enbridge recently announced it is planning to "replace" and expand its older Line #3 in its mainline corridor across northern Minnesota to Superior, WI. It says it is also looking at instead going south from Clearbrook, then east from Park Rapids to follow the proposed Sandpiper route. Therefore, Line #3 is listed here in order to portray amounts of product potentially flowing in these corridors.

Pipeline name	bpd Amount	cfs	Source	Pipe diameter	Citation
Sandpiper	375,000	24.4	Alberta	30	#7
Line 3 expansion	760,000	49.4	Alberta	36	#4, #5

Total expansion: 1,135,000bpd 73.8cfs

E. Total potential Enbridge and Minnesota Pipeline company from Clearbrook to Park Rapids

Pipeline Company	bpd Amount	cfs	Source	Citation
Minnesota Pipeline Co.	640,000	41.6	North Dakota, Canada	#2
Enbridge	1,135,000	73.8	Canada	#2, #5

Total in corridor: 1,775,000 115.4

F. SUMMARY OF EXISTING AND PROPOSED OIL/PRODUCT FLOWS IN EXISTING PIPELINE CORRIDORS AS COMPARED TO SELECTED RIVER FLOWS

Company	Existing	cfs	Existing+Proposed	cfs
1. Enbridge N.D. Pipeline to Clearbrook	210,000	13.6	no increase	13.6
2. Enbridge mainline to Clearbrook	2,680,400	174.2	3,720,400	242 cfs
3. Enbridge Clearbrook to Superior	2,435,400	158.0	3,930,400	255 cfs
(Existing and proposed column includes Sandpiper and #3 expansion)				
4. Enbridge and MinnPipe Co. Clearbrook To south of Park Rapids	455,000	29.6	1,775,000	115.4
5. Enbridge, Park Rapids to Superior	No corridor	000	1,135,000	73.8

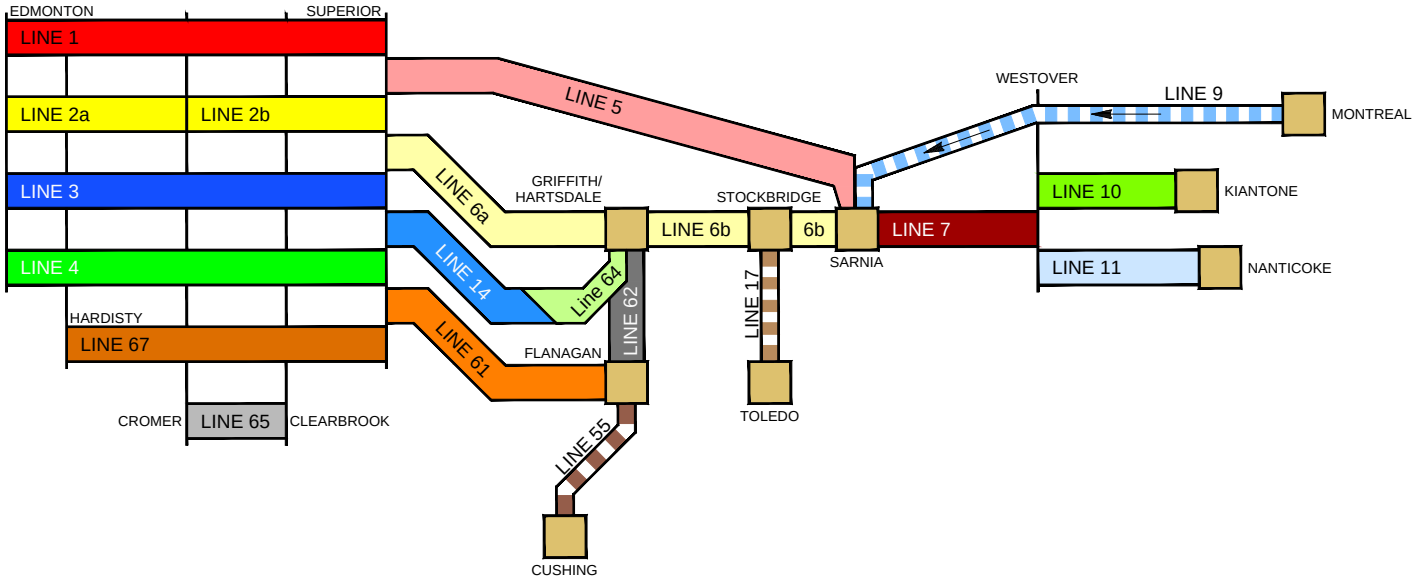
River name and location	Long-term median river flows (cfs) on this date from USGS Gauges, April 2, 2014	Approximate % of maximum oil flow to river flow
Snake river above Warren	124	195 percent
Clearwater river at Plummer	172	141 percent
Mississippi river at Bemidji	334	76 percent
Straight River south of Park Rapids	69	167 percent
Mississippi River at Grand Rapids	716	36 percent
Mississippi River at Aitkin	2,859	2.6 percent*
Prairie River at Taconite	125	204 percent
St. Louis River at Scanlon	1,850	14 percent

*New Enbridge corridor from Park Rapids to Superior crosses in this vicinity; all else are Enbridge mainline

Pipeline System Configuration

Docket No. 20152-106460-06

Quarter 1, 2013



Line 1

37,600 m^3/d (236.5 kbpd)
18"/20" - 1098 miles
NGL
Refined Products
Light Synthetics

Line 2

Line 2a
70,300 m^3/d (442.2 kbpd)
24" - 596 miles
Line 2b
70,300 m^3/d (442.2 kbpd)
24"/26" - 502 miles
Condensates
Light Synthetics
Sweet
Light & High Sour

Line 3

62,000 m^3/d (390.0 kbpd)
34" - 1098 miles
Condensates (Edmonton to Hardisty)
Light Synthetics
Sweet
Light & High Sour

Line 4

126,500 m^3/d (795.7 kbpd)
36"/48" - 1098 miles
Heavy
Medium (Ex-Clearbrook)
Light Sour (Ex-Clearbrook)

Line 5

78,100 m^3/d (491.2 kbpd)
30" - 645 miles
NGL
Light Synthetics
Sweet
Light & High Sour

Line 6

Line 6a
106,000 m^3/d (666.7 kbpd)
34" - 467 miles
Line 6b
45,000 m^3/d (283.0 kbpd)
30" - 293 miles
Light Synthetics (Superior to Lockport)
Sweet (Superior to Lockport)
Light & High Sour
Medium
Heavy

Line 7

23,900 m^3/d (150.3 kbpd)
20" - 120 miles
Light Synthetics
Sweet
Light & High Sour
Medium
Heavy

Line 65

29,500 m^3/d (185.6 kbpd)
20" - 313 miles
Light Sour
Medium

Line 10

11,800 m^3/d (74.2 kbpd)
12"/20" - 91 miles
Light Synthetics
Sweet
Light & High Sour
Medium
Heavy

Line 11

18,600 m^3/d (117.0 kbpd)
16"/20" - 47 miles
Condensates
Light Synthetics
Sweet
Light & High Sour
Medium
Heavy

Line 62

20,700 m^3/d (130.2 kbpd)
22" - 75 miles
Heavy

L 14 / L 64

50,500 m^3/d (317.6 kbpd)
24" - 467 miles
Light Synthetics
Sweet
Light & High Sour
Medium

Line 61

63,600 m^3/d (400.0 kbpd)
42" - 454 miles
Light Synthetics
Sweet
Light & High Sour
Medium
Heavy

Line 67

71,500 m^3/d (449.7 kbpd)
36" - 999 miles
Heavy

Not Part of the Enbridge Mainline System

Line 9

38,200 m^3/d (240.3 kbpd)
30" - 524 miles
Condensates
Sweet
Medium
Light & High Sour

Line 17

16,000 m^3/d (100.6 kbpd)
16" - 88 miles
Heavy

Line 55

30,700 m^3/d (193.3 kbpd)
22"/24" - 575 miles
Light Synthetics
Sweet
Light & High Sour
Medium
Heavy

NOTES:

Capacities provided are Annual Capacities and do not include current restrictions.

Updated: January 2013
File: 2013_Q1 System Config.dwg

Revised by: YZ
Drawn by: DRD

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contained within each circle.

- Potential impact circles that contain 20 or more structures intended for human occupancy;, buildings housing populations of limited mobility; buildings that would be hard to evacuate (e.g., nursing homes, schools); or buildings and outside areas occupied by more than 20 persons on a specified minimum number of days each year, are defined as HCA's.

How do operators of pipelines know where HCA's are located?

- High population areas and other populated areas are identified using maps and data from the U.S. Census bureau.
- Critical drinking water sources and unusually sensitive ecological areas are identified using information from National Heritage Programs and Conservation Data Centers in each state, in conjunction with The Nature Conservancy.
- Because of the complexity of HCAs for Hazardous Liquid Pipelines, the Office of Pipeline Safety identifies and maps HCAs for Hazardous Liquids on its National Pipeline Mapping System (NPMS). These maps are revised periodically by OPS based on new and updated information.
- Operators of natural gas transmission pipelines must use a specified equation to calculate the radius of "potential impact circles" along their pipeline and compare the structures in those circles to the HCA criteria in the rule.

How do operators determine what pipeline segments require extra integrity protection due to the presence of HCAs?

- Pipeline operators must determine which segments of their pipeline could affect HCAs in the event of a release. This determination must be made assuming that a release can occur at any point, even though the likelihood of a release at any given point is very small.
- Hazardous liquid pipelines that pass through an HCA, or that pass near enough that a release could reach the area by flow over land or within a river, stream, lake, or other means, are assumed to have the potential to affect that area.
- Gas transmission pipelines that pass within any of the HCA potential impact circles are assumed to have the potential to affect that area. (Or, alternatively, operators may choose to treat all of their pipeline segments in Class 3 and 4 areas as HCAs.)

Date of Revision: 12012011

ATTACHMENT 4
VERBATIM EXCERPTS FROM THE FOLLOWING PIPELINE RISK ASSESSMENT OF SHUTOFF VALVES, INCLUDING ESTIMATES OF AMOUNTS OF RELEASES OF OIL AND OTHER PRODUCT FROM RUPTURES

Oak Ridge National Laboratory 2012. "Studies for the Requirements of Automatic and Remotely Controlled Shutoff Valves on Hazardous Liquids and Natural Gas Pipelines with Respect to Public and Environmental Safety" Date Published: October 2012. Revised: December 2012. For U.S. Department of Transportation Pipeline and Hazardous Materials Safety Administration Pipeline Safety Program | East Building 2nd Floor 1200 New Jersey Avenue, S.E. Washington, DC 20590

ABSTRACT

Author's note: This 340 page study primarily concerns worst-case pipeline ruptures in populated areas, and was stimulated by a large California rupture of a gas pipeline in a urban area in California that killed 8 people. However, it also considers oil pipelines that do not catch fire, and those in High Consequence Areas (HCAs) that are also in or near ecologically significant areas. Therefore, it is highly relevant to certain the necessary route evaluation and environmental impact evaluation of the Sandpiper proposal. The underlined portions are indicate relevancy to Sandpiper, and in each case are the author's emphasis when they appear in the text.Page numbers at the bottom of the pages are excerpt page numbers rather than as in the original text.

This study assesses the effectiveness of block valve closure swiftness in mitigating the consequences of natural gas and hazardous liquid pipeline releases on public and environmental safety. It also evaluates the technical, operational, and economic feasibility and potential cost benefits of installing automatic shutoff valves (ASVs) and remote control valves (RCVs) in newly constructed and fully replaced transmission lines. Risk analyses of hypothetical pipeline release scenarios are used as the basis for assessing: . . . . and (3) socioeconomic and environmental damage in HCAs caused by hazardous liquid pipeline releases of crude oil. . . . . .However, these results may not apply to all newly constructed and fully replaced pipelines because site-specific parameters that influence risk analyses and feasibility evaluations often vary significantly from one pipeline segment to another and may not be consistent with those considered in this study. Consequently, the technical, operational, and economic feasibility and potential cost benefits . . . . . .need to be evaluated on a case-by-case basis. In theory, installing ASVs and RCVs in pipelines can be an effective strategy for mitigating potential consequences of unintended releases because decreasing the total volume of the release reduces overall impacts on the public and to the environment. However, block valve closure has no effect on preventing pipeline failure or stopping the product that remains inside the isolated pipeline segments from escaping into the environment. The benefits in terms of cost avoidance attributed to block valve closure swiftness increase as the time required to isolate the damaged transmission pipeline segment decreases. Block valve closure swiftness is most effective in mitigating damage resulting from a pipeline release. . . . .. Similarly, the avoided cost of socioeconomic and environmental damage for hazardous liquid pipeline releases without ignition increase as time required to isolate the damaged pipeline segment decreases.. . . .

The scope of the study is further limited by considering only worst case pipeline release scenarios in HCAs involving guillotine-type breaks rather than other more common breaks, such as punctures and through-wall cracks. Although ignition of the released product following a rupture is not ensured, this study only models release scenarios that result in immediate ignition of the released product at the break location. The study also assesses potential socioeconomic and environmental effects of unintended crude oil releases without ignition from hazardous liquid pipelines in HCAs.

EXECUTIVE SUMMARY

The U.S. Department of Transportation's Pipeline and Hazardous Materials Safety Administration (PHMSA) is the Federal safety authority responsible for ensuring safety in the design, construction, operation and maintenance, and spill response planning for the 2.3 million (M) miles of natural gas and hazardous liquid transportation pipelines in the United States. Its mission is to protect people and the environment from the risks inherent in transportation of hazardous materials by pipeline and other modes of transportation. . . . Section 4 of the Pipeline Safety, Regulatory Certainty, and Job Creation Act of 2011 calls for the Secretary of the U.S. Department of Transportation (DOT) to require by regulation the use of automatic or remotely controlled shutoff valves, or equivalent technology, where it is economically, technically, and operationally feasible on hazardous liquid and natural gas transmission pipeline facilities constructed or entirely replaced after the final rule was issued.. . . .The Act also requires a study to discuss the ability of transmission pipeline facility operators to respond to a hazardous liquid or natural gas release from a pipeline segment located in a high consequence area (HCA). . . . . .

(This) study assesses the effectiveness of block valve closure swiftness in mitigating the consequences of natural gas and hazardous liquid pipeline releases on public and environmental safety. . . . . .It also evaluates the technical, operational, and economic feasibility and potential cost benefits of installing ASVs and RCVs in newly constructed and fully replaced pipelines. The results of this study apply to natural gas and hazardous liquid transmission lines. . . . .

Potential effects of unintended releases from natural gas and hazardous liquid pipelines on public and environmental safety are categorized as personal injuries and fatalities, property damage, and environmental impacts.

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Hazardous liquid pipeline operators are required to install block valves at prescribed locations to facilitate isolation of pump stations, breakout storage tanks, and lateral takeoffs and other points along the pipeline near designated bodies of water and populated areas to minimize damage and pollution from an accidental hazardous liquid discharge. In addition, operators are required to consider installing emergency flow restricting devices such as check valves and RCVs on pipeline segments to protect a HCA in the event of a hazardous liquid pipeline release. In making this determination, an operator must, at least, consider the swiftness of leak detection and pipeline shut down capabilities and benefits expected by reducing the spill size.

E.1 CONSEQUENCE MODELS

Risk analyses of hypothetical pipeline release scenarios are used as the basis for assessing: . . . . . .(3) socioeconomic and environmental damage in HCAs caused by hazardous liquid pipeline releases of crude oil.

E.4 ASSESSMENT METHODOLOGY AND RESULTS FOR HAZARDOUS LIQUID PIPELINE RELEASES WITHOUT IGNITION

Potential consequences on the human and natural environments resulting from a hazardous liquid release without ignition generally involve socioeconomic and environmental impacts. These impacts are influenced by the total quantity of hazardous liquid released and the habitats, resources, and land uses that are affected by the release. The methodology used in this study to quantify socioeconomic and environmental impacts resulting from a hazardous liquid release involves computing the quantity xxvii

of hazardous liquid released as a function of block valve closure time and then using this quantity to establish the total damage cost based on the EPA's BOSCEM. The total damage cost is determined as follows:

☐ Add the unit response cost, the unit socioeconomic damage cost, and the unit environmental damage cost;

☐ Multiply the sum of these costs by the number of barrels spilled; and

☐ Apply a damage cost adjustment factor which aligns the total damage cost with the actual cleanup costs reported for recent crude oil spills in environmentally sensitive areas. The damage cost for crude oil released in the Enbridge Line 6B pipeline rupture in Marshall, Michigan in 2010 was approximately $38,000 per barrel.

The BOSCEM accounts for effects of spill size on the total damage cost by reducing the unit cost of damage as the number of barrels spilled increases.

The swiftness of block valve closure has a significant effect on mitigating potential socioeconomic and environmental damage to the human and natural environments resulting from hazardous liquid pipeline releases because damage costs increase as the spill size increases. The benefit in terms of cost avoidance for damage to the human and natural environments attributed to block valve closure swiftness increases as the duration of the block valve shutdown phase decreases.

1.3.2 Hazardous Liquid Pipeline Release Events

After a hazardous liquid pipeline ruptures, liquid begins flowing from the break and continues until draining is complete. The amount of material released following the break is influenced by a variety of factors. These factors include the type of liquid, the operating pressure of the pipeline, the size and position of the hole through which the liquid is released, the rate at which the liquid is being pumped through the pipeline, the response of the operator in terms of shutting off pumps and closing valves, the pipeline route and elevation profile, and the location of the break relative to the pumps and block valves. Block valves are installed in hazardous liquid pipelines to facilitate maintenance, operations, or construction and to limit the amount of liquid spilled following a pipeline rupture. For worst case, guillotine-type breaks, the effective hole size is equal to the line pipe diameter.

The behavior of the released liquid depends on its physical properties and the terrain in the vicinity of the break. For example, the liquid could flash on release of pressure to form a vapor cloud containing a fine mist of residual liquid droplets, accumulate in a pool on the ground surface near the pipeline break, create a stream that flows away from the release point, or soak into the surrounding soil (Acton, 2001).

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If the released liquid ignites following the break, it could result in a pool fire, a flash fire, or, under certain conditions, a vapor cloud explosion. Pool fires can spread out in all directions or flow in a particular path depending on the terrain. Figure 1.3 shows fire damage along a creek caused by a hazardous liquid pipeline release in Bellingham, Washington (NTSB, 2002). If ignition is delayed, the resulting evolution of vapor from the release could influence the magnitude and extent of a subsequent flash fire or explosion.

Fig. 1.3. Fire damage resulting from hazardous liquid pipeline release in Bellingham, Washington (NTSB, 2002).

Impacts resulting from time-dependent radiant thermal intensities at various separation distances from the break are based on the following hazardous liquid pipeline release scenario. The release occurs following a guillotine-type break where the escaping liquid accumulates in a pool on an impermeable level ground surface and ignites immediately upon release. Pool size is affected by the type of liquid

released, the line pipe diameter, the pipeline operating pressure, the time required to detect the leak and initiate corrective actions to mitigate the consequences of the release, the spacing of block valves, the time required to close block valves and isolate the break, and the terrain features. Any potential environmental impacts to air and water quality caused by the released liquids and their products of combustions are beyond the scope of this study.

As discussed in Section 1.3.1, thermal radiation hazard zones with increasing impact severity are described by concentric circles centered on the pipeline rupture. The thermal radiation intensities at the perimeters of these concentric circles increase as the radii decrease. Effects of progressively higher heat fluxes on buildings and humans are described in Table 1.1. Because thermal radiation effects on buildings and humans are a function of radiant heat flux and exposure duration, quantifying the time-

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dependent variations in radiant heat fluxes for specific radii is key to assessing the benefits of installing RCVs and ASVs in hazardous liquid pipelines.

Given the wide range of actual pipeline sizes and operating pressures, leak detection periods, and block valve spacing and closure times, ORNL developed methodologies for quantifying the impacts of these parameters on areas affected by combustion of the escaping liquid hydrocarbon. The methodologies, which are described in Section 3.2, also characterize time-dependent radiant thermal intensities at various separation distances from the break.

Without ignition, the escaping liquid could adversely affect waterway navigation, surface and ground water quality, and other aspects of the human and natural environments. In addition, the cost to remediate the affected areas could be substantial. Consequence mitigation for a hazardous liquid pipeline release without ignition requires rapid detection, pump shutdown, and block valve closure. However, even if these actions are taken quickly, some amount of liquid in the pipeline will drain out of the broken pipeline segments. Methodologies for quantifying spill volumes for hazardous liquid pipelines releases and for estimating socioeconomic and environmental damage caused by the spill are described in Section 3.3.

1.3.2.1 Phases of a Hazardous Liquid Pipeline Release

A pipeline break can range in size and shape from a short, through-wall crack to a guillotine fracture that completely separates the line pipe along a circumferential path. Although the volume of the discharge depends on many factors, the event is subdivided into four sequential phases – Phase 1 Detection, Phase 2 Continued Pumping, Phase 3 Block Valve Closure, and Phase 4 Pipeline Drain Down (Borener, 1994 and California State Fire Marshal, 1993). The total discharge volume equals the sum of the volumes released during each phase. Events associated with each phase are described below.

Phase – 1 Detection: The detection phase begins immediately after the pipeline ruptures, t0, and continues until the leak is detected by any means and the Operator initiates corrective actions to mitigate the consequences of the release, td. The volume of liquid discharged during the detection phase, Vd, depends on the duration of this phase and is influenced by factors such as the size, shape, and location of the rupture; the pumping rate; the pipeline pressure; and the effectiveness of the leak detection system.

The volume of liquid discharged during the detection phase is determined using the following equation.

$Vd = Qd(td – t0)$ (1.1)

where

Vd is the volume of liquid discharged during the detection phase, barrels (m3)

Qd is the discharge rate through the break that de

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Phase 2 – Continued Pumping: The continued pumping phase starts after corrective actions are initiated to mitigate the consequences of the release, td, and ends when the pumps stop operating, tp.

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During this time, additional hazardous liquid spills from the break. The duration of this phase can vary from a few minutes for systems with remotely operated pumps to hours for manually operated equipment located in remote areas. The volume of liquid discharged during the continued pumping phase, Vp, depends on the duration of this phase and is influenced by factors such as the type of equipment controls (automatically, remotely, or manually operated); personnel travel time to shutdown manually operated equipment; and the flow rates of the pumps.

…..Phase 3 – Block Valve Closure: The block valve closure phase starts when the pumps stop operating, tp, and ends when the upstream and downstream block valves close, ts. During this time, an additional amount of liquid in the pipeline spills from the break. The volume of liquid discharged during the block valve closure phase, Vs, depends on the duration of this phase and is influenced by factors such as the speed at which block valves located upstream and downstream from the break close. The duration of this phase can vary from a few minutes for systems with automatic or remotely controlled valves to hours for systems with manually operated valves located in remote areas.

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Phase 4 – Pipeline Drain Down: The pipeline drain down phase starts when the upstream and downstream block valves close isolating the portion of the pipeline that includes the break, ts. This phase

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ends when the remaining contents of the isolated portion of the damaged pipeline segment drain from the break, tf. The volume of liquid discharged during the drain down phase, Vf, is affected by the pipeline elevation profile including siphon action and the location of the break. A break that occurs at the highest elevation in the isolated portion of the pipeline results in no drain down volume, whereas a break that occurs at the lowest elevation could result in significant or complete drain down of the isolated portion of the pipeline.

The rate at which liquid drains from a break in the isolated portion of the damaged pipeline segment depends primarily on the size of the break and the pipeline elevation profile. It is also affected by the flow rate of air that must enter the break to replace the liquid and allow the draining to continue. In hilly or mountainous terrain, determining the length of pipeline, L, available to drain from a break must consider site-specific design and construction details. The volume of liquid discharged from the contributory length of pipeline, L, during the drain down phase, Vf, and the transient discharge rate, Qf, cannot be accurately determined without knowing the actual pipeline elevation profile as illustrated in Fig. 1.4.

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1.3.2.2 Block Valve Effects on a Hazardous Liquid Pipeline Release

The effectiveness of block valve closure swiftness on limiting the spill volume of a hazardous liquid pipeline release is influenced by the location of the block valves relative to the location of the break, the pipeline elevation profile between adjacent block valves, and the time required to close the block valves after the break is detected and the pumps are shut down.

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Block valves do not reduce the volume of liquid spilled during the detection and continued pumping phases because they are open. However, the total spill volume can be reduced by rapidly detecting the leak and taking immediate corrective actions including shutting down the pumps and closing the block valves to mitigate the consequences of the release. The effectiveness of block valve closure in mitigating the consequences of a hazardous liquid pipeline release decreases as the time required to close the block valve increases.

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1.3.5 Socioeconomic and Environmental Effects of a Hazardous Pipeline Release

Potential consequences and effects on the human and natural environments resulting from a hazardous liquid pipeline release without ignition generally involve socioeconomic and environmental impacts. These impacts are influenced by the total quantity of hazardous liquid released and the habitats, resources, and land uses that are affected by the release. The methodology used to quantifying socioeconomic and environmental impacts resulting from a hazardous liquid release involves computing the quantity of hazardous liquid released and then using this quantity to establish the total damage cost. The total damage cost is determined by adding the response cost, the socioeconomic damage cost, and the environmental damage cost as described in Section 3.3.3.

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3.2 HAZARDOUS LIQUID PIPELINES WITH IGNITION

Following a guillotine-type break in a hazardous liquid pipeline and ignition of the released hydrocarbon, a pool fire begins to form and continues to increase in diameter as liquid flows from the break. Eventually, the pool reaches an equilibrium diameter when the mass flow rate from the break equals the fuel mass burning rate. The fire will continue to burn until the liquid that remains in the isolated pipeline segments stops flowing from the pipeline.

A pipeline break can range in size and shape from a short, through-wall crack to a guillotine fracture that completely separates the line pipe along a circumferential path. Guillotine-type breaks are less common than other pipeline breaks such as fish-mouth type openings, but they can occur as a result of different causes including landslides, earthquakes, soil subsidence, soil erosion (e.g. scour in a river) and third-party damage. The guillotine-type break is the largest possible break and is therefore considered in this study as the worst case scenario. Although the volume of the discharge depends on many factors, to enable analysis, the event is divided into four sequential phases with the total discharge volume equal to the sum of the volumes released during each phase. The four phases (detection, continued pumping, block valve closure and pipeline drain down) are explained in Section 1.3.2.1.

The thermal radiation hazards from a hydrocarbon release and resulting pool fire depend on a variety of factors including the composition of the hydrocarbon, the size and shape of the fire, the duration of the fire, its proximity to the objects at risk, and the thermal characteristics of the object exposed to the fire.

3.3 HAZARDOUS LIQUID PIPELINES WITHOUT IGNITION

The socioeconomic and environmental effects of an oil spill are strongly influenced by the circumstances surrounding the spill including the type of product spilled, the location and timing of the spill, sensitive areas affected or threatened, liability limits in place, local and national laws, and cleanup

strategy. The most important factors determining a per-unit cost are location and oil type, and possibly total spill amount.

The amount of oil spilled can have a profound effect on the cleanup costs. Obviously, the more oil spilled, the more oil there is to remove or disperse, and the more expensive the cleanup operation. However, cleanup costs on a per-unit basis decrease significantly with increasing amounts of oil spilled. Smaller spills are often more expensive on a per-unit basis than larger spills because of the costs associated with setting up the cleanup response, bringing in the equipment and labor, as well as bringing in the experts to evaluate the situation (Etkin, 1999).

The following methodology was used to determine: (1) the time-dependent discharge from a hazardous liquid transmission pipeline resulting from a guillotine-type break, and (2) the quantity of hazardous liquid released during the detection, continued pumping, block valve closure, and drain down phases

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needed to estimate cleanup costs. The total volume of a hazardous liquid pipeline release is primarily influenced by the flow rate at the time of the break; the combined durations of the detection, continued pumping, block valve closure phases; and the size and shape of the break. For worst case, guillotine-type breaks, where the effective hole size is equal to the line pipe diameter, the governing parameters are the line pipe diameter and the pipeline length between plateaus and peaks in the vicinity of the break.

Appendix A: Spill Volume Released Due to Valve Closure Times in Liquid Propane Pipelines, contains a family of curves for various hazardous liquid pipeline release scenarios that quantify the volume of liquid released following a guillotine-type break.

3.3.1 Analysis Scope, Parameters, and Assumptions

The methodology is based on fundamental fluid mechanics principles for computing the time-dependent response of hazardous liquid pipelines following a guillotine-type break. It is also suitable for determining the effects that detection, continued pumping, block valve closure duration have on a worst case discharge release determined in accordance with federal pipeline safety regulations in 49 CFR 194 for estimating worst case discharges from hazardous liquid pipelines (DOT, 2011e).

The configuration of the hypothetical hazardous liquid pipeline used to evaluate the effectiveness of RCVs and ASVs in mitigating the consequences of a release has the following design features and operating characteristics:

- The pump stations are located at 100 mile intervals along the pipeline.
- Each pressure pump station has a remote control device that can be activated by the pipeline operator to shut down the compressors after a rupture occurs.
- The rupture is a guillotine-type break that initiates the release event.
- The break is located at a low point in the pipeline elevation profile.
- The following times are study variables.
- The time when the operator detects the leak.
- The time when the operator stops the pumps.
- The time when the upstream and downstream block valves are closed and the line section with the break is isolated.
- The total volume of the hazardous liquid release equals the volume of liquid released during the detection, continued pumping, block valve closure, and drain down phases.
- The time-dependent flow rate is a study variable.

Study variables used to characterize hazardous liquid pipeline releases are listed in Table 3.24.

3.3.2 Analytical Approach and Computational Models

After a hazardous liquid pipeline ruptures without ignition, liquid begins flowing from the break and continues until draining is complete. A pipeline break can range in size and shape from a short, through-

wall crack to a guillotine fracture that completely separates the line pipe along a circumferential path. Although the volume of the discharge depends on many factors, the event is subdivided into the four sequential phases with the total discharge volume equal to the sum of the volumes released during each phase. The phases of a hazardous liquid pipeline release are outlined in Section 1.3.2.1.

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block valve closure phase, minutes

The flow rate through the break remains constant through both the detection and continued pumping phases. In the block valve closure phase, the maximum flow rate through the break is based on the elevation difference of liquid in the pipeline. During the pipeline drain down phase, the maximum flow rate through the break is based on the difference between the operating pressure of the pipeline and atmospheric pressure. Requirements in 49 CFR 194.105(b)(1) state the worst case discharge is the largest volume of fluid released based on the pipeline's maximum release time, plus the maximum shutdown response time, multiplied by the maximum flow rate, which is based on the maximum daily capacity of the pipeline, plus the largest line drainage volume after shutdown of the line sections. In this methodology, the maximum flow rate can be estimated by multiplying the fluid speed at the pump by the cross sectional area of the line pipe. Although operators can use this rule to determine a worst case discharge, the actual flow rate during the block valve closure phase may be greater (less conservative) due to factors such as fluid density, pressure changes, pump performance characteristics, and the elevation profile of the pipeline which are not reflected in the methodology. These factors are important in a risk analysis because their effects influence time-dependent damage resulting from a release.

The influence of fluid density, pressure changes, and the elevation profile of the pipeline is taken into consideration in this study by using Bernoulli's equation to calculate the flow rate during the block valve closure and drain down phases. However, there are recognized limitations in using Bernoulli's equation to determine drain down time because it does not model the effects of air flow through the pipeline break which occurs as the fluid escapes following block valve closure. Although Bernoulli's equation does not produce an exact solution to this fluid dynamics problem, comparison of the results provides a consistent approach for evaluating the effectiveness of block valve closure swiftness on mitigating release consequences.

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3.3.3 Socioeconomic and Environmental Effects

The methodology for quantifying potential environmental effects resulting from a hazardous liquid release involves computing the quantity of hazardous liquid released and then using this quantity to establish the total damage cost. The total damage cost, Cd, is determined by adding the response cost, Cr, the socioeconomic damage cost, Cs, and the environmental damage cost, Ce. This methodology applies to crude oil and light fuel (gasoline) releases that affect the following areas.

☐ Commercially navigable waterways which means a waterway where a substantial likelihood of commercial navigation exists.

☐ High population areas and another populated areas which mean an urbanized area as defined and delineated by the Census Bureau that contains 50,000 or more people and has a population density of at least 1,000 people per square mile and a place as defined and delineated by the Census Bureau that contains a concentrated population, such as an incorporated or unincorporated city, town, village, or other designated residential or commercial area, respectively.

☐ Unusually Sensitive Areas (USAs) which is defined in 49 CFR 195.6 to mean a drinking water or ecological resource area that is unusually sensitive to environmental damage from a hazardous liquid pipeline release.

The response cost, Cr, is determined by multiplying the applicable unit response cost shown in Table 3.25 by the applicable medium modifier shown in Table 3.26.

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The response cost, C_r, is determined by multiplying the applicable unit response cost shown in Table 3.25 by the applicable medium modifier shown in Table 3.26.

Table 3.25. Unit response costs for crude oil and light fuel releases Release Quantity, barrels	**Crude Oil, $ per barrel**	**Light Fuels, $ per barrel**
<12	9,240	4,200
12-24	9,156	4,116
24-240	9,030	4,074
240-2,400	8,190	3,654
2,400-240,000	5,166	3,108
> 240,000	3,864	1,302

Table 3.26. Modifier for location medium categories for crude oil and light fuel releases Medium Category	**Medium Modifier**
Open Water/Shore	1.0
Soil/Sand	0.6
Pavement/Rock	0.5
Wetland	1.6
Mudflat	1.4
Grassland	0.7
Forest	0.8
Taiga (boreal forest)	0.9
Tundra	1.3

The socioeconomic damage cost, C_s, is determined by multiplying the applicable unit socioeconomic cost shown in Table 3.27 by applicable the socioeconomic cost modifier shown in Table 3.28.

Table 3.27. Unit socioeconomic and environmental costs for crude oil and light fuel releases Release Quantity, barrels	**Crude Oil, $ per barrel**		**Light Fuels, $ per barrel**	
Socioeconomic	**Environmental**		**Socioeconomic**	**Environmental**
<12	2,100	3,780	3,360	3,570
12-24	8,400	3,654	13,860	3,360
24-240	12,600	3,360	21,000	2,940
240-2,400	5,880	3,066	8,400	2,730
2,400-240,000	2,940	1,470	4,200	1,260
> 240,000	2,520	1,260	3,780	1,050

Table 3.28. Socioeconomic and cultural value ranking for crude oil and light fuel releases Value Rank	**Release Impact Site Description**	**Examples**	**Cost Modifier Value**

Extreme	Predominated by areas with high socioeconomic value that may potentially experience a large degree of long-term impact if oiled.	Subsistence/commercial fishing, aquaculture areas	2.0
Very High	Predominated by areas with high socioeconomic value that may potentially experience some long-term impact if oiled.	National park/reserves for ecotourism/nature viewing; historic areas	1.7
High	Predominated by areas with medium socioeconomic value that may potentially experience some long-term impact if oiled.	Recreational areas, sport fishing, farm/ranchland	1.0
Moderate	Predominated by areas with medium socioeconomic value that may potentially experience short-term impact if oiling occurs.	Residential areas; urban/suburban parks; roadsides	0.7
Minimal	Predominated by areas with a small amount of socioeconomic value that may potentially experience short-term impact if oiled.	Light industrial areas; commercial zones; urban areas	0.3
None	Predominated by areas already moderately to highly polluted or contaminated or of little socioeconomic or cultural import that would experience little short- or long-term impact if oiled.	Heavy industrial areas; designated dump sites	0.1

Note: Long-term impacts are those impacts that are expected to last months to years after the spill or be relatively irreversible. Short-term impacts are those impacts that are expected to last days to weeks after the spill occurs and are generally considered to be reasonably reversible.

Table 3.29. Freshwater vulnerability categories for crude oil and light fuel releases Freshwater Vulnerability Category	**Freshwater Vulnerability Modifier**
Wildlife Use	1.7
Drinking	1.6
Recreation	1.0
Industrial	0.4
Tributaries to Drinking/Recreation	1.2
Non-Specific	0.9

Table 3.30. Habitat and wildlife sensitivity categories for crude oil and light fuel releases Habitat and Wildlife Sensitivity Category	Habitat and Wildlife Sensitivity Modifier
Urban/Industrial	0.4
Roadside/Suburb	0.7
River/Stream	1.5
Wetland	4.0
Agricultural	2.2
Dry Grassland	0.5
Lake/Pond	3.8
Estuary	1.2
Forest	2.9
Taiga	3.0
Tundra	2.5
Other Sensitive	3.2

This methodology is consistent with the U.S. Environmental Protection Agency (EPA) Basic Oil Spill Cost Estimation Model (BOSCEM) that was developed to provide the US EPA Oil Program with a methodology for estimating oil spill costs, including response costs and environmental and socioeconomic damages, for actual and hypothetical spills (Etkin, 2004).

Total Damage Cost Validation

The following case studies compare the actual damage costs for two hazardous liquid pipeline releases to the corresponding total damage costs determined using BOSCEM.

Case Study 1 – Enbridge 2010

The Enbridge Line 6B pipeline ruptured in Marshall, Michigan on July 25, 2010, and released approximately 20,000 barrels of crude oil. This release from the 30-in. nominal diameter pipeline caused environmental impacts along Talmadge Creek and the Kalamazoo River (Nicholson, 2012). Cleanup and recovery costs for this release totaled $767,000,000.

Using the EPA BOSCEM, the estimated total damage cost for this release is approximately $307,900,000. This total damage cost, C_d, includes the response cost, C_r, the socioeconomic damage cost, C_s, and the environmental damage cost, C_e, determined as follows.

Response cost, C_r = unit response cost ☐ medium modifier

Socioeconomic damage cost, C_s = unit socioeconomic cost ☐ socioeconomic cost modifier (High) = $2,940 ☐ 1.0 = $2,940/barrel

Environmental damage cost, C_e = unit environmental cost ☐ 0.5 ☐[freshw

wildlife modifier (Wetland)] = $1,470 ☐ 0.5 ☐(1.7 + 4.0) = $4,190/barrel

Total damage cost (2004 basis), C_d = 20,000 barrels ☐ ($8,265 + $2

After adjusting for inflation, the total damage cost (2012 basis), C_d = $307,900,000 ☐ 1.25 (inflation factor) = $384,875,000 which is approximately 50% of the actual cost.

Case Study 2 – Yellowstone 2011

A 12-in. hazardous liquid pipeline owned by ExxonMobil Pipeline Company ruptured on July 1, 2011 under the Yellowstone River 20 miles upstream from Billings, Montana. The Yellowstone River is navigable water in the United States (EPA, 2011). The ruptured pipeline released an estimated 1,509 barrels of oil that entered the river before the pipeline was closed. Cleanup and recovery costs for this release totaled $135,000,000.

The estimated total damage cost for this release is $48,044,000 based on 2004 cost data. This total damage cost, C_d, includes the response cost, C_r, the socioeconomic damage cost, C_s, and the environmental damage cost, C_e, determined as follows.

Response cost, C_r = unit response cost ☐ modifier (Wetland) = $8,190 ☐ 1.6 = $13,104/b

Socioeconomic damage cost, C_s = unit socioeconomic cost ☐ socioeconom
$5,880 ☐ 1.7 = $9,996/barrel.
Environmental damage cost, C_e = unit environmental cost ☐0.5 ☐ water modifier (Wildlife Use) +
wildlife modifier (Wetland)] = $3,066 ☐ 0.5 ☐(1.7 + 4.0) = $8,738/barrel.
Total damage cost (2004 basis), C_d = 1,509 barrels ☐ ($13,104 + $9,9

After adjusting for inflation, the total damage cost (2012 basis), Cd = $48,044,000 ☐ 1.25 (inflation factor) = $60,054,000 which is approximately 44% of the actual cost.

Damage Cost Adjustment Factor

For this study, total damage costs of hazardous liquid pipeline releases are determined using the EPA BOSCEM and then increased by a damage cost adjustment factor of 2.1. This factor aligns the model with cleanup and recovery costs for two recent hazardous liquid pipeline releases of crude oil into sensitive socioeconomic and environmental areas.

3.3.4 Risk Analysis Results for Hazardous Liquid Pipeline Releases

The methodology for assessing socioeconomic and environmental damage to HCAs is based on computed release volumes corresponding to the detection, continued pumping, block valve closure, and drain down phases of a hazardous liquid pipeline release of crude oil without ignition. The method used in this analysis for defining maximum flow rate through the break is as defined in 49 CFR 195.105(b)(1) for the detection, pump shut down, block valve closure, and drain down phases. The damage is quantified using the EPA BOSCEM and the damage cost adjustment factor described in Section 3.3.3.

Eight case studies involving hypothetical hazardous liquid pipeline releases in HCAs are considered to assess effects of block valve closure time on socioeconomic and environmental damage resulting from a guillotine-type break. The duration of the detection and continued pumping phases for the hypothetical hazardous liquid pipelines are 5 minutes and 5 minutes, respectively. The duration of the block valve closure phases is 3 minutes.

….

Characteristics for Case Study 8A, 8B, 8C, and 8D that involve 36-in. nominal diameter hazardous liquid pipelines are tabulated in Table 3.32. These case studies compare the following effects on avoided damage costs.

☐ Case studies 8A and 8B compare effects of block valve closure swiftness on the avoided damage costs for hypothetical 36-in. nominal diameter hazardous liquid pipelines with MAOPs equal to either 400 psig or 1,480 psig, an elevation change of 100 ft, a drain down length of 3 mi., and block valve closure durations of 3, 30, 60, and 90 minutes.

☐ Case studies 8C and 8D compare effects of block valve closure swiftness on the avoided damage costs for hypothetical 36-in. nominal diameter hazardous liquid pipelines with MAOPs equal to either 400 psig or 1,480 psig, an elevation change of 1,000 ft, a drain down length of 3 mi., and block valve closure durations of 3, 30, 60, and 90 minutes.

☐ Case studies 8A and 8C compare effects of block valve closure swiftness on the avoided damage costs for hypothetical 36-in. nominal diameter hazardous liquid pipelines with MAOPs equal to 400 psig, an elevation change equal to either 100 ft or 1,000 ft, a drain down length of 3 mi., and block valve closure durations of 3, 30, 60, and 90 minutes.

☐ Case studies 8B and 8D compare effects of block valve closure swiftness on the avoided damage costs for hypothetical 36-in. nominal diameter hazardous liquid pipelines with MAOPs equal to 1,480 psig, an elevation change equal to either 100 ft or 1,000 ft, a drain down length of 3 mi., and block valve closure durations of 3, 30, 60, and 90 minutes.

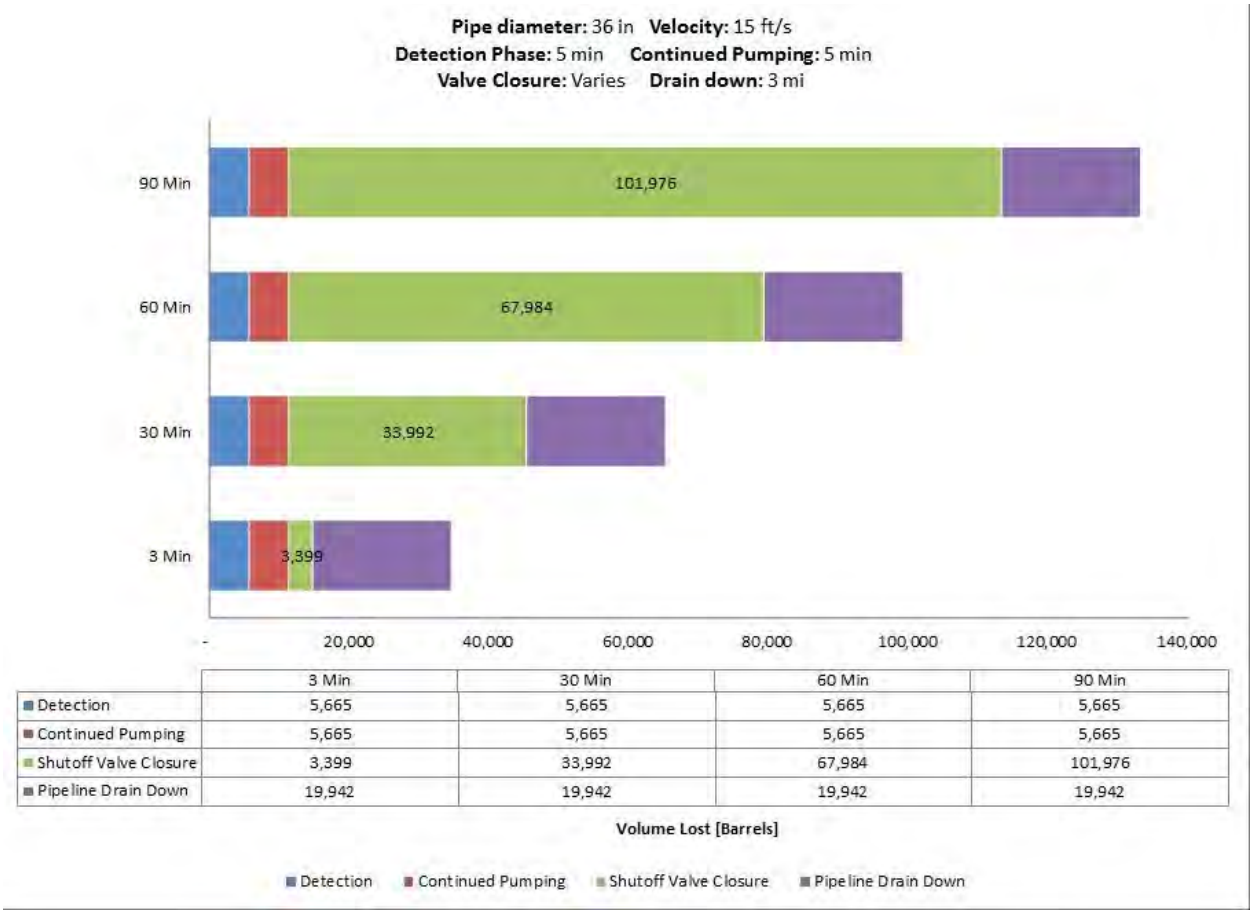
Figures 3.82 to 3.85 list the discharge volumes in barrels for Case Study 8A, 8B, 8C, and 8D. Discharge volumes listed in Table 3.32 for each case study are determined by adding the discharge volumes for the detection (5 minutes), continued pumping (5 minutes), block valve closure (3, 30, 60, and 90 minutes), and drain down (3 miles) phases. Avoided damage costs, which are also listed in Table 3.32, represent the differences between the discharge volumes for the various block valve closure durations and the 3 minute block valve closure duration multiplied by the avoided damage unit cost. The total damage unit cost for these case studies is estimated at $29,520 per barrel. This total damage cost is the sum of the response cost plus the socioeconomic damage cost plus the environmental damage cost. Note that the avoided damage costs are not sensitive to pressure and elevation changes because the model is based on the methodology in 49 CFR §194.105 (b) (1) for a worst case discharge which has a constant flow rate.

Benefits of Block Valve Closure Swiftness for a Hypothetical Hazardous Liquid Pipeline Releases without Ignition

The swiftness of block valve closure has a significant effect on mitigating potential socioeconomic and environmental damage to the human and natural environments resulting from hazardous liquid pipeline releases. The benefit in terms of cost avoidance for damage to the human and natural environments attributed to block valve closure swiftness increases as the duration of the block valve shutdown phase decreases.

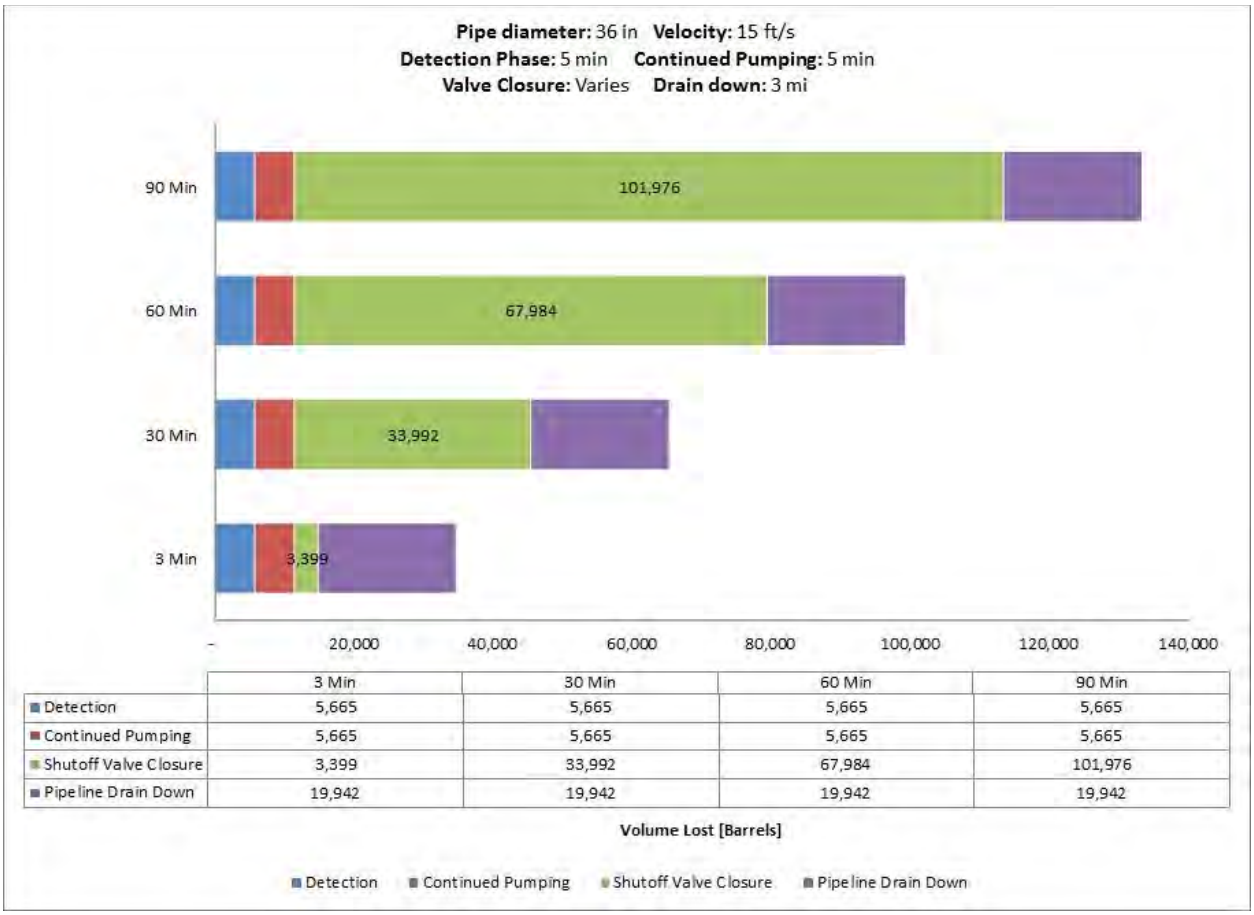
Table 3.32. Effects of hypothetical 36-in. hazardous liquid pipeline releases without ignition Characteristic	**Case Study 8A**	**Case Study 8B**	**Case Study 8C**	**Case Study 8D**
Type Hazardous Liquid	Crude Oil	Crude Oil	Crude Oil	Crude Oil
Flow Velocity, ft/s	15	15	15	15
Nominal Line Pipe Diameter, in.	36	36	36	36
Drain Down Length, mi.	3	3	3	3
MAOP, psig	400	1,480	400	1,480
Elevation Change, ft	100	100	1,000	1,000
Detection Phase Duration, minutes	5	5	5	5
Continued Pumping Phase Duration, minutes	5	5	5	5
Unit Response Cost, $/barrel	3,864	3,864	3,864	3,864
Medium Modifier (Wetland)	1.6	1.6	1.6	1.6
Response Cost, Cr	6,182	6,182	6,182	6,182
Unit Socioeconomic Cost, $/barrel	2,520	2,520	2,520	2,520
Socioeconomic Cost Modifier (Very High)	1.7	1.7	1.7	1.7
Socioeconomic	4,284	4,284	4,284	4,284

Damage Cost, C_s				
Unit Environmental Cost, $/barrel	1,260	1,260	1,260	1,260
One half Freshwater Modifier (Wildlife Use = 1.7) and Wildlife Modifier (Wetland = 4.0)	2.85	2.85	2.85	2.85
Environmental Damage Cost, C_e	3,591	3,591	3,591	3,591
Total Damage Unit Cost, C_d, $/barrel	14,057	14,057	14,057	14,057
Damage Cost Adjustment Factor for Hazardous Liquid Pipeline Releases	2.1	2.1	2.1	2.1
Total Damage Unit Cost on 2012 Basis, $/barrel	**29,520**	**29,520**	**29,520**	**29,520**
Detection Phase Release, barrels	5,665	5,665	5,665	5,665
Continued Pumping Phase Release, barrels	5,665	5,665	5,665	5,665
Drain Down Phase Release, barrels	19,942	19,942	19,942	19,942
Block Valve Closure Phase for Valve Closure in 3 minutes, barrels	3,399	3,399	3,399	3,399
Block Valve Closure Phase for Valve Closure in 30 minutes, barrels	33,992	33,992	33,992	33,992



	3 Min	30 Min	60 Min	90 Min
Detection	5,665	5,665	5,665	5,665
Continued Pumping	5,665	5,665	5,665	5,665
Shutoff Valve Closure	3,399	33,992	67,984	101,976
Pipeline Drain Down	19,942	19,942	19,942	19,942

Fig. 3.82. Case Study 8A – Discharge volumes for a 36-in. hazardous liquid pipeline with a 400 psig MAOP and an elevation change of 100 ft with a 3, 30, 60, and 90 minutes block valve closure phase.



	3 Min	30 Min	60 Min	90 Min
Detection	5,665	5,665	5,665	5,665
Continued Pumping	5,665	5,665	5,665	5,665
Shutoff Valve Closure	3,399	33,992	67,984	101,976
Pipeline Drain Down	19,942	19,942	19,942	19,942

Fig. 3.83. Case Study 8B – Discharge volumes for a 36-in. hazardous liquid pipeline with a 1,480 psig MAOP and an elevation change of 100 ft with a 3, 30, 60, and 90 minutes block valve closure phase.

May 29, 2014

Mr. Larry Hartman, Environmental Review Manager
Energy Environmental Review and Analysis (EERA)
Minnesota Department of Commerce
85 7th Place East, Suite 500
St. Paul, MN 55101-2198

Dear Mr. Hartman,

Regarding Public Utilities Commission (PUC) Docket No. PL9/PPL-13-474:

Please find attached our supplemental comments to be added to our position paper dated April 2, 2014 concerning the Enbridge/North Dakota Pipeline Company, LLC Sandpiper pipeline request for a proposed southern corridor route across northern Minnesota from Grand Forks, ND to Superior, WI.

The Friends of the Headwaters oppose this current projected route. You, the DOC and the Public Utility Commissioners will find further reasoning for our opposition and our proposal for an alternate route in the attached documents.

Friends of the Headwaters requests these documents be posted to the eDocket website as soon as possible.

Writing for the members of Friends of the Headwaters I thank you for your attention to these documents and for your attention to our concerns for the welfare and quality of our lands, waters and lives in the Headwaters Country.

Sincerely,

Richard Smith
President
Friends of the Headwaters

P.O. Box 583, Park Rapids, MN 56470
mnfriendsoftheheadwaters@gmail.com
facebook.com/savemississippiheadwaters
www.friendsoftheheadwaters.org

eDocket No. 20151-106460-07

SUPPLEMENTAL COMMENTS TO POSITION PAPER DATED 4/2/2014 REGARDING THE ENBRIDGE/NORTH DAKOTA PIPELINE COMPANY (NDPC) LLC SANDPIPER PIPELINE PROJECT

Public Utilities Commission (PUC) Docket Number: PL-6668/PPL-13-474

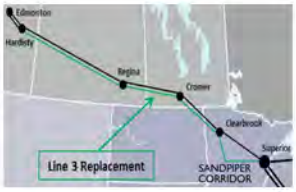
May 29, 2014

Prepared by
Richard Smith
Friends of the Headwaters
P.O. Box 583
Park Rapids, MN 56470

TO REVIEW:

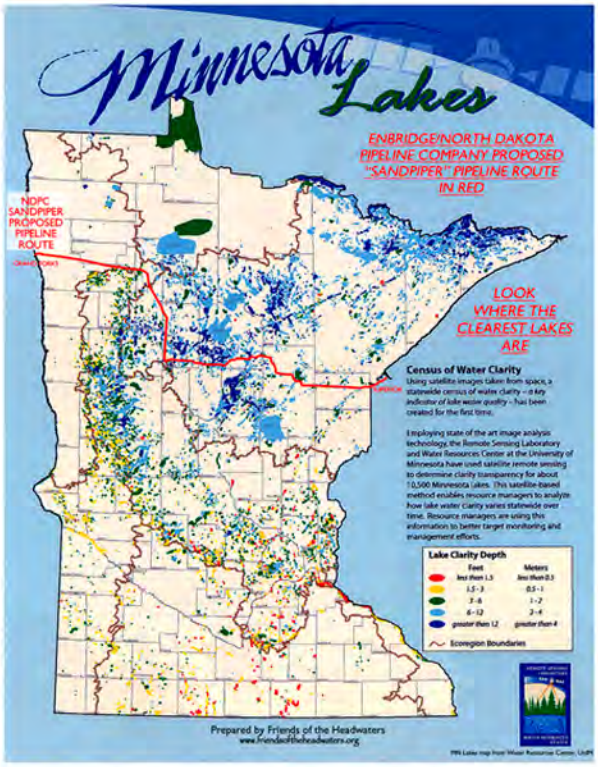
Friends of the Headwaters opposes the Enbridge/NDPC Sandpiper pipeline as currently projected to cross Minnesota's lake country from Grand Forks, ND to Superior, WI.

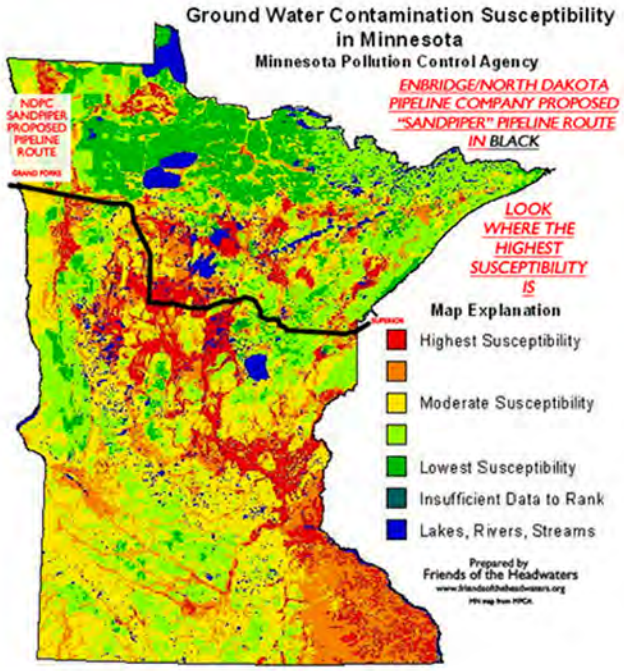
We believe Enbridge/NDPC's proposed "southern corridor" will NOT protect the high quality waters and other natural resoures along this route.



Friends of the Headwaters also believes Enbridge intends to proliferate another multiple pipeline corridor with their southern route proposal. Enbridge presented just that in an investor conference held April 2, 2014 in New York City.

We believe Enbridge/NDPC could not have chosen a worse route as evidenced by the maps below.



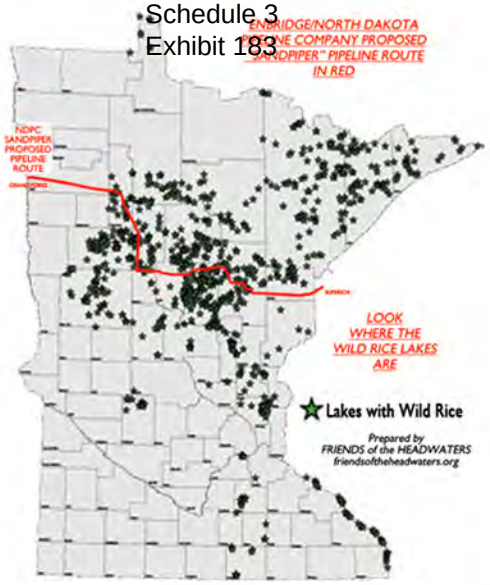


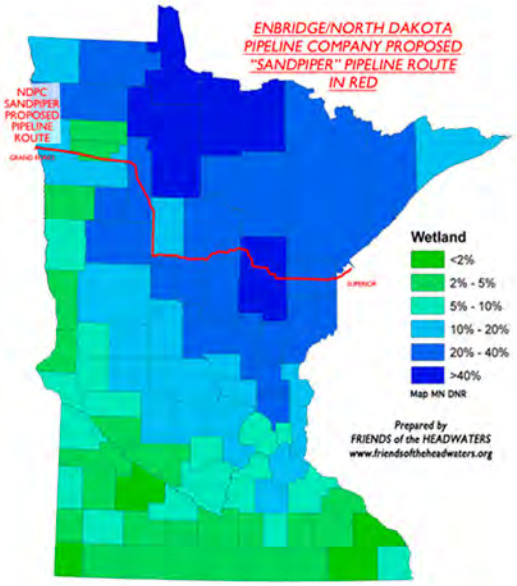
AT RISK: MINNESOTA'S
eDocket No. 20151-106460-07

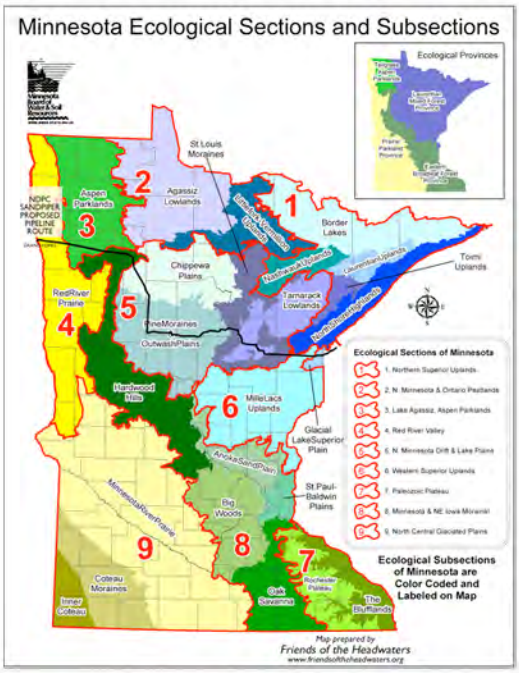
CLEAREST AND CLEANEST LAKES
GROUND WATER AQUIFERS
WILD RICE LAKES
WETLANDS
MOST SENSITIVE SOILS TO SPILLS
DIVERSITY OF VEGETATION
SENSITIVE ECOLOGICAL ZONES
THE LAKE SUPERIOR BASIN
HIGH VALUE RECREATIONAL AND RESIDENTIAL WATERS

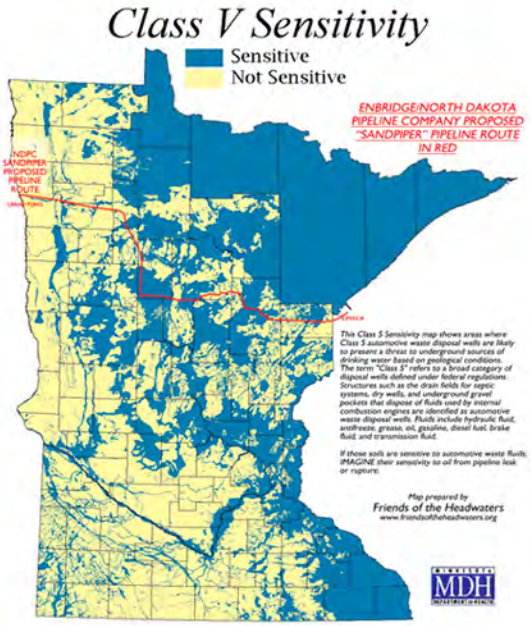
- $342 million annual revenue from fishing
- $4.3 billion annual retail sales hunting, fishing, wildlife watching
- $2 billion water-influenced properties in Hubbard County alone.

ENBRIDGE/NDPC COULD NOT HAVE PICKED A WORSE ROUTE.









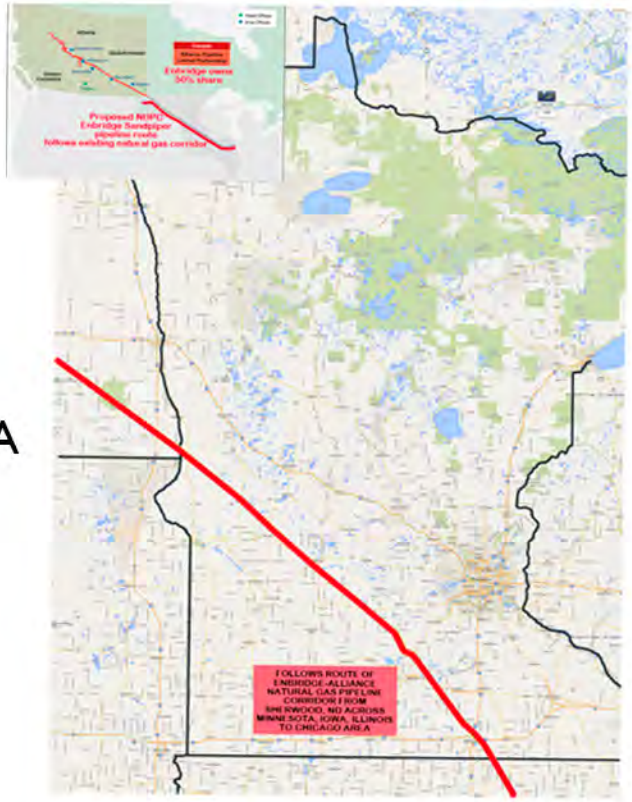
Given the high risk factors of Enbridge/NDPC's proposed Sandpiper 'southern corridor' route *FRIENDS of the HEADWATERS* has proposed a true 'southern corridor' across Minnesota which eliminates the potential for spills and damage to the state's most environmentally sensitive lands and waters.

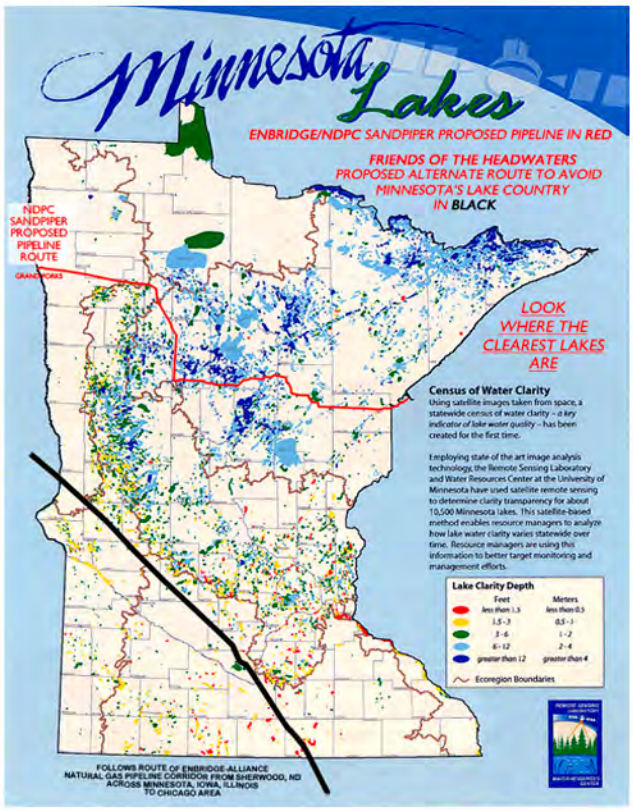
FRIENDS of the HEADWATERS Alternate Route A utilizes an existing energy corridor of which Enbridge is a 50% shareholder with Alliance Company of Canada. This corridor originates in Canada and ends west of Chicago. The proposed Enbridge/NDPC pipeline route would intersect this corridor east of Minot, ND at which point NDPC would turn and follow the corridor to Illinois.

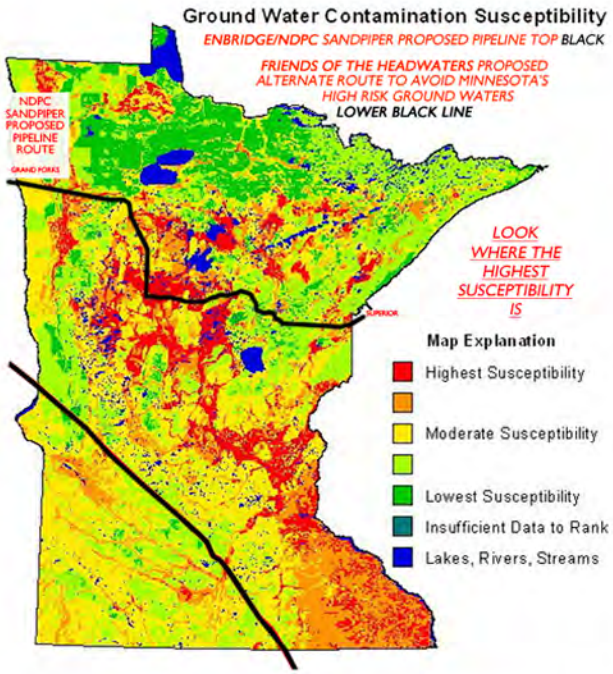
Alternate Route A below.

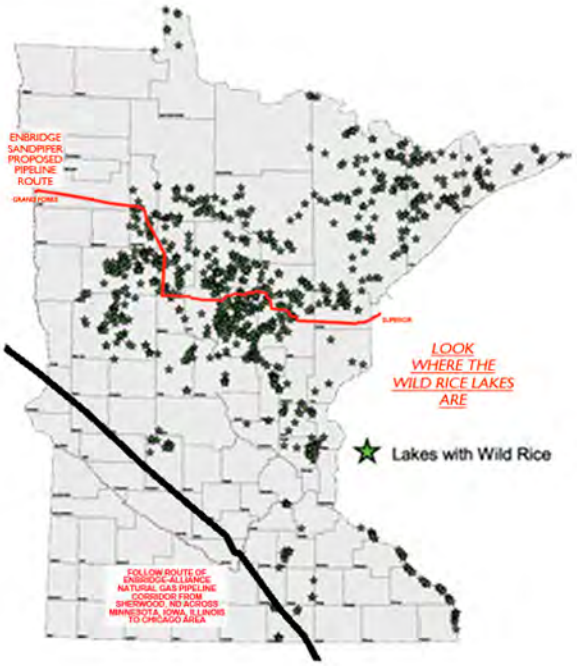
Compare the route risk factors in following maps.

A

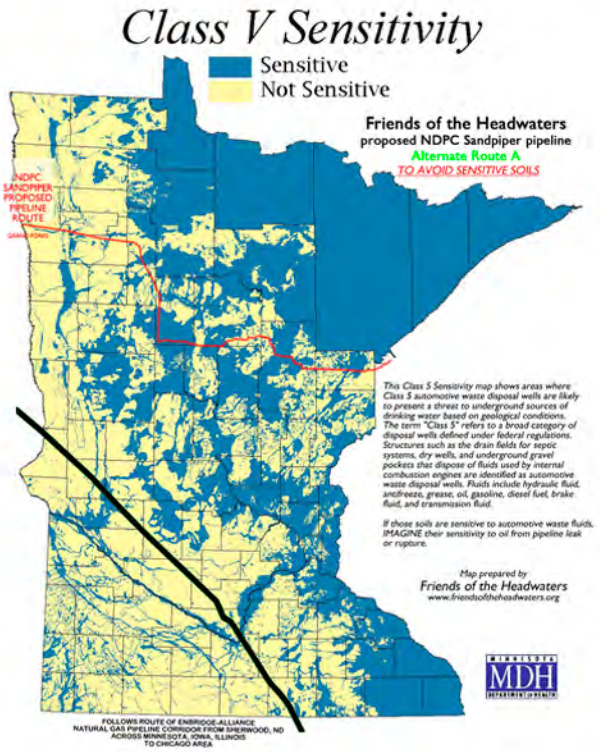


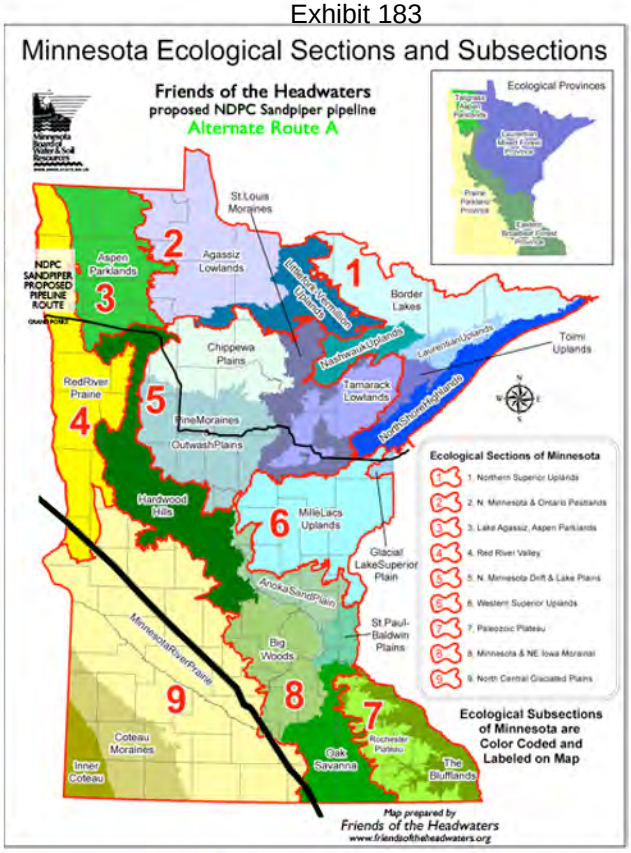


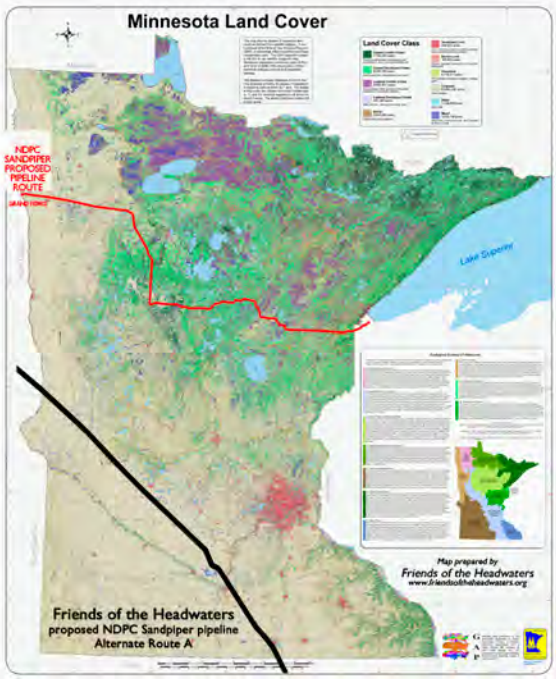


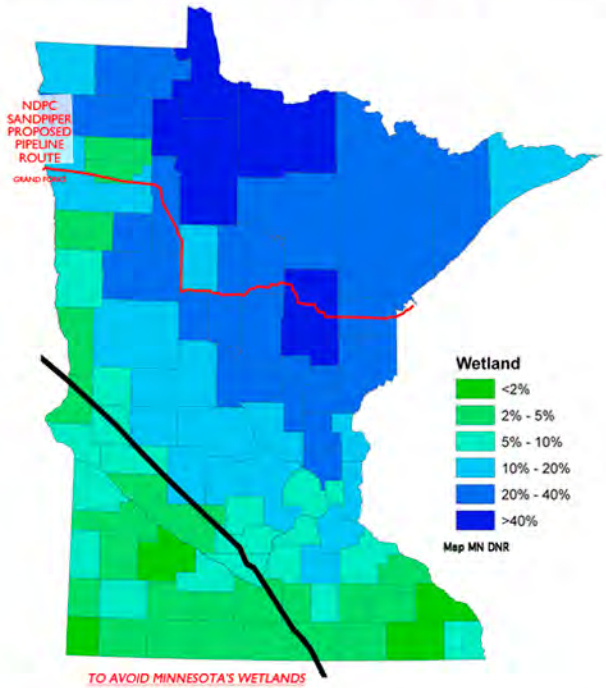


Route map comparisons continued:
eDocket No. 20151-106460-07





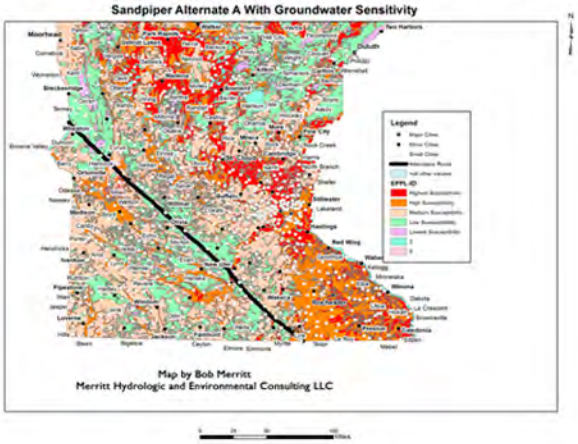




ALT ROUTE A traverses almost exclusively agricultural lands below Minnesota's primary lake country. This area is sparsely populated with mostly small towns among the farmlands.

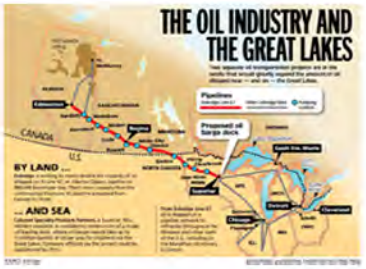
Note: Enbridge's Mark Curwin, Senior Director for Strategic Coordination of Major Project Executions in the US, stated their construction preference is to build pipelines across farmland. He made these remarks at a public meeting in Park Rapids on Jan. 29, 2014. Mr. Curwin gave the reasons of better soils, easier construction, easier access, less natural habitat destruction, cheaper and quicker. After construction the farmland can be put back into crop production. Access to leaks and spills is much easier. Winter wetland construction would be at a minimum.

Two additional maps by Bob Merritt, hydrologist, showing Alternate Route A in better detail.



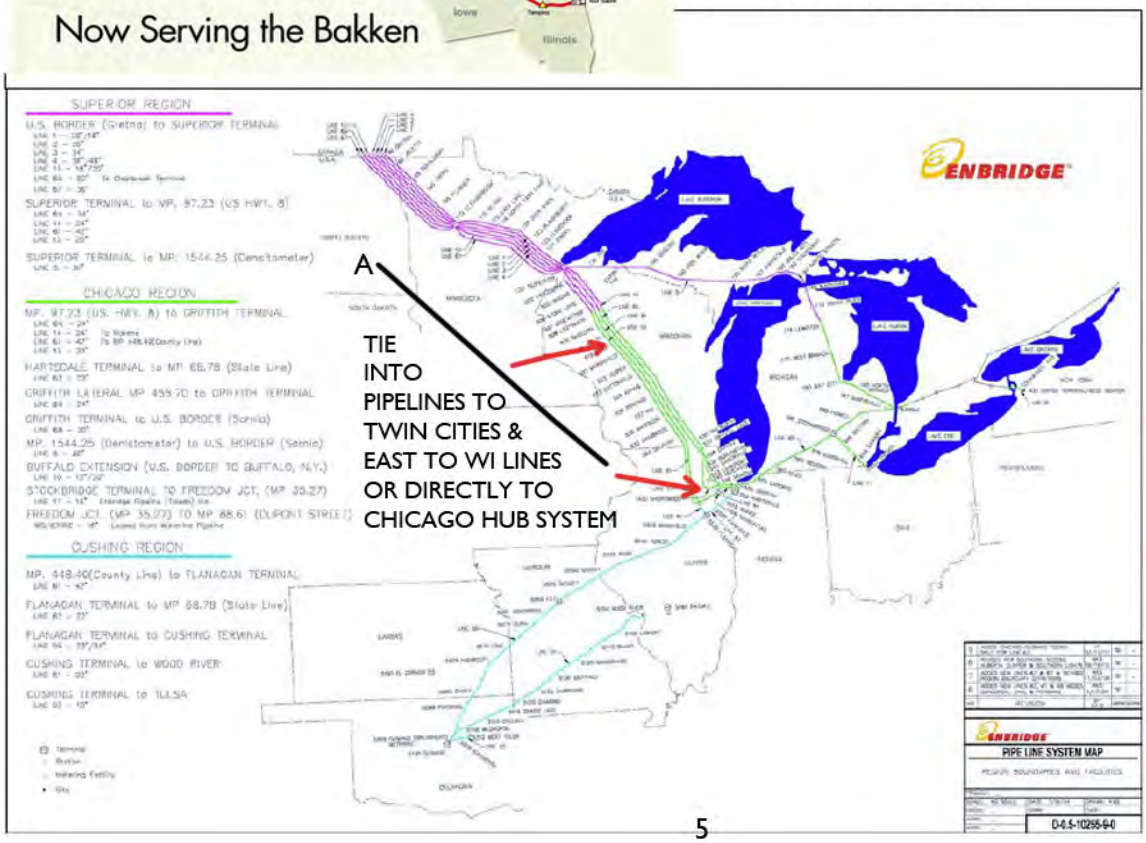
Minnesota still gets to keep jobs the construction will provide as well as North Dakota plus Iowa and Illinois.

Although the route does not end in Superior, it still ties into the existing Enbridge system in Illinois with routing options to Michigan and Ontario that avoid our greatest freshwater lakes of Lake Superior and the Mackinac Straits of Lakes Michigan and Huron.



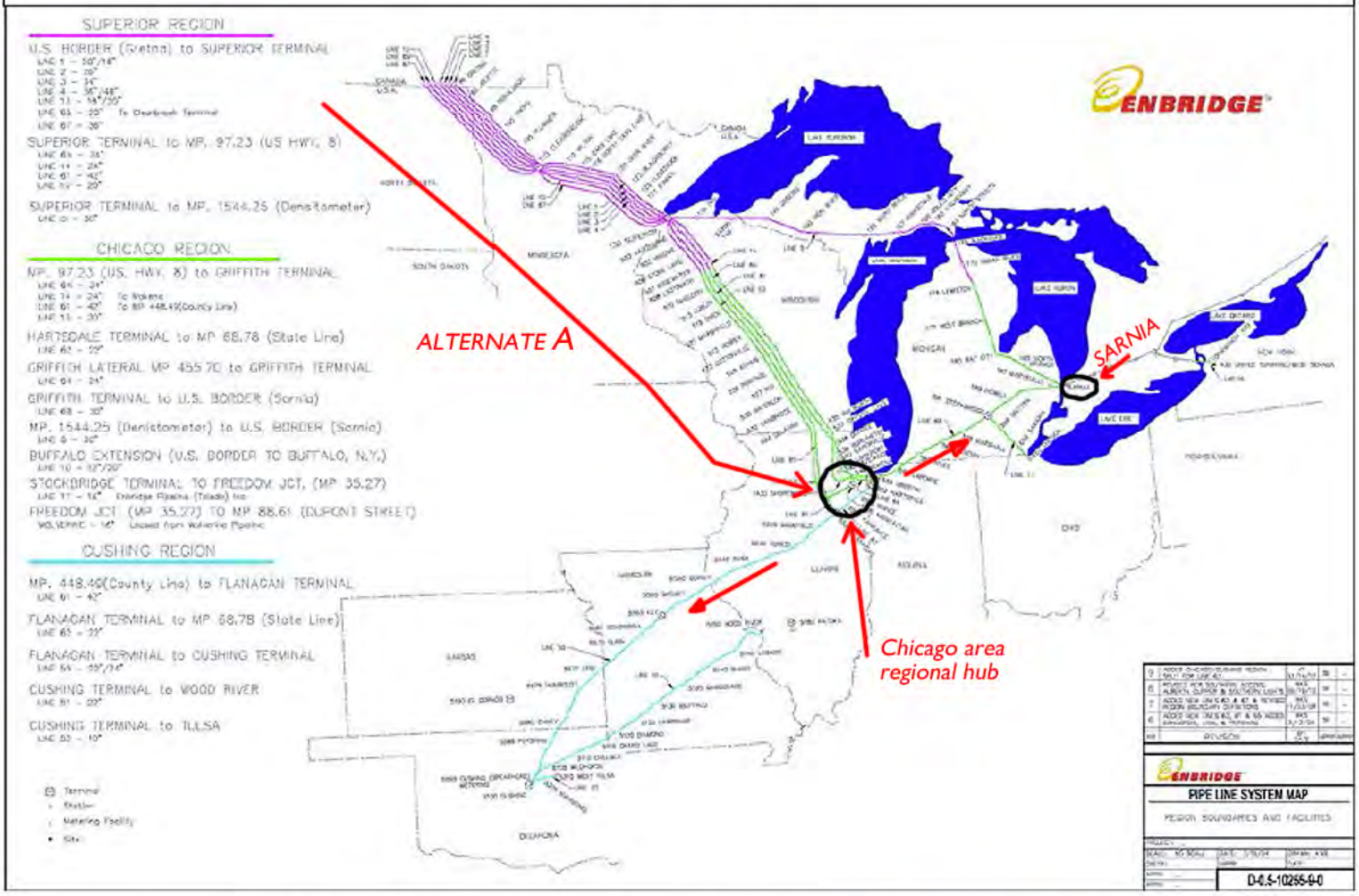
Since it's an existing corridor the company should have access to the mapping previously done for the pipeline already there. ALT ROUTE A also intersects pipelines in southern Minnesota owned and operated by other companies which provide the option of re-routing Bakken crude to the refineries in Rosemont and Saint Paul Park in the south Twin Cities Metro.

The Illinois Hub also allows Enbridge access to its pipelines to Oklahoma and points south.

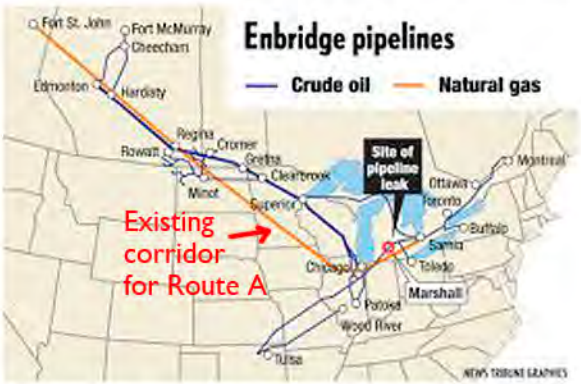


The *FRIENDS of the HEADWATERS* disputes Enbridge/NDPC's contention that the Sandpiper must end in Superior, Wisconsin. Enbridge has provided no rationale for the route ending in Superior other than "We want it. It connects to our existing system in Superior." The Alternate Route A proposed by *FRIENDS of the HEADWATERS* also connects to their existing system hub near Chicago, Illinois. It does not prevent Enbridge from then transporting the Bakken crude either south to Oklahoma and the Gulf Coast nor across Illinois, Indiana, Michigan and across the border to Sarnia, Ontario, Canada on their existing system.

Figure 7853.0510-2
Pipeline System Map



Alternate Route A already fits into their existing pipeline corridor system as evidenced by the map at right. Alternate Route A also appears to be a more direct route from the North Dakota Bakken Oil Fields to the primary energy markets of the US Midwest.



Friends of the Headwaters believes the citizens of Minnesota have the right to determine the route parameters of this pipeline corridor, not Enbridge/NDPC. The considerations of the Sandpiper pipeline and the Line 3 Rebuild proposed to run alongside the Sandpiper should not be dictated to the citizens of Minnesota by the company. The company already has too many pipelines crossing Minnesota's most valuable waters and lands.
The cumulative risk of adding additional lines to this region is too high to have the routing parameters set by what Enbridge 'wants'. They should not be allowed to frame the debate on this issue. The citizens of Minnesota and this state's governing and regulatory agencies need to reject this framing by Enbridge/NDPC

and reframe the discussion regarding the need and route of the proposed Sandpiper pipeline as what is beneficial to 2015 and 46 people, its communities and its natural resources. Until Enbridge/NDPC adequately provides a detailed explanation for demanding why the Sandpiper pipeline must end in Superior, Wisconsin, *Friends of the Headwaters* believes all alternative routes must be given full consideration, even those proposing a system overhaul of how and where Enbridge wants to cross the state.

If Enbridge/NDPC were truly committed to protecting our lakes, rivers, wetlands, aquifers and lands as they publically state they are, then prove it by not just giving Minnesotans statistics about how safe their pipelines are (their history says otherwise), but by actually moving their proposed route to the lowest risk part of the state as portrayed on the previously presented illustrated maps.

Costs should not be a factor. After all, once the Sandpiper is constructed, 375,000 barrels of oil will pass through it daily. At the current world price for a barrel of oil that amounts to $40 million dollars per day or $14.6 billion dollars annually. Even though Enbridge is charging a fee to move the amount of oil, it should not take too many years to recoup their construction costs. Plus it appears from the map below the company has plans to expand the pipeline system through Wisconsin. The money allocated for that extension could easily be applied to the extra construction costs of building Alternate Route A.

Since the company is adamant about Superior as a destination for the Bakken crude, perhaps this proposed extension in Wisconsin could be used to move the oil from the end of Alternative Route A back north to Superior.

Enbridge has ambitious expansion plans not just in Minnesota but nationally it appears.

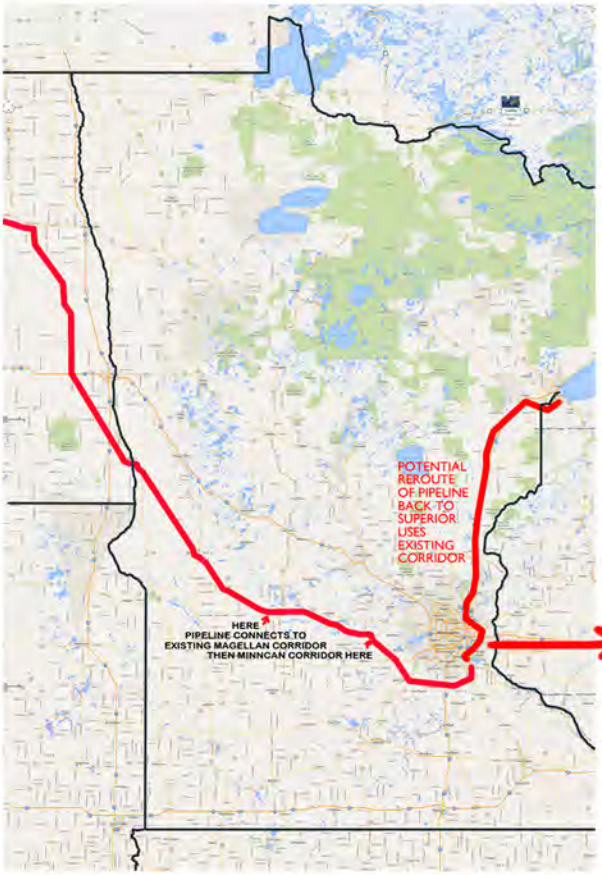
If their intensions are to expand rapidly towards the southern U.S. Alternative Route A would conform to those expansion plans more directly than their current proposed Sandpiper corridor.

The *FRIENDS of the HEADWATERS* also sponsors other alternate routes at this time.
These routes can be connected back to Superior along existing energy corridors.

ALTERNATE ROUTE "C" as previously proposed in Position Paper of 4/2/2014

West of Grand Forks near Larimore the Sandpiper would turn south following either railroad easements or road easements south-southeast down the Red River Vally, crossing the Red River near Wahpeton, ND and continuing along MN Hgy 9 until it intersects an existing pipeline corridor owned by the Magellan Company. The Sandpiper follows this corridor until its intersection with the MinnCan pipeline corridor at which point it follows this corridor to the Flint Hills and Saint Paul Park refineries and pipeline system southeast of the Twin Cities Metro area. Optionally the route could turn south from Enbridge/NDPC's proposed pumping station near Lakota, ND.

Route C bypasses Minnesota's sensitive lands and waters and gives Enbridge the option of two routes back to Superior. They can use an existing pipeline corridor along I35 to Duluth whereupon they would intersect their northern corridor and can turn east to Superior. Or they can use another existing pipeline corridor, the Magellan straight east into Wisconsin where that line intersects the Enbridge system in central Wisconsin. At that point Enbridge can use their proposed expansion line to move the oil back to Superior or down to Illinois.



MAP APPENDIX

Wisconsin Petroleum Pipelines

WISCONSIN ENERGY STATISTICS 2010 | 157

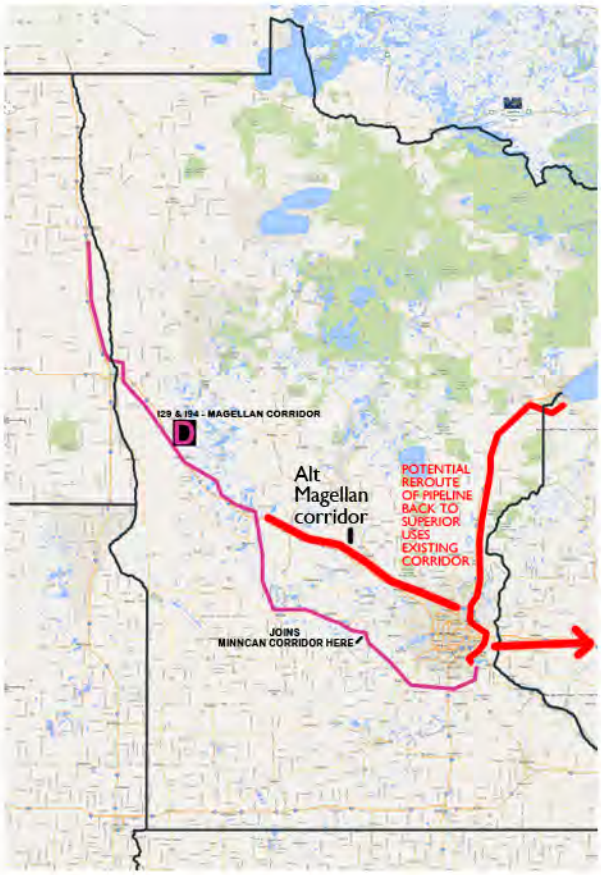
Friends of the Headwaters does question how excited the people of Wisconsin might be about new pipelines.

The *FRIENDS of the HEADWATERS* also sponsors other alternate routes at this time.
These routes can be connected back to Superior along existing energy corridors.

ALTERNATE ROUTE "D" as previously proposed in Position Paper of 4/2/2014

Near Grand Forks the Sandpiper would turn south following an existing pipeline corridor along Interstate 29 south towards Fargo, North Dakota then follow the same corridor east southeast adjacent Interstate 94. This existing pipeline corridor is owned by the Magellan Company, the same company which has the line continuing east from Minneapolis-StPaul into Wisconsin to intersect Enbridge's existing corridor there. The Sandpiper follows this corridor until its intersection with the MinnCan pipeline corridor at which point it follows this corridor to the Flint Hills and Saint Paul Park refineries and pipeline system southeast of the Twin Cities Metro area.

Route D bypasses most of Minnesota's sensitive lands and waters and gives Enbridge the option of two routes back to Superior. They can use an existing pipeline corridor along I35 to Duluth whereupon they would intersect their northern corridor and can turn east to Superior. Or they can use another existing pipeline corridor, the Magellan straight east into Wisconsin where that line intersects the Enbridge system in central Wisconsin. At that point Enbridge can use their proposed expansion line to move the oil back to Superior or down to Illinois.



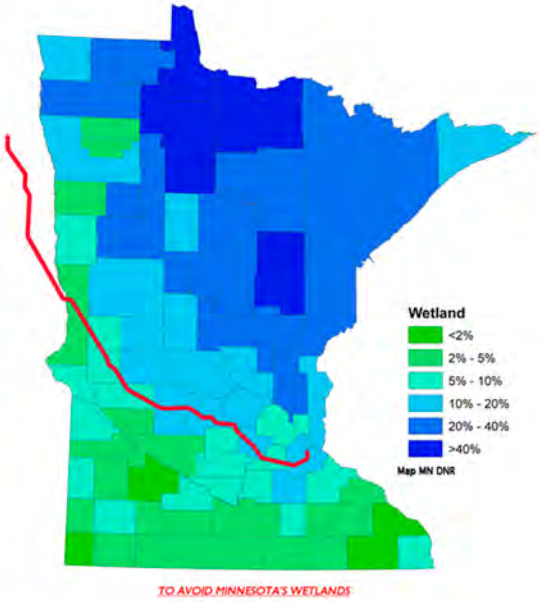
Route D could also stay in the Magellan corridor along I94 and continue on into Wisconsin.

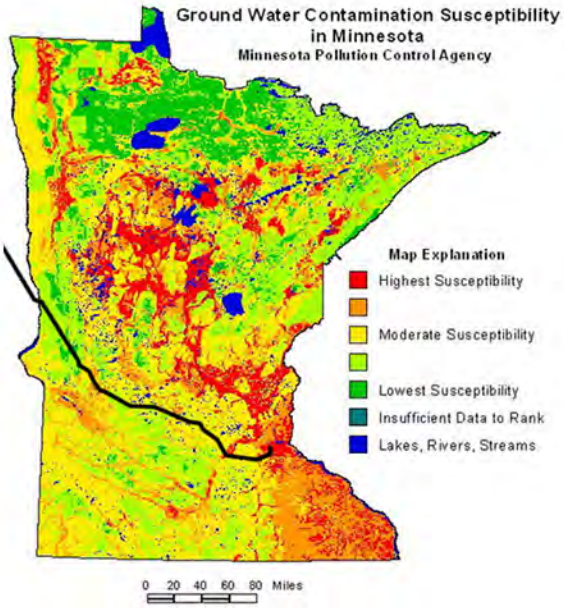
MAP APPENDIX

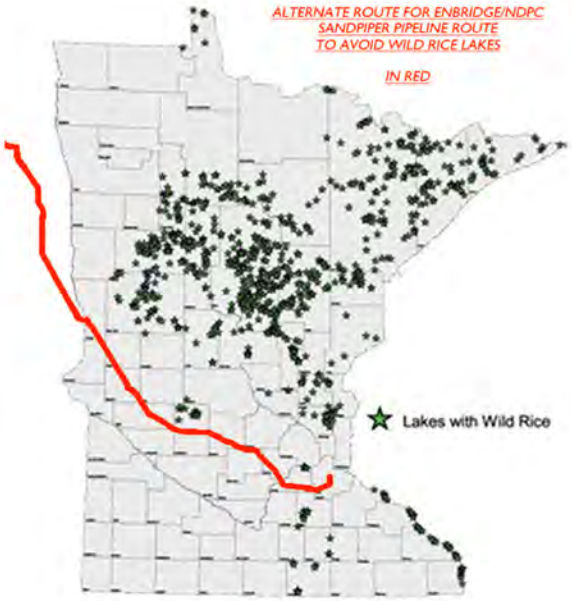
Wisconsin Petroleum Pipelines

Source:

Although these alternate routes avoid the high risk environmental lands and waters of the state as exhibited in the maps below, they do traverse areas of higher population near the Twin Cities. This route does allow a connection along existing pipeline corridors into western and central Wisconsin to Enbridge's pipeline system in Wisconsin. Enbridge has option to ship oil north back to Superior, WI or south to Chicago hub.



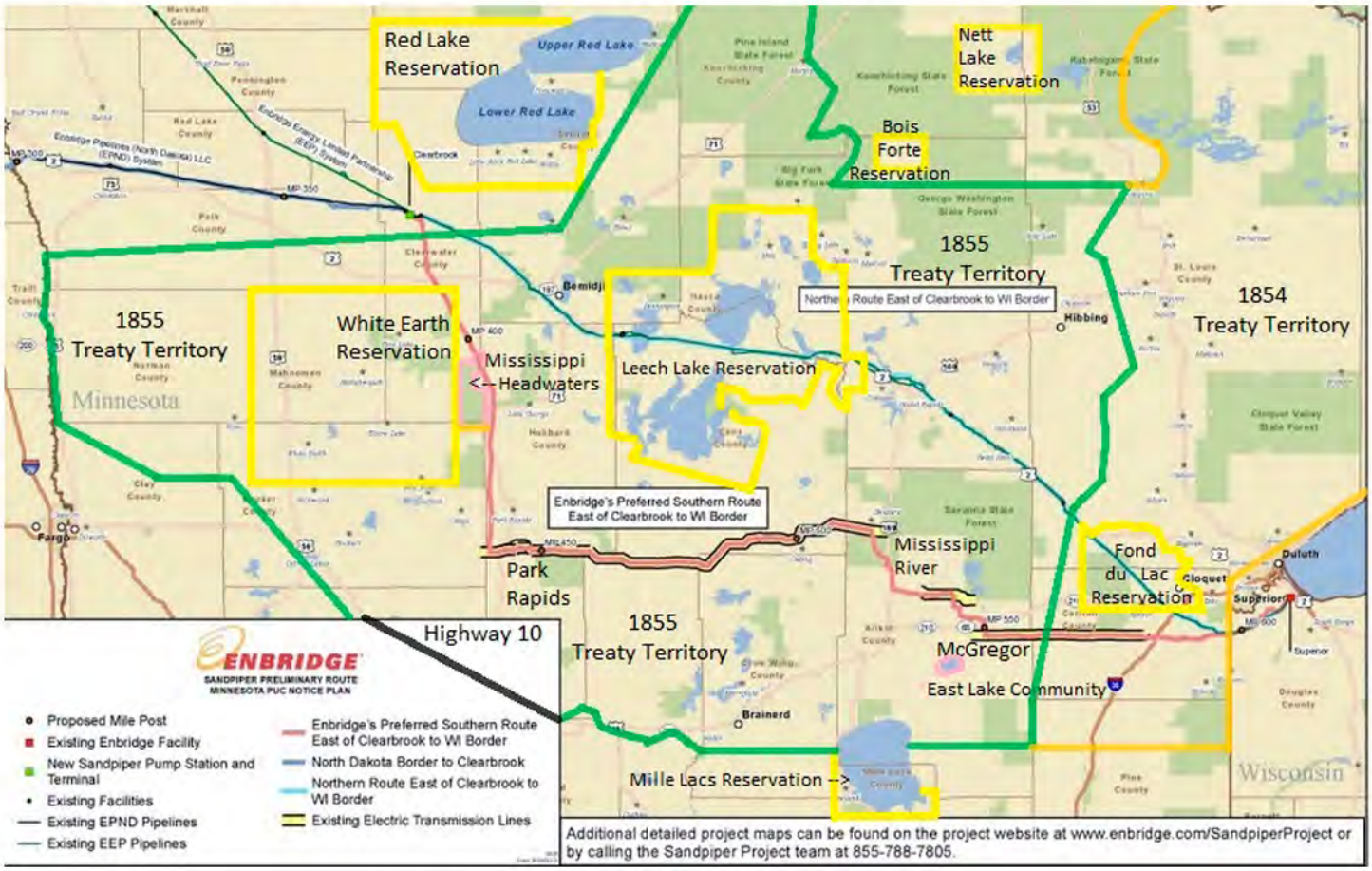




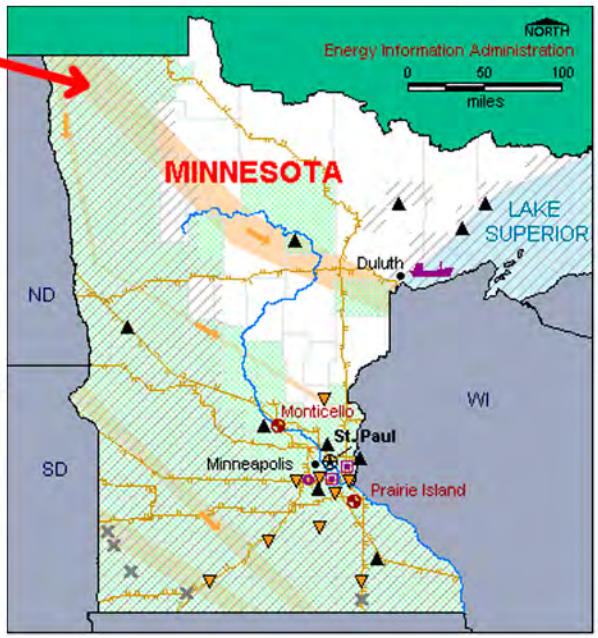
As currently planned with the exception of a few tax dollars and short term construction monies Minnesotans derive no long term benefits from these pipelines and assume all the risks from leaks/spills/ruptures. And eventually these pipelines will leak or break. Enbridge's spill history in Minnesota proves it true.

Friends of the Headwaters therefore recommends to the PUC, DOC and other state agencies that they enforce our MEPA statutes and deny the Certificate of Route permit for the Enbridge/NDPC's proposed Sandpiper pipeline corridor through Minnesota's prime lake country. A perfectly viable, low risk alternative is available south of our best waters.

In summary, the *FRIENDS of the HEADWATERS* opposes the Enbridge/NDPC Sandpiper Pipeline route proposal as marked on the map below. What does it say about a company that would neglect to feature the state's most famous river, the Mississippi, on their proposed route map? Perhaps this is evidence of their true concern for Minnesota's valuable and cherished water resources.



Enbridge already has too large a footprint across Minnesota's Headwaters Country.



Too much is at risk, not only with the state's clearest lakes; ground water aquifers; fish and wildlife; wild rice; lake and riverfront homes, businesses, and communities; tourism industry; lands and forests; but there's also Lake Superior.

Does Enbridge's insistence on the pipeline ending at Superior portend a future of shipping oil on the Great Lakes? Ironic that a ship icon just happens to be on the adjacent map.

The people of Minnesota should not allow a Canadian corporation with its North Dakota Pipeline Company US subsidiary to dictate the terms of this project.

The company has yet to explain the need for Superior as the end point. This proposed pipeline route should not proceed without legitimate justification. Said reasoning should not include corporate profits.

Friends of the Headwaters believes up here a barrel of water IS worth more than a barrel of oil.

STATE OF MINNESOTA
PUBLIC UTILITIES COMMISSION

Beverly Jones Heydinger	Chair
Dr. David C. Boyd	Commissioner
Nancy Lange	Commissioner
Dan Lipschultz	Commissioner
Betsy Wergin	Commissioner

In the Matter of the Application of North Dakota Pipeline Company LLC for a Certificate of Need for the Sandpiper Pipeline Project in Minnesota	OAH Docket No. 8-2500-31259 PUC Docket No. PL-6668/CN-13-473
In the Matter of the Application of North Dakota Pipeline Company LLC for a Pipeline Routing Permit for the Sandpiper Pipeline Project in Minnesota	OAH Docket No. 8-2500-31260 PUC Docket No. PL-6668 / PPL-13-474

FRIENDS OF THE HEADWATERS COMMENTS ON CONSIDERATION OF SYSTEM ALTERNATIVES AND THE LEGAL BASIS FOR CONSIDERATION OF SYSTEM ALTERNATIVES IN THE NEED AND ROUTING PROCEEDINGS

Friends of the Headwaters ("FOH") hereby provides its comments in response to the Minnesota Public Utilities Commission ("Commission") Notice of Comment Period dated August 12, 2014. This notice identified the following topics for comment:

- What if any of the eight system alternatives identified in the Department of Commerce Alternative Routes Summary Report should be considered further in these proceedings?
- What is the legal basis for determining whether a system alternative should be considered in the certificate of need proceeding?

- What is the legal basis for determining whether a system alternative should be considered in the route permit proceeding?

In response, FOH provides the following comments and also incorporates by reference its August 5, 2014, Reply Comments on the Comments and Recommendations of the Minnesota Department of Commerce on Selection of Alternative Routes ("FOH August 5 Comments").

I. CONSIDERATION OF SYSTEM ALTERNATIVES

Selection of so called "system alternatives" by the Commission under Minn. Stat. Ch. 216G ("Routing Law") and Minn. Stat. Ch. 116D, the Minnesota Environmental Policy Act ("MEPA"), must take into consideration the "underlying" need for the Project, the potential for an alternative to reduce environmental impacts, and an alternative's apparent feasibility with regard to this need. The factors that should be considered in the Commission's consideration are discussed in the FOH August 5 Comments at 24-27, 37-39.

A. The Alleged Underlying Need for the Project

FOH contests the overall need for the Project and intends to present evidence that the Commission must deny NDPC a Certificate of Need for failing to meet its burden of proof under Minn. Stat. § 216B.243 and Minn. R. Ch. 7853. This being said, NDPC has alleged a number of facts in its Application for a Certificate of Need ("CON Application") related to commercial demand for the Project and its plan to upgrade its infrastructure to meet this alleged demand. As described in detail in the FOH August 5 Comments at 6-8, NDPC has described the commercial purpose of the Project as follows:

> The Project's purpose is to transport the growing production of domestic crude oil from the Bakken and Three Forks formations in the Williston Basin of eastern Montana and western North Dakota to meet the increased demands of refineries and markets in the Midwest and the East Coast.

NDPC Environmental Impact Report ("EIR") at 1-2 (footnote omitted). In its CON Application, NDPC describes this purpose similarly:

> Enbridge's shippers will use the pipeline for the transportation of crude oil to Enbridge's breakout tankage facilities at Clearbrook, Minnesota or Superior, Wisconsin. At Clearbrook, the crude oil will be delivered to interconnected facilities operated by Minnesota Pipe Line Company for delivery to Minnesota refineries. At Superior, the crude oil will be delivered into the Enbridge Mainline System and other third-party pipelines for delivery to refineries in the Midwest and the East Coast.

CON Application at Section 7853.0230 at 5 (footnotes omitted.) Thus, NDPC has described three potential markets for the transportation services to be offered by the Project:

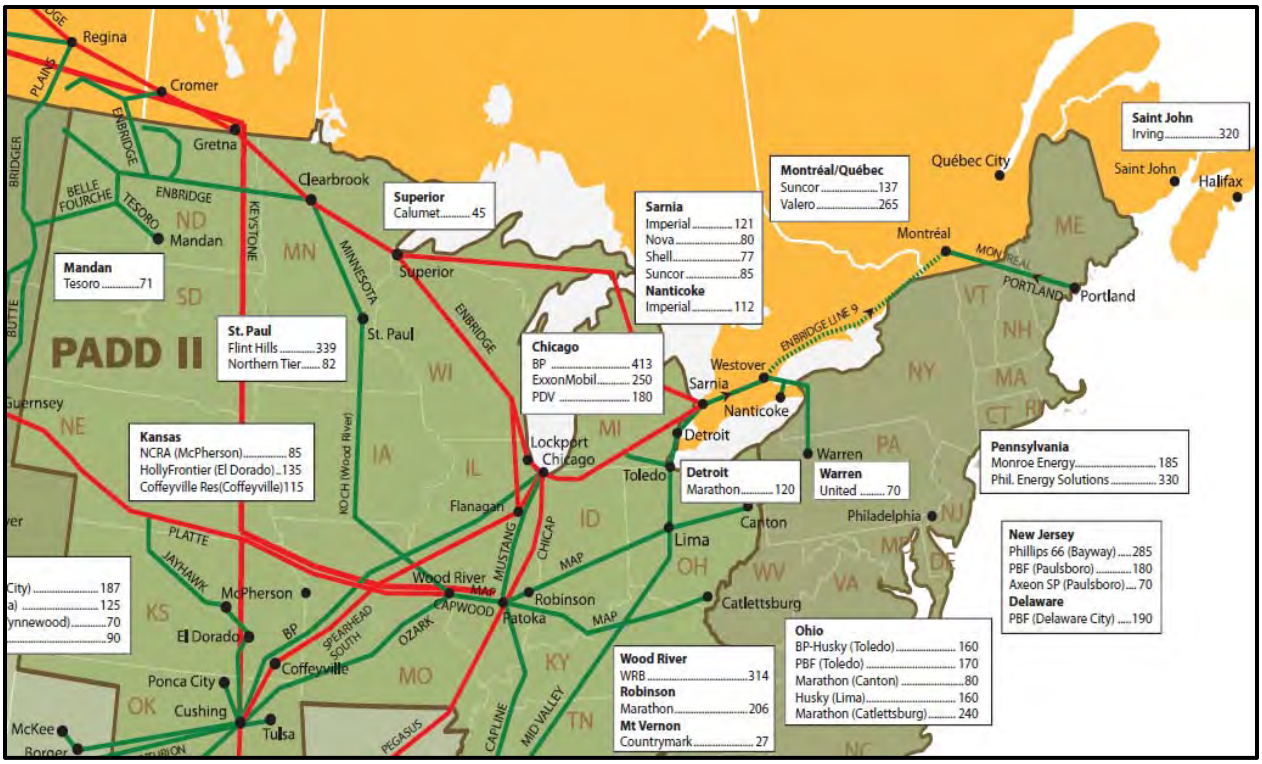
- Minnesota refineries;
- Midwestern refineries; and
- East Coast refineries.

NDPC has also claimed that serving these refinery markets require that the Project connect to its Clearbrook and Superior Terminals.

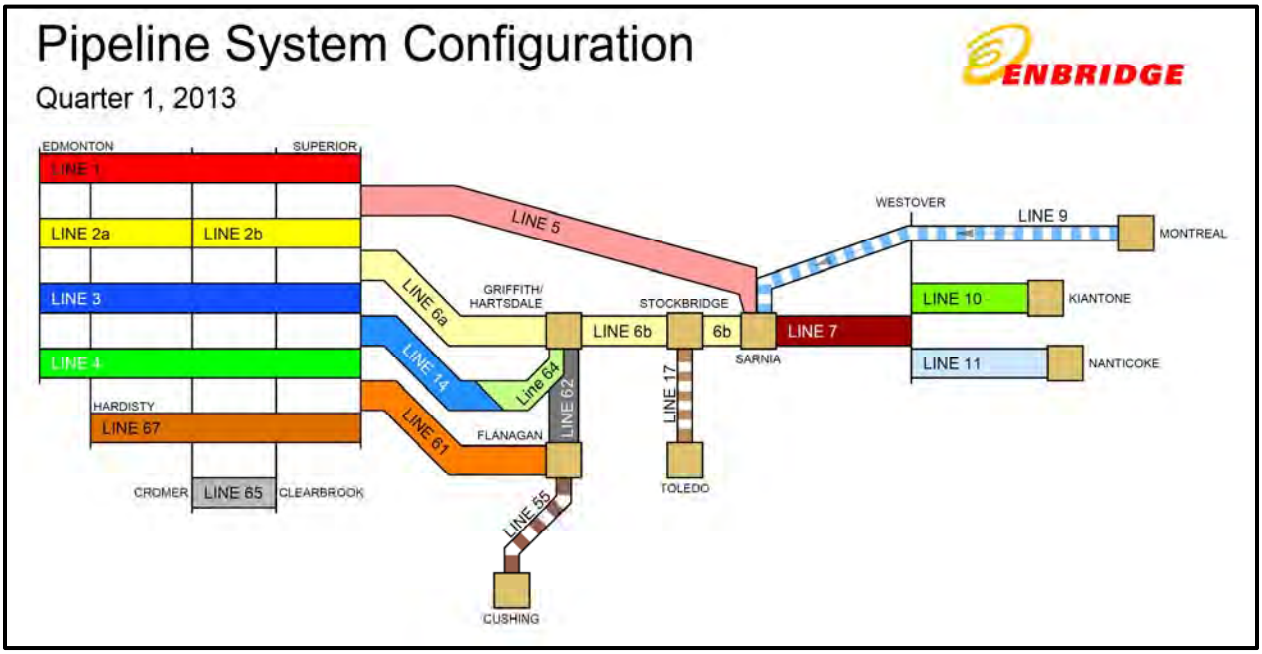
The following discusses the NDPC and Enbridge pipelines systems at issue, the alleged demand for the transportation services to be provided by the Project, and the need for NDPC to ship crude oil on the Project to this demand via the Clearbrook and Superior Terminals.

1. Description of Pipeline Systems at Issue

The following map provides a simplified view of the pipeline systems at issue in this proceeding.



In addition, Enbridge has published the following System Configuration graphic that schematically describes its Mainline System. (A complete map and system configuration graphic are included as Attachment A).



Together, the foregoing map and graphic show that the Clearbrook Terminal serves two structural purposes:

1) to transfer crude oil to the Minnesota Pipeline for delivery to Minnesota refineries; and
2) to accept oil from the North Dakota Pipeline for delivery to the Superior Terminal.

They also show that the Superior Terminal has four structural purposes:

1) delivery of crude oil via local pipeline to the Calumet Refinery in Superior, Wisconsin;
2) delivery of crude oil via Line 5 to the Sarnia Terminal in Ontario;
3) delivery of crude oil via Lines 6a, 14, and 64 to the Lockport Terminal in northern Illinois;
4) delivery of crude oil via Line 61 to the Flanagan Terminal in northern Illinois.

FOH notes that no U.S. East Coast refineries are served by pipelines, nor are the Canadian East Coast refineries in Quebec City, Quebec, and St. John, New Brunswick.

To understand the possible need for the Project to pass through the Clearbrook and Superior Terminals, it is necessary to determine the potential customer demand for service through these terminals. The following analyzes potential customer demand for U.S. Bakken Formation crude oil in U.S. and Canadian markets in relation to the specific functional purposes of the Clearbrook and Superior Terminals. This analysis shows that there is absolutely no need for additional crude oil pipeline service to the Clearbrook Terminal, and that what need exists related to the Superior Terminal is for transportation service to the Flanagan Terminal in

Northern Illinois, such that direct service to the Flanagan Terminal would meet most if not all of Enbridge's predicted customer need.

2. The Alleged Need for a Route Connection to Clearbrook and for Additional Pipeline Capacity to Ship Oil to Minnesota Refineries

Although Enbridge does not include service to Minnesota refineries in its statements of purpose, it nonetheless implies that part of the purpose for the Project is to provide service to these refineries. The Commission should understand that available evidence unequivocally shows that there is no need for additional crude oil pipeline deliveries from North Dakota to Minnesota through the Clearbrook Terminal.

On March 14, 2014, the St. Paul Park Refining Company ("SPPRC"), which owns the 89,000 bpd St. Paul Park Refinery, filed a Protest at the Federal Energy Regulatory Commission (Attachment B) in which it states, *inter alia*:

> this Protest demonstrates that the proposed expansion pipeline and expansion surcharge (a) are not needed, (b) do not have broad shipper support, [and] (c) will provide no benefit to shippers taking delivery at Clearbrook . . . .[1]
>
> * * *
>
> SPPRC does not believe the expansion pipeline proposed by NDP is necessary or desirable to meet the transportation needs of SPPRC.[2]
>
> * * *
>
> the purported shipper benefits cited by NDP have no value to SPPRC."[3]

In addition, the SPPRC Protest contains substantial evidence in the form of 104 pages of expert affidavits and documentation in support of SPPRC's position.[4] It also severely criticizes a

[1], *Petition for Declaratory Order of North Dakota Pipeline Company*, FERC Docket No. OR14-21-000. PROTEST OF ST. PAUL PARK REFINING CO. LLC (March 13, 2014) at 1.
[2] *Id.* at 4.
[3] *Id.*
[4] *Id.* at s.

NDPC study that alleges need for the Project.[5] Thus, the SPPRC has stated in unequivocal terms that there is no need for the Project to connect to the Clearbrook Terminal for ultimate delivery to the St. Paul Park Refinery, or for that matter to the Flint Hills Refinery.

Although FERC denied this Protest, it did so on procedural grounds and did not review SPPRC's factual claims.[6] FERC stated:

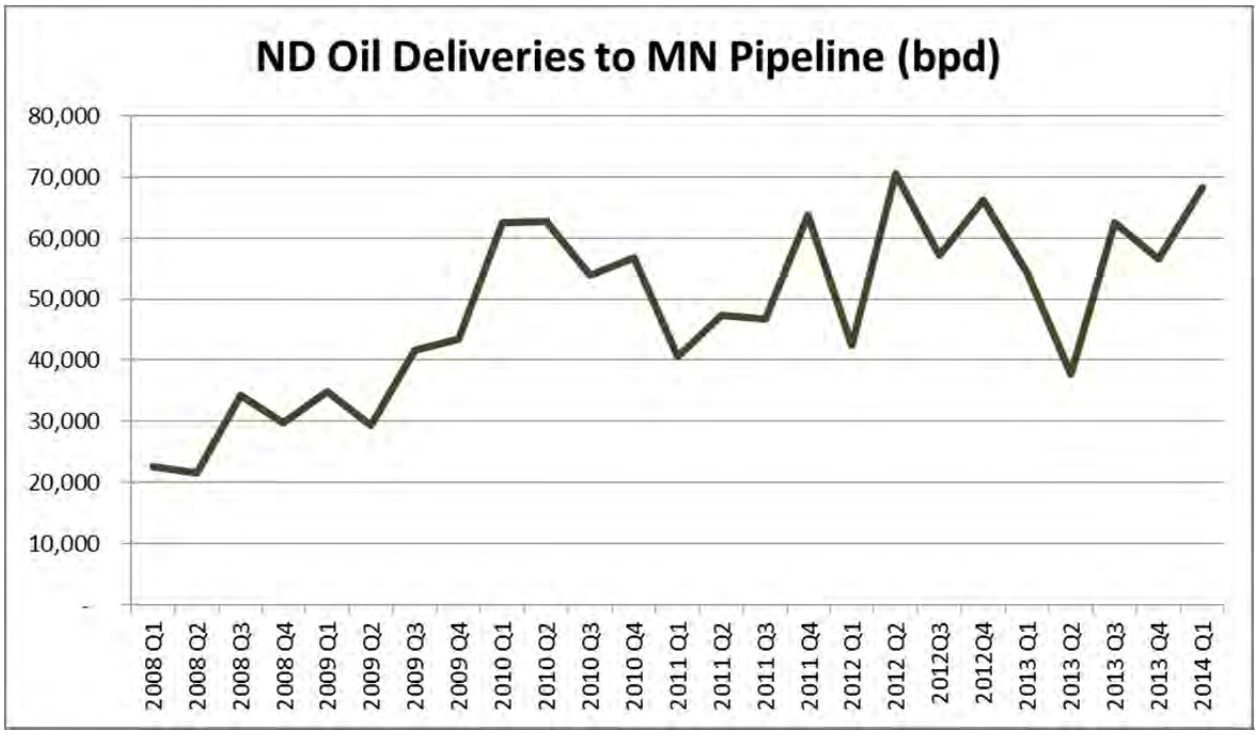
> More importantly, and especially pertinent to the instant petition, because the Commission does not regulate the entry14 or exit15 into the oil pipeline business as it does with natural gas pipelines, there is nothing preventing an oil pipeline from building or expanding a pipeline on a traditional common carrier cost-of-service basis and making the required initial rate filing thirty days prior to the requested effective date. Therefore, while the protesters criticize North Dakota Pipeline's study and assert there is no need for the proposed expansion and extension of the system, the arguments have no bearing on our determination here. Since the Commission does not have jurisdiction to grant certificates to oil pipelines or otherwise authorize or prevent construction, determining whether a pipeline is needed is not within its authority. Therefore, the Commission denies the protesters' requests to reject this petition based upon an alleged lack of need for the new construction or that issues concerning the justification for expanding the pipeline require examination at a hearing, before a declaratory order approving the general framework for the project is granted.

(Emphasis added, footnotes omitted.) FERC did not explain how an unneeded pipeline can ever have reasonable rates, nor did it discuss the fact that pre-approval of a tariff structure tends to promote pipeline development because there is almost no risk that FERC will impose a tariff that does not allow a return on investment. In contrast to FERC, the Commission has "jurisdiction to grant certificates [of need] to oil pipelines or otherwise authorize or prevent construction, determining whether a pipeline is needed . . . ." Thus, the claims of SPPRC are relevant to this proceeding.

[5] *Id.* at 7-9.
[6] Petition for Declaratory Order of North Dakota Pipeline Company, FERC Docket No. OR14-21-000. Order on Petition for Declaratory Order (May 15, 2014) at 9.

Flint Hills Resources, LP, ("Flint Hills"), which owns the 339,000 bpd Flint Hills Refinery in Rosemount, Minnesota, also filed comments in the same FERC docket (Attachment C).[7] While Flint Hills did not directly challenge the need for the Project, it did argue that it and other uncommitted shippers should "not bear financial responsibility for underutilization of the Sandpiper Project should shipper demand be less than NDPC anticipates . . . ."[8] Much of Flint Hill's comments relate to the financial risk resulting from underutilization of the Project. It seems unlikely that Flint Hills would focus on underutilization unless it anticipated a significant risk of it.

With regard to historical deliveries of U.S. Bakken Formation crude oil to Minnesota refineries by Line 81, FERC data filed by NDPC (and its predecessor) and the Minnesota Pipeline Company show the following quarterly deliveries[9]:



[7] *Petition for Declaratory Order of North Dakota Pipeline Company*, FERC Docket No. OR14-21-000. Comments of Flint Hills Resources, LP.
[8] *Id.* at 11
[9] This data is available at ferc.gov and comprises a substantial volume of material and therefore has not been attached hereto.

The data also shows that deliveries from North Dakota have been relatively stable for the past four years, ranging between approximately 50,000 bpd and 60,000 bpd, compared to a total refining capacity in the Twin Cities of 428,000 bpd. Assuming that Minnesota's refineries are operating at about 90% capacity, approximately 14% of the crude oil refined in Minnesota comes by pipeline from North Dakota. The average annual deliveries are shown below:

Year	BPD
Average 2010	58,993
Average 2011	49,650
Average 2012	59,087
Average 2013	51,569

The data filed at FERC by NDPC and the Minnesota Pipeline Company indicate that:

(1) the current capacity of the North Dakota Pipeline System (210,000 bpd) far exceeds historical deliveries to Minnesota refineries from North Dakota; and

(2) deliveries of North Dakota oil by pipeline to Minnesota are stable and show no sign of increasing.

NDPC has claimed that the Project will benefit Minnesota by providing redundant service to Clearbrook,[10] but the value, if any, of such redundant service appears low given that Minnesota's refineries have relied on the existing pipeline service from North Dakota for years and have not found it unreliable. FOH asserts that the benefit of such redundant service should not outweigh the risks to Minnesota's environment caused by the Project, and should not itself require service to the Clearbrook Terminal.

Taken together, the Protest filed by SPPRC and the FERC data indicate that Minnesota refineries do not need the Project such that connecting the Project to the Clearbrook Terminal is unnecessary. Although the Flint Hills refinery did not make as clear statements as SPPRC, it did

[10] CON Application, Section 7853.0230 at 5.

voice concerns about the risk of underutilization of the Project, including the risk that construction of the Project could unnecessarily increase Minnesota refinery costs. Such concern indicates that Flint Hills is likewise concerned about the future need for the Project. This position also suggests that there is no need for the Project route to pass through Clearbrook.

Moreover, NDPC has proposed to configure the Project so that no oil can be introduced into it from the Enbridge's Mainline System at Clearbrook. In the absence of a need to deliver crude oil to or receive oil at Clearbrook, there is no reason at all for the Project route to go through Clearbrook, except to the extent it might provide redundant service, which likely is of little to no value.

Given this information, the Commission should find that for the purposes of selecting alternative routes for further study, there is no need for such routes to connect to the Clearbrook Terminal. In fact, the evidence presented herein indicates that the Project could not be built at all or could bypass the Clearbrook Terminal without having any adverse impacts on Minnesota's refineries or Enbridge's downstream operations. Therefore, the Commission should find that connection to the Clearbrook Terminal and deliveries to Minnesota refineries are not a necessary component of the Project, such that it must consider "system alternatives" that do not include a connection to Clearbrook.

3. The Alleged Need for a Route Connection to the Superior Terminal

Evaluating the alleged need for the Project to end at the Superior Terminal is somewhat more complex, but can be understood through a systematic analysis of each of the downstream markets served by this terminal. The following provides a preliminary analysis. Although a full analysis of need will depend on completion of the contested case hearing under Minn. Stat. Ch. 216G, the purpose of the following analysis is to help the Commission gain an adequate

understanding of the customer needs alleged by NDPC in relation to the Superior Terminal, so that it can better understand why it must consider "system alternatives" that could feasibly meet Enbridge's alleged underlying purpose and need for the Project by connecting to other Mainline System terminals.

As noted, Enbridge can ship oil from the Superior Terminal directly to one refinery and three other terminals that serve differing refinery market. Specifically, from the Superior Terminal, Enbridge can ship crude oil:

1) via local pipeline to the Calumet Refinery in Superior, Wisconsin;
2) via Line 5 to the Sarnia Terminal in Ontario, which terminal serves a number of refineries in Sarnia, as well as refineries downstream in Detroit, Michigan, Warren, Pennsylvania, Nanticoke, Ontario, and Montreal, Quebec;
3) via Lines 6a, 14, and 64 to the Lockport Terminal in northern Illinois, that transfers oil for delivery to refineries in Illinois, Detroit, Ohio, the Sarnia Terminal and all the refineries served by it, as well as refineries in the Midwest and Gulf Coast; and
4) via Line 61 to the Flanagan Terminal in Illinois, which can serve essentially the same refineries as Lines 6a, 14, and 64, but which also has a higher capacity connection to the U.S. Gulf Coast.

The question before the Commission with regard to the Superior Terminal is whether this is the only delivery point on the Enbridge Mainline System that could feasibly serve the customer needs alleged by Enbridge. Each of the foregoing delivery options is discussed below, in turn.

Deliveries to the Calumet Refinery

The Calumet Refinery, which refines primary light crude oil, is one of the smallest in the U.S., with a rated capacity of only 45,000 bpd.[11] This capacity is dwarfed by the Mainline System's current light crude oil capacity of 1,254,300 bpd.[12] Thus, the Calumet Refinery is adequately served by existing light oil pipeline capacity to the Superior Terminal and does not itself justify a routing requirement that the Project terminate at the Superior Terminal.

Deliveries Via Line 5 to Sarnia, Ontario, and Downstream Refineries

Line 5 begins at the Superior Terminal and ends at the Sarnia Terminal in Ontario, Canada. However, Line 5 is not the only Enbridge pipeline to Sarnia, because Line 6b also terminates at Sarnia. Thus, it is possible to ship light crude oil to northern Illinois and then on to Sarnia.

It is not possible to ship crude oil from Sarnia further south than perhaps Toledo, Ohio, though it is not clear that all of the refineries in Toledo have access to this crude oil. Thus, Line 5 at most serves only three U.S. Midwestern refineries: the Detroit Marathon Refinery and the PBF and BP-Husky Refineries in Toledo, Ohio. To FOH's knowledge, none of these refineries has announced plans to refine greater amounts of light sweet crude oil, or to increase their overall capacity. Also, all of these refineries are also served by spurs off of Line 6b. and the Toledo refineries are also served by the Mid-Valley Pipeline from the south, such that the pipeline infrastructure that currently serves them is adequate to meet their needs. Thus, the evidence indicates that these refineries will have no increased demand for U.S. Bakken Formation crude oil, and to the extent that marginal increases might be needed, they are currently served by two other pipelines in addition to Line 5. As such, demand from these three

[11] CAPP North American Pipeline Map, Attachment A.
[12] Enbridge System Configuration, Attachment A.

Midwestern U.S. refineries does not justify increased shipments of U.S. Bakken Formation crude oil through the Superior Terminal on Line 5.

Crude oil shipped on Line 5 can also reach the small United Refining Refinery in Warren, Pennsylvania, but this refinery consumes mostly heavy crude oil and has no expansion plans. Therefore, this refinery, too, provides no justification to ship increased amounts of Bakken Formation crude oil to the Superior Terminal for transportation on Line 5.

Other than the foregoing U.S. refineries, Line 5 serves only eastern Canadian refineries. With regard to the need for increased shipments of Bakken Formation crude oil to eastern Canada, a group of NDPC's customers also filed a protest in Enbridge's FERC tariff case ("Shipper Protest") (Attachment D), in which they alleged that this need was specious.[13] The Shipper Protest includes the following statement about NDPC's claim that the Project serves refinery needs in eastern Canada:

> [NDPC's] suggestion that Bakken crude can break into the Eastern Canadian market is also fanciful. This region receives large quantities of its pipeline crude oil supplies from Western Canadian producers and Canadian producers view this area as a target market for their growing production. It is faulty economic logic to assume that those producers will permit their markets to be eroded by Bakken crude oil without taking responsive action. Furthermore, 330,000 bpd of Eastern Canadian refining capacity is not even connected to pipelines.[14]

(Emphasis added.) The Shipper Protest also states:

> there is no economic basis to [NDPC's] conclusion that the construction of the Sandpiper pipeline will permit Bakken crude oil to replace existing crude oil supplies to U.S. Mid-Continent and Eastern Canadian refineries. . . . these refineries are currently buying Western Canadian crude oil and Canadian producers will

[13] Petition for Declaratory Order of North Dakota Pipeline Company, FERC Docket No. OR14-21-000, Protest and Opposition and Renewed Motion to Intervene of Concord Energy LLC, Enserco Energy LLC, Enwest Marketing LLC and WPX Energy Marketing, LLC in Response to North Dakota Pipeline Company LLC Petition for Declaratory Order (March 14, 2014).
[14] *Id.* at 21.

> certainly not permit American Bakken crude deliveries to undercut their markets. In fact, . . . when faced with price competition in the past, Canadian producers have taken whatever measures they believed necessary to preserve their market. There is every reason to believe that they will continue to do so in the future, particularly in view of the long distance pipelines that TransCanada and Enbridge are building from Western Canadian crude oil fields to Eastern Canadian refineries.[15]

(Footnotes omitted.) In short, it is very unlikely that eastern Canadian refineries will demand U.S. Bakken Formation crude oil because they are already supplied by domestic Canadian crude oil producers. Moreover, all of the refineries served by pipeline in eastern Canada are owned by companies (Imperial Oil, Nova, Shell, and Suncor) that also own crude oil extraction facilities in the Tar Sands Region, such that they can buy crude oil from themselves. Therefore, it appears very unlikely that these eastern Canadian refineries will demand Bakken Formation crude oil deliveries through the Superior Terminal via Line 5.

With regard to Enbridge's alleged need to transport oil by pipeline to U.S. East Coast refineries, which are in New Jersey, Pennsylvania, and Delaware, this is not currently physically possible because none of these refineries are served by pipelines. The same is true for Canada's coastal refineries in Quebec City and St. John. Thus, it appears that deliveries to these refineries do not create a need to ship Bakken Formation crude oil through the Superior Terminal to Line 5.

Therefore, available evidence indicates that NDPC and Enbridge have no need to ship oil to the Superior Terminal for delivery via Line 5 to Sarnia, because none of the refineries served by Line 5 are likely to demand more or even any U.S. Bakken Formation crude oil. As such, the Commission should not assume that deliveries to the Superior Terminal for transportation on Line 5 are a substantial purpose of the Project.

[15] *Id.* at 35-36.

Deliveries Via Lines 6a, 14, and 64 to the Lockport Terminal in Northern Illinois

Shipments to the Superior Terminal can also be forwarded to the Lockport Terminal in northern Illinois via Lines 6a, 14, and 64, and from there on to refineries in the Chicago area. From the Chicago area, there are connections east on Line 6b to Toledo, Detroit, Sarnia, Warren, Pennsylvania, and eastern Canada; and connections south to Patoka, Illinois, from where pipelines continue to refineries in Toledo, Lima, Canton, and Catlettsburg, Ohio, Cushing, Oklahoma, and the U.S. Gulf Coast.

As previously discussed, the likelihood of increased demand for U.S. Bakken Formation crude oil shipments via the Lockport Terminal by refineries in Toledo, Detroit, or Sarnia, or in refineries downstream from Sarnia, is a best limited, if not "fanciful." Thus, these refineries do not provide a need for increased Bakken Formation crude oil deliveries to the Superior Terminal for delivery to the Lockport Terminal.

The other refineries directly served by the Lockport Terminal are three Chicago area refineries:

(1) BP's 413,000 bpd Whiting Refinery, which recently completed a major modification to allow it to process primarily heavy sour crude oil, such that it will likely demand much less light crude oil;

(2) Exxon Mobil's 250,000 bpd Joliet Refinery, which is configured to process primarily heavy sour crude oil; and

(3) PDV/CITGO's 180,000 bpd Lemont Refinery in Lemont, Illinois; which is also configured to process primarily heavy sour crude oil, originally from its parent corporation in Venezuela.

Due to the configuration of these refineries, it is doubtful that they will demand greater supplies of U.S. Bakken Formation crude oil. Thus, it is unlikely that Enbridge can show a need to ship U.S. Bakken Formation crude oil via the Superior and Lockport Terminals to these refineries.

It is also possible to ship crude oil from Chicago to the Patoka Terminal in southern Illinois on the 100,000 bpd Mustang Pipeline, for delivery to refineries in Ohio, the southern Midwest, and the U.S. Gulf Coast. However, the small size of the Mustang Pipeline means that relatively little crude oil can flow through the Superior and Lockwood Terminals to these more distant markets. Instead, it appears that Enbridge intends to serve these more distant markets via Line 61 and the Flanagan Terminal.

Therefore, service through the Superior Terminal on Lines 6a, 14, and 64 to the Lockwood Terminal, is mostly confined to refineries in the Chicago area, Toledo, Detroit, Sarnia, and refineries downstream from Sarnia. As previously discussed, none of these refineries are likely to demand greater quantities of light sweet U.S. Bakken Formation crude oil. Therefore, there appears to be little reason for Enbridge to need additional pipeline capacity from North Dakota to the Superior Terminal for service to these refineries. This conclusion is also supported by the opinion of an expert who provided a sworn declaration included in the Shipper Protest, which declaration states:

> As far as the U.S. Midwest– *i.e.*, Eastern PADD II – is concerned, there are 13 refineries located in Michigan, Illinois, Indiana, Kentucky, Tennessee and Ohio. These refineries collectively use approximately 2.5 million bpd of crude oil. In 2012, these refineries imported over 1.2 million bpd of crude oil. Ninety-seven percent of these imports were from Western Canada. Canadian crude oil producers delivered a total of approximately 1.7 million bpd into the entire American Midwest region in 2012. <u>I do not believe that there is any real possibility that Western Canadian producers will permit North Dakota Bakken crude oil to replace any of the crude oil Mid-Continent refiners are now receiving from</u>

> Western Canada. In fact, if anything, Western Canadian crude oil will occupy an increasing portion of this PADD II market.[16]

(Emphasis added, footnotes omitted.) Thus, a number of Enbridge's shippers also believe that demand in the eastern Midwest for U.S. Bakken Formation crude oil will at best remain stagnant, but will more like drop due to increased pressure from Canadian crude oil imports.

Therefore, the Commission should not assume that the Project needs to connect to the Superior Terminal to allow increased quantities of light sweet U.S. Bakken Formation crude oil to flow via Lines 6a, 14, and 64 and the Lockport Terminal to downstream refineries. Since the need for increased service to the Lockport Terminal is at best limited and at worst non-existent, the Commission should not require alternative routes to terminate at the Superior Terminal based on a need to provide service to the Lockport Terminal.

Deliveries Via Line 61 to the Flanagan Terminal in Northern Illinois

The largest potential new pathways for oil from the Superior Terminal are on either:

- Line 61 to the Flanagan Terminal, which has a maximum capacity of 1,200,000 bpd, but currently is rated at only 400,000 bpd; or
- the yet to be announced Line 66 project to the Flanagan Terminal, which will likely be an 800,000 bpd pipeline.

From the Flanagan Terminal, Enbridge can at present, or plans via expansions, to ship crude oil to:

1) the Chicago area and markets downstream from Chicago on Line 6b or the Mustang Pipeline;

[16] Shipper Protest, Exhibit D, Sworn Declaration of Robert P. Garner in Support of Enwest Marketing Llc's Protest and Opposition to North Dakota Pipeline Company LLC's Petition for Declaratory Order and Enwest's Motion to Intervene at 13.

2) the Patoka Terminal, which has connections to Ohio refineries, Wood River, and possibly the U.S. Gulf Coast (if Marathon reverses its Capline Pipeline); and

3) the Cushing Terminal, which has connections to a number of refineries in southern states, as well as to U.S. Gulf Coast refineries via the Seaway Pipeline.

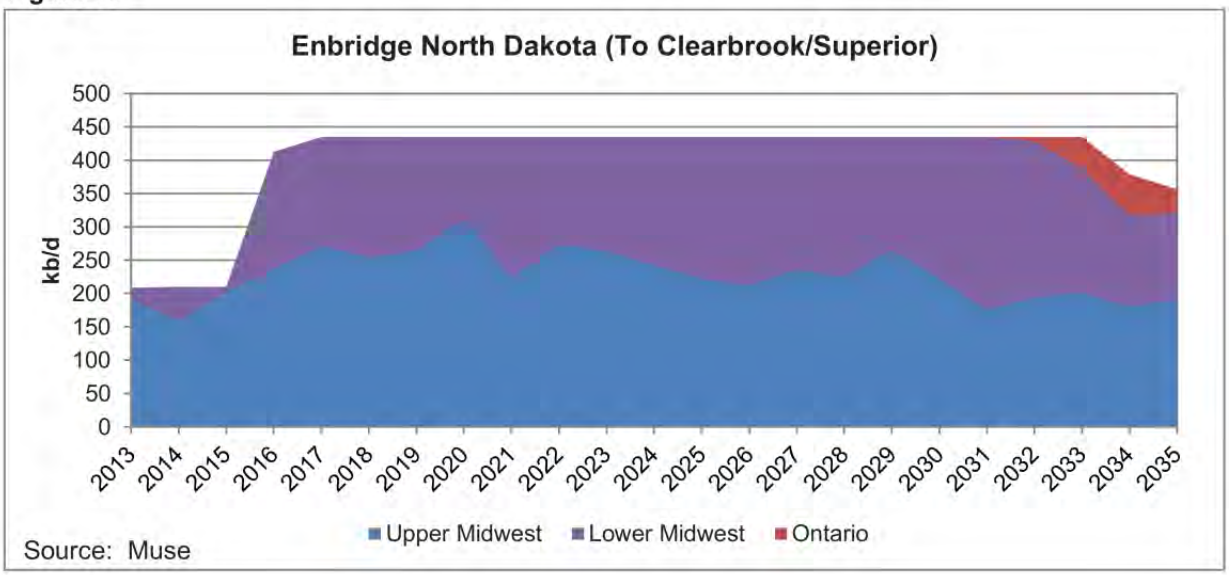
Each of the foregoing shipping options is discussed below.

Although crude oil can or will be able to flow from the Flanagan Terminal to the Chicago area via Enbridge's planned Line 78, as previously discussed, the likelihood of increased shipments of U.S. Bakken Formation crude oil to these markets is limited or even non-existent. There are no pipelines from Chicago to the U.S. East Coast refineries, increased demand by eastern Canadian refineries for U.S. Bakken crude oil appears "fanciful," and the refineries in the upper and eastern Midwest are primarily configured to refine heavy crude oil, which is provided by competing Canadian crude oil suppliers, and these refineries have not announced any significant expansions of light sweet crude oil refining capacity.

In contrast, Enbridge's planned pipeline expansions from the Flanagan Terminal south on the Southern Access Extension or Flanagan South Pipeline suggest that Enbridge's primary target market for the Project is the lower Midwest or U.S. Gulf Coast. From the Flanagan Terminal, Enbridge plans to ship oil via the Southern Access Extension to the Patoka Terminal and from there to Ohio refineries on Marathon's MAP Pipeline, and possibly to the U.S. Gulf Coast should Marathon reverse its Capline Pipeline to Louisiana. It also plans to ship crude oil on the Flanagan South Pipeline to Cushing, Oklahoma, which has connections to a number of southern refineries and the U.S. Gulf Coast. Thus, the primary new crude oil pathways planned or being built by Enbridge all pass through the Flanagan Terminal, which is intended to serve refineries in Ohio, a number of southern states, and the U.S. Gulf Coast.

This conclusion is also supported by the recently filed Direct Testimony of Neil Earnest, which provides the following chart on page 48 of the attached Schedule 2 Report.

Figure 18



While FOH does not agree that the historical or forecast data on which this chart is based are accurate, it does show that almost all of the new markets that Enbridge hopes will use the Project are in the "Lower Midwest." It shows that currently Enbridge is shipping between 150,000 to 200,000 bpd of U.S. Bakken Formation crude oil to the "Upper Midwest" and almost none of this oil to the "Lower Midwest." This forecast predicts that shipments to the "Upper Midwest" will increase to an average of approximately 250,000 bpd and then decline. In contrast, it predicts that shipments of U.S. Bakken Formation crude oil to the "Lower Midwest" will increase from current levels of 25,000 bpd or less to about 225,000 bpd. Thus, this chart reinforces FOH's contention that the primary purpose for the Project anticipated by NDPC and Enbridge is to ship more Bakken Formation crude oil to the Flanagan Terminal for shipment south.

This chart also confirms the contention in the SPPRC and Shipper Protests that shipments to eastern Canadian refineries are unlikely, because it shows no forecasted shipments to Ontario refineries until about 2032, which is far enough in the future to make such shipments entirely speculative.

To the extent that Enbridge hopes to ship crude oil to Ohio refineries, its best route is not through the Lockport Terminal and Chicago, but via the Flanagan Terminal and the planned Southern Access Extension to Patoka and then on Marathon's MAP Pipeline System to the Ohio Refineries.

Thus, the underlying need hoped for by NDPC and Enbridge is not primarily to deliver more oil through Lines, 5, 6a, 14, and 64 to the Sarnia, Lockwood and Chicago area Terminals, but rather on Lines 61 and 66 to the Flanagan Terminal for delivery through the Patoka and Cushing Terminals to markets to the south.

Given this underlying alleged need to move oil to the Flanagan Terminal, it is reasonable for the Commission to investigate "system alternative" options that serve the Flanagan Terminal, because such alternatives could meet most if not all of Enbridge's underlying alleged need.

B. The Commission Must Select One or More Routes that Connect to the Flanagan Terminal and Avoids Minnesota's Pristine Aquatic Resources, Because Such Route Would Meet Most if Not All of Enbridge's Alleged Underlying Need and Likely Reduce Environmental Impacts

In response to the Commission's January 31, 2014, Notice of Application Acceptance and Public Information Meetings, FOH volunteers proposed a number of alternative routes, including the routes enumerated by the Department of Commerce Report dated July 17, 2014, ("DOC Report") as SA-04, SA-05, SA-06, SA-07, and SA-08. In addition, Honor the Earth proposed a route that followed Interstate 29 to Interstate 94 through Minnesota, and the

Minnesota Pollution Control Agency ("PCA") proposed route SA-03 and voiced support for consideration of other routes through central Minnesota.

The general policy intent of these routes was to avoid going through Minnesota's most pristine aquatic and wild rice while still providing crude oil transportation service to northern Illinois. It is true that these routes are not technically specific and were based on uncertainty about Enbridge's alleged commercial need for its Project, but the Commission should not expect citizens to provide alternative routes with the same level of precision as that possessed by NDPC and Enbridge. Instead, FOH suggests that the Commission understand that its purpose should be to focus on the underlying policy goals of citizen commenters and then direct the Department of Commerce to develop more precise alternative routes that meet these goals.

Moreover, the Commission should consider these routes in light of the June 25, 2014, approval by the North Dakota Public Service Commission of a route through North Dakota, because this approval did not exist during Minnesota's routing comment period. Should this approval have been made before or during Minnesota's comment routing comment period, citizens would have adapted their routes to it. The Commission has the discretion to recognize this recent development and modify previously proposed routes accordingly.

1. FOH Combined Routes

After reviewing all of its own proposed routes, as well as the routes proposed by Honor the Earth and the PCA, in light of the North Dakota approval, the DOC Route Report, and the more detailed need analysis presented in these comments, FOH proposes that the Commission adapt different elements of the various proposals into an alternative route or routes that likely meet the policy goals of the citizen commenters, as well as many Minnesotans, while still

meeting most if not all of Enbridge's alleged need. Specifically, FOH proposes the following combined route alternatives:

a) **Combined SA-03, SA-07, and SA-04 Route**: Due to the completion of the North Dakota Public Service Commission routing process, FOH proposes to start SA-04 at the terminus of the North Dakota route and then follow SA-03 south along the Viking Pipeline to the point where the Viking Pipeline turns east. At his point, this proposed alternative route would continue south to the Magellan Pipeline and follow it to the SA-04 route (Alliance Pipeline), from where it would follow the Alliance Pipeline to northern Illinois and ultimately the Flanagan Terminal. The policy purpose of this route is to combine the SA-03, SA-07, and SA-04 routes so as to recognize the North Dakota approval and follow existing pipeline corridors to the maximum extent possible while avoiding northern Minnesota's aquatic resources and providing crude oil transportation service to northern Illinois.

b) Combined SA-03 and SA-08 Route Extended Through Wisconsin:

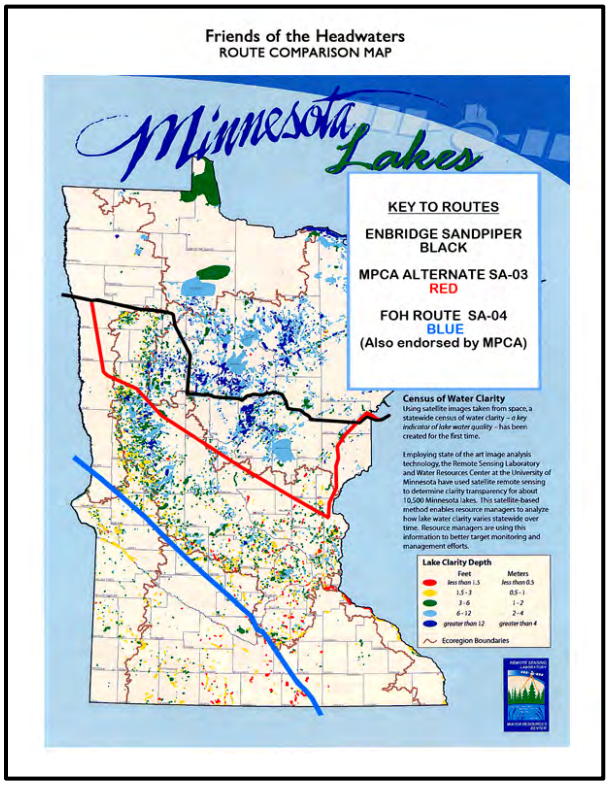
This proposed route is intended to acknowledge the decision of the North Dakota Public Service Commission by entering Minnesota at the terminus of the approved route in North Dakota, then following SA-03 south along the Viking Pipeline to the point that it turns east, and continuing south from there to the SA-07/SA-08 routes, at which point the route would follow the Magellan Pipeline to into central Wisconsin, to a connection with Line 61. The policy purpose of this route is to combine the SA-03, SA-07, and SA-08 routes so as to follow existing pipeline corridors to the maximum extent possible while avoiding northern Minnesota's aquatic resources and providing crude oil transportation service to northern Illinois.

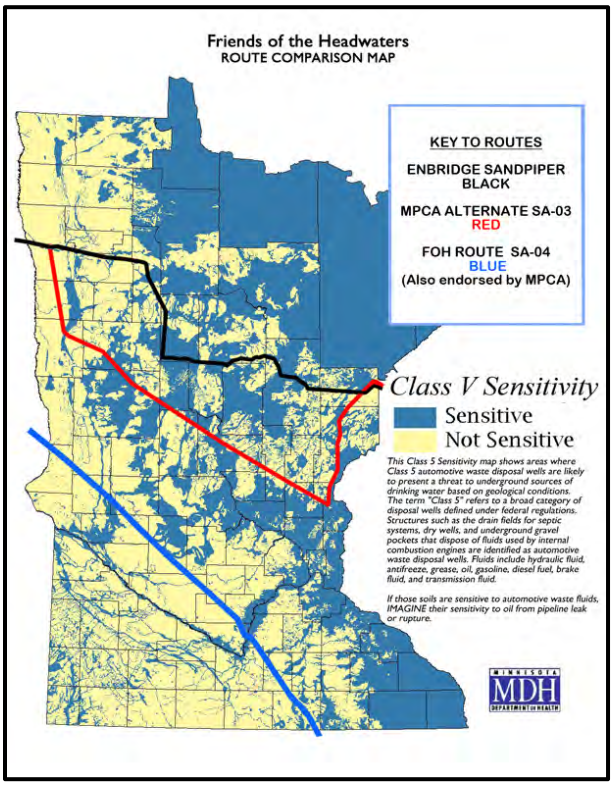
c) Combined SA-03, SA-07, and Wood River Pipeline Route:

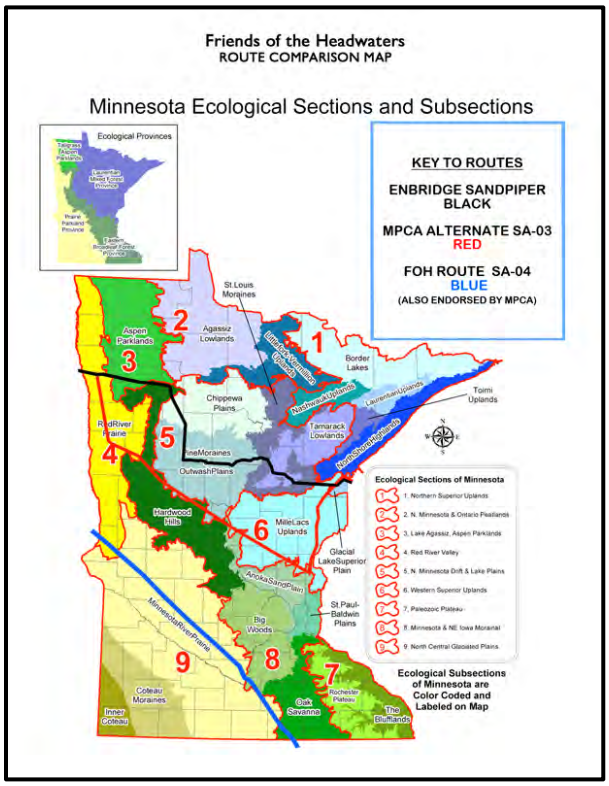
This proposed route is intended to acknowledge the decision of the North Dakota Public Service Commission by entering Minnesota at the terminus of the approved route in North Dakota, then following SA-03 south along the Viking Pipeline to the point that it turns east. At this point, this proposed alternative route would continue south to the Magellan Pipeline and follow it to the terminus of the Wood River Pipeline, from where Enbridge would purchase and use the Wood River Pipeline to transport crude oil to its Flanagan South Pipeline and/or Wood River. The policy purpose of this route is to combine the SA-03, SA-07, and currently mothballed Wood River Pipeline so as to follow existing pipeline corridors to the maximum extent possible and fully utilize existing pipeline infrastructure within the state while avoiding northern Minnesota's aquatic resources and providing crude oil transportation service to central Illinois. Although the Wood River Pipeline has been discussed by a number of commenters, FOH believes the Commission would be remiss if it did not at least investigate why an existing unused pipeline through Minnesota that could serve much of the need alleged by Enbridge is not being used by the industry.

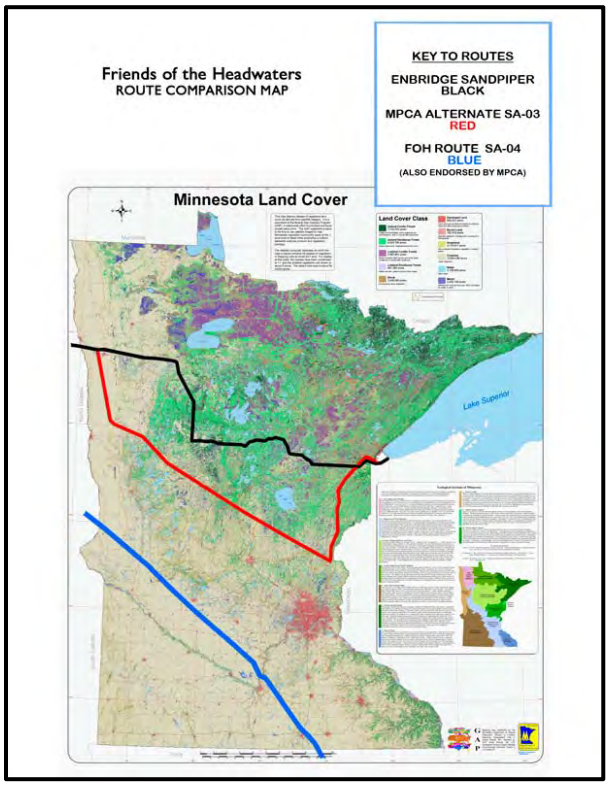
2. The Environmental Advantages of FOH's Proposed Combined Routes Relative to the NDPC Preferred Route

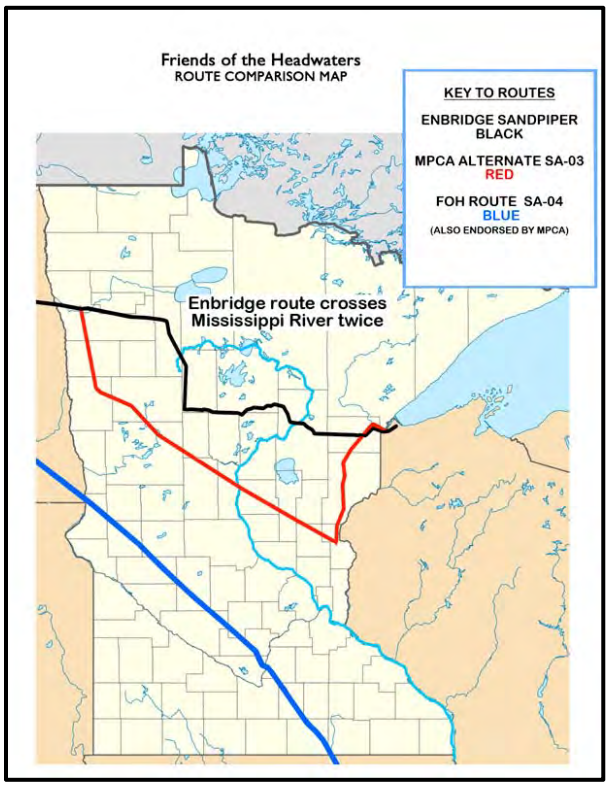
As previously described in FOH written and oral comments, the NDPC proposed route cuts through the heart of Minnesota's pristine lake county, Mississippi River headwaters, and the wild rice that grows abundantly in this region. In addition, it impacts sensitive soil types and ground water resources. In contrast, the routes proposed by citizens and the PCA seek to avoid these impacts while continuing to serve Enbridge's alleged commercial need for the Project. The following maps show with great clarity that NDPC's proposed route puts critical environmental resource at risk.

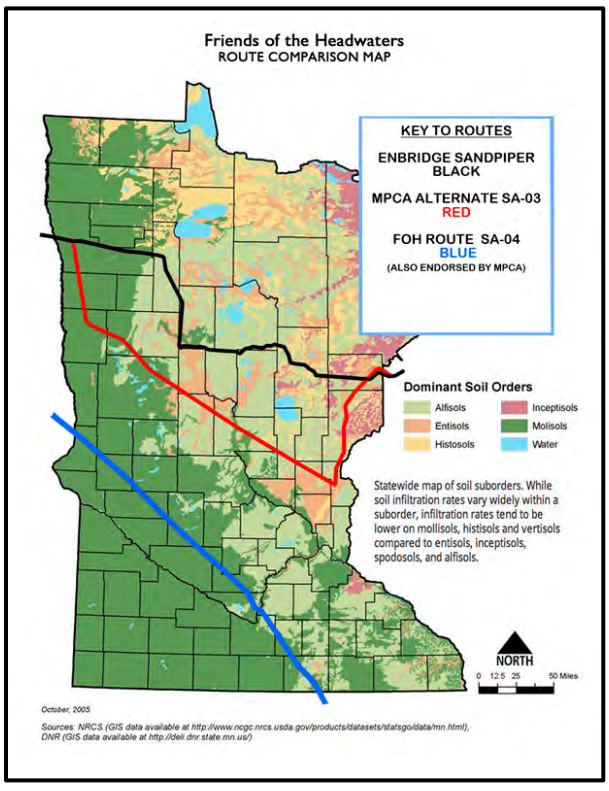

Friends of the Headwaters
ROUTE COMPARISON MAP
Minnesota Lakes
KEY TO ROUTES
ENBRIDGE SANDPIPER
BLACK
MPCA ALTERNATE SA-03
RED
FOH ROUTE SA-04
BLUE
(Also endorsed by MPCA)
Census of Water Clarity
Using satellite images taken from space, a statewide census of water clarity – a key indicator of lake water quality – has been created for the first time.
Employing state of the art image analysis technology, the Remote Sensing Laboratory and Water Resources Center at the University of Minnesota have used satellite remote sensing to determine clarity transparency for about 10,500 Minnesota lakes. This satellite-based method enables resource managers to analyze how lake water clarity varies statewide over time. Resource managers are using this information to better target monitoring and management efforts.
Lake Clarity Depth
Feet
Meters
less than 1.5
less than 0.5
1.5 - 3
0.5 - 1
3 - 6
1 - 2
6 - 12
2 - 4
greater than 12
greater than 4
Ecoregion Boundaries


Friends of the Headwaters
ROUTE COMPARISON MAP
KEY TO ROUTES
ENBRIDGE SANDPIPER
BLACK
MPCA ALTERNATE SA-03
RED
FOH ROUTE SA-04
BLUE
(Also endorsed by MPCA)
Class V Sensitivity
Sensitive
Not Sensitive
This Class 5 Sensitivity map shows areas where Class 5 automotive waste disposal wells are likely to present a threat to underground sources of drinking water based on geological conditions. The term "Class 5" refers to a broad category of disposal wells defined under federal regulations. Structures such as the drain fields for septic systems, dry wells, and underground gravel pockets that dispose of fluids used by internal combustion engines are identified as automotive waste disposal wells. Fluids include hydraulic fluid, antifreeze, grease, oil, gasoline, diesel fuel, brake fluid, and transmission fluid.
If those soils are sensitive to automotive waste fluids, IMAGINE their sensitivity to oil from pipeline leak or rupture.
MINNESOTA
MDH
DEPARTMENT OF HEALTH


Friends of the Headwaters
ROUTE COMPARISON MAP
Minnesota Ecological Sections and Subsections
Ecological Provinces
KEY TO ROUTES
ENBRIDGE SANDPIPER
BLACK
MPCA ALTERNATE SA-03
RED
FOH ROUTE SA-04
BLUE
(ALSO ENDORSED BY MPCA)
St.Louis Moraines
Aspen Parklands
Agassiz Lowlands
Border Lakes
Chippewa Plains
Tamarack Lowlands
Toimi Uplands
RedRiver Prairie
OutwashPlains
Hardwood Hills
MilleLacs Uplands
Glacial LakeSuperior Plain
AnokaSandPlain
St.Paul-Baldwin Plains
Big Woods
MinnesotaRiverPrairie
Coteau Moraines
Inner Coteau
Oak Savanna
Rochester Plateau
The Bluffs
Ecological Sections of Minnesota
1. Northern Superior Uplands
2. N. Minnesota & Ontario Peatlands
3. Lake Agassiz, Aspen Parklands
4. Red River Valley
5. N. Minnesota Drift & Lake Plains
6. Western Superior Uplands
7. Paleozoic Plateau
8. Minnesota & NE Iowa Morainal
9. North Central Glaciated Plains
Ecological Subsections of Minnesota are Color Coded and Labeled on Map


Friends of the Headwaters
ROUTE COMPARISON MAP
KEY TO ROUTES
ENBRIDGE SANDPIPER
BLACK
MPCA ALTERNATE SA-03
RED
FOH ROUTE SA-04
BLUE
(ALSO ENDORSED BY MPCA)
Minnesota Land Cover
Land Cover Class
Lake Superior


Friends of the Headwaters
ROUTE COMPARISON MAP
KEY TO ROUTES
ENBRIDGE SANDPIPER
BLACK
MPCA ALTERNATE SA-03
RED
FOH ROUTE SA-04
BLUE
(ALSO ENDORSED BY MPCA)
Enbridge route crosses
Mississippi River twice


Friends of the Headwaters
ROUTE COMPARISON MAP
KEY TO ROUTES
ENBRIDGE SANDPIPER
BLACK
MPCA ALTERNATE SA-03
RED
FOH ROUTE SA-04
BLUE
(ALSO ENDORSED BY MPCA)
Dominant Soil Orders
Alfisols
Inceptisols
Entisols
Mollisols
Histosols
Water
Statewide map of soil suborders. While soil infiltration rates vary widely within a suborder, infiltration rates tend to be lower on mollisols, histisols and vertisols compared to entisols, inceptisols, spodosols, and alfisols.
NORTH
0 12.5 25 50 Miles
October, 2005
Sources: NRCS (GIS data available at http://www.ncgc.nrcs.usda.gov/products/datasets/statsgo/data/mn.html),
DNR (GIS data available at http://deli.dnr.state.mn.us/)

While it is true that all routes have an impact, it is also true that some routes have fewer environmental impacts than others. The foregoing maps make clear that the NDPC preferred route has far more significant impacts to treasured resources then the alternatives proposed herein. According, if one or more proposed routes appear to be feasible to the extent that they could reasonably be expected to substantially meet the need alleged by the NDPC, then MEPA requires that the Commission include them for consideration within the Comparative Environmental Analysis ("CEA").

3. The Economic Merits of the Various Routes to the Flanagan Terminal Are Uncertain and Require Consideration of the Cost of the Line 61 and 66 Projects in Comparison to SA-04

It seems likely that NDPC will continue to present economic evidence related to the alternative routes in an effort to convince the Commission that they are not feasible. FOH understands that MEPA requires consideration of alternatives without requiring detailed economic analysis ahead of time. Instead, the CON docket is intended to address economic analysis, such that the Commission should not base its routing decision for the CEA on economic data provided by Enbridge. Moreover, consideration of such data would be entirely unfair to citizens who do not have access to Enbridge's level of financial, personnel, and data resources.

II. What Is the Legal Basis for Determining Whether a System Alternative Should Be Considered in the Certificate of Need Proceeding?

The CON process is required by Minn. Stat. § 216B.243. This law does not expressly describe the range of alternatives that must be considered by the Commission. Due to the legislature's confusing decision to apply what was historically a law written for electric power line siting to underground pipelines, much of the language in this section relates poorly to the decision at hand. The only language in it that relates to the Commission's obligation to consider alternatives is in Subd. 3(6), which states in relevant part:

> No proposed large energy facility shall be certified for construction . . . unless the applicant has otherwise justified its need. In assessing need, the commission shall evaluate:
> (6) possible alternatives for satisfying the energy demand or transmission needs including but not limited to potential for increased efficiency and upgrading of existing energy generation and transmission facilities . . . .

In an effort to interpret this law, the Commission promulgated Minn. R. Ch. 7853. It also does not provide significant guidance with regard to the scope of alternatives that the Commission must consider. Part 7853.0120 requires that the Commission "consider only those alternatives proposed before the close of the public hearing and for which there exists substantial evidence on the record with respect to each of the criteria listed in part 7853.0130." Thus, this Part limits the Commission's consideration to (1) alternatives proposed before the end of the hearing, (2) for which substantial evidence exists with regard to the criteria listed in Part 7853.0130.

Part 7853.0130 states in relevant part:

> A certificate of need shall be granted to the applicant if it is determined that:
> * * *
> B. a more reasonable and prudent alternative to the proposed facility has not been demonstrated by a preponderance of the evidence on the record by parties or persons other than the applicant, considering:
> (1) the appropriateness of the size, the type, and the timing of the proposed facility compared to those of reasonable alternatives;
> (2) the cost of the proposed facility and the cost of energy to be supplied by the proposed facility compared to the costs of reasonable alternatives and the cost of energy that would be supplied by reasonable alternatives;
> (3) the effect of the proposed facility upon the natural and socioeconomic environments compared to the effects of reasonable alternatives; and
> (4) the expected reliability of the proposed facility compared to the expected reliability of reasonable alternatives;

However, when read in light of Part 7853.0120, it is clear that this language does not apply to a pre-determination of the alternatives that must be considered in the CEA, because parties that propose alternatives have until the "close of the public hearing" to meet this burden.

Minn. Stat. § 216B.243 and Minn. R. Ch. 7853 are not the only laws that govern the CON process. As more fully discussed in the FOH August 5 Comments, the Commission must prepare an environmental review for the CON decision, as well as the routing decision. Under MEPA, an EIS or alternative form of review must be prepared for "major governmental actions" "where there is potential for significant environmental effects" resulting from the action. Minn. Stat. § 116D.04, Subd. 2a. In this regard, Minn. Stat. § 116D.04, Subd. 1a(d), defines "governmental action" as activities, including projects wholly or partially conducted, permitted, assisted, financed, regulated, or approved by units of government . . . ." A key policy component of the MEPA process is "[a]n early and open process" "to determine . . . the alternatives which are appropriate for consideration in the statement." Minn. Stat. § 116D.04, Subd. 2a(f).

Here, granting a CON is a "major governmental action" within the meaning of MEPA, such that a decision under it requires an environmental review of the environmental impacts related to the Commission CON decision. The plain language of Minn. R. Ch. 7853 demonstrates that the Commission must consider environmental impacts within the CON docket. *See, e.g.,* Minn. R. 7853.0130(B)(3); 7853.0130(C)(2),(4); and 7853.0600 to 0800. Therefore, it cannot be argued that the Commission's decision in the CON docket has no environmental impacts. The Commission may choose to conduct a separate Environmental Impact Statement ("EIS") for the CON docket, or it may choose to include consideration of CON issues in its CEA, but it cannot ignore MEPA as it applies to the CON docket.

Thus, the answer to the Commission's question about "the legal basis for determining whether a system alternative should be considered" at this phase of the proceeding depends not on Minn. Stat. § 216B.243 or Minn. R. Ch. 7853, but on MEPA.

Moreover, to avoid irreparable conflicts between these laws, the Commission must simply ensure that its scoping process for the CEA considers not only route permit alternatives, but also non-route alternatives. Unfortunately, the Commission has not fully addressed its responsibilities in this regard and has chosen to elicit comments on only route alternatives. To rectify this situation, the Commission must open its docket to allow scoping related to the CON docket. After it identifies both route and non-route alternatives, the DOC-EERA will be able to complete a CEA or EIS that fully complies with MEPA.

Therefore, at this phase of this proceeding, the law that applies to the Commission's decision about the range of alternatives to consider is governed by MEPA. After the close of the public hearing, the Commission has discretion to disregard those alternatives that are not supported by substantial evidence. But, the Commission may not apply this "substantial evidence" test now, because the public hearing process has just begun.

III. What is the legal basis for determining whether a system alternative should be considered in the route permit proceeding?

The routing permit law, Minn. Stat. § 216G, does not specify the alternatives that must be considered by the Commission. Likewise, Minn. R. Ch. 7852 does not specify the alternatives that the Commission must consider. Instead, it states:

> A comparative environmental analysis of all of the pipeline routes accepted for consideration at public hearings shall be prepared by the commission staff or by the applicant and reviewed by the commission staff. This comparative environmental analysis must be submitted as prefiled testimony as required by part 1405.1900.

By reference the "comparative environmental analysis," the regulation makes clear that it defers to the policy standards for alternative review under MEPA Section. § 116D.04, Subd. 4a, including the policy standards for selection of alternatives. These policy standards are described more fully in the FOH August 5 Comments at 23-27.

Thus, the legal basis for determining whether a system alternative should be considered in the Commission's routing permit proceeding is the standard for alternative review provided by MEPA.

IV. CONCLUSION

For the foregoing reasons, FOH respectfully requests that the Commission issue an order:

1) requiring consideration of a route or routes that do not pass through northern Minnesota yet still serve the underlying need alleged by Enbridge;
2) directing the DOC-EERA to include consideration in the CEA those reasonable alternatives proposed by parties in the CON docket; and
3) directing the DOC-DER to consider all routes evaluated by the CEA to be alternatives in the CON docket.

Date: August 21, 2014

Respectfully submitted,

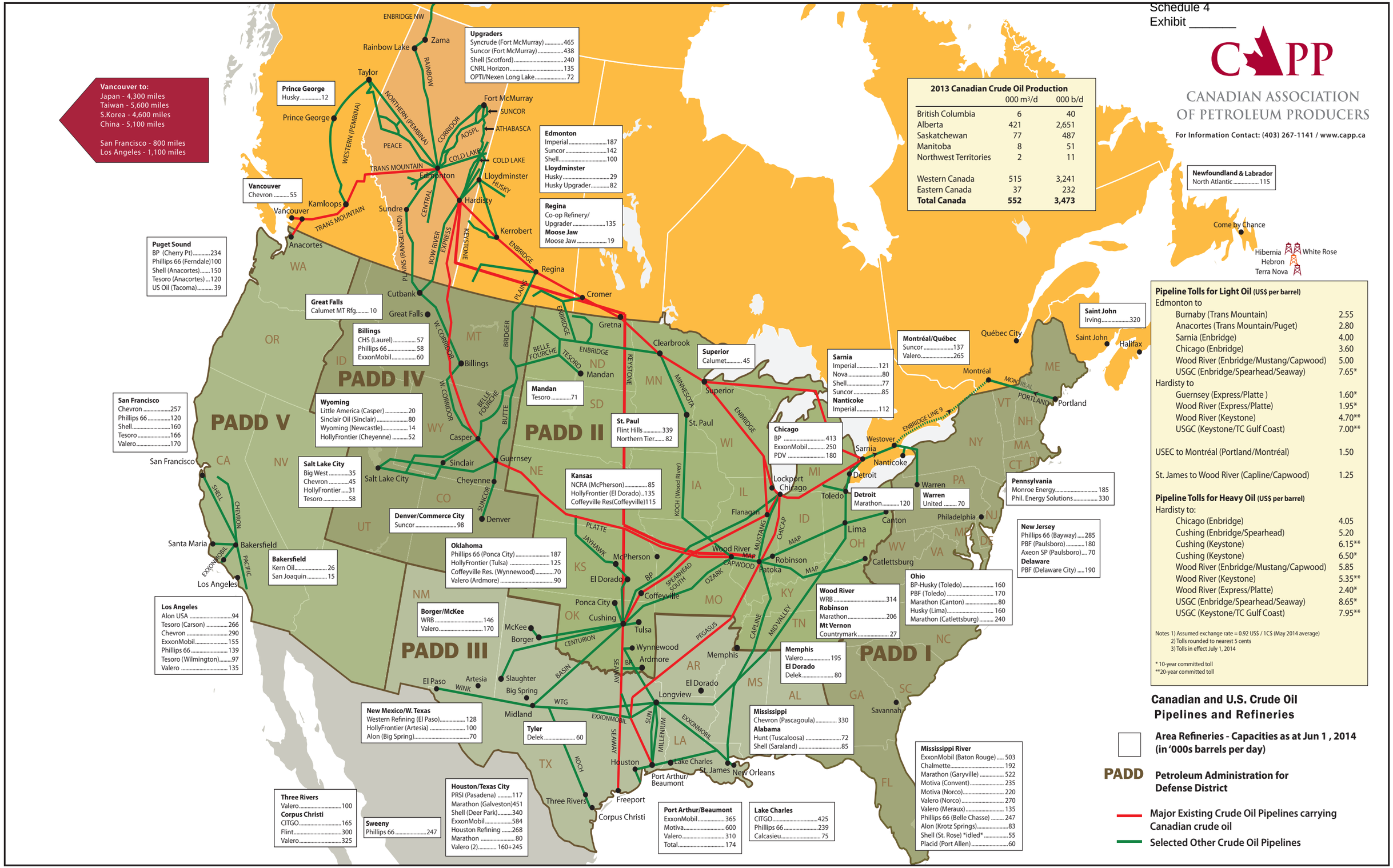
/s Paul C. Blackburn
Attorney for Friends of the Headwaters
P.O. Box 17234
Minneapolis, MN 55417
Phone: 612-599-5568
Bar No. 0391685

ATTACHMENT A

ATTACHMENT B

ATTACHMENT C

ATTACHMENT D



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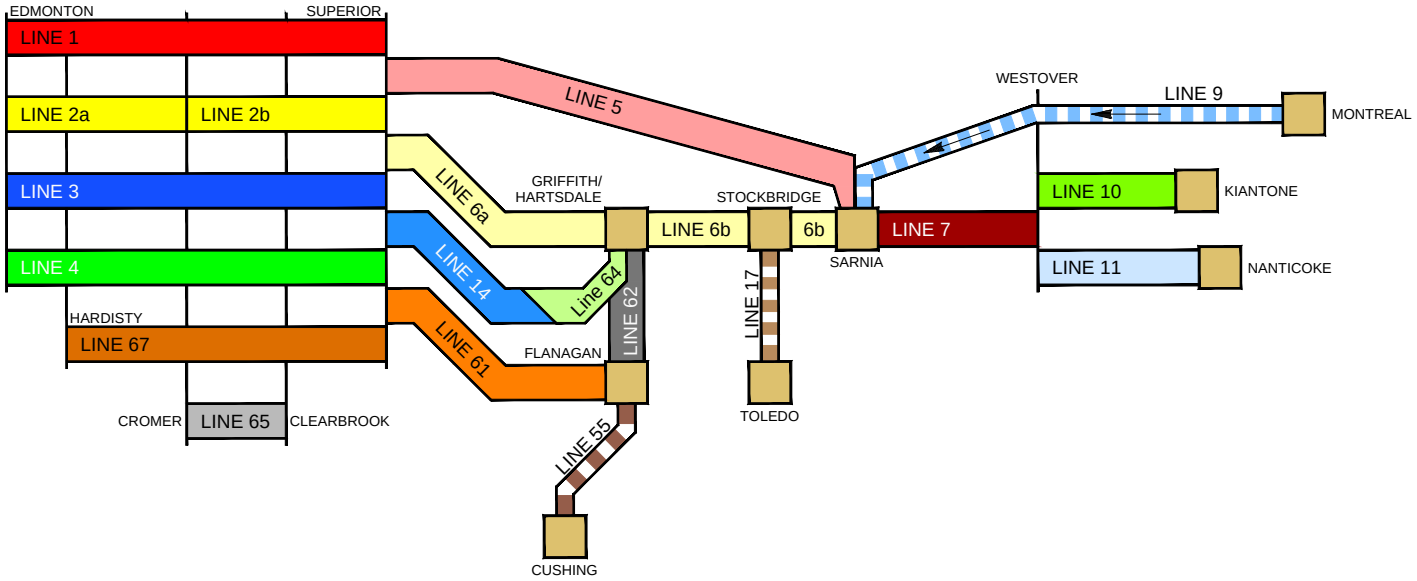
Pipeline System Configuration

Quarter 1, 2013



Line 1

37,600 m^3/d (236.5 kbpd)
18"/20" - 1098 miles
NGL
Refined Products
Light Synthetics

Line 2

Line 2a
70,300 m^3/d (442.2 kbpd)
24" - 596 miles
Line 2b
70,300 m^3/d (442.2 kbpd)
24"/26" - 502 miles
Condensates
Light Synthetics
Sweet
Light & High Sour

Line 3

62,000 m^3/d (390.0 kbpd)
34" - 1098 miles
Condensates (Edmonton to Hardisty)
Light Synthetics
Sweet
Light & High Sour

Line 4

126,500 m^3/d (795.7 kbpd)
36"/48" - 1098 miles
Heavy
Medium (Ex-Clearbrook)
Light Sour (Ex-Clearbrook)

Line 5

78,100 m^3/d (491.2 kbpd)
30" - 645 miles
NGL
Light Synthetics
Sweet
Light & High Sour

Line 6

Line 6a
106,000 m^3/d (666.7 kbpd)
34" - 467 miles
Line 6b
45,000 m^3/d (283.0 kbpd)
30" - 293 miles
Light Synthetics (Superior to Lockport)
Sweet (Superior to Lockport)
Light & High Sour
Medium
Heavy

Line 7

23,900 m^3/d (150.3 kbpd)
20" - 120 miles
Light Synthetics
Sweet
Light & High Sour
Medium
Heavy

Line 65

29,500 m^3/d (185.6 kbpd)
20" - 313 miles
Light Sour
Medium

Line 10

11,800 m^3/d (74.2 kbpd)
12"/20" - 91 miles
Light Synthetics
Sweet
Light & High Sour
Medium
Heavy

Line 11

18,600 m^3/d (117.0 kbpd)
16"/20" - 47 miles
Condensates
Light Synthetics
Sweet
Light & High Sour
Medium
Heavy

Line 62

20,700 m^3/d (130.2 kbpd)
22" - 75 miles
Heavy

L 14 / L 64

50,500 m^3/d (317.6 kbpd)
24" - 467 miles
Light Synthetics
Sweet
Light & High Sour
Medium

Line 61

63,600 m^3/d (400.0 kbpd)
42" - 454 miles
Light Synthetics
Sweet
Light & High Sour
Medium
Heavy

Line 67

71,500 m^3/d (449.7 kbpd)
36" - 999 miles
Heavy

Not Part of the Enbridge Mainline System

Line 9

38,200 m^3/d (240.3 kbpd)
30" - 524 miles
Condensates
Sweet
Medium
Light & High Sour

Line 17

16,000 m^3/d (100.6 kbpd)
16" - 88 miles
Heavy

Line 55

30,700 m^3/d (193.3 kbpd)
22"/24" - 575 miles
Light Synthetics
Sweet
Light & High Sour
Medium
Heavy

NOTES:

Capacities provided are Annual Capacities and do not include current restrictions.

- Updated: January 2013

File: 2013_Q1 System Config.dwg

Revised by: YZ
Drawn by: DRD

UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATION COMMISSION

North Dakota Pipeline Company LLC Docket No. OR14-21-000

PROTEST OF ST. PAUL PARK REFINING CO. LLC

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UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATION COMMISSION

North Dakota Pipeline Company LLC Docket No. OR14-21-000

PROTEST OF ST. PAUL PARK REFINING CO. LLC

1. Pursuant to Rule 211 and to the Notice of Petition for Declaratory Order issued herein on February 19, 2014, St. Paul Park Refining Co. LLC ("SPPRC") hereby protests the petition for declaratory order ("Petition") filed herein by North Dakota Pipeline Company LLC ("NDP") on February 12, 2014. The petition of NDP seeks certain advance rulings on the rate treatment for a proposed expansion and extension of its pipeline system known as the "Sandpiper Project." The proposed project would include a new pipeline installed alongside the existing NDP pipeline from Beaver Lodge, ND to Clearbrook, MN. Petition at 14-16. NDP proposes to recover the cost of the new parallel pipeline by charging uncommitted shippers to Clearbrook and beyond a surcharge styled as an "Expansion Rate Component." Petition at 28-29.

2. SPPRC protests NDP's request for approval of the proposed Expansion Rate Component to be imposed on shippers, such as SPPRC, which take delivery at the Clearbrook destination point. Contrary to the Petition, this Protest demonstrates that the proposed expansion pipeline and expansion surcharge (a) are not needed, (b) do not have broad shipper support, (c) will provide no benefit to shippers taking delivery at Clearbrook, and (d) are not based on any intelligible cost allocation or rate design. Accordingly, the Commission should deny the Petition. If the Petition is not denied, the

Commission should refer the Petition to an Administrative Law Judge for discovery and hearing.

The Petition of NDP

3. According to NDP, the current pipeline from Beaver Lodge to Clearbrook has a capacity of 210,000 bpd, but has been curtailed temporarily to 170,000 bpd by a pipeline integrity program. Petition at 12. The new parallel pipeline to Clearbrook would add 230,000 bpd so that the combined pipeline system would have a capacity of 440,000 bpd. Petition at 15. The proposed Expansion Rate Component would be designed to recover the cost of service of the new pipeline at the time of start-up, calculated pursuant to the Commission's Opinion No. 154-B methodology and using design capacity as the initial throughput assumption.

4. NDP states that it conducted an open season through which it obtained Transportation Services Agreements ("TSAs") containing ship-or-pay commitments for 155,000 bpd. Those commitments represent 35 percent of the new combined pipeline capacity to Clearbrook. Petition at 23. NDP acknowledges that the "anchor shipper" for the project is Marathon Petroleum Corporation ("Marathon"), which is also a part-owner of NDP through a subsidiary company. *Id*. NDP does not disclose the volume commitment contained in the TSA executed by Marathon.

5. NDP's claim that the Sandpiper Project is needed is based on a study by Muse Stancil & Co. ("Muse") entitled "Market Prospects and Benefits Analysis for the Sandpiper Project" dated February 2014 ("Muse study"). The Muse study purports to show that the expanded pipeline system would operate at capacity during its entire useful

life. Petition at 18-22. NDP relies on the Muse study, and on its claim that the existing pipeline is subject to prorationing, as a basis for requiring existing shippers to pay an expansion surcharge designed to recover the cost of the new pipeline.

Motion of SPPRC to Intervene

6. On March 4, 2014, SPPRC filed a timely motion to intervene in this proceeding pursuant to Rule 214 and 18 C.F.R. § 343.2(a). SPPRC is a captive uncommitted shipper of crude oil to the Clearbrook destination on NDP's existing system and would be a captive uncommitted shipper of crude oil to Clearbrook on the proposed expansion system. Thus, SPPRC would be subject to the expansion surcharge proposed by NDP if the surcharge is approved by the Commission. Accordingly, SPPRC has an interest as a customer which may be directed affected by the outcome of this proceeding. *See* Rule 214(b)(2)(ii)(B). The position of SPPRC, and the basis in fact for that position, are set forth in the prior motion of SPPRC to intervene and in this Protest.

Lack of Shipper Support or Benefits

7. SPPRC questions NDP's claim that the proposed expansion has received widespread shipper support. Petition at 24-25. NDP concedes that the "anchor shipper" for the project is Marathon Petroleum Corporation ("Marathon"), which is a part-owner in NDP through a subsidiary company. Petition at 23, n.27. NDP does not disclose how much of the 155,000 bpd in committed contract volume is accounted for by Marathon, nor does NDP indicate the extent to which other committed shippers are affiliated with NDP or Marathon. Thus, discovery is needed to determine the actual level of independent shipper support for the proposed expansion.

8. As a regular uncommitted shipper to Clearbrook, SPPRC has no reason to support the proposed expansion. As explained below, SPPRC does not believe the expansion pipeline proposed by NDP is necessary or desirable to meet the transportation needs of SPPRC. SPPRC has not suffered from chronic prorationing on the NDP system, and SPPRC has seen no operational evidence that the system is subject to persistent excess demand.

9. Contrary to the Petition, imposition of the proposed expansion surcharge on existing uncommitted shippers is not supported by the Commission's prior decisions in *Colonial Pipeline Co*., 116 FERC ¶ 61,078 (2006), *order denying reh'g*, 119 FERC ¶ 61,183 (2007) or *Calnev Pipe Line LLC*, 120 FERC ¶ 61,073 (2007). In both those cases, there were undisputed constraints on existing capacity and there was universal agreement that the expansion capacity was needed. In this case, there is evidence that the prior congestion on the NDP system has been relieved and that the system has recently operated well below capacity. Here, unlike the *Colonial* and *Calnev* cases, SPPRC and other shipper parties have expressed serious doubts that the proposed expansion pipeline is needed.

10. Moreover, the purported shipper benefits cited by NDP have no value to SPPRC. The proposed expansion surcharge will require SPPRC to pay a higher transportation cost for the level of service it currently receives, while SPPRC is entirely satisfied with its current level of service. Nor will SPPRC benefit from the increased price of Bakken crude oil which NDP predicts as a result of the expansion. To the extent that the expansion causes an increase in the price of Bakken crude oil, the effect will be

to increase the feedstock acquisition cost of the SPPRC refinery served by NDP, which will in turn increase the refined product prices paid by the customers of SPPRC. Any such crude oil price increase will harm, not benefit, the business of SPPRC and its customers.

11. Indeed, NDP's Petition acknowledges that the proposed expansion pipeline is not designed or intended to benefit shippers to Clearbrook. The Petition concedes that the existing system did not operate at capacity in 2013, but claims that new pipeline projects downstream from Superior will create strong demand for the expanded upstream NDP system. Petition at 14. This confirms that the expansion pipeline is designed to benefit and will benefit shippers to destinations downstream from Superior, not shippers, such as SPPRC, which use the existing system to reach Clearbrook. Thus, NDP is proposing to collect a surcharge from upstream Clearbrook shippers to pay for an expansion designed to benefit shippers to downstream destinations.

Limited Prorationing

12. As mentioned above, SPPRC has not experienced any chronic prorationing on the NDP system, and SPPRC has seen no operational evidence that the system is subject to persistent excess demand. On the contrary, the recent instances of prorationing experienced by SPPRC have involved specific segments and have been temporary and transitory in nature. SPPRC has not incurred the type of sustained curtailment which could justify a major expansion. Discovery is needed to establish the extent to which prorationing is, or is not, a sustained problem on the NDP system.

13. In his attached Affidavit, Mr. Justin Amoah disputes NDP's claim that demand for space on its system has consistently outstripped available capacity. Petition at 12. Mr. Amoah explains that, since September 2012, temporary integrity maintenance work has been primarily responsible for any necessary prorationing. By the end of the third quarter of 2014, the full nameplate capacity of 210,000 bpd should be available. Even with the temporary reduction in available capacity, prorationing in 2013 was intermittent, not sustained. Amoah Affidavit at P 9.

14. Mr. Amoah also points out that the Bakken Portal Expansion Pipeline ("BPEP"), which is owned by an affiliate of NDP, has been severely underutilized since its inception in March 2013. BPEP transported less than 4,500 bpd between March 2013 and January 2014, which was less than three percent of its 145,000 bpd capacity. The management of BPEP reported that its capacity "was not well utilized in 2013." Amoah Affidavit at P 10.

Unexplained Cost Allocation and Rate Design

15. The Petition does not explain which costs will support the committed rates and which costs will support the uncommitted rates and the expansion surcharge. In this regard, the Petition merely states that uncommitted shippers will have no responsibility for the cost of the portion of the pipeline used to transport committed volumes, and that NDP will deduct $7.5 million from the cost of service for the upstream facilities in recognition of the premium paid by priority committed shippers. Petition at 42. The Petition provides no economic or regulatory basis for the amount of the cost-of-service deduction. Thus, discovery is needed to provide an understanding of the basis for the

proposed $7.5 million deduction and the proposed allocation of costs between the committed and uncommitted rates.

16. NDP claims that uncommitted shippers will be protected against the risk that the expansion pipeline will be underutilized because NDP will use full capacity as the design throughput volume in calculating the initial Expansion Rate Component. Petition at 28-29. However, NDP reserves the ability to change the surcharge by any of the Commission's ratemaking methodologies, which presumably would include cost-of-service ratemaking pursuant to 18 C.F.R. §§ 346.1, *et seq*. Petition at 26, n.30. That option could allow NDP to increase the expansion surcharge to account for a shortfall in actual throughput volume, which would place the impact of underutilization squarely on the uncommitted shippers. Thus, if the Commission allows NDP to impose the expansion surcharge, the Commission should require NDP to use full capacity as the design throughput volume in calculating any future change in the initial Expansion Rate Component.

Errors in the Muse Study

17. In his attached Affidavit, Mr. Amoah concludes that the Muse study is a highly questionable attempt to overcome the simple fact that there is and will continue to be adequate takeaway serving the Williston Basin for the foreseeable future. Amoah Affidavit at P 3. Mr. Amoah provides a detailed table showing that there will be more than 2.25 million bpd of takeaway capacity in place by the end of 2015, prior to Sandpiper's proposed start in the first quarter of 2016. The Muse study itself adopts a production forecast indicating that Williston Basin production will peak at approximately

1.4 million bpd in the 2025-27 timeframe, after which it will begin to decline. Muse study at 25. Thus, there will continue to be sufficient takeaway capacity to handle all of the current and future Bakken production through the 2035 period, leaving no logistical need for the Sandpiper Project. Amoah Affidavit at P 3.

18. Mr. Amoah further explains that the Muse study, in attempting to dismiss the excess capacity serving the Williston Basin, relies on a highly speculative prediction that shippers will shift away from rail transportation to Sandpiper. Amoah Affidavit at P 4; Muse study at 6-7. The Muse study ignores the fact that substantial producers, marketers, and refiners have made large financial commitments to ship production by rail from Montana and North Dakota, including investments by Statoil and Hess. An affiliate of NDP has also invested in an 80,000 bpd rail facility that allows crude oil volumes to reach the "premium markets" the Muse study contends will be served by Sandpiper. Amoah Affidavit at P 4. The Muse study essentially assumes that these shippers, and others which have made equally large financial commitments, would abandon their investments in rail in favor of using Sandpiper, an assumption which has no basis in fact. In this regard, it is highly unlikely that shippers with significant investments in rail have made volume commitments to Sandpiper by executing TSAs.

19. The Muse study contends that Sandpiper would allow shippers to reach "premium markets" for light sweet crude oil. Muse study at 11. However, Mr. Amoah points out that markets for light sweet crude oil are already accessible by rail at Cushing, Oklahoma, the East Coast, the West Coast, and the Gulf Coast. The crude oil markets in those regions are all currently priced at a premium relative to the upper mid-continent

market, where Sandpiper will terminate. Amoah Affidavit at P 5. In fact, producers, marketers, and refiners operating in the Williston Basin have confirmed that rail transportation gives them the ability to move Bakken crude oil out of the once-constrained Williston region to markets offering premium prices. Amoah Affidavit at P 6.

20. Furthermore, Mr. Amoah notes that the Muse study admittedly does not consider or analyze costs that are fundamental in evaluating the Sandpiper Project. Those costs include "physical loss allowances, miscellaneous pump-over fees at pipeline interconnections, terminal storage costs, and working capital costs." Muse study at 31; Amoah Affidavit at P 7. By excluding such costs—which are not equivalent across separate transportation systems—the Muse study does not accurately portray the economics of the Sandpiper Project relative to other projects. Amoah Affidavit at P 7.

21. Finally, the Muse study uses estimates for rail freight rates that may not be accurate. Mr. Amoah points out that many rail shippers have been provided with private freight rates by railroads that are well below the estimated rail costs used in the Muse study. Amoah Affidavit at P 8. Some rail shippers also have their own loading and unloading facilities and therefore do not pay the loading and unloading fees used in the Muse study. *Id.*

Deficiencies in the Muse Study

22. In addition to the errors identified by Mr. Amoah, the attached expert affidavit of Dr. Daniel S. Arthur identifies deficiencies in the Muse study which undermine the credibility of its conclusion that the Sandpiper Project would be fully utilized. Dr. Arthur finds that the Muse study fails to provide information to support several assumptions which have a material impact on the analysis and conclusions in the study. These unsupported assumptions include assumed crude oil production and grade of crude oil for several geographic areas and assumed prices for refined petroleum products that presumably affect the crude oil refining value inputs to the Muse model. Arthur Affidavit at PP 8-12.

23. Dr. Arthur also finds that the Muse study provides incomplete information regarding the capacities and prices of transportation alternatives and the capacities of refineries. He observes that the Muse study apparently assumes that the transportation and refinery capacities that are known today, as well as several transportation projects expected to be in service over the period 2014-2020, will be the capacities that persist over the period 2016-2035. Dr. Arthur finds it more reasonable to expect that there will be changes in transportation and refining capacities in response to changes in crude oil production volumes in various basins, including the Bakken region and other production basins in North America. Arthur Affidavit at PP 13-15.

24. Finally, Dr. Arthur sees no indication that the Muse study factored into its analysis any potential alternative scenarios other than its set of baseline assumptions with and without the Sandpiper Project. He notes that alternative scenarios would provide

information on whether the Muse study's conclusion that the expanded NDP system after the Sandpiper Project would be operating at or near capacity for the forecast period 2016-2035 is robust under alternative scenarios, or whether other plausible scenarios exist whereby the expanded NDP system may not operate at full capacity over that period. Arthur Affidavit at P 16.

25. Dr. Arthur concludes that the deficiencies in the Muse study undermine the credibility of its conclusion that the expanded NDP system will operate at or near capacity for the forecast period 2016-2035. He observes that it is not possible, in the brief period of time available to respond to the petition of NDP for a declaratory order, to perform a more complete or thorough analysis. However, Dr. Arthur identifies several categories of information regarding the inputs, assumptions, and optimization model used in the Muse study which are needed in order for the validity of the study to be intelligently evaluated. Arthur Affidavit at P 17.

Need for Discovery and Hearing

26. If the Commission does not deny the Petition, it should refer the Petition to an Administrative Law Judge for discovery and hearing. The Muse study purports to justify NDP's claim that there is a pressing need for new takeaway capacity out of the Bakken. However, as demonstrated herein, the Muse study is based on questionable, unsupported, and unverifiable assumptions. Discovery and hearing are therefore necessary for the Commission to resolve the issues of fact created by the Muse study. As the Commission recognized in *Express*, discovery is appropriate in a declaratory order

proceeding to resolve disputed issues of fact that cannot be resolved on the basis of pleadings alone. *Express Pipeline Partnership*, 76 FERC ¶ 61,245, 62,253 (1996).

27. In addition, there are material issues of fact regarding the extent of prorationing on the NDP system. The Petition claims that prorationing has been persistent and that there is growing demand for capacity. Petition at 11-14. This Protest, and the Affidavit of Mr. Amoah, indicate that recent prorationing has been intermittent and that there is no evidence of excess demand for capacity on the NDP system. Amoah Affidavit at PP 9-10. Information regarding recent system-wide prorationing, which is within the possession of NDP, is needed to resolve this factual issue.

28. There is also a material factual issue regarding the level of independent shipper support for the proposed expansion. NDP acknowledges that part-owner Marathon accounts for an undisclosed portion of the 155,000 bpd in TSA commitments. Only NDP has the information necessary to determine the extent to which the 155,000 bpd in TSA commitments is by NDP affiliates or by independent shippers. Discovery is needed to obtain the pertinent information.

29. The Commission's procedural rules expressly contemplate that protests against petitions may be set for hearing. Rule 211(a)(1) provides that any person may file a protest against any petition. Rule 211(a)(3) provides that the Commission will consider protests in determining further appropriate action. Rule 211(a)(4) specifies that a protest is not part of the decisional record where a proceeding is set for hearing.

30. Thus, there are multiple disputed issues of material fact in this case which warrant denial of the Petition or require discovery and hearing. To summarize, those disputed factual issues include:

a. Whether there is a need for additional takeaway capacity to serve the Williston Basin in the foreseeable future.

b. Whether prorationing on NDP has been persistent or intermittent in the recent past or can be expected to be persistent or intermittent in the foreseeable future.

c. Whether Sandpiper can be expected to operate at full capacity over its useful life as predicted by the Muse study.

d. Whether current rail shippers can reasonably be expected to shift to Sandpiper as predicted by the Muse study.

e. Whether shippers which take delivery a Clearbrook will actually benefit from the proposed expansion pipeline.

f. Whether there is broad independent shipper support for the expansion pipeline.

g. What is the proposed basis for allocating costs between the committed and uncommitted rates and does that basis constitute a reasonable rate design?

h. What design throughput volume does NDP propose to use in calculating future changes in the Expansion Rate Component and will that rate design protect uncommitted shippers from the risk of underutilization?

31. In addition, Dr. Arthur identifies several basic categories of missing or incomplete information which are required in order for the validity of the Muse study to be intelligently evaluated. Arthur Affidavit at P 17. Those basic information requirements include:

a. Complete information on assumptions made regarding inputs to the optimization model.

b. Complete information on outputs of the optimization model, including information on estimated transportation flows and the

shadow price of crude oil in the producing basins predicted by the optimization model.

c. A description of Muse's process for validating the results of the optimization model, together with related documents.

d. A working version of the optimization model, or some mechanism for access to the model, in order to perform model runs using alternative assumptions to examine the sensitivity and robustness of the conclusions presented in the Muse study under varying input assumptions.

Conclusion

32. For the foregoing reasons, the Commission should deny the Petition. If the Petition is not denied, the Commission should refer the Petition to an Administrative Law Judge for discovery and hearing.

Respectfully submitted,

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March 14, 2014

CERTIFICATE OF SERVICE

I hereby certify that I have this 14th day of March, 2014, served the foregoing Protest of St. Paul Park Refining Co. LLC by email on each person designated on the official service list compiled by the Secretary of the Commission in this proceeding.

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