Friends of the Headwaters
Comments re: Draft EIS proposed Enbridge projects

Friends of the Headwaters (FOH) is opposed to both the Sandpiper and Line 3 Replacement projects as currently proposed for Minnesota and Wisconsin.

FOH has presented a persuasive and common sense argument for route alternatives for these projects which will greatly reduce the risk of North Dakota Bakken and Alberta tar sands crude oils spilling into not only Minnesota's but also Wisconsin's iconic waters: Lake Superior, the Mississippi River headwaters, the St. Croix and Namakagon Wild and Scenic River Way, and the many more lakes, streams, rivers, wetlands, aquifers and wild rice waters of both states. Besides the 14 miles of proposed Sandpiper corridor in Douglas County in Wisconsin, FOH is also opposed to Enbridge's other proposed expansion plans for Line 61 and a possible new pipeline, Line 66, through Wisconsin.

You will find attached the FOH testimony and comments with maps presented to the Minnesota Department of Commerce (MDOC) and the Minnesota Public Utilities Commission (MPUC). Much of this testimony is equally applicable to Wisconsin's valuable water resources. Please note: due to the MPUC's docket system for energy issues and the multiple public comment periods in these two dockets for each pipeline project, you will find some redundancy in the attached comments.

What you will not find within these previously drafted documents is any testimony related to the recently released National Academy of Sciences Report, "SPILLS OF DILUTED BITUMEN FROM PIPELINES: A COMPARATIVE STUDY OF ENVIRONMENTAL FATE, EFFECTS, AND RESPONSE". The data, findings and conclusions of the NAS Dilbit Report should give any state with tremendous freshwater resources, such as those in Wisconsin and Minnesota, grave environmental and economic concerns about transporting tar sands crude oil, known in the trade as diluted bitumen or "dilbit", through its water rich regions. A few key findings and conclusions from the report are listed below.

- In comparison to other commonly transported crude oils, many of the chemical and physical properties of diluted bitumen, especially those relevant to environmental impacts, are found to differ substantially from those of the other crude oil. ***The key differences are in the exceptionally high density, viscosity, and adhesion properties of the bitumen component of the diluted bitumen that dictate environmental behavior as the crude oil is subjected to weathering (a term that refers to physical and chemical changes of spilled oil).***

- Immediately following a spill, the environmental processes, behavior, and toxicity of diluted bitumen are similar to those of other commonly transported crudes. Beginning immediately after a spill, however, exposure to the environment begins to change spilled diluted bitumen through various weathering processes. The net effect is a reversion toward properties of the initial bitumen. An important factor is the amount of time necessary for the oil to weather into an adhesive, dense, viscous material. For any crude oil spill, lighter, volatile compounds begin to evaporate promptly; in the case of diluted bitumen, a dense, viscous material with a strong tendency to adhere to surfaces begins to form as a residue. ***For this reason, spills of diluted bitumen pose particular challenges when they reach water bodies. In some cases, the residues can submerge or sink to the bottom of the water body.*** Importantly, the density of the residual oil does not necessarily need to reach or exceed the density of the surrounding water for this to occur. The crude oil may combine with particles present in the water column to submerge, and then remain in suspension or sink.

- These factors are important to consider for spill response planning and implementation. Spills of diluted bitumen into a body of water initially float and spread while evaporation of volatile compounds may present health and explosion hazards, as occurs with nearly all crude oils. It is the subsequent weathering effects, unique to diluted bitumen, that merit special response strategies and tactics. For example, the time windows during which dispersants and in situ burning can be used effectively are significantly shorter for diluted bitumen than for other commonly transported crudes. In cases where traditional removal or containment techniques are not immediately successful, the possibility of submerged and sunken oil increases. ***This situation is highly problematic for spill response because 1) there are few effective techniques for detection, containment, and recovery of oil that is submerged in the water column, and 2) available techniques for responding to oil that has sunken to the bottom have variable effectiveness depending on the spill conditions.***

- When comparing properties affecting transport, fate, effects, and response, several key properties emerge. The chart on the next page illustrates the properties relevant to transport, fate, effects and potential environmental outcomes following a crude oil spill. Based on the similarities and differences between diluted bitumen (in pipeline and weathered forms) and other commonly transported crudes, the comparative levels of concern associated with these properties are highlighted. ***The majority of the properties and outcomes that differ from commonly transported crudes are associated not with freshly spilled diluted bitumen, but with the weathering products that form within days after a spill***. Given these greater levels of concern for weathered diluted bitumen, spills of diluted bitumen should elicit unique, immediate actions in response.

- It is clear that the Pipelines and Hazardous Materials Safety Administration (PHMSA) takes a substantially different approach from that of the U.S. Environmental Protection Agency (USEPA) and the U.S. Coast Guard (USCG) when setting expectations for and reviewing spill response plans. Notably, PHMSA reviews plans for completeness in terms of the regulatory requirements only, while USEPA and USCG review plans for both completeness and adequacy for response. ***Broadly, regulations and agency practices do not take the unique properties of diluted bitumen into account, nor do they encourage effective planning for spills of diluted bitumen.***

- In light of the aforementioned analysis, comparisons, and review of the regulations, it is clear that ***the differences in the chemical and physical properties relevant to environmental impact warrant modifications to the regulations governing diluted bitumen spill response plans, preparedness, and cleanup.*** The concern associated with these differences is summarized in the following chart for both diluted bitumen and weathered diluted bitumen. Each property that is relevant to environmental transport, fate, and effects is identified with the potential outcomes and a qualitative level of concern compared to other commonly transported crudes. The most notable changes observed are in the comparison between diluted bitumen and weathered diluted bitumen.

	Property	Potential Outcomes	Level of Concern Relative to Commonly Transported Crude Oils: Diluted Bitumen	Weathered Diluted Bitumen
Transport	Density	• Movement in suspension or as bedload	SAME	MORE
	Adhesion	• Movement in suspension or as bedload (oil particle aggregates)	MORE	MORE
	Viscosity	• Movement as droplets • Spreading on land • Groundwater contamination	SAME	LESS
	Solubility	• Mobility and toxicity in water	SAME	LESS
	BTEX	• Toxicity (water and air emissions)	LESS	LESS
Fate	Density	• Sinking • Burial	SAME	MORE
	Adhesion	• Sinking after sediment interaction • Surface coating	SAME	MORE
	Viscosity	• Penetration	LESS	LESS
	Percentage of light fraction	• Air emissions	SAME	LESS
	Flammability	• Fire or explosion risk	SAME	LESS
	Biodegradability	• Persistence	MORE	MORE
	Burn residue	• Quantity of residue • Residue sinking	MORE	MORE
Effects	Density	• Impaired water quality from oil in the water column and sheening	SAME	MORE
	Adhesion	• Fouling and coating	MORE	MORE
	BTEX components	• Contaminated drinking water • Respiratory problems/disease	SAME	LESS
	HMW components	• Trophic transfer/food web • Aquatic toxicity	UNKNOWN	
	LMW components	• Aquatic toxicity • Taste/odor concerns in drinking water	UNKNOWN SAME	LESS

The relative level of concern for diluted bitumen is

Less Same More

when compared to commonly transported crudes.

Chart: Spill hazards: diluted bitumen relative to commonly transported crude oils. Acronyms: BTEX: benzene, toluene, ethylbenzene, xylenes; HMW: high molecular weight; LMW: low molecular weight.

- Crude oil that floats on water is transported by different mechanisms than crude oil that submerges, often sorbed onto sediments, and is transported in suspension or in the bed load of streams and rivers. The greater density of weathered bitumen results in a greater level of concern that weathered bitumen will become submerged in an aquatic environment. Even in the first days of a spill, the greater adhesive properties of diluted bitumen compared to commonly transported crude oils result in a greater level of concern. This concern derives form impacts on wildlife and vegetation and from the associated public reaction, as volunteers mobilize to rescue contaminated wildlife, for example.

- The greater level of concern for weathered bitumen also reflects the potential magnitude of the long-term effects of a spill that reaches a water body. Given the known composition of diluted bitumen, a much greater proportion of the material released can be expected to become denser than water and/or adhere to sediments, thereby sinking and entering the bed load and sediments of riverine, wetland, and coastal environments. Furthermore, once the weathered bitumen becomes incorporated into the bed load, it may be deposited some distance from the initial spill and remobilized in a future storm or flood. Thus, the benefits of being prepared to contain the diluted bitumen early during the response to a spill are substantial.

- Very little is known about the risks associated with a subsurface release of diluted bitumen (i.e., into groundwater or a deep water column), particularly in terms of the risks of dissolution of the light, relatively water-soluble monoaromatics such as benzene, toluene, ethyl benzene, and xylenes into the groundwater, where loss by volatilization and microbial degradation are likely to be slow.

- There are no known, effective strategies for recovery of crude oil that is suspended in the water column, particularly where it occurs as droplets or oil particle aggregates. Accordingly, the objectives are to track the suspended material and to predict where it may sink to the bottom.

- The prospect of a release of crude oil into the environment through a pipeline failure inherently raises a number of concerns. These concerns include not only minimizing a number of possible long-term environmental impacts but also protecting the safety of responders and the public during and after the spill response. When all risks are considered systematically, there must be a greater level of concern associated with spills of diluted bitumen compared to spills of commonly transported crude oils.

- In the context of fate, transport, and effects, the properties of diluted bitumen and weathered diluted bitumen that consistently result in greater levels of concern involve the higher density of the bitumen. The environmental outcome that should be most vigorously avoided in a spill response is the weathering of spilled diluted bitumen into heavy, sticky, sediment-laden residue that cannot readily be recovered, which requires dredging and disposal of large quantities of contaminated sediment and water, and which will not degrade if left in the environment. This weathering process begins rapidly following a release and can change the behavior of diluted bitumen in a matter of days.

Those are but a few of the findings and assessments from the lengthy and comprehensive report, which is available from the National Academies Press at http://www.nap.edu/21834

As a region at the top of three major watersheds with critical freshwater resources, which are becoming more valuable with the oncoming demands of a growing population and a changing climate, it would seem feasible and prudent for Minnesota and Wisconsin to act jointly on this issue of new pipelines and to not let the applicant, Enbridge, divide its overall pipeline expansion plan into segments acted upon separately by the individual states.

Although FOH has won a court victory in Minnesota for a robust, reliable and comprehensive EIS, that EIS will be conducted by Minnesota state agencies. This is the first ever state conducted EIS on a large oil pipeline in Minnesota history. Consequently FOH has strong concerns about the capabilities and experience that will be brought to this process by the MPUC and MDOC. Recently FOH presented a motion to the MPUC asking the MPUC Commissioners to assign an outside panel of scientists and experts as an independent advisory panel to work with the state agencies. As noted in the findings of the NAS Dilbit Report a scientist with that background and expertise would be particularly invaluable in the scoping for a comprehensive EIS.

A properly scoped EIS must consider socio-economic issues as well as the expected environmental ones. Since Enbridge and its subsidiaries made their initial applications for these pipelines, the world oil market has changed dramatically. Are the company's economic arguments and its contractual agreements with shippers for needing these pipelines still relevant in today's oil marketplace? An independent panel of advisors should include an oil market economist to compile that data.

Because the proposed pipeline corridors pass through Minnesota and Wisconsin lands ceded to indigenous peoples, the Ojibwe, for hunting, fishing and gathering, they should have a seat on this advisory panel.

These pipelines do not end at Minnesota's border with Wisconsin nor do they start at Wisconsin's border with Minnesota. They are small portions of a much larger integrated network of pipelines Enbridge has and is building upon throughout its system in Canada and the US. It is time the involved states start looking at these developments with a regional outlook. If these pipelines are needed, then where are the environmentally safest and lowest risk locations to put them? Only a properly conducted EIS can assist us in charting that course, if necessary. Perhaps it's time to think outside of the box, to think the EIS currently ordered for Minnesota be expanded to the level of a joint multi-state and federal EIS. It makes sense. As the chairwoman of the MPUC said, "This is a gigantic project." It demands a thorough and comprehensive environmental impact study, one better than that conducted on the TransCanada Keystone XL pipeline.

The Sandpiper and Line 3 Replacement pipelines will carry 1,135,000 barrels of oil per day across Minnesota and on into Superior, if approved. That is nearly 300,000 more barrels per day than the Keystone XL was forecasted to ship. Imagine, nearly 48 MILLION gallons of oil per day through our pristine northern waters. Enbridge's plan for Line 61 from Superior to Illinois will move that much alone. And the company wants to build a twin, Line 66, next to Line 61.

It's time Wisconsin and Minnesota act together to protect its waters. A barrel of water is worth more than a barrel of oil.