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**To: Richard Smith**
**President**
**Friends of the Headwaters**

**To be filed electronically to: Pipeline.Comments@state.mn.us**
**Docket Nos. CN-14-916 & PPL-15-137**

**Re: Accufacts Review of the Draft Environmental Impact Statement for the Line 3 Pipeline Project Prepared for the Minnesota Department of Commerce**

Accufacts Inc. ("Accufacts") was asked to perform a technical review of the Draft Environmental Impact Statement for the Line 3 Pipeline Project ("Draft EIS") prepared for the Minnesota Department of Commerce with a primary emphasis on Chapters 10 and 12 dealing with accidental crude oil releases and cumulative potential effects, respectively.[1] The Draft EIS attempts to analyze a proposed new 36-inch pipeline route to transport both conventional and dilbit crude oils. A new pipeline would replace the existing 34-inch Enbridge pipeline which is to be abandoned. The 34-inch pipeline is currently operating under a pressure reduction limitation because of numerous serious anomalies on that line that could lead to rupture if not remediated. U.S. federal minimum pipeline safety regulations do not permit permanent pipeline pressure reduction as an acceptable approach toward assuring pipeline integrity to avoid rupture, for various good reasons.[2] As outlined in further detail below, Accufacts finds the Draft EIS pipeline route analyses and comparisons woefully inadequate. Among other things, the Draft EIS fails to provide clear oil pipeline information needed for a complete release engineering analysis reflecting true oil pipeline hydraulics and release dynamics, especially pipeline rupture, for the presented possible pipeline routes. Such release volumes and their associated consequences can be instrumental in prudently selecting a new pipeline route. An attached CV outlines some of my extensive experience to comment on this pipeline matter.

**In reviewing the Draft EIS, Accufacts has the following major observations:**

1. **Critical pipeline technical information is missing concerning the various presented pipeline route options.**

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[1] Posted at website https://mn.gov/commerce/energyfacilities/resource.html?id=34695.
[2] 49CFR§195.452(h)(1)(i) *Temporary pressure reduction*.

In determining route options for a liquid pipeline, certain basic information is needed to evaluate the suitability of possible routes. The Draft EIS is missing this important critical technical information. Such critical pipeline route information is missing in the Draft EIS and should not be excluded from public review. For various route options an EIS should, for example, incorporate:

1. the pipeline elevation profile (approximate elevation vs approximate milepost, or "MP"),

2. a line indicating the Maximum Operating Pressure(s), or MOP(s), on the elevation profile,

3. a hydraulic profile at the design rate case for the control crude oil case (various additional rates may be included as well for large elevation changes) on the elevation profile,

4. location of mainline valves and their type of operation (e.g., manual, remote, automatic), as well as specific safety design if warranted,

5. general location/type of critical leak detection monitoring devices by milepost, and

6. identification by milepost range of High Consequence Areas, or HCAs.

With the exception of HCAs, the above noted information is often made public in Canadian pipeline filings to the National Energy Board, or NEB, the agency chartered with approval of interprovincial liquid transmission pipelines.[3] The above information is essential to permit an independent validation/determination of pipeline hydraulics, safety margins, and oil release volumes along the pipeline routes, and the pipeline's potential to influence sensitive receptors. None of the above information is provided for the route alternatives mentioned in the Draft EIS. The above technical information concerning route selection are details that many pipeline operators don't grasp, so it can be understandable if non-pipeline operators or engineers may not realize their importance in pipeline routing decisions. The incomplete Draft EIS as presented will most likely result in an uninformed decision concerning pipeline routing that will significantly increase the risks to the public and the environment.

[3] Canadian pipeline integrity management approaches differ from U.S. pipeline integrity management regulatory approaches. For example, in Canada HCAs are not utilized nor defined in their pipeline safety regulations or standards.

2. **Based on extensive pipeline rupture investigations, the consequence assessment simplifications, attempting to deal with a large oil release, in all probability are understating the oil release consequences for various Line 3 route proposals.**

   The Draft EIS identifies seven specific release locations that were investigated and claims that these sites along with 42 representative release scenarios can be used to characterize risk assessment for potential large oil releases and their fate, or affects for the possible Line 3 preferred or alternate routes.[4] The study apparently is trying to avoid modeling a wide range of water body types/situations should oil be spilled into them. One of the critical factors that can affect new pipeline route selection, relates to the amount of oil that can be released into the sensitive waters, which can vary considerably by route. The technical parameters identified in Section 1 above are critical to verifying if the claimed pipeline potential release volumes are reasonable. It should be noted that the oil release volumes have not been made public in the Draft EIS so no verification can be made as to the oil spill "simplification" assertions claimed in the Draft EIS documents. Without the additional technical details identified in Section 1, in my opinion, an EIS concerning an oil pipeline route selection is highly incomplete, even negligent.

   I also need to comment on the attempt to characterize that new pipelines are somehow better than older more vintage pipelines. Even new modern steel pipelines are not invincible to introduction of various anomalies or imperfections that can grow and fail as a rupture at a later time. The explanation that pipeline threats fall into three major categories can be misleading and set up pipeline operators for a rupture failure.[5] One has to be very careful when using or applying industry standards as such standards require application of certain experiences that may not be identified in such references, even for those standards where only certain sections are incorporated by reference into federal pipeline safety regulation. For example, some of the most insidious pipeline threats are related to a family of so-called "third party damage" type threats that fail, usually as a rupture at a later date. One does not have to hit a pipeline to introduce such threats to a pipeline. The point being if pipeline operators start to believe their own stories about new pipelines being invincible, they avoid or shortcut the management processes intended to prevent pipeline failure. Even on new pipelines, especially on large pipeline projects involving billions of dollars, the pipeline management can lose control of their quality administration/quality control ("QA/QC") processes through the many lifecycle stages of a pipeline, that can render QA/QC ineffective

[4] Stantec Consulting Services Inc., RPS/ASA, Dynamic Risk Assessment Systems Inc. ("Stantec Report"), "Line 3 Replacement Project: Assessment of Accidental Releases: Technical Report," January 13, 2017, p. 1.10.

[5] Draft EIS, Chapter 10.1.2.1, "Threats to Crude Oil Transportation by Pipeline Systems," May 15, 2017, p. 10-6.

at avoiding introduction of anomalies to the pipeline, even new pipelines. Numerous failures have served as the initiator for U.S. integrity management regulatory development after too many pipeline rupture tragedies and the regulatory focus was not on just older more vintage pipelines for very good reasons.

3. **The portrayal that a pipeline failure "full bore rupture is an unlikely event" is extremely misleading.**[6]

I often see the argument that developing an oil release case as a full bore rupture is a "conservative" approach as it creates the misimpression that a full bore failure releases the greatest amount of oil that can be released on a pipeline. In reality, a rupture is a high rate pipeline release from a pipeline that has failed because of pipeline fracture mechanics forming a large opening in the pipe, usually fishmouth shaped for liquid pipelines, that have failed from anomalies in the pipe that have grown to defect size. Ruptures are high rate releases that can be very difficult to remotely identify depending on many factors associated with liquid compressibility, the systems hydraulic and elevation profiles, as well as mainline valve selection and placement. Liquid pipeline rupture releases usually lower the pressure curve of the pipeline segment, increasing the rate of oil release fed from both sides of the failure point, well above pump design pumping limits. These transient changes, as well as the impact of compressible hydrocarbon liquid unpacking in the mainline, make timely remote rupture identification very challenging. A liquid pipeline rupture can quickly release large volumes of oil depending on many factors. It is disingenuous to convey that rupture release volumes are bounded by full bore pipeline failure events. Liquid pipeline ruptures are not that uncommon and only a minority of ruptures are full bore, or guillotine like failures. Technically the statement may not be false, but it conveys a false level of safety.

For example, the July 1, 2011 ExxonMobil operated Silvertip Pipeline failed as a full bore or guillotine-like rupture caused by the Yellowstone River at flood stage uncovering the buried pipeline in an area of previously known river scouring (other nearby pipelines in the general area had previously ruptured from river forces). The uncovered thick pipe then failed from excessive vortex vibration created by the flowing floodwaters over a girth weld heat affected zone, or HAZ, resulting in a 360 degree circumferential crack failure and full bore release. The Silvertip Pipeline is basically an approximately 50-mile long pipeline flowing downhill, with the Yellowstone River crossing the pipeline's low point. Specially designed remote operated quick acting valves installed on the pipeline on either side of the Yellowstone River crossing were not commanded closed until considerable amounts of conventional crude oil

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[6] Stantec Report., "Section 5.2.1 Full Bore Rupture is an Unlikely Event" January 13, 2017, p. 5.149.

had been released. This conventional oil spread over 80 miles downstream, and spill response plans were highly ineffective at oil containment during the flood stage. At that time the Silvertip Pipeline was known to also move dilbit. Had dilbit been in that pipeline river crossing at the time of the rupture, the spill cleanup would have, in all probability, replaced the Enbridge Line 6B Marshall, MI pipeline rupture as one of the most expensive onshore pipeline rupture oil spill cleanups in the U.S. In March 2013, ExxonMobil did experience a pipeline rupture on their Pegasus Pipeline in Mayflower, AR that released dilbit. That line remains down to this day.

4. **Failure probability or risk assessment analysis based on Canadian or U.S. federal pipeline safety reporting databases are fatally flawed for various reasons.**

I often see risk assessment approaches trying to utilize Canadian or U.S. pipeline safety databases to predict or assess the probability of future failure on a specific pipeline. Often such analyses utilize a normalization approach such as probability per mile of pipeline from a certain threat category. There are problems with such a simplistic approach. For one, there are considerable errors in the reported databases that even the regulator cannot correct. More importantly, the databases are not auditable, subject to independent verification that the files are truly accurate. For many reasons, historical PHMSA/OPS as well as Canadian pipeline database files can be inadequate and incomplete so as to make their use in assigning risk probability inappropriate or inadequate, for a specific pipeline operation, even with "normalization" attempts such as releases per pipeline mile. While PHMSA has made considerable attempts to make pipeline incident/accident information reported to the agency public, reports are often filed before sufficient information can be supplied to accurately complete a pipeline failure report. It is well known that numerous initial reports are not accurately updated. This can be especially problematic as to actual cause, or released volumes, which historically have been found to be inaccurate or misleading. In my experience, I have seen probability analysis abuses based on such databases on both sides of the fence, usually to drive false agendas or preordained conclusions about pipelines. These databases should be applied with great caution.

More importantly, it is not an incident database frequency that is relevant to a specific pipeline and its location, but the management approach utilized in the pipeline's siting, design, construction, operation, and maintenance of the system through its long lifecycle. This is one reason why in the early 2000s, U.S. federal integrity management pipeline safety regulation was implemented, after several pipeline rupture tragedies, to address major regulatory deficiencies observed from too many pipeline rupture failures. Canadian regulations in this area, developed after U.S. efforts, do not emulate the U.S. regulations concerning integrity management approaches. While not specifically identified, U.S. federal pipeline integrity management regulation is especially focused on utilizing management practices intended to prevent pipeline ruptures. Pipeline integrity management implementation in the U.S. is not an overly complex matter, but over the past fifteen years since its implementation it has met with mixed success in preventing pipeline ruptures.

While I can appreciate the allure to use probability risk analysis, such an approach is inappropriate in determining a pipeline route. Historical pipeline database files do not predict nor represent future risk probabilities on a specific pipeline system in a specific location. Other more important considerations should be utilized in routing decisions, and an EIS should incorporate these additional considerations such as those identified in Section 1 that are clearly missing in the Draft EIS.

5. **Routing pipelines to avoid HCAs misses the intent of such integrity management efforts in U.S. federal minimum pipeline safety regulations.**

There are currently over 200,000 miles of liquid transmission pipeline in the U.S. Over forty percent of this mileage involves pipelines that could affect HCAs as defined by that regulation. Although HCAs should be easily identified in possible pipeline routing decisions, the intent of HCAs was not to avoid such potential high consequence areas, but to ensure that multiple management processes were in play to prevent pipeline failure in such locations. Integrity management regulation mimics process safety management approaches on many fronts in that possible threats to pipeline integrity need to be identified, assessed in a timely/frequent manner, and addressed well before such threats or multiple threats that can interact, result in a pipeline failure, especially pipeline rupture. These various threats will be pipeline specific and depend on many factors such as location and environment and, importantly, the pipeline management approach.

6. **Dilbit oil spill risk and cleanup are not adequately addressed in the Draft EIS.**

The proposed new pipeline will be designed to move conventional crude oil as well as Canadian diluted bitumen or "dilbit." Such batch movement will complicate the remote monitoring and identification of possible pipeline releases, especially pipeline rupture. Pipeline route selection can play an important role in the ability of a pipeline operator to design a pipeline for more rapid rupture release detection. Despite attempts to misconvey the impression, dilbits are not likely to act like conventional heavy crude oil when spilled from a pipeline. The Stantec Report does not resolve whether a dilbit oil spill will sink or float, in a particular environment. This is an important consideration when addressing the risks and effectiveness of proposed oil spill response plans in/near sensitive waters. Dilbits can experience a wide range of compositions, even varying throughout the year, as the pipeline tariff specification are usually driven by viscosity maximums in which a gravity tariff specification plays a much lesser role on pipeline operation. Prudence would dictate that in the absence of such clear demonstrable public agreement, a worst case oil spill scenario and response plan should be assumed for a dilbit release (that some dilbit will sink and other oil constituents will float on water, as demonstrated by the Enbridge Line 6B Marshall, MI rupture release). It should be mentioned that the worst case approach defined in federal pipeline oil spill response regulation (49CFR§194.105) does not adequately capture a worst case release from a pipeline rupture, and its associated transient release dynamics that substantially increase release rates well above pumping design rates.

**7. The Draft EIS fails to address the major pipeline route alternatives to the proper level of analysis and review.**

The Draft EIS presents six possible major pipeline route alternatives (Applicant's preferred, RA-03, SA-04, RA-06, RA-07, & RA-08) as well as a series of minor possible reroutes.[7] While these figures attempt to identify sensitive HCA receptors that might be near the various proposed major routes, the figures do not adequately present all the major routes (i.e., SA-04) to permit a full comparison. None of the route descriptions provide the information identified in Section 1 above which are needed to make an informed pipeline routing decision. Pipeline routing decisions should be based on a more complete EIS, not the incomplete Draft EIS.

**8. Pinhole releases.**

Because the Draft EIS mentions "pinhole" releases, Accufacts has been asked to briefly comment on such release events.[8] Pinhole releases are usually slow rate oil leaks that can still cause great environmental damage depending on their location and time to eventually detect. Such pipeline releases have been getting more attention in pipeline operation because:

1) such releases through minor holes or small cracks are almost impossible to remotely detect via internal (SCADA) leak detection systems,
2) external leak detection currently applied on limited pipeline mileage in highly sensitive areas has a very mixed bag of success,
3) the released oil doesn't always rise to the surface of the pipeline right-of-way, making identification by patrol surveillance unreliable, and

[7] Draft EIS, Chapter 10, "Figures 10.4-2 through 10.4-9," May 15, 2017.
[8] Draft EIS, Chapter 10.2.4.2.2, "Pinhole Leak Analysis for the Applicant's Preferred Route and Certificate of Need Pipeline Alternatives," May 15, 2017, p. 10-20.

4) such pinhole anomalies aren't always identifiable by current inline inspection technology ("ILI" or smart pigs), or other means of technical detection such as sound balls that are passed internally in a pipeline, or pressure loss.

As discussed in Section 4 above, the probability of a pipeline system incurring pinhole leaks is very pipeline specific, with a lower probability more likely in new pipelines that have incorporated certain protocols such as: welding QA/QC procedures and radiological inspection into their new pipeline construction, implementing hydrotesting protocols not spelled out in current U.S. hydrotesting regulations, and avoiding, as required in federal regulations, stray current interactions that can cause pipeline metal loss. Such protocols, in excess of federal regulations and industry standards, may not be implemented by a pipeline management focused on getting a new multibillion dollar pipeline project quickly into operation. With such protocols in play, however, a new pipeline is more likely not to develop pinhole leaks.

**Conclusion**

It is very important to recognize that risks assessment approaches provided in the Draft EIS are not codified in U.S pipeline federal safety regulations for very good reasons. The attempts to characterize or quantify pipeline risks as low risks can be very reckless, especially if such attempts are based on databases that don't represent a particular pipeline's management approaches or location. The introduction of various threats that can result in a release can be very pipeline specific even for new pipelines. Attempts to normalize pipeline risks per year, per mile, etc., on such systems may not adequately capture risks that can vary considerably through a pipeline's long life cycle or the very long life of the project. Pipeline project life can easily exceed many decades, well beyond 50 years, if not indefinitely.

A previous Accufacts report discussing the various life cycle stages of a pipeline, while focused on gas transmission pipelines, also applies to liquid transmission pipelines.[9] This referenced report illustrates how the various stages of a pipeline's lifecycle can introduce different threats that can result in failure over its long life if mismanaged. Such threats can be especially critical if attempts to characterize pipeline risks as low risk miss or ignore that inappropriate management approaches can prove unsuccessful at addressing various risks at different stages. The cracking risks on the existing current Line 3 that have resulted in significant reduction in maximum operating pressure, or MOP, illustrate this point. Such shortcutting can be particularly problematic if decision makers and management start to believe their own story of low risks and

[9] Accufacts Inc., "Increasing MAOP on Gas Transmission Pipelines," March 31, 2006 at http://www.pstrust.org.

fail to effectively implement management processes intended to prevent such threat introductions to a particular pipeline. Another classical example I am seeing in way too many pipeline rupture failure investigations is the over use or over reliance on ILI assessment tools to deal with pipeline threats that can result in pipeline failure, when the tool's technical capabilities have not adequately advanced, been publicly demonstrated with field verification digs, or used wisely to justify such dependence.

I have also observed, especially on multibillion dollar projects, all too often a focus to cut corners to rush such projects to operation to generate cash flow, which can result in understatement of risk that the public and the environment might ultimate have to bear for such shortsightedness. Even in such costly projects, the pipeline operator should be able to readily demonstrate to the public that they have the project under control during all its life cycle stages. In the case of a new Line 3, as presented in Section 1, the elevation and hydraulic profiles are at the core foundation of a prudent siting determination. From the above, it should be obvious that, concerning a new Line 3 pipeline routing selection, the Draft EIS is incomplete. Additional very critical information is needed and should be required for public review before the Minnesota Department of Commence proceeds with a pipeline route decision if it is determined a new Line 3 pipeline is warranted.

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