MULLETT LAKE AREA PRESERVATION SOCIETY

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NEWSLETTER SPECIAL EDITION

Whether Pro or Con Line 5 – Things We Should Know

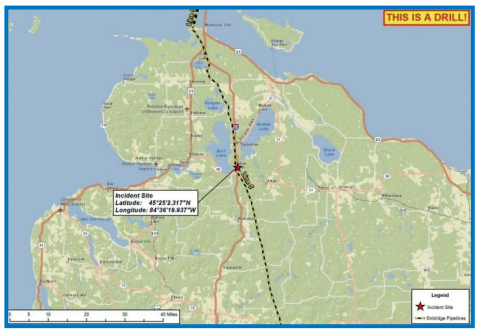
The Mullett Lake Area Preservation Society (MAPS) has set out to better understand how the Enbridge Line 5 pipeline matters to the Mullett Lake Watershed. MAPS Board members have attended public hearings, reviewed state and Enbridge documents, talked with Enbridge emergency response planning staff, and thanks to coordination through Jennifer McKay, (Tip of the Mitt Watershed Council's policy director and representative on Line 5 deliberations), MAPS met with Enbridge on Feb. 18, 2020.

Our goal is to better understand Line 5 operations, maintenance, monitoring, and response to any potential spills within the Mullett Lake Watershed. Should there ever be a release, we need to understand what actions would be taken and by whom; what impacts could occur to the environment, property owners and drinking water wells; and who would be financially responsible.

Below is what we know and what questions still linger. In sharing this information, we highlight the responsibilities, not only of Enbridge, but of federal, state, and local governments, and contractors involved with Line 5. After summarizing the information below, we raise several questions about whether maximum preparedness and capabilities exist to prevent releases from Line 5 and to respond to any releases to protect our health and environment. MAPS believes we need a plan that integrates these questions, and assures full readiness, accountability and transparency of the on-going status and future decisions relating to Line 5.

History and Current Status of Line 5

On November 13, 2020, Governor Whitmer revoked and terminated the 1953 easement which allowed the operation of Line 5 in the Straits of Mackinac. This revocation requires the dual pipelines in the Straits to cease operation by May 12, 2021. This pipeline is managed by the oil and gas company, Enbridge Energy, Limited Partnership.



Line 5 issues have mostly focused on the 4 miles of the pipeline that lies at the bottom of the Straits of Mackinac, between Lakes Huron and Michigan. There's concern about a potential release from the 67-year-old pipeline into two of the largest sources of fresh water on the globe. Although there is common concern about protecting these waters, there's also long-standing differences about which protection options should be adopted: decommissioning the existing line through the Straits and building a tunnel in the Straits to house a new pipeline, or completely shutting down Line 5 in the Straits and delivering the commodities through other alternatives. In the event of a complete shutdown and decommissioning of Line 5, petroleum products will be transported by other means (e.g., by truck, rail, or ship) through our area in the near future. Line 5 and these other transportation alternatives all carry risks, to varying degrees. It is hoped that current and future development of and transition to alternative energy technologies, will continue to lessen

risks in meeting our energy and manufacturing needs. Understanding these systems' risks and benefits and comparing them is beyond the scope of this article.

In 1953, the State of Michigan originally granted permission to Lakehead Pipe Line Company, Inc. (a subsidiary of Interprovincial Pipe Line – IPL Energy, which in 1998 became Enbridge) to construct two pipelines "for the purpose of transporting any material or substance which can be conveyed through a pipe line over, through, under and upon" the Straits of Mackinac. [1,2]

In 2010, Enbridge was responsible for release of an estimated 21,000 barrels (840,000 gallons) of heavy crude oil from a different pipeline into a tributary of the Kalamazoo River, bringing extensive scrutiny to Enbridge. This spill was one of the largest spills affecting a waterway in U.S. history. It cost Enbridge $1.2 billion to clean up and shut down 40 miles of the river for over two years. As part of the cleanup Consent Decree for this spill, "Enbridge agreed to pay $110 million on spill prevention and pipeline operations in the Great Lakes region and a $61 million fine" and to address Line 5 issues. [3]

Considering the age and location of the Line 5 Dual Pipelines in the Straits (an environmentally sensitive area) and Enbridge's past performance in pipeline management, existing concerns about Line 5 in the Straits were exacerbated. A number of agreements, monitoring, and actions followed.

1. In 2015, an agreement between Enbridge and the State of Michigan stipulated that Enbridge did not and will not transport heavy crude through the Straits "in the current engineering configuration and under the current operating parameters of the Straits Pipeline." [4,5] And although light synthetic crude has fallen from 60% in 2007 to 35% in 2019 and heavy oil production is expected to increase over the next decade, in 2018 it was agreed that Enbridge will not transport heavy crude oil through the Straits Line 5 Replacement Segment. [6,7]

2. In 2018, Enbridge reached an agreement with then Gov. Rick Snyder to build a utility tunnel beneath the lake bottom that could house, among other things, a pipeline to replace the existing exposed Dual Pipelines, eliminating risks of future oil spills. [8] Enbridge estimated that it would cost them about $500 million and 5-6 years to complete construction of the tunnel. The tunnel would be publicly owned by the Mackinac Straits Corridor Authority within Michigan's Department of Transportation (MDOT), with Enbridge holding a 99-year lease. [9]

3. On June 27, 2019, Governor Whitmer directed the Department of Natural Resources to undertake a comprehensive review of Enbridge's compliance with the 1953 Easement. Enbridge began sharing information with Michigan from January to June, 2020.

4. In November 2020, after the above review, the Governor determined that Enbridge violated the 1953 Easement Agreement. [10] There were two categories of issues.

First, Enbridge failed, for decades, to meet compliance and due-care obligations of the 1953 easement in managing the pipeline. The violations stated are:

- Unsupported spans - From 1963 to 2012 Enbridge failed to properly support the pipeline with distance between footings not to exceed 75 ft. Enbridge instead adopted a 140 ft span standard with some pipeline sections spanning between 216 and 421 ft. without support.

- Failure to maintain the pipeline's protective coating [11] - From 2003 to 2014, Enbridge was on notice that zebra and quagga mussels accumulating on the pipeline made it impossible to analyze the integrity of the coating. Enbridge did not take action. In 2014, an Enbridge consultant found areas along the pipeline missing coating, but Enbridge failed to tell the state or address the areas of bare steel for three years.

- Minimum Pipeline curvature requirement – curvature of the pipe limits stresses on the pipeline and potential subsequent failures. Inspection reports found 20 to 25 exceedances of the Easement's minimum curvature requirements. [12]

Second, siting the pipeline in the Straits violates a Public Trust Doctrine that states that "Michigan has an obligation to protect and preserve the waters of the Great Lakes and the lands beneath them for the public." [13] Michigan is required to hold these navigable waterways "in trust" to protect the public's use for fishing, boating, and other protected uses. The potential for anchor strikes and a subsequent catastrophic oil spill in the Straits poses an unreasonable threat that could impair or destroy these resources for the public's use.

The State discovered that "In April 2018, the pipelines were struck and dented in three different locations by an anchor inadvertently dropped and dragged by a commercial vessel. Then, in June 2020, Enbridge disclosed that the pipelines had again been struck sometime in 2019 by anchors or cables deployed by nearby vessels, damaging pipeline coatings and severely damaging a pipeline support. Four of the five vessels potentially responsible for the impacts were operated by Enbridge's own contractors." [14] Enbridge immediately shut down the pipeline when the damaged was discovered. [15] Both legs of Line 5 were shut down on June 19, 2020 by court order. The west leg reopened on July 1; and the east leg reopened in early September, 2020 after inspection by the U.S. Department of Transportation's Pipeline and Hazardous Materials Safety Administration (PHMSA). [16]

Enbridge contends that the federal Department of Transportation's PHMSA has ultimate jurisdiction over the matter of pipeline safety under the Pipeline Safety Act. They are appealing the Governor's revocation and termination of the 1953 easement agreement.

In April 2020, Enbridge also filed an application with the Michigan Public Service Commission (MPSC) to replace and relocate the segment of Line 5 crossing the Straits of Mackinac into a tunnel beneath the Straits. [17] Enbridge thought approval was not necessary because the Commission previously approved the construction and operation of Line 5 in 1953. However, MPSC required Enbridge to submit a new application because the proposed new pipeline differs significantly in design, location, and carrying capacity from the original 1953 authorization. [18] Review of this permit application is now affected by the Governor's Revocation and Termination of the 1953 Easement and complicates MPSC's decisions on the pipeline relocation.

Given such a large, proposed investment in infrastructure – with a 99-year lease in a very environmentally sensitive area – a complicated and multi-pronged lengthy process is in play. Permit applications will require environmental, economic, and engineering data, reviews, and public input.

Why does Line 5 Matter to the Mullett Lake Watershed?

The largest percentage of Line 5 does not lie in the Straits, but rather, inland, in buried pipelines. It originates in Superior, Wisconsin, travels through the Upper Peninsula (UP) through the Straits of Mackinac and down between Mullett and Burt Lakes. It then turns towards the thumb, to Marysville, MI and crosses the St. Clair River back to Sarnia, Ontario, Canada. It crosses 400 waterways in Michigan, besides the Straits. Within the Mullett Lake Watershed, it runs between Mullett and Burt Lakes, crosses the Indian River, the Little Sturgeon, Pigeon, and Upper Black Rivers, and a tributary to Mullett Creek. [19]

With a carrying capacity of up to 23 million gallons per day, it carries 540,000 barrels a day of light crude oil, light synthetic crude and natural gas liquids. [20] The inland portion of the pipeline operates at higher pressures than the pipeline in the Straits, with 2/3 less material thickness (the standard for inland pipelines is 0.281 inches as compared to the Straits portion of 0.813 inches). The inland pipeline's construction is also different, having side seams making it more vulnerable to stress cracking. [21] Product also flows through at higher pressures closer to pump stations like the two pump stations in Indian River.

Some Pipeline Water Crossings in the Mullett Lake Watershed are Identified as High Consequence Priority Areas

Following an agreement between the State of Michigan and Enbridge, a State/Enbridge Technical Team evaluated pipeline water crossings and assessed measures to "minimize the likelihood and/or consequences of a release at each water crossing location." [22] This map identifies where Line 5 crosses Mullett Creek (#31), Burt Lake (#32), Indian River (#33), Little Sturgeon River (#34 & 35), and Pigeon River Tributary (#36, 37, 38 & 39). [23] The Indian River, the Little Sturgeon River, and a tributary to Mullett Creek are three of the 74 priority crossings with higher potential consequences to fish and wildlife habitat, drinking water sources and land use. Additionally, the region from Mackinaw Water Crossing down to Indian River (including the land between Mullett and Burt Lakes) was identified as one of 11 general regions of highest consequence. [24]

How Line 5 is Monitored

Due to an enforcement consent decree between U.S. EPA and Enbridge related to the Line 6B Kalamazoo River spill in 2010, Enbridge has had to change their equipment and procedures to ensure more rapid data analysis and shutdown response when irregularities in their pipelines occur. [25] Details of how Enbridge monitors and manages Line 5 is detailed in their *Report to the State of Michigan: Enhancing safety and reducing potential impacts of Line 5 water crossings.* [26]

Enbridge has also provided information to MAPS in or following our meetings with them. Highlights are below.

Enbridge uses multiple computerized systems to monitor Line 5, each with a different focus and each using different technologies, resources, and timing. According to Enbridge, the volumes, rate of flow, vapor concentrations, pressure, temperatures, pump seal failures and equipment vibration levels within the pipeline are continuously monitored by sensors all along the line and monitored at the Pipeline Control Center in Edmonton, Canada. Line balance calculations (i.e., volumes in = volumes out) are measured several times a day. Enbridge states that when a system alarm occurs, they will take 10 minutes to determine whether there is an actual release or whether it is a false alarm. If it cannot be verified within 10 minutes, protocol is to shut the pipeline down.

However, Enbridge estimates that about 140,700 gallons per day could be released without being detected by line balance calculations per day. [27]

Enbridge has scheduled inspections using their in-line inspection (ILI) tools – MRI-like technologies that travel through the pipeline to detect any material flaws or degradation of integrity in the pipeline. There are three different types of "smart pigs" that look for changes in geometry, corrosion, or cracking, respectively. These tools are placed into the pipeline at Mackinaw City and monitor 160 miles through the line down to Bay City. Enbridge states that they repeat this monitoring program every 3-5 years. Below is a history of past ILI inspections using "smart pigs" and future scheduled inspections on the part of the line that passes through the Mullett Lake Watershed: [28]

- Geometry tests done in 1978, 2005, 2010, 2012, 2017, 2020 (every 5 years thereafter)
- Metal loss tests done in 1972, 2002, 2007, 2012, 2014, 2018, 2020 (every 4-5 years thereafter)
- Crack tests done in 2005, 2007, 2011, 2013, 2016, 2018, 2019 (every 3 years thereafter)

Enbridge also states that they conduct site visits using physical measurements and magnetic and ultrasonic inspections for metal loss and geometry every 4-5 years, and for cracks every 3 years. [29] External cathodic protection systems and coatings along the pipeline are designed to protect the line from corrosion and Enbridge states that they are checked regularly. If needed, repairs typically include excavation and reduction of pressure in the pipeline until repairs are complete. In late 2019, two axial cracks were found about one mile upstream from the Indian River pump station, using the ILI. In May, 2020, Enbridge scheduled two repairs to this portion of the line. Between 1973 and 2019, there have been 85 maintenance repairs within the 160-mile line between Mackinaw City and Bay City. [30]

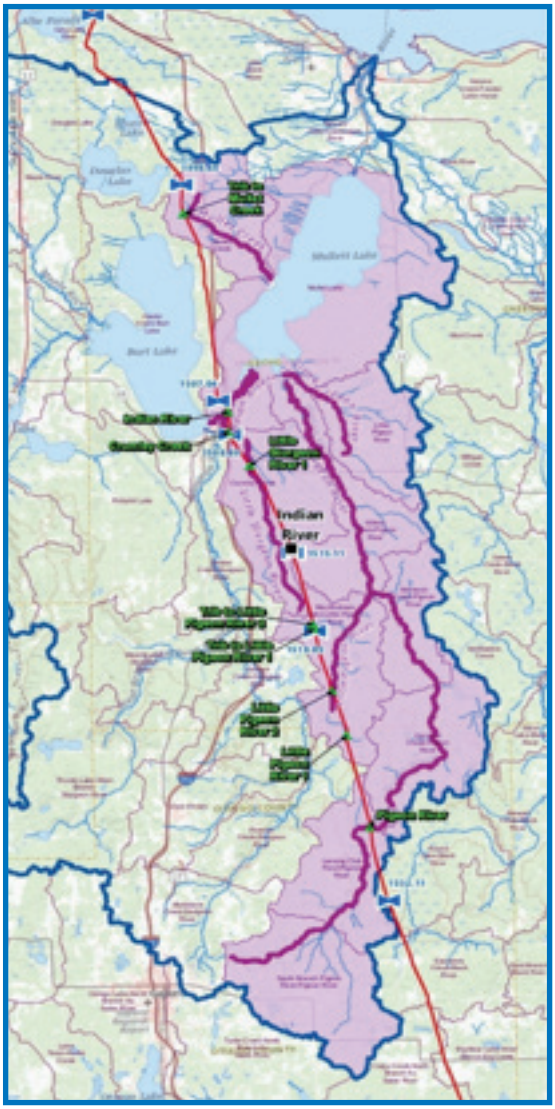
Enbridge implements a Geohazard Inspection Program which characterizes the physical attributes of the environment that the line passes through for predicting susceptibility to any land and water changes. Enbridge states that aerial inspections of water crossings occur every two weeks, and on-site inspections for scouring and loss of cover are done following flood events. Enbridge states that in 2015 they started real-time flood monitoring at water crossings and that they monitor pipeline rights-of-way for potentially damaging activities and where there might be insufficient cover depth. The last full right-of-way survey was done in 2016 and the next one is scheduled for 2022. Where the pipeline crosses water, existing depth-of-cover data is compared to predicted impacts of a 500-year flood event to estimate potential pipeline exposures, actions and follow-up assessments.

Depth of cover inspections occurred in 2017 and 2018 on the following water crossings with future inspections scheduled:

- Tributary to Mullett Creek — 1.6 ft. inspected August 6, 2018
  Scheduled for 2021
- Indian River — 8.2 ft. inspected August 17, 2017
  Scheduled for 2025
- Little Sturgeon River — 10.5 ft inspected August 6, 2018
  Scheduled for 2027
- Tributary to Little Pigeon River (2) — 1.3 ft inspected August 6, 2018
  Scheduled for 2021
- Tributary to Little Pigeon River (1) — 1.6 ft inspected August 6, 2018
  Scheduled for 2021
- Little Pigeon River (2) — 3.6 ft. inspected August 6, 2018
  Scheduled for 2021
- Little Pigeon River (1) — 3.9 ft. inspected August 6, 2018
  Scheduled for 2025
- Pigeon River — 5.6 ft. inspected August 17, 2017
  Scheduled for 2023

Where are Line 5 Pipeline Shut-off Valves?

There are manual valves and 60 remote valves operated by Enbridge's Pipeline Control Center. Locations of valves consider topography and elevations and how to best reduce potential releases to nearby water crossings, drinking water sources, high consequence areas, urban populations, environmentally sensitive areas, and navigable waters. There are 7 valves located in our watershed. (See the blue "butterflies" in the map below) Two are at the Indian River pumping station, two near the Indian River water crossing, and two upstream and downstream where Line 5 enters and leaves the watershed. In 2018, a new valve was installed near the crossing of two tributaries to the Little Pigeon River. Enbridge states that all these valves are controlled remotely and tested annually. If there was a power outage, they would have to be shut off manually. Enbridge claims it would take 3 minutes for full closure of these valves, if operating correctly; elsewhere they have claimed it would take 13 minutes to shut down the entire Line 5. Enbridge does not share the maximum and minimum volumes of product that is controlled between valves, so



we could not get an estimate of the maximum amount of a potential spill in the watershed.

Who Would Respond to a Release?

There is a protocol for the sequence of events and communications/notifications when a release is discovered. It considers who discovers the leak, how big it is, and its proximity to sensitive environments or communities. These are all captured in *Enbridge's Integrated Contingency Plan (ICP)* which is required under federal law. [31] This plan includes (among other things): notification procedures to responders, managers, state, local and tribal officials and the community; identification of Enbridge and external staff and equipment needed for a response; and hazard and environmental response actions.

Enbridge and their Oil Spill Response Organizations (OSROs) have resources positioned in Mackinaw City, St. Ignace, Cheboygan, and additional equipment stored near Detroit and Escanaba. Three emergency response firms and other heavy equipment and environmental/wildlife cleanup companies are also contracted with Enbridge and listed in their ICP. Their staff are located in Indian River, Cheboygan, Alpena, Bay City, Ludington and southeast Michigan. A response could involve just Enbridge staff, their contractors, local first responders, and/or state, federal, and tribal responders, depending on the extent of release.

Enbridge has 75 staff trained to respond. Besides the nearby Pipeline Maintenance Crew, other staff are stationed in Escanaba, Bay City, Stockbridge, and Marshall, MI. Any federal, state, or tribal responders are also trained and certified for emergency response independently of Enbridge. The State of Michigan, the U.S. Coast Guard, and the U.S. EPA (Region 5) have their own Integrated Contingency Plans for responses.

The Enbridge ICP lists portions of Indian River, the Little Sturgeon and Pigeon Rivers as having "unusually sensitive areas." Enbridge's emergency response planning staff indicated that response measures to be used at any priority water crossings (such as those in the watershed) are contained in a Remediation Master Planning Book to be used by responders in the field. Enbridge's Field Emergency Response Plans are available to emergency response organizations in each area. This document gives Tactical Control Points and potential locations for containment booms, etc. There is also a Tactical Response Plan for the Indian River. These plans are not available to the public.

2014 Theoretical Worst-Case Exercise

Each major operating region of Line 5 is required to complete a full readiness exercise cycle every 3 years; this includes at least one full-scale exercise, multiple table-top exercises and equipment deployments.

On September 17, 2014, a full-scale Emergency Response exercise was implemented in Indian River in response to a theoretical Worst-Case Discharge (WCD) of 368,000 gallons of light crude oil from a pipeline breach into the Indian River. Enbridge, federal, state, tribal, local, industry officials and environmental organizations, (including Tip of the Mitt Watershed Council), were involved in this full-scale equipment deployment.

The purpose was to test the effectiveness of Enbridge's tactical response plans and test the coordination of operations and communications amongst all government and industry parties during an emergency. Operational sites were set up and recovery methods were tested. This exercise involved Enbridge, the U.S. Coast Guard, the U.S. Environmental Protection Agency, the Michigan Department of Environmental Management, the Great Lakes Commission, the National Response Center, local responders including the Charlevoix/Cheboygan/Emmet County Central Dispatch Authority, the local 911 call center, the local Tuscarora Township, East Mullett and Topinabee fire departments, and the county Emergency Operations Center. For inland spills, the U.S. EPA rather than the US Coast Guard has lead jurisdiction, although Coast Guard served a valuable coordinating communication role.

Emergency notifications via phone and the Alert Warning System were conducted. Tracking the location of personnel and equipment tested the real-time availability of resources. Sites were located to establish a local Wildlife Processing Center and a Rehab site; and an 800-phone system was set up for citizens to report oiled wildlife. A venue to deal with the media was set up. A claims process for those impacted by the spill was also developed.[32]

Remaining Questions and Concerns

The distance of the pipeline entering the northern part of our watershed and leaving the southern portion of our watershed is approximately 46 miles long; including traveling about 14 miles in a narrow piece of land ranging from 2 to 4 miles wide between Mullett and Burt Lakes. There are several questions that linger related to Line 5 in the Mullett Lake Watershed.

It should be noted that, like so many things in our lives, the probability of an adverse event from a managed system may be small; but should an event occur, the consequences will depend on many factors. Preventing releases (i.e., reducing the probability) in the first place requires detailed knowledge of the system, and ensuring effective, well performing technology through effective management, processes and training to vigilantly monitor, act and be accountable. Should a release occur, it is important to be able to minimize the impact with maximum containment and recovery. This requires not only knowledge of the system but its impact on other systems – in this case human health, the environment and the economy.

Maintenance, Monitoring and Reporting

Enbridge has developed and implemented many procedures, protocols, and technologies to monitor Line 5 as safeguards against human error or neglect. Consistency and accountability in implementing procedures and applying technical skills is critical. Given the length of Line 5 and the diversity of environments it lies in, inspections are scheduled in years, rather than months. Given its 645-mile expanse and based on information presented below, we raise questions about monitoring and managing this ever-aging pipeline in our watershed. Our intention is to identify opportunities for minimizing the probability of and responding effectively to releases to ensure protection of the environment, public health, and the economy.

raining and uniform implementation – In November, 2020, PHMSA issued a letter to Enbridge summarizing inadequacies found in their 2018 inspection of Enbridge's operations and maintenance (O&M), integrity management and emergency response procedures.[33] Inadequacies in their O&M manual included: not requiring inspection of maintenance work and reliability of pressure safety valves; inadequately stating when and how a cathodic protection inspection is determined to be required; how often effectiveness of their O&M procedures training will take place or clear guidelines on how review of work done by operator personnel is done to determine effectiveness of procedures. Enbridge must also amend procedures to perform post-accident reviews of employee activities so as to evaluate emergency deficiencies, take corrective action, and update Integrity Management Plan risk procedures.

Rights-of-way – PHMSA requires inspection of rights-of-way and crossings under navigable waters at least every three weeks.[34] Inspections are done through walking, driving, flying or other methods. On November 19, 2020, PHMSA released its inspection report for the Lakehead system (i.e., Line 5) and cited probable violations at two locations on Line 5 (not in the Mullett Lake Watershed) for ineffectively inspecting rights-of-way aerially due to overgrowth of vegetation obstructing views of the pipeline.[35]

Water-crossings – Three Enbridge Technical Memorandums summarizing inspections on three Line 5 water-crossings (not in the Mullett Lake watershed) make it clear that maintaining depth-of-cover in water-crossings poses continuous challenges. [36] Flow rates in rivers and streams vary seasonally and can change dramatically during storm events. Increased frequency and severity of precipitation events can cause bank erosions, washouts, and large debris coursing down raging waterways. These conditions pose threats to maintaining secure footings, stable embankments and stream beds supporting the pipeline. In the three above-mentioned Enbridge-reviewed water-crossing inspections, all had some form of stream bed or bank erosion, and all had lengths of pipeline (7 – 19 feet) no longer buried. One portion of pipeline at one crossing lacked any stream bed support for around 9 feet. [37] Combining this condition with the potential for large debris passing by an uncovered portion of pipeline in high flow situations could result in pipeline rupture. Enbridge recognizes that some recommended mitigation options for these circumstances often don't assure a permanent remedy since high flow events can remove sediment. Line 5 water-crossings are not stable predictable environments, as described above.

- Is the frequency of inspection schedules in the Mullet Lake Watershed (summarized on pg. 6) adequate – particularly the 6 - 9 year span between inspections for depth of cover for the Indian River, the Little Sturgeon Rivers, the Little Pigeon River and the Pigeon River?

- How can mitigation methods permanently secure the stability of Line 5 in these water crossings?

- How has Enbridge incorporated increased frequency and severity of storms from a changing climate – sometimes severely affecting stream flows and erosion – in their planned schedule of inspections?

Detecting releases – Enbridge estimates that about 140,700 gallons per day could be released without being detected by line balance calculations. [38] Therefore, visual detection of a release may be important. However, a large portion of Line 5 is buried underground and travels through relatively remote areas. A release may not be detected by line balance calculations for a number of days. This could result in hundreds of thousands of gallons of product released into the environment, undetected, resulting in extensive environmental damage and clean-up costs.

- Do we have maximum readiness to detect and respond to a release, regardless of weather conditions, location, and extent of release?

- Added to this concern, how would varying weather conditions affect detection of a leak too small to be detected by line balance calculations in remote or non-remote areas?

Timely and transparent sharing of Line 5 information – One anchor strike in the Straits occurred sometime in 2019 but wasn't disclosed to the State of Michigan until June 2020, which resulted in Line 5 being temporarily shut down. And in 2014, an Enbridge consultant found areas along the pipeline missing coating, but Enbridge failed to tell the state or address the areas of bare steel for three years.

- How timely and transparent will Enbridge be in sharing their monitoring results in our watershed with the state and the public?

- How will we validate scheduled inspections have been conducted according to schedule and what the results of such inspections are within our watershed?

- Did the metal loss and geometry inspections with "smart pigs" occur in 2020 in the Mullett Lake Watershed as scheduled? What were the results?

Enbridge identifies areas especially sensitive to third-party damage, such as roads, railroads, and water crossings. PHMSA requires pipeline operators to take additional precautions at pipeline water-crossings, such as increased pipeline wall thicknesses and burial depth or encasing pipelines to reduce the damage. [39, 40]

- In vulnerable areas within the Mullett Lake Watershed (i.e., water-crossings, roads and neighborhoods) is there increased pipeline wall thickness or encasements?

- In water-crossings, particularly those with shallow depth-to-cover (i.e., tributaries to Mullett Creek and the Little Pigeon River) should increased burial depth, encasement or horizontal directional drill be considered to protect the pipeline from sporadic high flow erosion of cover or impact of debris?

Potential Health and Ecological Risks from Line 5 Releases

As noted above, the probability of a release may be small, but potentially consequential; and requires knowledge to respond appropriately. Once product is released into the environment, how it travels through and remains in the environment is dependent on the physical and chemical characteristics of the product, the environment and weather conditions. It can vary considerably, depending on which region and what geologic formation the crude is derived from. [41]

Line 5 transports product that originates from the Leduc oil fields in Alberta, and natural gas liquids and synthetic light crude from oil sand deposits in the Western Canada Sedimentary Basin. [42, 43] Enbridge's Commodities Routing Summary and their Great Lakes Integrated Contingency Plan show a number of light crude or natural gas liquids products carried by Line 5. [44] They include: Sunoco OSJ – Light Virgin Distillate, used as a refinery feedstock; Synthetic Light Crude – Hardisty Synthetic Crude; Upgraded Crude, used as refinery stock; High Sweet Clearbrook – light sweet crude; Western Canadian Select, used as chemical feedstock; as well as natural gas liquids.[45] These travel through the pipeline separately. Line 5 does not carry heavy crude.

Spill response tactics will differ depending on which product is in the line at the time of an inadvertent release. Environmental, health and safety risks will also vary during cleanup and beyond, based on the physical and chemical characteristics of product released. The "light" crude is sometimes "sweet" (with very low levels of sulfur) or "sour" (which contains very high amounts of sulfur).[46] Light crudes are less dense and less viscous than heavy crudes. Viscosity influences the degree and rate that a spill will spread, disperse and emulsify and is affected by temperature; so viscosity and environmental conditions matter in affecting spread of a release. Because light crude has low to moderate viscosity it floats on water and can spread quickly into thin slicks. [47] These sheens are difficult to pick up, but, are non-persistent. [48]

According to their Material Safety Data Sheets (MSDS), vapors from all of these have the potential to be flammable and explosive, may travel through subsurface migration along sewer lines and other underground spaces, and may accumulate in confined areas (such as basements and other built structures), potentially presenting explosion hazards. They can also cause asphyxiation if hydrogen sulfide is present from light sour crude.[49] If a release occurred near built structures emergency responders would need to be aware of this concern.

- How would the chemical and physical characteristics of Line 5 products affect potential vapor intrusion of building structures?

- Are local fire departments aware of the location of Line 5 where vapor intrusion could occur?

Picture of Line 5 through Indian River, MI. Source: Line 5 – Indian River Full Scale Area PREP Exercise, Exercise Plan, September 17, 2014

Many homes close to the pipeline have private drinking water wells. Although In the early phase of a release a significant portion of light crude can be lost to the environment through evaporation, there are chemicals that still can remain in the soil. Benzene, Hexane, Naptha (petroleum distillate), Toluene, and Xylene, common constituents in these products, all have high mobility in soils, and may contaminate ground water and drinking water wells, depending on soil type, permeability, depth to groundwater, and groundwater flow. [50] It would be important to prevent these compounds from contaminating drinking water wells.

The Great Lakes ICP states that "the potential for the spill to impact underlying groundwater should be determined and generally requires some knowledge of the local hydrogeology including soil type/permeability and depth to groundwater, and groundwater flow direction." [51] Intercepting contaminant plumes before they reach drinking water wells is a common approach to protecting these wells, when necessary.

- Does a readily available database of drinking water wells close to Line 5 exist?

- Does readily available information on the hydrogeology of the land in close proximity to Line 5 exist to enable timely interception of subsurface and surface potential migration of chemicals to wells?

- How would the specific chemical and physical characteristics of these Line 5 products affect contamination and remediation of drinking water wells?

Although some MSDS have thorough environmental and toxicological data on Line 5 products, some (e.g., Upgraded crude, Western Canadian Select, and Sunoco OSJ) have incomplete toxicological data on mutagenicity, carcinogencity, reproductive and aspiration toxicities or have not been fully characterized for their persistence, degradability, bioaccumulation or mobility in the environment. [52] So, behaviors of these products in the environment are not completely documented.

Of the products listed in Enbridge's Great Lakes ICP, all are listed as either toxic or highly toxic to aquatic life. [53] Some (i.e., upgraded crude) pose risks to fish, aquatic crustacea, algae & other aquatic plants, and microorganisms when immediately exposed (acute toxicity).[54] Although light crude may evaporate, the "films formed on water may affect oxygen transfer and damage organisms." [55]

High Sweet Clearbrook and Synthetic Petroleum Crude Oil have chronic toxicity data (i.e., prolonged effects from exposure). Their MSDS state that they are "very toxic to aquatic life with long lasting effects".

- What efforts, if any, are underway to update the Material Safety Data Sheets on all products flowing through Line 5?

- What role does/can Enbridge play in including more thorough environmental and toxicological information on the products in Line 5?

Identification of Environmentally Sensitive Areas

Pre-identification of environmentally sensitive areas is essential during a response to a release. The Enbridge ICP lists portions of Indian River, the Little Sturgeon and Pigeon Rivers as having "unusually sensitive areas." Yet, during the 2014 full-scale Emergency Response exercise, Enbridge's Wildlife Branch Director and the Enbridge Environmental Unit member were not familiar with the Northern Michigan Area Contingency Plan, which would identify those areas.[56]

Considering several areas of high environmental consequence in the Mullett Lake Watershed, areas with extensive wetlands, such as the Spreads in the Indian River, (not far from where the pipeline crosses the river) are of particular concern.

- What specific environmental vulnerabilities have been identified in the wetlands between Mullett Lake and Indian River (the Spreads)?

- Has there been an Environmental Impact Study of the wetlands within the Mullett Lake Watershed?

- What has been done to ensure that Enbridge's Wildlife Branch Director, Environmental Unit, and others involved in spill response, are familiar with the Northern Michigan Area Contingency Plan?

Enbridge and the State Technical Team have been working to map environmentally sensitive areas for the Indian and Pigeon Rivers. They also stated they planned to conduct baseline studies of rare wetland communities.

- Have these been conducted and integrated into Enbridge's Field Emergency Response Plans for Indian River?

Detection, Repair, and Cleanup Methods in Environmentally Sensitive Areas

The first 4-6 hours are critical in response and recovery operations. Released product can spread quickly and is influenced significantly by the type of crude (e.g., light vs. heavy), topography of land and types of environments, (such as wetlands and types of vegetation), types of surface and subsurface soils, (e.g., permeable or not), types of water (e.g., lake, large river, stream, grassy wetlands) and conditions of water, (e.g., volume and flow of water, current and wave), and shoreline and bottom sediment characteristics.

MAPS asked Enbridge what specific containment and recovery strategies would be used for timely and maximum containment in environmentally sensitive areas, particularly the Spreads. Enbridge indicated that techniques and equipment could include floating excavators, construction of timber mat roads for access, air boats and possible in-situ burning of the oil. [57] (In-situ burning is not yet an approved remediation method for Michigan. The Northern Michigan Area Committee, led by the U.S. Coast Guard and U.S. EPA, are working to develop a procedure in which in-situ burning can be quickly approved to address oil spills.) Pictures of these measures from other real-world spills are shown here. [58]

Different cleanup and recovery methods will have differing impacts on the environment, depending on the circumstances. [59] There will always be a balance between thoroughness of remediation and avoiding extensive harm to the natural environment and habitats.

Removing / excavating

Sorbents

In-situ Burning: grassy vegetation

From presentations of EPA On-Scene Coordinators, some of the remediation techniques that Enbridge suggests are viewed as having high impacts in grassy wetlands. Barriers, trenching, manual removal, excavation, dredging, high-pressure hot-water flushing, sediment reworking/mixing on land, and vegetation removal are all identified in EPA's remediation training as having high adverse impacts in grassy wetlands for remediating light and very light crude oils. [60]

- What physical and habitat destruction would occur during containment and remediation of a spill in extensive wetlands, such as those between Mullett Lake and the Indian River?

- What short- and long-term impacts would occur to fish, fowl and other environmental populations, fishing, boating, swimming, and navigation of these waters?

In-situ burning, although it may consume product, will also release hazardous combustion products. For products possibly flowing through Line 5 these include: carbon monoxide (CO), carbon dioxide (CO2). nitrogen oxides (NOx), oxides of sulfur (SOx), aldehydes, and aromatic hydrocarbons. [61]

- What are potential health and environmental effects for in-situ burning of specific Line 5 products?

Sometimes, no active removal of spilled product will be possible, if the contaminated area is inaccessible to recovery/remediation equipment. [62] What cannot be recovered after a spill is left to naturally biodegrade. The rate of biodegradation is dependent on the presence of bacteria capable of degrading hydrocarbons, nutrients, oxygen, temperature, and oil composition. Therefore, weather conditions can affect the duration and extent of environmental impacts of a release. [63]

- How would winter conditions and ice cover or warmer conditions assist or impede product containment, recovery and degradation or environmental recovery?

Communications, Training and Coordination

An After Action Report was submitted by the U.S. Coast Guard following the 2014 full-scale Emergency Response exercise at Indian River. Although the six objectives laid out by the Coast Guard were met in this exercise, the Report demonstrates that training is important for not just Enbridge, but also local authorities.

The Report documented that not all participants had an equal knowledge of the Incident Command System (ICS), which is critical for effective coordination in emergency response. In this instance, it led to a breakdown of communication between the Unified Command and the local Emergency Operations Center (EOC). During the 2014 full-scale exercise, the (EOC) initially "seemed to operate in a vacuum and did not receive adequate incident information and did not initially attempt to seek out incident information." [64] "The Situation Unit did not establish a reporting procedure to keep the EOC informed and the Unified Command member from the county was unable to provide timely situation updates to the EOC." [65] This was later corrected by the U.S. Coast Guard stepping in to improve communications to inform the local EOC of actions occurring at the Incident Command Post. "It was also determined that Enbridge's Agency representative placed in the EOC needed a good working knowledge of both the ICS [Incident Command System] and of spill response procedures." [66] Although the county EOC requested to have a representative in the Situation Unit, the Enbridge Liaison Officer did not respond until late in the exercise. Clearly, more training is needed.

The local Emergency Operations Centers are critical players in the first hours of a response to a release. In the spring of 2020, the Charlevoix, Cheboygan, Emmet Tri-County Emergency Operations Center was disbanded. Two new Directors for the Cheboygan County and Charlevoix/Emmet County Emergency Operations Centers were separately appointed. Both these new Directors were not appointed in 2014 and therefore, did not participate in the full-scale exercise.

- What is the protocol to ensure that new staff are "experts at the ready" should a rapid coordinated response be needed?

- Are these new Directors trained and familiar with Enbridge's ICP and has Enbridge offered training to them?

- Has Enbridge updated it's ICP to include these new Directors' updated contact information?

- Will website information be updated to easily contact these Emergency Operations Centers?

Cheboygan County is in the process of updating the Hazard Contingency Plan to be completed by 2021.

- How is Line 5 being integrated into this Plan?

- Does the District 4 Health Department have input into it?

- Does Cheboygan County have a Communications Plan for incidents involving releases from Line 5?

- Do all local responders have Enbridge's *Field Emergency Response Plan* and participated in training?

- Have there been past, or what is the schedule for future, Emergency Response training exercises and integrated contingency training events?

In Enbridge's *Report to the State of Michigan: Enhancing safety and reducing potential impacts at Line 5 water crossings*, several actions were identified to ensure coordination between Enbridge and state and local responders. [67]

- Has the Emergency Response Training and Exercise Communication Plan been completed and reviewed by the State Technical Team for Indian River and the Little Sturgeon River?

- Has there been collaborative review of the tactical control plans between Enbridge, State, and local authorities for Indian River?

Public Awareness and Maintenance of Rights-of-way Along the Pipeline

All inland portions of the pipeline are buried underground or in waterways. The pipeline is in close-proximity to some neighborhoods in Indian River.

Enbridge identifies areas especially sensitive to third-party damage, such as roads, railroads, and water crossings. Markings are meant to help anyone easily identify the location of the pipeline to avoid damaging it.

The pipeline typically has a 25-foot easement on either side of it (50 ft. total). A call to the State of Michigan One Call System, MISS DIG, (811) is required prior to any excavation near Line 5. Enbridge staff are then notified to identify the line before excavation. Although some contractors and citizens may know of this requirement to call, do not, or may not wait for Enbridge to identify the line.

Markers are in some easements, and at the Indian River crossing – but not others. Pipeline markers have a number to call in case of an emergency or detecting a release. There is a toll-free 24-hour emergency number 800-858-5253. Enbridge's downloadable public awareness brochure has a typo in the Department of Transportation's website to access the National Pipeline Mapping System. The correct link to access the National Pipeline Mapping System is https://www.npms.phmsa.dot.gov/.

- How will the public become more familiar with the pipeline's location and cautions around it? What public awareness, education and outreach does Enbridge conduct to inform and reach out to communities living near the pipeline? Have they evaluated its effectiveness? How effective is it?

Financial Assurance for Response and Recovery

In a Second Agreement between the State of Michigan and Enbridge, signed October 3, 2018, Enbrdge agreed to maintain $1,878,000,000 in financial assurance mechanisms to cover their liabilities, should a worse-case discharge occur from the Dual Pipelines into the Straits – for as long as they operate the Dual Pipelines. [68] They reconfirmed that commitment in a subsequent Third Agreement with the State of Michigan. [69] However, it appears that this agreement only focuses on liabilities associated with a release in the Straits; not other inland portions of Line 5.

Additionally, Enbridge has a rather complex corporate structure. Only Enbridge Energy, Limited Partnership, Enbridge Energy Company, Inc. and Enbridge Energy Partners, L.P. are signatories to the 1953 Easement, and the Second and Third Agreements. The parent company, "Enbridge, Inc. is not contractually obligated to stand behind the indemnity agreements of a subsidiary." [70, 71] However, in a letter to the State of Michigan, Enbridge, Inc. attached their 2019 financial assurance filing, which they state identifies their assets exceeding the required $1.878 billion that are available to cover any Enbridge liability. In an email from an Enbridge spokesperson, Enbridge states that they would take "full responsibility for the clean-up of any incident in Michigan or anywhere along our pipeline system." In July, 2020, Michigan DNR, concerned that the Enbridge subsidiaries may not be able to meet financial assurance obligations, requested that Enbridge, Inc. enter into a written, legally enforceable agreement with the State of Michigan to provide financial assurances to cover all damages and losses, if need be. Enbridge, Inc., however, stated in a July 20, 2020 letter that they are already committed to providing financial assurance."

- What assurances do residents have that the costs of both response and recovery will be fully covered by Enbridge subsidiaries and its parent company?

- How can we be assured that loss of resources, property values, quality of life, and economic well-being would be compensated for if a leak affected any of these aspects of our community?

In Summary

MAPS summarized this information to point out opportunities for continuous improvement and accountability for Enbridge and help our members and decision-makers better understand and consider how Line 5 is managed and what is involved, should there be a release from the existing Line 5 or any future pipeline, in our watershed. To ensure our environment and public health are protected, we need a transparent and accountable plan that addresses these questions. We will continue to work with Tip of the Mitt Watershed Council as a primary source of new and relevant information, and keep our members apprised as appropriate.

(contact: Donna Perla; donnaperla52@gmail.com)

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Donations to MAPS are a special way to remember a special person.
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Great Nieces and Nephews
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