MICHIGAN
PIPELINE SAFETY ADVISORY BOARD
FINAL REPORT

SUBMITTED DECEMBER 20, 2018

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Message to the Governor

From Keith Creagh, Director, Michigan Department of Natural Resources
and C. Heidi Grether, Director, Michigan Department of Environmental Quality
Co-chairs of the Michigan Pipeline Safety Advisory Board

Dear Governor Snyder:

Michigan is uniquely blessed with abundant natural resources in the public trust for the enjoyment of all Michiganders. Protecting the state's rich environment, public health and safety, and the Great Lakes from which this state gets its world-renowned nickname is of paramount concern. Balanced with that priority is the need to have utility infrastructure to reliably and safely fuel the needs of Michigan's residents and businesses. The two can and should exist in harmony for our state to continue to be an economic leader and an international tourist destination.

More than 3,400 miles of pipelines move hazardous liquids, including crude oil and petroleum products, in a statewide network to be processed into products that Michiganders use every day. But, the transport of these liquids also comes with some risk. The Pipeline Safety Advisory Board notes the broad universe of information from various sources that is available regarding pipelines in Michigan and it encourages the public to study all sides of the issue.

In regard to the PSAB's charges, the Board maintains the state must be vigilant in monitoring and regulating pipelines as well as addressing gaps in our current system. The state must also continue its emergency management training, and work with agencies and subject matter experts to make emergency preparedness information readily available to all stakeholders. Michigan should partner more closely with federal pipeline oversight agencies to access information about hazardous liquids pipelines, be active in the decision-making process, and collaborate on pipeline inspections. Finally, the state should make sure pipeline companies are more transparent and the public has easy access to useful pipeline data and information.

There have been many robust discussions among Board members and the public on the topic of pipelines in Michigan. We are confident that those discussions have prompted a great deal of actions resulting in protections for pipelines in Michigan.

The Pipeline Safety Advisory Board would like to especially thank the public for their attendance at our open meetings. Their valuable perspective was extremely important and very much appreciated.

We also valued the insight and hard work of past and current Board members – some of whom regularly traveled great distances – in shaping key discussions. We would like to thank the staffs of the state agencies represented on the Board – Michigan Agency for Energy, Michigan Department of Attorney General, Michigan Department of Environmental Quality, Michigan Department of Natural Resources, Michigan Public Service Commission, and Michigan State Police – for their dedication to our mission.

Finally, we would like to thank you, Governor Snyder, for entrusting in us the duty to further the state's stewardship of the environment while ensuring its continued economic wellbeing.

We respectfully submit the final report and findings of the Michigan Pipeline Safety Advisory Board.

Keith Creagh C. Heidi Grether

Keith Creagh C. Heidi Grether

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Pipeline Safety Advisory Board Members

Current appointees of the governor

Keith Creagh (Co-chair)	Director, Michigan Department of Natural Resources
C. Heidi Grether (Co-chair)	Director, Michigan Department of Environmental Quality
Anne Armstrong Cusack	Executive Director, Michigan Agency for Energy
Tony England	Dean, College of Engineering and Computer Science, University of Michigan-Dearborn
Col. Kristie Kibbey Etue	Director, Michigan State Police (Insp. Chris Bush designee)
R. Craig Hupp	Lawyer, R.C. Hupp Law PLLC
Shawn Lyon	Vice President of Operations, Marathon Pipe Line LLC
Homer A. Mandoka	Chairman, Nottawaseppi Huron Band of the Potawatomi; President of the United Tribes of Michigan
Jennifer McKay	Policy Director, Tip of the Mitt Watershed Council
Jeffrey Pillon	Technical consultant with expertise in petroleum supply, energy assurance and Director of Energy Assurance, National Association of State Energy Officials (NASEO)
Jerome Popiel	Coast Guard Liaison (non-voting member)
Bill Schuette	Michigan Attorney General (Matthew Schneider, Laura Moody, designees)
Brad Shamla	Vice President of U.S. Operations, Enbridge Energy Partners, LLC
Christopher Shepler	President, Shepler's Mackinac Island Ferry Service
Michael Shriberg	Great Lakes Regional Executive Director, National Wildlife Federation
Sally Talberg	Chairman, Michigan Public Service Commission

Past Board Members

Valerie Brader	Former Executive Director, Michigan Agency for Energy; Former Co-chair, Pipeline Safety Advisory Board
Carol Isaacs	Designee, Department of Attorney General
Capt. Chris Kelenske	Designee, Michigan State Police
Dr. Guy Meadows	Professor, Michigan Technological University
Craig Pierson	President, Marathon Pipe Line LLC
John Quackenbush	Former Chairman, Michigan Public Service Commission

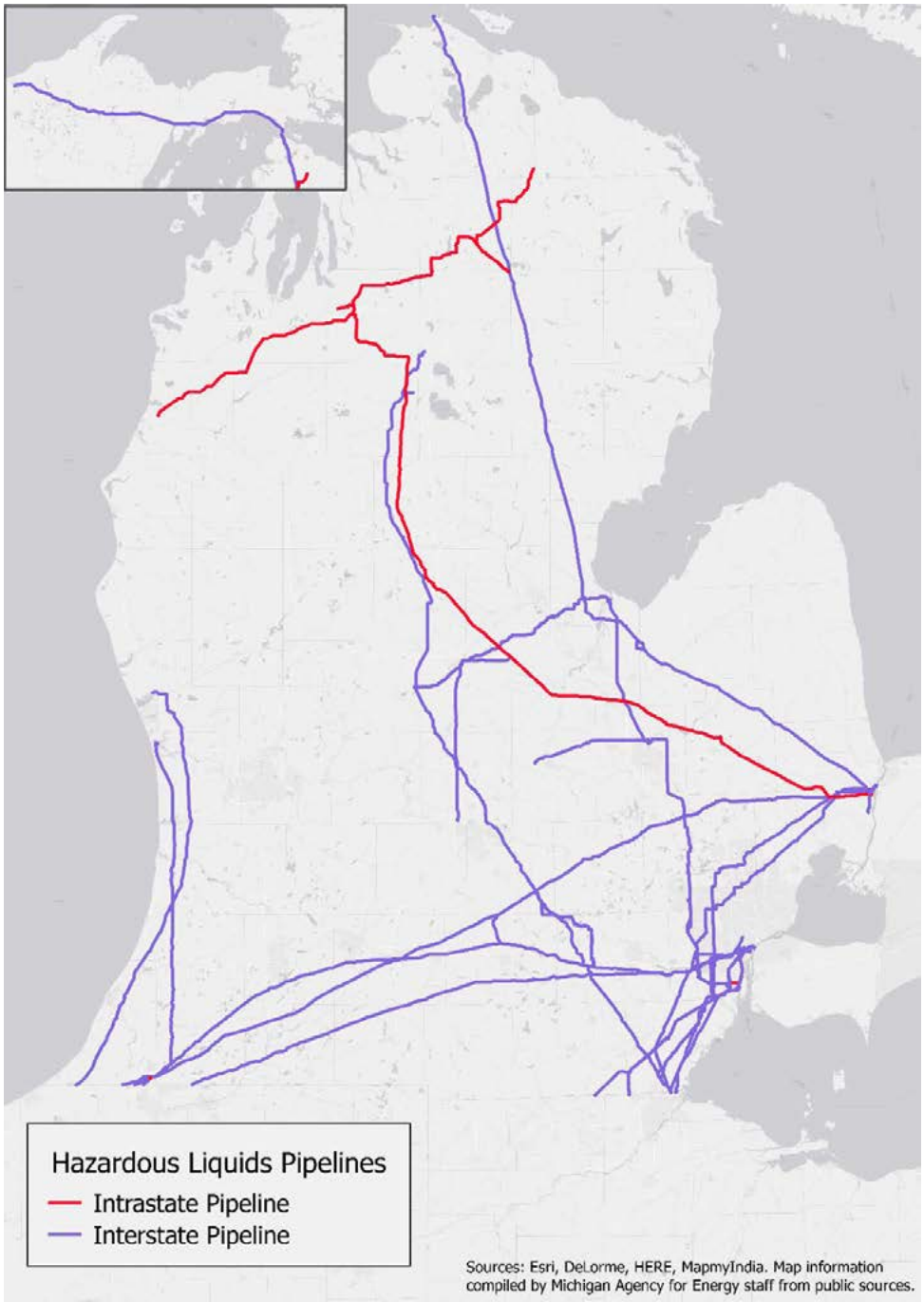
Board Support Team

Department of Attorney General	Robert Reichel
Department of Environmental Quality	Holly Simons, PSAB secretary; Scott Dean and Mary Beth Thelen
Department of Natural Resources	Mark Sweatman, Ed Golder, and Judy Tkaczyk
Michigan Agency for Energy	Nick Assendelft, Alex Morese, Brian Sheldon, Travis Warner, Reka Holley, Jovita Moffett, Richard Olivarez, Chrissie Pearce, Sandra Philpott-Burke, Joel Roseberry, Carol Simon, and Kari Vaughn
Michigan Public Service Commission	Dave Chislea

Petroleum Pipeline Infrastructure in Michigan

A network of products, facilities, and companies

Liquid pipelines in Michigan



Intrastate and Interstate Pipeline Operators in Michigan

Commodity	Operator	Intrastate Miles	Interstate Miles
Crude	Enbridge Energy, Limited Partnership		1,073.0
	Enbridge Pipelines (Toledo), Inc.		137.0
	Sunoco Pipeline L.P.		117.6
	Marathon Pipe Line LLC		61.4
	MarkWest Michigan Pipeline, LLC	39.9	
	Mid-Valley Pipeline Co.		7.0
Highly Volatile Liquids	Merit Energy Co.	225.0	
	Sunoco Pipeline L.P.		164.1
	Kinder Morgan Utopia LLC		72.2
	Plains Pipeline L.P.		55.4
	Marathon Pipeline LLC	26.4	
	Plains Marketing L.P.		17.6
	Nova Chemicals (Canada) Ltd.	11.2	
	DCP Midstream	4.2	
	Buckeye Development and Logistics, LLC		3.3
Refined Product	Wolverine Pipeline Co.		693.5
	Buckeye Partners, L.P.		392.3
	Amoco Oil Co.		162.5
	Marathon Pipe Line LLC		121.1
	Sunoco Pipeline L.P.		52.5
Total Miles: 3,437.2		306.7	3,130.5

Source: U.S. Pipeline and Hazardous Materials Safety Administration, Department of Transportation, Dec. 2017

Hazardous Liquids Transported via Pipeline, as defined by the Pipeline and Hazardous Material Safety Administration

Category	Description
Crude Oil	Liquid petroleum produced from the ground.
Refined Petroleum Products	Flammable, toxic, or corrosive products which are liquids at ambient conditions and are produced by distilling and processing crude oil or another unfinished hydrocarbon. Examples: gasoline, diesel fuel, jet fuel, kerosene, fuel oil
Highly Volatile Liquids or Other Flammable or Toxic Fluids	Liquids which produce a vapor cloud when released to the atmosphere and flammable or toxic fluids which are gases at ambient conditions. Examples: propane, ethane, butylene, anhydrous ammonia
Carbon Dioxide (CO2)	A fluid consisting of more than 90 percent carbon dioxide molecules compressed to a supercritical state.
Biofuel	Liquid fuels derived from biological feedstock. Examples: ethanol, biodiesel

Source: U.S. Pipeline and Hazardous Materials Safety Administration, Department of Transportation, Dec. 2017

Hazardous Liquid and Natural Gas Pipelines, St. Clair River, St. Clair County*

Information for this chart was provided to the PSAB as part of its informational packet (Attachment C) for its March 2016 meeting.[1] The full Informational Document regarding St. Clair River Hazard Liquid and Gas Pipelines can be found in Appendix 5 of this report.

Operator name	Commodity	Pipeline status
Plains Marketing, L.P. (2 lines)	Liquefied petroleum gas	Retired
Plains Marketing, L.P. (2 lines)	Liquefied petroleum gas	In service
Enbridge Energy, L.P. (2 lines)	Crude oil	In service
Enbridge Energy, L.P.	Crude oil	Idle
Nova Chemicals (Canada), Ltd. (4 lines)	Natural gas liquids	In service
Buckeye Development and Logistics, LLC	Butane	In service
Sunoco Pipeline, L.P.	Other highly volatile liquid	In service
PAA Natural Gas Storage, LLC	Natural gas	In service
ANR Pipeline Co.	Natural gas	In service
DTE Gas Co.	Natural gas	In service
Vector Pipeline, L.P.	Natural gas	In service
Great Lakes Gas Transmission Co. (3 lines)	Natural gas	In service

* Includes one abandoned hazardous liquids pipeline
Source: National Pipeline Mapping System (NPMS), 2016

[1] PSAB meeting packet

Introduction

Board's creation, duties, processes

Following the rupture of Enbridge Energy Partners' Line 6B in Talmadge Creek near Marshall, Michigan, and recognizing that major petroleum pipelines run near or through water resources in the state, the Michigan Petroleum Pipeline Task Force[2] was created to thoroughly examine Michigan's liquid petroleum pipelines. The task force was made up of agencies that had technical expertise, regulatory authority, public land and infrastructure management responsibilities, and emergency response experience.

When the Task Force completed its assigned duties in July 2015 one of the recommendations in its *Michigan Petroleum Pipeline Task Force Report*[3] was for the state to continue its focus on hazardous liquids pipeline safety. The Task Force recommended that Governor Rick Snyder create an advisory committee on pipeline safety and on Sept. 3, 2015, the Governor signed Executive Order 2015-12[4] to establish the Michigan Pipeline Safety Advisory Board (PSAB). In creating the 15-member panel, the Governor noted the importance to the state of Michigan of ensuring that oil and gas development and transportation is balanced with protecting public health, safety, and natural resources. (The Governor rescinded his executive order in November 2015 and replaced it with Executive Order 2015-14,[5] which expanded the board to 16 members.)

The Board is housed within the Michigan Department of Environmental Quality (MDEQ)[6] and its members include representatives from the Department of Attorney General (AG), MDEQ, the Michigan Agency for Energy (MAE), Michigan Department of Natural Resources (MDNR), Michigan Public Service Commission (MPSC), and the Michigan State Police (MSP). It also has members appointed from federal response and recovery agencies, the oil and gas industry, environmental and conservation groups, pipeline operators, academia, the tourism industry, as well as a technical consultant, a member of the public, and a representative of Michigan's tribes.

The duty of the PSAB was to review and recommend actions for the state to ensure the safety, upkeep and transparency of issues related to the network of more than 3,400 miles of petroleum and hazardous liquid pipelines in Michigan. It also was charged with advising state agencies on matters related to pipeline routing, construction, operation, and maintenance, and with helping Michigan to better understand the risks, benefits, and alternatives to pipelines.

Governor Snyder assigned these tasks to the PSAB:

- Review and make recommendations for statutory, regulatory, and contractual implementation of the *Michigan Petroleum Pipeline Task Force Report*.

[2] Michigan Petroleum Pipeline Task Force webpage
[3] Michigan Petroleum Pipeline Task Force Report
[4] Executive Order creating the Michigan Petroleum Pipeline Advisory Board
[5] Rescission of Executive Order 2015-12, updating Executive Order creating PSAB
[6] Michigan Department of Environmental Quality homepage

- Identify areas of best practice in pipeline safety and siting across the United States that could be implemented in Michigan.
- Review and make recommendations on state policies and procedures regarding emergency response and planning for pipelines.
- Review and make recommendations on state policies and procedures regarding pipeline siting.
- Review information submitted to the state in response to the *Michigan Pipeline Task Force Report*.
- Provide recommendations to increase transparency and public engagement on pipelines.

The Executive Order creating the PSAB set an expiration date for the Board of Dec. 31, 2018.

The PSAB created a subcommittee to look at best practices that could be implemented from a regulatory standpoint. The Pipeline Safety Best Practices and Pipeline Siting Subcommittee recommended increased coordination between state agencies in route reviews, increased public involvement, and a more rigorous overall pipeline siting review process. The Board also requested and received from the MAE a whitepaper that looked at practices in other states and also provided a thorough review of Hazardous Liquid Pipeline Safety programs.

Among the additional topics of Board discussion was emergency preparedness in preparation for a possible spill in the Straits of Mackinac, legislation calling for companies to file with the MDEQ spill prevention and contingency plans, openness with the public about pipeline issues, and the economic impact that a disruption of the Enbridge-owned[7] Line 5 pipeline would have on Michigan.

The PSAB conducted 15 regular meetings, most in Lansing but also in Roscommon and Petoskey. The media was given advance notice of PSAB meetings and, in accordance with the Michigan Open Meetings Act,[8] notices of public meetings were posted prominently in public meeting locations.

[7] Enbridge Energy Partners LLC homepage
[8] Michigan Open Meetings Act, Act 267 of 1976

Opportunities for public comments

Openness and transparency

The public had many opportunities to comment to the Board on pipeline issues. A total of 608 public comments were received by the Board at its public meetings, with 196 presented in person and 412 submitted in writing. Commenters traveled from throughout Michigan to attend meetings and express their views on topics about which they are passionate. They represented grass-roots organizations such as the Straits Area Concerned Citizens on Peace, Justice and the Environment, and Mackinac Straits Raptor Watch, to larger groups such as For Love of Water, and Clean Water Action. In addition, representatives of Michigan's tribes provided input to the Board. Many commenters remained engaged throughout the process.

Michigan Pipeline Safety Advisory Board Meetings

Date	Estimated attendance	Written comments	Verbal comments
Oct. 28, 2015	N/A	0	1
Dec. 14, 2015	N/A	4	2
Feb. 14, 2016	N/A	12	5
June 6, 2016	N/A	10	14
Sept. 19, 2016	N/A	8	7
Dec. 12, 2016	N/A	8	16
Mar. 13, 2017	249	15	28
June 12, 2017	252	106	46
Sept. 18, 2017	44	140	22
Dec. 11, 2017	98	8	19
Feb. 26, 2018	58	68	14
May 14, 2018	60	29	6
Aug. 6, 2018	42	7	8
Oct. 15, 2018	35	2	7
Dec. 10, 2018	35	1	4

Some comments were mailed or e-mailed to the PSAB and all correspondence was provided to the Board members. Correspondence, comments, reports by outside groups and presentations to the PSAB are archived on the Michigan Petroleum Pipelines website.[9]

A great majority of the nearly 200 oral comments to the Board expressed concerns with or advocated shutting down Enbridge's dual pipelines at the Straits of Mackinac or Line 5 throughout Michigan. A spill anywhere along its length could have an impact on inland lakes, rivers, or eventually Lakes Huron or Michigan was regularly voiced in public comments. Questions were raised by the public about the condition of the structure and they pointed to Enbridge's Line 6B spill in 2010 as one reason to increase the state's focus on pipeline safety in Michigan and protect the state's environment. Concerns were expressed that what had happened with Line 6B could also happen to Enbridge's Line 5, creating ecological and economic problems by impacting two Great Lakes and northern Michigan tourism.

Many commenters questioned the need and benefit of the pipeline to Michigan residents when weighed against the risk of a spill. Commenters supporting Line 5 cited the benefits of propane supply and crude oil transportation from northern Michigan wells. Other commenters referenced tax income to state and local governments and the jobs created by Line 5. While small in number but still notable, there were additional comments pertaining to other existing or proposed pipelines in Michigan.

[9] Michigan Petroleum Pipelines website events page.

Summary of Action on PSAB Recommendations

What's been accomplished, what's left to do

While the Pipeline Safety Advisory Board reached consensus on many issues, with the overarching goal of protecting the state's land and waters from pipeline spills, no specific recommendations were voted on by the Board.

	Executive Order 2015-14 Charges	Status
1.	Review and make recommendations for statutory, regulatory, and contractual implementation of the *Michigan Petroleum Pipeline Task Force Report*.	
2.	Identify areas of best practice in pipeline safety and siting across the United States that could be implemented in Michigan.	✓
3.	Review and make recommendations on state policies and procedures regarding emergency response and planning for pipelines.	✓
4.	Review and make recommendations on state policies and procedures regarding pipeline siting.	✓
5.	Review information submitted to the state in response to the *Michigan Petroleum Pipeline Task Force Report.*	✓
6.	Provide recommendations to increase transparency and public engagement on pipelines.	✓

✓ = Complete; ✕ = In Progress; C = Ongoing

1. Review and make recommendations for statutory, regulatory, and contractual implementation of the Michigan Petroleum Pipeline Task Force Report.

The Task Force made 13 recommendations: six were completed, three are in progress to completion, and four are ongoing. The recommendations are highlighted here and discussed in more detail later in this report.

Those completed are:

- Prohibit transportation of heavy crude oil through the Straits pipeline.
- Require independent risk analysis and financial assurance for Straits pipeline.
- Require independent alternatives analysis to using the Straits pipeline.
- Evaluate establishing hazardous liquids pipeline safety program in Michigan.
- Create advisory committee on safety.
- Create pipeline petroleum information website.

Those in progress to completion are:

- Coordinate among state agencies mapping of pipelines.
- Consider legislation on spill response plans.
- Consider legislation on improving siting process for pipelines.

Those ongoing are:

- Obtaining information from Enbridge.
- Collaboration by state agencies on emergency planning and spill response.
- Planning coordinated emergency response training exercises and drills.

- Ensuring regular consultation with the federal Pipeline and Hazardous Materials Safety Administration.

2. Identify areas of best practice in pipeline safety and siting across the United States that could be implemented in Michigan.

The Pipeline Safety Best Practices and Pipeline Siting Subcommittee's recommendations call for increased coordination between state agencies in route reviews, increased public involvement, and a more rigorous overall pipeline siting review process.

A Michigan Agency for Energy whitepaper on liquid pipeline safety authority also addresses this charge. It describes mechanisms by which the state could increase its participation in liquid pipeline safety activities, including pursuing interstate and intrastate hazardous liquids pipeline safety programs and participating in pipeline-related inspections, drills, and exercises. (The whitepaper is in Appendix 2.)

In developing the whitepaper, the siting and safety practices of other states were reviewed and considered for possible implementation in Michigan. See details on the Subcommittee's recommendations under Charge 4 below.

3. Review and make recommendations on state policies and procedures regarding emergency response and planning for pipelines.

Based on an analysis of current response capabilities and procedures, the following recommendations were made to ensure all-hazard plans fully address the risks from transporting petroleum and hazardous liquids:

- The state emergency management lead works with local, state, and federal agencies to incorporate high-risk emergency situations into their planning documents including pipeline and oil-in-water/hazardous material response.
- The MDEQ Emergency Management Coordinator will work with each U.S. Coast Guard Area Committee to disseminate information to all applicable state agencies and subject experts.
- Major pipeline utilities designate a hazardous goods/safety training position to assist local emergency management, fire, and police in emergency planning and training preparation for response to pipeline incidents.
- All state agency public information officers should participate in an emergency response Joint Information Center (JIC) exercise to become familiar with processes and procedures for coordinating public messaging among multiple agencies when part of a Unified Command.

In discussions before the PSAB and with the state, Enbridge said safety measures by the company will continue as long as the Line 5 dual pipelines in the Straits are operational. These measures include buying and placing emergency response equipment, positioning personnel near Line 5 where it crosses the Straits, and improving personnel response times to manually close valves on Line 5.

Under the authority of the Michigan Emergency Management Act (MEMA)[10], the Michigan State Police's Emergency Management and Homeland Security Division (EMHSD) is responsible for maintaining an emergency management system. The MSP provides leadership for the state's emergency management and homeland security programs and efforts. The Division coordinates local, state and federal emergency management activities across all 83 counties, manages operations of the State Emergency Operations Center (SEOC), and coordinates the use of state assets during and after emergencies.

EMHSD, along with other state agencies, reviews and updates the Michigan Emergency Management Plan (MEMP)[11], which contains information related to pipelines, oil spills, and hazardous response situations. The EMHSD and emergency management coordinators work with the 109 local emergency management programs in all 83 counties to train for emergencies. The Division also manages and operates the Emergency Management and Homeland Security Training Center (EMHSTC) in partnership with private industry.

Board members Hupp, McKay, and Pillon recommended more action be taken to stage resources, train emergency responders, and monitor energy supplies to be prepared for a disruption to Line 5.

> ***Hupp*** *said he has no indication that there is "adequate response equipment or resources in or near the Straits for a quick and successful response to a major release from Line 5. … I have not heard any assurances from responders (other than Enbridge) that there are adequate resources available, particularly in adverse conditions." He suggested in the short term increasing the staging of equipment east and west of the Mackinac Bridge to respond to a spill. "Increasing response equipment will cost a tiny fraction of the damages we wish to avoid."*
>
> ***McKay*** *suggested four actions: Amend laws as needed to allow for expedited approval of in situ burning as an emergency response tool, require pipeline operators to attend local emergency planning committee (LEPC) and regional area committee meetings at least once annually, require facility response plans to be reviewed and approved by state agencies, and implement all recommendations put forth in July 23, 2018 memo provided to the PSAB members.*
>
> ***Pillon*** *said, in part, the document titled "State Policies on Emergency Response and Planning for Pipelines" dated July 23, 2018 that was provided to the Board should be expanded to include:*
> - *Information that describes the serious impact an unanticipated closure of Line 5 for an extended period could have on petroleum product supply and prices in Michigan, Ontario, Canada, and surrounding states.*
> - *The Michigan Energy Assurance Plan and related support documents including the petroleum shortage response plans should be updated.*
> - *How local Energy Assurance Planning can enhance preparedness and awareness to the consequences of energy supply disruptions.*

[10] Michigan Emergency Management Act, November 2013
[11] Michigan Emergency Management Plan, February 2017

- *The (MAE) should continue to monitor residential heating oil and propane prices and supply, issue its semi-annual Energy Appraisal to assess consequences of fuel disruptions, and develop a coordinated, multistate response to energy emergencies.*

4. Review and make recommendations on state policies and procedures regarding pipeline siting.

The Pipeline Safety Best Practices and Pipeline Siting Subcommittee, chaired by Travis Warner (as the designee for MPSC Chairman Sally Talberg) and two PSAB members, Jennifer McKay and Shawn Lyon, developed seven consensus recommendations that, if implemented, would improve or codify the existing liquid pipeline siting process. (Subcommittee report can be found in Appendix 3.)

1. Promote public awareness and participation.

The MPSC, through its Gas Operations Section,[12] which is responsible for pipeline siting in the state, should implement processes to improve and promote the public's involvement in siting cases, including creating an information guide of the siting process, holding additional public comment hearings, and additional engagement with local governments and organizations.

2. Codify and improve noticing requirements.

The MPSC should codify existing noticing practices for pipeline siting cases as well as expand the parties required for notification to include other state agencies.

3. Codify and improve application requirements.

The MPSC should require a pre-application meeting with applicants and establish a minimum list of information that must be included in pipeline applications relating to public need, routing, and environmental considerations.

4. Expand the environmental impact review process to include other state agencies.

The MPSC and other state agencies should dedicate resources and commit to collaboration during the pipeline siting review process. The goal should be to efficiently and effectively review and provide input relating to siting cases by state staff.

5. Codify the criteria used by the MPSC in making decisions.

The MPSC should codify and further define the criteria that will be used in future determinations of need and pipeline routing.

6. Review for tribal consultation.

For each application filed, an MPSC tribal liaison should consult with the state tribal liaison to determine if a tribal consultation should be held.

7. Track staff time and expense required for review.

The MPSC should begin tracking staff resources required for application reviews to ensure that future changes to the process or application fees remain appropriate.

[12] Michigan Public Service Commission natural gas webpage

Several PSAB members provided comments specific to the seven consensus recommendations. PSAB members McKay, Shriberg, Pillon, Hupp and the MDEQ, MDNR, MAE, MSP, and AG, known as the State Agencies, supported implementation of the seven recommendations in their written comments.

The subcommittee also suggested two additional concepts for consideration that, for multiple reasons, were not finalized as consensus recommendations.

The first relates to siting future pipelines in or beneath the Great Lakes. The report discusses the options for how this situation might be best addressed in the future, whether to outright prohibit such pipelines or to review and permit these pipelines within the current process, or some combination of these options depending on circumstance.

> ***McKay*** *stated, "we recommend that Act 16[13] be amended to prohibit the siting of crude oil pipelines on or beneath the bottomlands of the Great Lakes."*
>
> ***Shriberg*** *stated, "the state should opt for "variation 2" in the memo, which would prohibit exposed pipelines on the lake bottomlands of the Great Lakes but allow for potential construction beneath the Great Lakes bottomlands if certain criteria are met."*
>
> ***State Agencies*** *stated, "the Agencies do not recommend a prohibition of pipelines in or beneath the Great Lakes at this time. Instead, the Agencies recommend continued focus on a robust siting process that ensures protection of Michigan's natural resources as well as the safety and well-being of Michigan's citizens."*

The second additional topic is the concept of requiring some form of environmental justice analysis for pipeline applications under Act 16. While this is not currently a requirement for applications, the MPSC would consider any evidence brought forth on this topic in its determinations for need and pipeline route. The recent report by the Environmental Justice Interagency Work Group[14] implied that perhaps the state should require an environmental justice analysis for all applications for transportation projects, which could include pipelines.

> ***McKay*** *recommended requiring "the newly created Environmental Justice Interagency Work Group to assist the MPSC in the development of environmental justice policies and procedures for pipeline projects."*
>
> ***Shriberg*** *stated, "The environmental justice analysis should be a required part of siting moving forward. This recommendation directly aligns with the governor's Environmental Justice Interagency Work Group's recommendations and with following through on commitments that the state has made to treat people in a fair and just manner."*
>
> ***State Agencies*** *stated, "The agencies recommend that the MPSC consult with the recently created Environmental Justice Interagency Work Group to review the current pipeline siting process and*

[13] Crude Oil and Petroleum Act 16 of 1929
[14] Environmental Justice Work Group

determine if an environmental justice review is appropriate and how this concern might be best addressed in the future."

Additional comments were made relating to pipeline siting beyond the scope of the subcommittee's report. These recommendations include: specifying product type, capacity, and operational term length in pipeline approvals; clarifying the applicability of the MPSC and Act 16 in major pipeline repairs or upgrades; requiring horizontal directional drilling for water crossings; and developing a procedure for how Native American remains are addressed when found during pipeline construction. (Comments supporting these recommendations can be found in Appendix 5.)

5. Review information submitted to the state in response to the Michigan Petroleum Pipeline Task Force Report

All information submitted to the state has been reviewed by Board members and state staff and has been made publicly available to the extent practicable.

6. Provide recommendations to increase transparency and public engagement on pipelines.

The MAE, partnering with the MDEQ, has created and maintains the Michigan Petroleum Pipelines website.[15] The website maintains information such as the *Michigan Petroleum Pipelines Task Force Report*; agreements between the state and Enbridge; emergency preparedness and spill response reports; required Enbridge reports to the state; independent analyses of alternatives to using Line 5 and worst-case scenario spill risks; PSAB meeting information and presentations; and a platform to collect public comment and feedback.

Joint agency comments indicate that the state plans to *"continue supporting this website and redefine the content to a broader focus on liquid petroleum pipelines throughout the state, not just Line 5."* Examples include, but are not limited to:

- Maps of petroleum (liquid) pipelines in Michigan.
- Laws, rules, and guidelines regarding liquid pipelines.
- Public information and education primers.
- Links to major pipeline cases before Michigan Public Service Commission.
- Updates on the future of Line 5.

The update and maintenance of this website will be coordinated by the MAE, with cooperation from the MDEQ, MDNR, and MPSC. The MAE has updated its contract with the website host through 2020.

***Hupp** would have appreciated if board member and public comments were better reflected in the meeting minutes, suggesting "excellent advice and discussion" occurred at the meetings which was not adequately documented in the record. Additionally, Hupp felt the petroleum website failed to document many of these "substantive comments, reports and submissions received."*

***Hupp** also believed the Board could have been more effective and missed an opportunity to fully use the expertise of the individual members: "On only one occasion was a subcommittee appointed to address a particular topic as a working group. The excellent "Recommendations for Liquid*

[15] Michigan Petroleum Pipelines website

Pipeline Siting" emerging from that effort is a credit to the thoughtful work of the three authors (Travis Warner, Jennifer McKay and Shawn Lyon) and an example of what could have been achieved on other topics."

***McKay** would like to require additional information of all major pipeline operations in the state. "In an effort to improve communication and transparency, all transmission pipeline operators should be required to submit comprehensive annual reports to the state of all inspections, repairs, updates, incidents or spills, commodities transported, and any other relevant information the state may request or require. Reports should be posted on the Petroleum Pipeline Information website to meet the charge of increasing transparency and public engagement on pipelines."*

Michigan Petroleum Pipeline Task Force Report Recommendations

An update on the Task Force's guidance

	Straits of Mackinac	Status
1.	Prohibit the transportation of heavy crude oil through the Straits pipelines.	✓
2.	Require an independent risk analysis and adequate financial assurance for the Straits pipelines.	✓
3.	Require an independent analysis of alternatives to the existing Straits pipelines.	✓
4.	Obtain additional information from Enbridge.	C

	Statewide	Status
1.	Coordinate mapping of existing pipelines among state agencies.	🛠
2.	Ensure state agencies collaborate on emergency planning and spill response.	C
3.	Ensure coordinated emergency response training exercises and drills.	C
4.	Ensure regular state consultation with the federal Pipeline and Hazardous Materials Safety Administration (PHMSA) on hazardous liquid (including petroleum) pipelines.	C
5.	Consider legislation requiring state review and approval of oil spill response plans, improved spill reporting, and more robust civil fines.	🛠
6.	Evaluate whether to establish a hazardous liquids pipeline safety program in Michigan.	✓
7.	Consider legislation or rulemaking to improve siting process for new petroleum pipelines.	🛠
8.	Consider issuing an executive order creating an advisory committee on pipeline safety.	✓
9.	Create a continuing petroleum pipeline information website.	✓

✓ = Complete; 🛠 = In Progress; C = Ongoing

Straits-Specific Recommendations

1. Prohibit the transportation of heavy crude oil through the Straits pipelines.

A Sept. 3, 2015 agreement between the state and Enbridge prohibits the company from transporting heavy crude oil through the Straits pipelines in its current engineering configuration and

under the current operating parameters.[16] If Enbridge proposes to change the engineering configuration of the pipeline to be able to transport heavy crude oil through the Straits pipelines, it must provide 180 days' written notice to the state and may not transport heavy crude unless the state provides written approval. The agreement further states that should Enbridge be compelled to transport heavy crude oil through Line 5 by order of a court or regulatory body, or by a change to any law, regulation or rule, the stipulations of the agreement will no longer apply as written. (See Appendix 1 on Page 42 of this report.)

2. Require an independent risk analysis and adequate financial assurance for the Straits pipelines.

The PSAB was tasked with overseeing the successful completion of two independent reports: a risk analysis and an alternatives analysis. Enbridge agreed to fund both reports regardless of their outcomes. Payments for the reports were the purview of the AG, with no direct involvement by Enbridge.

Following a competitive bidding process for both reports, Det Norske Veritas (DNV GL) was hired in July 2016 to perform the risk analysis.[17] In June 2017, work by DNV GL was terminated as state officials learned of a conflict of interest by a member of the DNV GL team prior to the company submitting its report. At the time the state terminated DNV GL's contract,[18] the company had not submitted its draft findings to the state and DNV GL was not paid for any of its work.

A second Independent Risk Analysis would be completed by a team led by Dr. Guy Meadows of Michigan Technological University, who was contracted in January 2018 to complete the study at an approximate coast of $749,000.[19] Meadows, who at the time was a member of the PSAB, resigned his seat on the Board and Tony England, the Dean of the College of Engineering and Computer Science at the University of Michigan-Dearborn, was appointed by Governor Snyder to fill Meadows' position.

The Independent Risk Analysis was to estimate Enbridge's total potential liability from a worst-case scenario oil spill from one or both of the Straits pipelines. On Sept. 15, 2018 Meadows submitted his team's final report, which was followed by a public feedback session in Harbor Springs.[20] About 50 people commented online on the report.

Meadows' Independent Risk Analysis found that a "worst-case scenario" release of 58,000 barrels (2.4 million gallons) of oil from a double rupture of the Straits pipelines would result in nearly $1.9 billion in costs for cleanup, property loss, lost income from tourism and recreation, and other damages. His team calculated that a spill could impact more than 400 miles of shoreline in Michigan, Wisconsin, and Canada depending on wind and current conditions. Depending on the timing and magnitude of a spill, 47 wildlife species of concern and 60,000 acres of unique habitat could be at risk.

[16] Agreement Between the State of Michigan and Enbridge Energy Regarding the Transportation of Heavy Crude Oil Through the Straits of Mackinac Pipelines
[17] Press release: State of Michigan announces selection of two contractors that will conduct analyses of Straits of Mackinac pipelines
[18] State Terminates Independent Contractor Analyzing Line 5 Risks
[19] Independent Risk Analysis for Straits Pipeline
[20] Michigan Tech professor to detail findings of Line 5 Risk Analysis

A similar study by a Michigan State University ecological economist, using different assumptions, found a significant pipeline break would release more than 47,000 barrels (2 million gallons) of oil and cost Michigan's economy $6.3 billion.[21]

> ***Hupp*** *said "Enbridge should have a financial assurance of about $2 billion for a Straits spill, as well as money for other areas that could be troublesome. … The state should consider expanding the financial assurance requirement to cover releases from all of Line 5. There are too many locations, particularly along U.S. 2 in the U.P., where a release would reach Lake Michigan quickly."*

3. Require an independent analysis of alternatives to the existing Straits pipelines.

Also, in July 2016, Dynamic Risk Assessment Systems Inc. was hired to look at alternatives to using Line 5. Its Independent Alternatives Analysis Final Report[22] includes an analysis of six alternatives (alternative four had two related scenarios, 4a and 4b) that the state identified as possibilities to transport the identical amount of product that is now moved through the Straits pipelines every day. The report also provided comparative estimates of the costs, lead times, and impacts, risks and other factors for each of the alternatives. The alternatives included maintaining the status quo, replacing the Straits pipelines with new pipe (including tunnel feasibility), and alternative transportation methods that could be used should the Straits pipelines be decommissioned. The report also provided an engineering analysis of the condition of the existing Straits pipelines, analyzed the principal threats to the pipelines' operation, and evaluated the probability that such threats could cause one or both pipelines to fail.

Line 5 Reports Public Feedback Sessions

Event	Location	Date	Attendance*
Alternatives analysis Draft	Holt	July 6, 2017	172
Alternatives analysis Draft	Holt	July 24, 2017	105
Alternatives analysis Draft	Traverse City	July 24, 2017	321
Alternatives analysis Draft	St. Ignace	July 25, 2017	152
Alternative analysis Final	Taylor	Dec. 6, 2017	128
Alternative analysis Final	St. Ignace	Dec. 12, 2017	144
Alternative analysis Final	Traverse City	Dec. 13, 2017	232
Risk Analysis Draft	Harbor Springs	Aug. 13, 2018	130

* Estimated

Dynamic Risk submitted its draft report in July 2017, which was followed by a public presentation of its findings and three public feedback sessions on the report. The public also could comment on the independent analysis at the Michigan Petroleum Pipelines website. According to an MDEQ presentation to the PSAB at its September 2017 meeting, 24,481 online comments were received on the draft report, some of which had attachments with individual comments. The total included 10,656 signatures that are attached to an Oil and Water Don't Mix comment. Comments could also be sent by the public via postal mail or email to the MDEQ and the MAE. Dynamic Risk and the state agencies reviewed all the comments and Dynamic Risk made appropriate changes to its report based on some of the feedback it received.

Three more public feedback sessions were held after Dynamic Risk submitted its final report to the state in November 2017. About 125 online comments were made on the final alternatives analysis. Dynamic Risk was paid an estimated $2.8 million for its work.

[21] Oil Spill Economics: Estimates of the Economic Damages of an Oil Spill in the Straits of Mackinac in Michigan
[22] Alternatives Analysis for the Straits Pipeline

In its final report, Dynamic Risk concluded that only one of the six alternatives it evaluated was not feasible. Dynamic Risk further explains that, while feasible, the remaining alternatives could result in impacts to key conditions such as economic, market, socioeconomic, environmental, and spill risk.

Alternative	Description	Conclusion
Alternative 1	Construct one or more new pipelines that do not cross open waters of the Great Lakes.	Feasible
Alternative 2	Utilize existing alternative pipeline infrastructure that does not cross the open waters of the Great Lakes.	Not feasible
Alternative 3	Use alternative transportation methods (e.g. rail, tanker trucks, oil tankers and barges).	Feasible
Alternative 4a	Replace the existing Straits Pipelines using a conventional trenched installation.	Feasible
Alternative 4b	Replace the existing Straits Pipelines using a tunnel installation.	Feasible
Alternative 5	Maintain the existing Straits Pipelines.	Feasible
Alternative 6	Abandon the Straits Pipelines.	Feasible

While some board members either thought the Dynamic Risk study was useful and helpful in understanding the pros and cons of the alternatives, or had no opinion, others questioned the Alternative Analysis' assessment and methodologies and disagreed with its conclusions:

> ***Hupp*** *averred, "There is a significant shortcoming in the scoping of the draft Alternatives Analysis. It has the wrong time perspective. The state must make a long-term choice, but the report evaluates the alternatives on today's circumstances -- not 5, 10, 30 or 50 years from now -- yet the infrastructure associated with each alternative will last at least 30 to 50 years. There will be significant changes in energy production, usage, sources and technology over the coming decades, many of which have already begun. They will change the cost and feasibility of the alternatives."*
>
> ***McKay*** *observed, "Throughout all of the analyses conducted on Line 5, key questions that were never adequately addressed were how much of the commodities transported through Line 5 do the citizens and industries of Michigan utilize and what are the impacts if Line 5 were to be decommissioned. … The conclusion from the leading experts was that Michigan has substitutes for the services provided by Line 5 which would have no noticeable impact to our economy."*
>
> ***Shriberg*** *also found shortcomings in the Alternatives Analysis. "The most significant error was one of perspective: Dynamic Risk assumed, for reasons that are not clear to me, that the state had a responsibility to ensure that all of Enbridge's product was still transported through Michigan even if Line 5 was no longer in the service. In other words, Dynamic Risk did not assess what products and services of Line 5 are actually utilized in the state. Therefore, Dynamic Risk ignored alternatives that are beneficial for Michigan."*

4. Obtain additional information from Enbridge.

At the March 2017 meeting of the PSAB questions arose about the integrity of the protective coating on Line 5 in the Straits and Enbridge told the Board the coating was intact. However, in August the company said it had known as far back as 2014 of gaps in the coating, prompting the state to order Enbridge to immediately inspect areas around pipeline anchors for damage to Line 5's coating.[23] The Board expressed frustration with the company and said it felt the company had not told the truth to the PSAB in a timely manner.[24] In November 2017, the state demanded that Enbridge make a full accounting to the PSAB at its December meeting of the status of Line 5 after new information was released by the company that additional coating gaps were discovered during pipeline inspections.

Some Board members had concerns about Enbridge not providing information in a timely manner, a concerned shared by the state when it demanded the company improve its transparency, truthfulness, and timeliness in providing information about the pipeline.[25] Enbridge has submitted to the state reports including about leak detection, coating, geologic and geotechnical data collection, St. Clair River horizontal drilling progress, leak detection technologies, and waterway crossing safety measures. The reports are posted for public review at the Michigan Petroleum Pipelines website.[26]

Statewide Recommendations

1. Coordinate mapping of existing pipelines among state agencies.

State agencies collaborate to share available mapping data. Additionally, the state is interested in obtaining improved data through the National Pipeline Mapping System (NPMS), part of the Pipeline Hazardous Materials Safety Administration (PHMSA), that receives and maintains mapping information for transmission pipelines in the United States. While the mapping data is available to the states, federal law and the agreements under which the data is provided restrict the extent to which it can be disclosed. Lack of clear disclosure protections under Michigan's Freedom of Information Act raises concerns about the state's ability to adhere to the disclosure restrictions imposed by the data sharing agreements.

Until the state can clearly demonstrate its willingness to prevent compelled disclosure of this information, the ability of state agencies to collect the data necessary to complete pipeline mapping, whether from private industry or federal agencies, is severely limited. Statutory changes addressing these disclosure concerns will likely be necessary to move forward with this recommendation.

2. Ensure state agencies collaborate on emergency planning and spill response.

The response to PSAB Recommendation 3 addresses the response to this recommendation.

3. Ensure coordinated emergency response training exercises and drills.

All state agencies collaborate on updating the all-hazards Michigan Emergency Management Plan annually. State and local agencies will work with the Coast Guard on reviewing area contingency plans as they are updated. In addition, routine drills and exercises are conducted around the state for state and local agency participation as well as in the SEOC. State and local organizations are encouraged to attend

[23] Press release: State agencies call for immediate repair of damage to coating on Straits pipeline
[24] Press release: Need for Transparency Underscored by Revelation Enbridge Knew of Coating Damage Despite March Statements
[25] Agreement with Enbridge regarding Line 5
[26] Michigan Petroleum Pipelines website Resources and Reports page

a yearly coordination workshop for training that occurs around the state. The response to PSAB Recommendation 3 further addresses the response to this recommendation.

4. Ensure regular state consultation with the federal Pipeline and Hazardous Materials Safety Administration (PHMSA) on hazardous liquid (including petroleum) pipelines.

In coordination with PHMSA, the MPSC's Gas Operations Section oversees natural gas pipeline safety and maintains a working relationship with PHMSA staff. MPSC staff consults with the federal agency on significant matters relating to hazardous liquid pipelines. MAE's Liquids Safety whitepaper (see Appendix 2) presents options to further enhance this relationship, which are discussed more fully in the response to Task Force Statewide Recommendation 6.

5. Consider legislation requiring state review and approval of oil spill response plans, improved spill reporting, and more robust civil fines.

Michigan House Bill 6201 of 2018[27] proposes imposing spill reporting requirements upon the owner and/or operator of a gas or oil pipeline in the Straits, requiring them to file spill prevention and contingency plans with the MDEQ for review and approval. The legislation provides that the MDEQ may request the Attorney General (AG), to file a civil action in the event of a gas or oil spill from a Straits pipeline or from a vessel into state waters, regardless of whether other civil or criminal penalties apply under the law. In the event of a spill, fines can be assessed of up to $37,500 for each day the spill occurs and at least $150,000 if the spill is the result of gross negligence or willful misconduct.

Proposed amendments to the legislation require a person who reports the spill must meet within 60 days with representatives from the MDEQ, the MSP, and the MPSC to discuss the nature of the release and response measures that have been, or will be, taken. The bill also requires the owner and/or operator of a Straits gas or oil pipeline meet annually with local emergency responders to review the pipeline's spill prevention and contingency plans. At the time of the preparation of this report, House Bill 6201 was awaiting action in the Michigan Senate.

PSAB members Hupp, McKay, and Shriberg indicated the bill's application to only Straits oil and gas pipelines is too narrow and suggested expansion of the scope in various measures:

Member	Topic	Comment
Hupp	Application	Too narrow; expand to include all pipelines that cross "significant waterbodies or areas of significant environmental interest." (Comments referenced HB 5198 but content of 6201.)
Mandoka	Consultation	Needs to be a liaison process between Michigan House and Senate and Michigan Tribal representatives.
McKay	Application	Too narrow; expand to include all transmission pipelines in the state.
McKay	Plan Requirements	Make plan requirements Michigan specific and allow for public comment on the plans to improve public engagement and transparency.
McKay	Fees	Impose per-barrel fines for any discharge and or spill.

[27] Michigan House Bill 6201

McKay	Notification	Require notification of spills from the pipelines to local response authorities.
Shriberg	Application	Too narrow; expand to include all transmission pipelines.
Shriberg	Clarity	Definition of "sufficient" as it relates to "sufficient personnel, materials and equipment."
Shriberg	Consultation	Require Tribal consultation.
Shriberg	Fees	Tie fines to the size of the spill (i.e. per barrel fines, not flat fine).
Shriberg	FOIA	Remove FOIA exemption.

Similar legislation was introduced in 2015 (House Bill 5198). It did not receive a hearing, but was the topic of PSAB discussions. HB 5198 of 2015 contained many of the provisions that carried over to HB 2601 of 2018 but applied those provisions to all oil transportation pipelines within the state.

6. Evaluate whether to establish a hazardous liquids pipeline safety program in Michigan.

In Michigan, the federal PHMSA is the primary agency responsible for ensuring the safe and secure transportation of hazardous liquids by pipeline.[28] This includes, among other things, setting and enforcing regulations for the design, construction, operation, maintenance, or abandonment of hazardous liquids pipelines by pipeline companies.[29] PSAB members were presented with the following four options, were asked to weigh their relative advantages and disadvantages, and then make a recommendation to the Governor about which option the state should pursue.

A. Continue to allow PHMSA to oversee Michigan's hazardous liquids pipelines.

This option represents a continuance of Michigan's existing policies and practices regarding the safety oversight of hazardous liquids pipelines in Michigan.

B. Pursue an intrastate hazardous liquids pipeline safety program.

Current federal law permits Michigan to assume PHMSA's full safety authority over the state's intrastate hazardous liquids pipelines, provided it meets or exceeds minimum program requirements.

C. Pursue a combination intrastate and interstate hazardous liquids pipeline safety program.

Subsequent to establishing an intrastate program, Michigan may request authority from PHMSA to inspect Michigan's interstate hazardous liquids pipelines. Unlike the full regulatory authorities that are assumed when creating a certified intrastate program, Michigan can only request to assume inspection authorities for Michigan's interstate hazardous liquids pipelines. The authority to create or enforce standards for interstate hazardous liquids pipelines cannot be delegated to Michigan by PHMSA.

D. Jointly inspect, with PHMSA, specific hazardous liquids pipelines in Michigan.

As an alternative to creating an intrastate or combination intrastate and interstate program to oversee Michigan's hazardous liquids pipelines, Michigan may instead opt to selectively join PHMSA in inspecting certain or all hazardous liquids pipeline facilities in Michigan.

[28] Pipeline and Hazardous Materials Safety Administration regulations
[29] Pipeline and Hazardous Materials Safety Administration and Pipelines FAQs

The MAE staff submitted to the PSAB a whitepaper (See Appendix 2) in July 2018 that presents and assesses considerations about the four options. Members indicated a need for the state to have closer involvement with PHMSA and, in general, to be better connected to issues related to Michigan's hazardous liquids pipelines. They cited, among other things, improved access to pipeline information, benefits to overall state preparedness, and new opportunities for improved coordination with Michigan's Tribal representatives as reasons for doing so. They also noted that Michigan has a combination intrastate and interstate program for its natural gas pipelines, which is well-respected nationally.

Members also discussed several of the tradeoffs of each option, including:

Costs and Funding: Apart from option A, all options would require additional state funding to implement. Options B and C are eligible for partial reimbursement from PHMSA – covering up to 80 percent of the state's costs – while the costs associated with option D are not reimbursable and must be covered by the state. In its discussions, some members expressed uncertainty about how much funding might be needed for each option, where it would come from, and the timeframe under which the funds might become available.

Timing and Ease of Implementation: Options B and C would require, among other things, state legislative action and subsequent rulemaking to implement. The MAE whitepaper estimates it would take at least three to four years to implement option B, and at least six additional months to implement option C. Some PSAB members expressed a desire for the state to increase its involvement in a quicker, more certain timeframe, and they noted that option D provides that ability.

Scope of Authority: Board members also noted that Michigan has relatively few miles of intrastate hazardous liquids pipelines, and that the pipelines of elevated PSAB interest – including Line 5 – are generally interstate pipelines that would not fall under Michigan's purview under option B and would fall under limited state purview under options C and D.

Board Members McKay, Pillon, Shriberg, and the State Agencies provided recommendations on this topic:

> ***McKay*** *recommended that "the state should identify a dedicated funding mechanism to allow for the MPSC to participate in joint inspections with PHMSA. In addition, the state should request participation in intrastate inspections and work with PHMSA to develop a program to accommodate such requests."*
>
> ***McKay*** *further noted that "Michigan can achieve many of the benefits of a hazardous liquid program, such as greater access to information and oversight, increased emergency preparedness, and building relationships with liquid pipeline operators in the State, by participating in joint inspection with PHMSA."*
>
> ***Pillon*** *recommended "the state establish and intrastate hazardous liquids pipeline safety program in Michigan to be funded by the federal government to the fullest extent possible. If the state of*

Michigan is truly concerned about the safety of liquid pipelines, it should take over this responsibility which will also allow for a higher level of coordination with PHMSA with regards to interstate pipelines operating within Michigan."

***Shriberg** recommended that "there is an opportunity for Michigan to observe and participate in interstate pipeline inspections, which the state should take advantage of immediately." The state should also "[continue] to assess the benefits and costs of a full-scale program."*

***State Agencies** recommended that "the state should participate with PHMSA … in the joint inspection of liquids pipelines in Michigan that pose the highest threat to public safety and to Michigan's natural resources."*

***The Agencies also recommended** the "state should seek ways to improve access to information about liquids pipelines and to ensure the state remains connected to the decision-making process surrounding such pipelines." They further recommended that the "state should consult with PHMSA and liquids pipeline operators to seek ways to increase the state's involvement in liquids pipeline-related exercises and drills."*

In addition to the members' comments on whether to establish a hazardous liquids pipeline safety program, McKay recommended, with Pillon's support, that the "state have MPSC staff who will engage in the joint inspections go through the Hazardous Liquids Training Program" offered by PHMSA.

7. Consider legislation or rulemaking to improve siting process for new petroleum pipelines.

The response to PSAB Recommendation 2 addresses this recommendation.

8. Consider issuing an executive order creating an advisory committee on pipeline safety.

Executive Order No. 2015-14 created the PSAB. (See text of EO on Page 40.)

9. Create a continuing petroleum pipeline information website.

The response to PSAB Recommendation 6 addresses this recommendation.

Issues before the PSAB

Coating gaps, anchor strikes, emergency preparedness, energy supply, Line 5 agreements

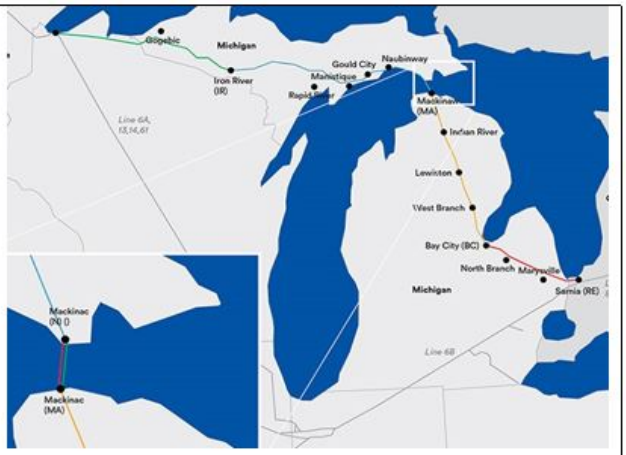
While the Board was instructed to consider issues related to all hazardous liquid pipelines in the state, one pipeline garnered the most attention of the Board and the public: Line 5, owned by Enbridge. Many members of the PSAB agreed with the need to develop a solution for dealing with the presence of the dual pipelines in the Straits. However, the full Board made no formal recommendation on the pipeline's future, even though individual members expressed specific points of view. Neither did the Board indicate support for any plan or legislation that addressed a path forward on Line 5. Focus on Line 5 by state officials and the public emerged after the release of a 2012 report on pipelines in the Great Lakes region[30] and a 2015 report from Governor Snyder's Petroleum Pipeline Task Force.[31] Public consciousness was raised about the potential ecological and economic damage that could occur if a hazardous fluid pipeline, namely Line 5, failed.

The following issues prompted considerable discussion among Board members.

1. Coating Gaps

The 1953 easement for Line 5 required a coating on the pipeline to protect the steel from external corrosion. In a March 2017 presentation, Enbridge told the PSAB that there were no known gaps in the

What is Line 5?



Line 5 is 645 miles long, beginning in Superior, Wisconsin, and crosses both the Upper and Lower Peninsulas of Michigan. The pipeline is 30 inches in diameter along its full route through Michigan, except in the 4.5-mile wide Straits of Mackinac. There, it divides into twin, 20-inch diameter lines. It lies on the bottom of the Straits within an easement issued in 1953 by the State of Michigan. The easement authorized Lakehead Pipe Line Co., Inc., which was eventually bought by Enbridge, "to construct, lay and maintain pipe lines over, through, under and upon certain lake bottom lands … for the purpose of transporting petroleum and other products; and

"… the Conservation Commission is of the opinion that the proposed pipe line system will be of benefit to all of the people of the State of Michigan and in furtherance of the public welfare."

The pipeline is part of Enbridge's Lakehead System and transports up to 540,000 barrels (roughly 22.7 million barrels) a day of light crude oil and natural gas liquids, including propane, according to Enbridge. Some of the natural gas liquids are refined and used in the Upper Peninsula. Other products are routed for processing at oil refineries in Detroit and Toledo, Ohio, with the remainder crossing the St. Clair River for processing in Sarnia, Ontario.

[30] National Wildlife Federation report: After the Marshall Spill: Pipelines in the Great Lakes Region
[31] Michigan Petroleum Pipelines Task Force Report

protective coatings on the dual pipelines. Five months later, Enbridge notified the state that a number of coating gaps, also known as holidays, were found.[32] As a result of the new information, the Board sought clarification from Enbridge about the potential threats the gaps posed. After initially telling state officials that the gaps were few in number and of limited size, Enbridge revealed that their additional investigation revealed more coating gaps than originally announced and some as large as 16 inches. Additionally, a white, calcareous deposit was found along certain segments of the pipeline.

Enbridge explained that some of the coating gaps were created during work to install new screw anchors on the pipeline. Enbridge said the cathodic protection of the pipelines was never compromised and it provided dependable protection against corrosion. Enbridge proposed a plan to repair all known instances of bare metal, received the required state permits, and completed the work in 2018.

The state ordered Enbridge to submit two reports about the coating on the pipeline:

- Enbridge Coating interim report submitted to MDEQ, Part 1[33] and Part 2,[34] in February 2018.
- Evaluation of technologies to assess the condition of pipe coating on Line 5, in June 2018.[35]

2. Vessel Damage

In April 2018, a maritime vessel traversing the Straits is believed to have dragged its anchor along the bottom and damaged electrical utility infrastructure at the bottom of the Straits and dented both segments of Line 5. The western segment was found to have two dents and the eastern segment had one. It's believed the anchor severed two electrical lines, owned by ATC (American Transmission Co.), which link the state's two peninsulas. About 600 gallons of dielectric insulating fluid leaked into the Straits from the severed lines. A second ATC cable was severely damaged, as were abandoned electrical cables owned by Consumers Energy Co., although those abandoned cables did not contain similar insulating fluid. The MDEQ and Coast Guard discussed the incident at the May 2018 PSAB meeting.[36]

The incident reaffirmed the importance of having measures in place to avoid anchor strikes on Line 5. Dynamic Risk estimated that there is a 1.6 percent chance of the Straits pipelines failing prior to 2053, with over 75 percent of this probability attributable to risks posed by vessel anchors. Following the ATC incident, Governor Snyder issued an emergency order banning anchor use in a portion of the Straits that houses utility infrastructure. That action was followed by the Coast Guard approving in October 2018 a Restricted Navigation Area (RNA)[37] in the Straits, effectively designating it a "No Anchor" zone. No vessel may anchor or loiter within the RNA at any time without the express permission of the Captain of the Port of Sault Ste. Marie or a designated representative. In an emergency, however, vessels can deviate from the Coast Guard regulation as necessary to avoid endangering the people, the environment, and/or property.

[32] Press release: Need for Transparency Underscored by Revelation Enbridge Knew of Coating Damage Despite March Statements
[33] Enbridge Coating interim report Part 1
[34] Enbridge Coating interim report Part 2
[35] Evaluation of technologies to assess the condition of pipe coating on Line 5
[36] Point LaBarbe / McGulpin Point Response Ninth Coast Guard District
[37] U.S. Coast Guard Regulated Navigation Area final rule

3. Energy Supply

The question of "Does Michigan need Line 5" arose numerous times in public meetings by both members of the Board and the public. An important issue in evaluating alternatives to Line 5 is the effect each may have on energy supply in the Upper and Lower Peninsulas. Line 5's impact on energy supply were addressed in a number of reports and sources of information. The Board as a whole did not vet the accuracy and efficacy of any of the sources of information discussed during its meetings.

The analyses and conclusions of each report reflect differences in assumptions, methodology, approach (local vs. regional, product segmentation) and time scale (short- versus medium-term). They offered varying conclusions on the short- and medium-term impacts on energy supply in the absence of Line 5 and the impacts on consumers. PSAB members were not specifically asked to address the topic of Line 5's contribution or necessity to Michigan's energy supply and security or economic impact. Therefore, summarizing the analyses and conclusions of the various studies is beyond the scope of this report. Because of the importance of this issue in evaluating alternatives to Line 5, the Board urges the public and policymakers to review these reports in detail and give them careful consideration.

Among the information sources the Board urges readers of this report to consult on this topic:

- The 2016 American Community Survey, compiled by the U.S. Census Bureau.[38]
- The federal Energy Information Administration and the Federal Energy Regulatory Commission.[39]
- MAE's Line 5 Market Impact report. (See Appendix 4.)
- Dynamic Risk's Independent Alternatives Analysis.[40]
- London Economics International studies for the National Wildlife Federation.[41] [42] [43]
- Enbridge's website.[44]

Some Board members offered their viewpoints on the impact of loss of product from Line 5.

Hupp *said, "Line 5 plays an important role in the regional energy supply network serving Midwest states and Canadian provinces. In the short term, it is needed to serve intrastate energy needs to supply propane to the UP and to deliver Michigan crude to market in the U.P. There are not good alternatives available in the short term."*

Hupp *also pointed to a medium-term solution that could alleviate some of the dependence on Line 5. " … it is likely feasible to reduce or eliminate dependence on Line 5 for propane in the U.P. and crude oil transport in the L.P. Steady conversion from propane to alternative energy sources for*

[38] American Community Survey, U.S. Census Bureau
[39] MAE PSAB presentation: Line 5 Market Impacts/Alternatives, Appendix 4
[40] Dynamic Risk Alternatives Analysis final report, Appendix G12
[41] National Wildlife Federation report: Assessment of Alternative Methods to Suppling Propane to Michigan in the Absence of Line 5
[42] NWF report: Michigan Crude Oil Production: Alternatives to Enbridge Line 5 for Transportation
[43] NWF report: Michigan Refining Sector: Alternatives to Enbridge Line 5 for Transportation
[44] Enbridge Energy Line 5 products blog

heat in the U.P. coupled with development of alternate sources of propane supply should make that possible."

Pillon *cited price volatility Michigan consumers would face if Line 5 ceased operation suddenly. "In my experience and professional opinion, the price impacts of an immediate shutdown of Line 5 would produce much larger petroleum product and propane price impacts than shown in the alternatives or risk studies due to the relatively inelastic nature of the demand for propane and other petroleum products in the short term."*

Continued ***Pillon****, " … should Line 5 be shut down due to any unanticipated reason for an extended period, it could have serious impact on petroleum product supply and prices in Michigan, Ontario and surrounding states. If this occurred during the winter months there is a significant potential for serious impact to propane supplies and prices that could impact residential customers and others."*

Shriberg *contended that Michigan has substitutes for the services provided by Line 5. "When compared with the $2 - $6 billion or more in costs plus inestimable cultural and aesthetic losses due to a spill, the choice is clear. There is no substitute for the Great Lakes and our way of life but there are clear and easy substitutes for the services that Line 5 provides to Michigan. Therefore, the state must begin the process of decommissioning Line 5."*

4. First agreement between state, Enbridge

In November 2017, the state and Enbridge entered into an agreement[45] to improve stewardship of Line 5, evaluate topics relating to the potential replacement of the dual pipelines, and improve operations and safety criteria for other parts of Line 5 throughout the state. Known as the First Agreement, it became a topic of discussion for the PSAB and outlined specific actions by Enbridge, with deadlines, for oversight, safety improvements, and transparency. The agreement required Enbridge to temporarily shut down the dual pipelines during periods of sustained adverse weather conditions in the Straits if waves reach eight feet for at least one hour, and to use horizontal directional drilling below the St. Clair River near Marysville to replace the existing segment of Line 5 that lies on the riverbed.

Enbridge was also to complete four reports:[46]

- Assess available underwater technologies to enhance leak detection of the dual pipelines above those currently in place.
- Assess options to mitigate the risk of potential vessel anchor strikes or damage to Line 5 at the Straits of Mackinac.
- Identify priority waters crossed by Line 5 – jointly by the state and Enbridge – and propose measures at critical water crossings to minimize the likelihood and consequences of a spill.
- Assess feasible alternatives for replacing the dual pipelines in the Straits. [47]

[45] Agreement Between the State of Michigan and Enbridge Energy on Line 5 in Michigan
[46] Enbridge Reports for November 2017 Agreement
[47] Alternatives for replacing Enbridge's dual Line 5 pipelines crossing the Straits of Mackinac report

Under the agreement, the state hired two subject matter experts to provide independent oversight of Enbridge's studies.[48]

Members of the PSAB expressed dismay that they were left out of the agreement negotiations with Enbridge. Comments by the public echoed this sentiment. Board members Hupp, McKay, Shepler, and Shriberg expressed opposition to the wave height standard saying it was not restrictive enough. Several members of the Board put forth resolutions for a vote calling on the Governor to:

- Conduct a detailed analysis of the public need for Line 5 and alternatives to supplying its products to Michiganders.
- Shut down Line 5 in the Straits until coating gaps could be repaired and the pipe inspected.
- Strengthen spill response measures and protections.
- Tighten the conditions which trigger shutting down the pipeline during adverse weather conditions from 8 feet to 3 feet.

The resolutions were presented to the Governor, who responded to the Board explaining why he chose not to implement the recommendations.[49]

5. Second agreement between state, Enbridge

In October 2018, the state and Enbridge announced a Second Agreement[50] that called for the two entities to discuss a further agreement around the design, construction, operation, management, and maintenance of a tunnel under the Straits in which a replacement for the dual pipelines could be located. Further, the agreement called for Enbridge to initiate discussions to negotiate a public-private partnership agreement with the Mackinac Bridge Authority for Enbridge to fund the construction of a tunnel for the dual pipelines and potentially other utility infrastructure. Input from PSAB members and numerous other sources -- including representatives of Michigan tribes, the public, and technical reports – influenced the Second Agreement. A tunnel option had come up publicly two times prior to the announcement of the Second Agreement: Dynamic Risk's Independent Alternatives Analysis in July 2017 studied the feasibility of a tunnel, and a Straits utility corridor presentation by a team of MTU students led by Professor Michael Drewyor at the PSAB's May 2018 meeting.[51]

Other measures called for in the Second Agreement:

- Enbridge is required to carry nearly $1.9 billion in financial assurance in the event of a spill and undertake additional monitoring and safety measures for the entirety of Line 5.
- Installation of a radar system to monitor wave heights in the Straits in real time to better comply with stipulations of the First Agreement on adverse weather conditions.
- Enbridge must have employees stationed near the pipeline if wave heights are measured at 6.5 feet for one hour to be ready to manually shut down the pipeline in the event automatic procedures or systems fail to stop the flow of product through the pipeline.

[48] Press release: State hires 2 pipeline experts as part of Enbridge study team
[49] Governor Risk Snyder's response to PSAB resolutions
[50] Second Agreement Between the State of Michigan and Enbridge Energy on Line 5 in Michigan
[51] Michigan Technological University Senior Design Project: Mackinac Straits Underground Utility Corridor

- High-resolution cameras are also to be placed along the Straits to allow authorities to monitor adherence to the Coast Guard "no anchor" zone rule.[52]
- Protective measures all along Line 5 throughout Michigan, specifically at 13 priority and 68 other locations where the pipeline crosses on or near waterways.

Board members offered their insights in letters that were provided to the Governor in early September 2018.

England *noted a concern among Michiganders about Line 5. " … the public's tolerance for an oil spill in the Great Lakes is considerably lower than it was more than a half century ago when Line 5 was designed. … Apprehension associated with concerns that Line 5 has exceeded its design life means both that there are increasing uncertainties about its condition and that its design is increasingly dated."*

Hupp *said, "As soon as possible the state and Enbridge must reach a decision how to relocate Line 5 from the Straits' bottomlands because it is imperative that it be relocated given the enormous environmental risks Line 5 poses in its present configuration."*

Pillon *said, "Other critical pipeline water crossing points that present significant risks have also been studied and prioritized. This work has produced an action plan for mitigation programs for each individual prioritized crossing. This work should continue and critical points of vulnerability at these locations remediated."*

Schuette *cautioned that shutting down Line 5 could have negative consequences for Michiganders, especially those living in the Upper Peninsula. "Simply shutting down Line 5 without ensuring a reasonably priced and reliable supply of propane to the Upper Peninsula residents, and allowing continued energy production in Northern Michigan, is not a viable option."*

Shepler *said Line 5 is part of every discussion his ferry company has about growing his business. "Our strategic planning is completely parallel to whether or not oil continues to flow under the Straits of Mackinac through Line 5. … External and regional economic threats, such as Line 5, cause us to question decisions to borrow money and invest in redevelopment projects."*

Added ***Shriberg****, " … The most important consideration in the future of Line 5 and in the future of any agreement is one which has not received attention thus far in a process where all of the information and reports have been funded by Enbridge Energy: What is in the best interests of the state of Michigan?"*

England *observed that "Even if a new Line 5 under the Straits could be permitted today, it would almost certainly require use of pipe-in-pipe technology and barriers against physical contact by dragging anchors." He goes on to say "(t)he proposed utility tunnel is the most and, perhaps, only acceptable alternative to the current Line 5. A tunnel avoids risks of damage from dragging anchors; offers other utilities safer, more convenient, and more reliable linkages between*

[52] U.S. Coast Guard Regulated Navigation Area final rule

Michigan's upper and lower peninsulas; provides a controlled environment for all utilities; allows access for testing and replacement; and comprises a secondary containment for pipeline failures."

McKay *said the utility corridor agreement is not "a wise decision," adding, "Replacement of Line 5 in the Straits, whether tunneled below the lakebed or trenched in secondary containment, will not eliminate the risk to the public trust waters of the Great Lakes. The inland portions of Line 5 will still remain, with nearly 400 sites where it crosses a waterbody in Michigan" and "Line 5 will traverse across the Upper Peninsula, along the U.S. 2 corridor, where there are a number of direct tributaries to Lake Michigan."*

Pillon *supported the tunnel plan because it helps to assure an adequate and reliable supply of petroleum products to the people and businesses in Michigan and makes needed investments in aging infrastructure. "Based on my review of the extensive research and studies that have been done over the last few years, I generally concur with the studies that the only viable alternative to the existing pipeline crossing the Straits of Mackinac is the construction of a tunnel for a new pipeline," he wrote to Governor Snyder.*

Shepler *noted Line 5 is 65 years old. "Line 5 will not last forever and any tunnel project will take upwards of a decade to complete, so what is the contingency plan now to remove this immediate threat from our way of life," he asks.*

In addition, both agreements require semi-annual meetings between the state and Enbridge to review matters relating to pipeline integrity, and emergency response and preparedness.

Conclusion, Next Steps

How do we keep the momentum going?

The vigilance needed to protect Michigan's pristine waterways from a potential hazardous liquids spill must not wane with the dissolution of the Michigan Pipeline Safety Advisory Board. Michigan has an unparalleled reputation for plentiful lakes and rivers, lush forests, teeming wildlife, and robust tourist attractions. A pipeline mishap could threaten aspects of Michigan's outdoors and tourism cultures and threaten public health and safety. Likewise, Michigan's utility infrastructure is the backbone of a vibrant economy. An interruption of fuel transported by pipeline could create long-term hardship for Michigan's families and businesses as well as increase costs for commodities.

State agencies, pipeline companies, environmental groups, and other stakeholders must all work toward reducing risk from Michigan's network of pipelines.

As of the writing of this report, the future of Line 5 is uncertain. As the 2017-18 Legislative session came to a close, lawmakers passed a bill which was signed into law by Governor Snyder. Public Act 359 of 2018 establishes the Mackinac Straits Corridor Authority (MSCA), and its Board voted Dec. 19, 2018, to approve an agreement with Enbridge to build a utility tunnel in the Straits for a new Line 5 and then decommission the dual pipelines once construction is complete. In addition, under the Second Agreement protections are to be made along the entire length of Line 5, particularly at critical and other water crossings.

The PSAB calls on the state to use the recommendations of the Board and the Michigan Petroleum Pipeline Task Force as it focuses on safe pipeline operation. Officials must work with pipeline owners to reduce adverse effects in the event of a pipeline incident.

Steps toward those goals include:

- Ensuring state agencies continue to collaborate on emergency planning and spill response.
- Coordinating emergency response training exercises and drills.
- Ensuring regular state consultation with the federal PHMSA on hazardous liquid (including petroleum) pipelines.
- Continuing a dialogue with Enbridge regarding Line 5 and other water crossings.
- Maintaining and coordinating pipeline information at www.mipetroleumpipelines.com to ensure public transparency.
- Implement recommendations of the PSAB Pipeline Siting Subcommittee.
- State agencies should collaborate to map existing pipelines in Michigan.
- Implement consensus pipeline siting recommendations.

Acknowledgements

We would like to acknowledge the efforts of the staff of the Michigan Agency for Energy who were instrumental in the development of this report: Anne Armstrong Cusack, Nick Assendelft, Alex Morese, Brian Sheldon, and Travis Warner.

Glossary of Terms

AG	Department of Attorney General
ATC	American Transmission Co.
DNV GL	Det Norske Veritas, GL
Dynamic Risk	Dynamic Risk Assessment Systems, Inc.
Dual pipelines	East and west segments of Line 5 in the Straits of Mackinac
EMHSD	Emergency Management and Homeland Security Division, Michigan State Police
EMHSTC	Emergency Management and Homeland Security Training Center
Enbridge Energy, Partners, LLC	Canadian company that owns Line 5
First Agreement	Agreement between state of Michigan and Enbridge calling for increased stewardship of Line 5, evaluation of several topics relating to the potential replacement of the dual pipelines, and improvements to operations and safety criteria for other parts of Line 5 throughout the state
Hazardous liquids	Crude oil; refined petroleum products; highly volatile liquids or other flammable or toxic fluids; carbon dioxide; or biofuel
LEPC	Local emergency planning committee
Line 5	Hazardous liquids pipeline owned by Enbridge Energy Partners, LLC that traverses Michigan's Upper and Lower Peninsulas
L.P.	Lower Peninsula of Michigan
MAE	Michigan Agency for Energy
MDEQ	Michigan Department of Environmental Quality
MDNR	Michigan Department of Natural Resources
MEMA	Michigan Emergency Management Act
MEMP	Michigan Emergency Management Plan
MPSC	Michigan Public Service Commission
MSCA	Mackinac Straits Corridor Authority
MSP	Michigan State Police
MTU	Michigan Technological University in Houghton
NPMS	National Pipeline Mapping System
PHMSA	Federal Pipeline Hazardous Materials Safety Administration
PSAB	Michigan Pipeline Safety Advisory Board
RNA	Restricted navigation area in the Straits as designated by the U.S. Coast Guard
Second Agreement	Agreement between state of Michigan and Enbridge for the construction of a utility corridor below the Straits of Mackinac to contain a new section of Line 5 and, once the tunnel is completed, permanently decommission the dual Line 5 pipelines in the Straits
SEOC	State Emergency Operations Center
The Agencies	Department of Attorney General, Michigan Agency for Energy, Michigan Department of Environmental Quality, Michigan Department of Natural Resources, Michigan State Police
U.P.	Upper Peninsula of Michigan

Executive Order 2015-14

Creation of the Pipeline Safety Advisory Board

RESCISSION OF EXECUTIVE ORDER 2015-12
CREATION OF PIPELINE SAFETY ADVISORY BOARD
MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY

WHEREAS, Section 1 of Article V of the Michigan Constitution of 1963 vests the executive power of the state of Michigan in the Governor; and

WHEREAS, Section 2 of Article V of the Michigan Constitution of 1963 empowers the Governor to make changes in the organization of the Executive Branch or in the assignment of functions among its units that he considers necessary for efficient administration; and

WHEREAS, it is important that the state of Michigan ensure that oil and gas development and transportation is balanced with protecting public health, safety, and natural resources; and

WHEREAS, the state of Michigan recognizes the importance of oil and gas development, transportation, and use in the state's economy; and

WHEREAS, state government leaders undertook an extensive review of the nexus between energy transmission and environmental protection with formation of the Michigan Petroleum Pipeline Task Force; and

WHEREAS, a key finding of the task force was that effective coordination of state and local resources- including stakeholders in conservation and environment, oil and gas development, and transportation, and other state agencies dealing with energy production and transportation- is needed to provide necessary transparency and to implement other task force recommendations; and

WHEREAS, establishment of a Pipeline Safety Advisory Board within the Michigan Department of Environmental Quality will advise and assist in the implementation of matters relating to hazardous liquid and gas pipeline safety, routing, construction, operation and maintenance, and provide recommendations for statutory, contractual, or procedural changes to improve the safety of pipelines in this state; and

WHEREAS, this amended Order is a replacement of Executive Order 2015-12;

NOW, THEREFORE, I, Richard D. Snyder, Governor of the state of Michigan, by virtue of the power and authority vested in the Governor by the Michigan Constitution of 1963 and Michigan law, order the following:

I. CREATION OF THE PIPELINE SAFETY ADVISORY BOARD

A. The Pipeline Safety Advisory Board (the "Board") is created as an advisory body to the Governor within the Michigan Department of Environmental Quality (the "Department").

B. The Board shall consist of the following 16 members who shall serve a term expiring on December 31, 2018.

- The director of the Department of Environmental Quality, or his/her designee from within the Department of Environmental Quality;
- The Attorney General, or his/her designee from within the Department of Attorney General;
- The director of the Department of Natural Resources, or his/her designee from within the Department of Natural Resources;
- The director of the Michigan State Police, or his/her designee from within the Department of State Police;
- The executive director of the Michigan Agency for Energy, or his/her designee from within the Michigan Agency for Energy;
- The chairperson of the Public Service Commission, or his/her designee from within the Public Service Commission;
- An individual representing federal response and recovery agencies, or his/her designee from within that federal response and recovery agency, who shall be appointed by the Governor;
- An individual representing an environmental group who shall be appointed by the Governor;
- An individual who is an elected official of a tribal government located within Michigan that is recognized by and eligible to receive services from the United States Bureau of Indian Affairs who shall be appointed by the Governor;
- An individual representing a statewide conservation group who shall be appointed by the Governor;
- An individual representing pipeline operators who shall be appointed by the Governor;
- An individual representing the oil and gas industry who shall be appointed by the Governor;
- An individual representing public universities who shall be appointed by the Governor;
- An individual representing the hospitality and tourism industry who shall be appointed by the Governor;
- A technical consultant with experience in pipeline operations and safety who shall be appointed by the Governor; and
- An individual representing the public who shall be appointed by the Governor.

C. A vacancy on the Board occurring other than by expiration of the term designated in section I. B. shall be filled in the same manner as the original appointment for the balance of the unexpired term.

II. CHARGE TO THE BOARD

A. The Board shall act in an advisory capacity to the Governor and shall do all of the following:

1. Review and make recommendations for statutory, regulatory, and contractual implementation of the Michigan Petroleum Pipeline Task Force Report.

2. Identify areas of best practice in pipeline safety and siting across the United States that could be implemented in Michigan.

3. Review and make recommendations on state policies and procedures regarding emergency response and planning for pipelines.

4. Review and make recommendations on state policies and procedures regarding pipeline siting.

5. Review information submitted to the state in response to the Michigan Petroleum Pipeline Task Force Report.

6. Provide recommendations to increase transparency and public engagement on pipelines.

B. As directed by the Department Director, Department staff shall assist the Board with establishment of policies and procedures regarding the use of grants and other funds.

C. The Board shall provide other information or advice as requested by the Governor or the Department.

Ill. OPERATIONS OF THE BOARD

A. The Board shall be staffed and assisted by personnel from the Department as directed by the Department Director. Any budgeting, procurement, and related management functions of the Board shall be performed under the direction and supervision of the Department Director.

B. The Governor shall designate the Chairperson(s) of the Board.

C. The Board may select from among its members a Vice Chairperson.

D. The Board may select from among its members a Secretary. Board staff shall assist the Secretary with record keeping responsibilities.

E. The Board may create committees and advisory panels from among its members to assist in policymaking recommendations.

F. A majority of the members of the Board serving constitutes a quorum for the transaction of the board's business. The Board shall act in making its recommendations by a majority vote of its serving members.

G. The Board shall adopt procedures consistent with Michigan law and this Order governing its organization and operations and may establish committees and request public participation on advisory panels as the board deems necessary. The Board may adopt, reject, or modify any recommendations proposed by committees or advisory panels.

H. The Board shall meet at the call of the Chairperson and as may be provided in procedures adopted by the Board.

I. In developing recommendations, the Board may, as appropriate, make inquiries, studies, investigations, hold hearings, and receive comments from the public. The Board may consult with outside experts in order to perform its duties, including, but not limited to, experts in the private sector, organized labor, government agencies, and at institutions of higher education.

J. Members of the Board shall serve without compensation but may receive reimbursement for necessary travel and expenses according to relevant statutes and the rules and procedures of the Michigan Civil Service Commission and the Department of Technology, Management and Budget, subject to available funding.

K. The Board may hire or retain contractors, sub-contractors, advisors, consultants, and agents, and may make and enter into contracts necessary or incidental to the exercise of the powers of the board and the performance of its duties as the Department Director deems advisable and necessary, in accordance with this Order, and the relevant statutes, rules, and procedures of the Michigan Civil Service Commission and the Department of Technology, Management and Budget.

L. The Board may accept donations of labor, services, or other things of value from any public or private agency or person. Any donations shall be expended in accordance with applicable laws, rules, and procedures.

M. Members of the Board shall refer all legal, legislative, and media contacts to the Department.

IV. MISCELLANEOUS

A. All departments, committees, commissioners, or officers of this state or of any political subdivision of this state may give to the Board, or to any member or representative of the Board, any necessary assistance required by the Board or any member or representative of the Board, in the performance of the duties of the Board so far as is compatible with its, his, or her duties.

B. Any suit, action, or other proceeding lawfully commenced by, against, or before any entity affected by this Order shall not abate by reason of the taking effect of this Order.

C. The invalidity of any portion of this Order shall not affect the validity of the remainder of the Order.

D. A member of the Pipeline Safety Advisory Board appointed and serving under section I. B. of Executive Order 2015-12 shall continue under this Order as a member of the Pipeline Safety Advisory Board. Any and all actions taken by the Pipeline Safety Advisory Board created in Executive Order 2015-12 are ratified and shall carry forward as though taken under this Order.

E. The Board shall dissolve on December 31, 2018, at the expiration of the term of office of Board members provided in Section I. B.

F. Executive Order 2015-12 is rescinded.

Appendix 1

2015 agreement banning heavy crude oil from Line 5

AGREEMENT BETWEEN THE STATE OF MICHIGAN AND ENBRIDGE ENERGY, LIMITED PARTNERSHIP REGARDING THE TRANSPORTATION OF HEAVY CRUDE OIL THROUGH THE STRAITS OF MACKINAC PIPELINES

This Agreement is entered on September 3, 2015, between the Attorney General of the State of Michigan and the Directors of the Michigan Departments of Environmental Quality and Natural Resources, on behalf of the State of Michigan (State) and Enbridge Energy, Limited Partnership (Enbridge).

Definitions

For purposes of this Agreement,

"1953 Easement" means the "Straits of Mackinac Pipe Line Easement [granted by the] Conservation Commission of the State of Michigan to Lakehead Pipe Line Company, Inc. (Lakehead) executed April 23, 1953.

"Heavy crude oil" means any liquid petroleum with an American Petroleum Institute gravity index of less than 22 degrees, including, but not limited to, diluted bitumen.

"Light crude oil" means liquid petroleum with an American Petroleum Institute gravity index of between 31 and 70 degrees.

"Straits of Mackinac Pipelines" or "Straits Pipelines" means that portion of Enbridge's Line 5 pipeline system consisting of two twenty-inch diameter pipelines located within the area covered by the 1953 Easement.

Background

In the 1953 Easement, the State of Michigan authorized Lakehead to construct, operate and maintain the Straits of Mackinac Pipelines on State-owned Great Lakes bottomlands, subject to the terms and conditions of the Easement.

Enbridge, as the successor-in-interest to Lakehead, currently operates the Straits of Mackinac Pipelines subject to the terms and conditions of the Easement. Among other things, the Easement requires that "at all times [Enbridge] shall exercise the due care of a reasonably prudent person for the safety and welfare of all persons and of all public and private property . . ."

Enbridge operates the Straits Pipelines pursuant to Pipeline and Hazardous Materials Safety Administration regulations (49 C.F.R. Part 195) to transport light crude oil and natural gas liquids and condensates. Enbridge has never transported heavy crude oil on the Straits Pipelines, not due to safety concerns related to heavy crude oil, but because they are part of the Line 5 pipeline system, which was designed, constructed and is currently operated for the purpose of transporting light crude oil, natural gas liquids and condensates. Accordingly, the Straits Pipelines are not transporting heavy crude because, from an engineering perspective, they are part of a pipeline system that is not currently configured to do so and Line 5 would need to be modified in order to transport heavy crude oil efficiently and without impacting the quality of other crudes transported on Line 5.

As detailed in the July 2015 Michigan Petroleum Pipeline Task Force (Task Force) Report, the State of Michigan has reviewed a number of issues and concerns

involving liquid petroleum pipelines within the State generally, and the Straits Pipelines in particular. The Task Force focused on the Straits Pipelines because their location in the Great Lakes presents unique risks of ecological and economic harm in the event of a spill or release of oil.

One issue addressed by the Task Force was the possibility that heavy crude oil may be transported through the Straits Pipelines in the future, and its belief regarding associated risks of transporting such a product. This issue gained higher priority when the Task Force was informed that there was potential demand for increased heavy crude oil for use by refineries served by Enbridge's pipeline system.

The Task Force Report found that because heavy crude oil has different properties from light oil, it is more likely to sink if released into open water. The Report also noted that the U. S. Coast Guard has publicly acknowledged that with existing technologies, it lacks the capacity to effectively respond to spills of heavy crude oil in the Great Lakes.

Enbridge does not agree with the Task Force Report's conclusions regarding the properties of heavy crude oil and notes that the issue of whether the transport of heavy crude oil raises any unique safety or environmental concerns is currently being studied by the National Academy of Sciences (NAS). Enbridge does not concur that transporting heavy oil raises any unique safety or environmental concerns.

The State has concluded that transporting heavy crude oil through the Straits Pipelines would present an unreasonable risk of ecological and economic

harm, and as such, would be inconsistent with the standard of care imposed on Enbridge under the Easement. Enbridge does not agree with the State that transporting heavy crude oil through the Straits Pipelines could present an unacceptable risk.

The State has, however, determined that Enbridge should formally re-affirm its previous statements that it does not transport and has no plans to transport heavy crude oil through the Straits Pipelines.

Accordingly, the State and Enbridge agree as follows:

1. Enbridge does not transport heavy oil through the Straits Pipelines and will not do so in the current engineering configuration and under the current operating parameters of the Straits Pipelines, except as otherwise provided in this Agreement.
2. If, based upon changed circumstances, Enbridge proposes to change the current engineering configuration or operating parameters of the Straits Pipelines in order to transport heavy crude oil through the Straits Pipelines, Enbridge shall, in addition to any other obligation or requirement of applicable law, provide at least 180 days prior written notice to the State that it proposes to do so. The notice shall include documentation of the changed circumstances, and reasonably demonstrate that transportation of heavy crude oil would be consistent with the standard of care under the Easement, taking into

consideration all relevant information, including, but not limited to, compliance with any applicable laws and regulations.

3. The State will respond in writing to Enbridge's proposal within 180 days.
4. Unless the State's written response approves Enbridge's proposal, Enbridge shall not transport heavy crude oil through the Straits Pipelines pending final resolution of any dispute between the State and Enbridge.
5. Notwithstanding anything else in this Agreement to the contrary, if at any time Enbridge is legally required to transport heavy crude oil through the Straits of Mackinac Pipelines, whether
    a. by order of a regulator or court having jurisdiction over Enbridge or the Line 5 Pipeline, or
    b. by changes or additions to any law, regulation or rule applicable to Enbridge or the Line 5 Pipeline,

    then the stipulations concerning transporting heavy crude oil through the Straits Pipelines under paragraphs 1 and 4 of this Agreement shall not apply to such change of service. In such case, Enbridge shall promptly notify the State of any administrative, judicial or legislative proceeding in which such order or change or addition to applicable law, regulation or rule is proposed.

6. The State and Enbridge consent to the jurisdiction of the U.S. District Court for the Western District of Michigan to enforce this Agreement and to resolve any disputes arising under its terms; provided that if the U.S. District Court does not have jurisdiction over disputes arising hereunder, the State and Enbridge consent to jurisdiction of Emmet County Circuit Court to resolve a dispute arising hereunder.
7. This Agreement shall bind the State, Enbridge and their respective successors and assigns.
8. No amendment to this Agreement shall be effective unless made in writing and executed by persons authorized to bind the State and Enbridge.

FOR THE STATE OF MICHIGAN

Bill Schuette, Attorney General
Dated: September 3, 2015

Dan Wyant, Director
Department of Environmental Quality
Dated: September 3, 2015

ENBRIDGE ENERGY, LIMITED PARTNERSHIP
By Enbridge Pipelines (Lakehead) L.L.C., its General Partner

(Name)
(Title)
Dated:

(Signatures continued on following page)

Keith Creagh, Director
Department of Natural Resources
Dated: September 3, 2015

6. The State and Enbridge consent to the jurisdiction of the U.S. District Court for the Western District of Michigan to enforce this Agreement and to resolve any disputes arising under its terms; provided that if the U.S. District Court does not have jurisdiction over disputes arising hereunder, the State and Enbridge consent to jurisdiction of Emmet County Circuit Court to resolve a dispute arising hereunder.
7. This Agreement shall bind the State, Enbridge and their respective successors and assigns.
8. No amendment to this Agreement shall be effective unless made in writing and executed by persons authorized to bind the State and Enbridge.

FOR THE STATE OF MICHIGAN

Bill Schuette, Attorney General
Dated: _____

Dan Wyant, Director
Department of Environmental Quality
Dated: _____

ENBRIDGE ENERGY, LIMITED PARTNERSHIP
By Enbridge Pipelines (Lakehead) L.L.C., its General Partner

_____ JWK
(Name) Brad Shamla
(Title) Vice President, U.S. Operations
Dated: 9/3/2015

(Signatures continued on following page)

Appendix 2

MAE whitepaper on Hazardous Liquid Pipeline Safety

Liquids Pipeline Safety

THE BENEFITS AND DRAWBACKS OF ESTABLISHING A HAZARDOUS LIQUIDS PIPELINE SAFETY PROGRAM IN MICHIGAN

JULY 2018

Michigan Agency for Energy
ENERGY SECURITY SECTION

Executive Summary

Pursuant to Statewide Recommendation #6 of the *Michigan Petroleum Pipeline Task Force Report*, the Energy Security Section staff of the Michigan Agency for Energy ("MAE") present the following document evaluating the relative merits of establishing a hazardous liquids pipeline safety program in Michigan. In this document, we first outline the various forms a liquids pipeline safety program could take and discuss how the form chosen impacts the respective roles of federal and state agencies as they coordinate to oversee liquids pipeline safety in Michigan. Next, we present a review of historical pipeline incident data, which is then used to compare the safety performance of liquids pipelines under federal safety jurisdiction versus the performance of those under state safety jurisdiction. Finally, we conclude by discussing the practical ramifications of establishing a liquids pipeline safety program in Michigan, including the expected costs, staffing needs, access to certain pipeline information, and the specific pipeline facilities that could fall under future state inspection or regulatory oversight.

Major takeaways include:

- Under federal law, Michigan is permitted to assume the inspection and regulatory oversight of the state's intrastate liquids pipelines as long as the state meets certain federal requirements.
- State inspection of interstate liquids pipelines is allowed at the sole discretion of the Pipeline and Hazardous Materials Safety Administration ("PHMSA"), though any suspected violations found by state inspectors must be referred to PHMSA for potential enforcement action.
- States are permitted to establish and enforce standards for intrastate pipelines that are stricter than the federal standards, but they may not do the same for interstate pipelines.
- Our analyses of historical liquids pipeline incident data find that for the nation as a whole, liquids pipelines under state oversight appear to be performing relatively evenly with those under federal oversight.
- If Michigan decides to establish an intrastate liquids pipeline safety program, and if it also requests and is granted permission from PHMSA to inspect the state's interstate liquids pipelines, it is estimated that the program would require:
    - 1.5 additional field engineers to conduct the necessary liquids pipeline inspections.
    - $350,000 of annual funding to support the entire liquids safety program, of which up to 80% may be reimbursed by PHMSA.
    - State legislation that grants state staff the authority to inspect liquids pipelines and allows for the state's adoption and enforcement of the federal pipeline safety regulations and any state-determined pipeline safety regulations.
    - A minimum of 3 to 4 years to complete the prerequisites needed to begin operating a certified intrastate liquids program and at least six additional months to request and secure a PHMSA agreement allowing the state to inspect its interstate liquids pipelines.
- A state liquids safety program would give state staff access to company inspection records, spill response plans, and other information about the facilities they oversee, which could help inform the state's energy policy objectives and be useful in the event of a pipeline-related emergency.
- Recent actions by PHMSA suggest that if the state were to request authorization from PHMSA to inspect interstate liquids pipelines, it is unlikely that PHMSA would grant the request.
- Michigan had 3,517 miles of liquids pipelines in 2016, but only about 423 of those miles were from intrastate pipelines that would be fully regulated by the state in a liquids safety program.

Introduction

In Statewide Recommendation #6 of the *Michigan Petroleum Pipeline Task Force Report*, the Michigan Agency for Energy ("MAE") is tasked with evaluating the relative merits of establishing a hazardous liquids pipeline safety program in Michigan.[1] The staff of MAE's Energy Security Section, with assistance from staff from the Michigan Public Service Commission ("MPSC"), has developed the following document in response to this task. This paper details our approach, our general findings, and makes efforts to place these findings into meaningful context.

To facilitate comprehension of this issue, this paper is divided into three sections which collectively speak to our overall charge.

> **Section 1: Federal and State Roles in a Hazardous Liquids Pipeline Safety Program**. This section discusses the historical and regulatory underpinnings of the Federal Pipeline Safety Program, and perhaps most importantly, attempts to explain what it means – and does not mean – when a state requests to "take over" hazardous liquids pipeline safety from the federal government.
>
> **Section 2: Analyses of Pipeline Safety Data.** In this section, through descriptive statistics and regression analysis, we seek a data-driven basis to inform decision-makers about whether it makes sense, from the perspective of safety outcomes, to establish a Hazardous Liquids Pipeline Safety Program in Michigan.
>
> **Section 3: Ramifications of Establishing a Hazardous Liquids Pipeline Safety Program in Michigan.** This section discusses the costs, staffing requirements, regulatory implications, and other considerations which should be contemplated before deciding whether to establish a Hazardous Liquids Pipeline Safety Program in Michigan.

Section 1: Federal and State Roles in a Hazardous Liquids Pipeline Safety Program

Background

With the passage of the Natural Gas Pipeline Safety Act of 1968, Congress directed the U.S. Department of Transportation ("USDOT") to promulgate minimum federal safety standards ("federal safety standards") for the pipeline transportation of natural gas.[2] In 1979, Congress expanded USDOT's safety authority to include the pipeline transportation of hazardous liquids such as gasoline and crude oil.[3] Subsequent policy changes shaped these authorities over time and ultimately produced the statutory and regulatory environment that exists today.[4] In many respects – though certainly not all – the regulation of natural gas pipelines is analogous to that of hazardous liquids pipelines. Indeed, several of the regulatory concepts discussed in this paper are directly applicable to both gas and liquids pipelines. Nonetheless, one should bear in mind that several important differences exist between the regulation

[1] https://mipetroleumpipelines.com/document/michigan-petroleum-pipeline-task-force-report
[2] http://www.emlf.org/clientuploads/directory/whitepaper/Diamond_Curry_13.pdf
[3] Ibid.
[4] Statutory authorities for gas and hazardous liquids pipeline safety are described primarily in 49 USC § 601, and the associated regulations are contained primarily in 49 CFR § 190-199.

natural gas pipelines and hazardous liquids pipelines, and that this paper focuses on the latter in accordance with our charge from the *Task Force Report*.

In addition to being designated as the primary safety standard-making body for hazardous liquids pipelines, under 49 USC § 601 the USDOT is also the primary inspection and enforcement body, giving USDOT the authority to take actions to help ensure pipeline owners and operators comply with the federal safety standards. Federal pipeline safety activities are carried out by USDOT's Office of Pipeline Safety ("OPS"), which was created by Congress in 1968.[5] OPS is currently housed within USDOT's Pipeline and Hazardous Materials Safety Administration ("PHMSA"), an agency created in 2004 to focus specifically on ensuring the safe transportation of hazardous materials.[6]

State Participation in Liquids Pipeline Safety

Under federal law, a state[7] may assume from PHMSA some hazardous liquids pipeline safety authorities, if it chooses to do so, subject to certain restrictions and requirements. Some of these authorities may be assumed solely at the state's discretion, while others require the consent of PHMSA. In practice, states can assume four (4) main levels of involvement in liquids pipeline safety, ranging from no involvement to the maximum allowable by law. The levels are derived from the types of certifications and agreements that a given state might have with PHMSA. Listed in order of increasing state involvement, they are:

1. State without a Hazardous Liquids Pipeline Safety Program
2. State with an Intrastate Agreement for hazardous liquids pipelines[8]
3. State with a Certified Hazardous Liquids Pipeline Safety Program[9]
4. State with a Certified Hazardous Liquids Pipeline Safety Program and an Interstate Agent Agreement for hazardous liquids pipelines.[10]

Apart from ad-hoc agreements with PHMSA which temporarily alter a state's safety authority,[11] each state can be characterized as belonging to one of the four above groups. The groupings reflect differences in the types of safety authorities a state has assumed from PHMSA and whether these authorities apply to intrastate pipelines, interstate pipelines, or both.

For intrastate pipelines, a state may assume PHMSA's inspection authority over intrastate pipelines within that state's borders (Intrastate Agreement) or the entirety of PHMSA's regulatory authorities over these pipelines (Certification). To obtain certification, the state must first adopt the minimum federal safety standards found in 49 CFR, and state law must allow for the inspection of hazardous liquids pipeline operators and the enforcement of the safety standards. States with a certified program

[5] https://www.transportation.gov/50/timeline/accessible

[6] https://www.transportation.gov/transition/phmsa

[7] For the purposes of this paper, "state" refers to the 50 U.S. states, the District of Columbia, and Puerto Rico.

[8] As described in 49 USC § 60106(a)

[9] As described in 49 USC § 60105

[10] As described in 49 USC § 60106(b)

[11] Though this paper focuses on formal, longer term safety arrangements with PHMSA, two temporary and/or ad-hoc arrangements bear mentioning. First, at the request of PHMSA, states may operate as an Interstate Agent on a temporary basis. Second, under the PIPES Act of 2016, a state with a certified intrastate program may request to jointly participate with PHMSA in the inspection of a specific interstate pipeline or pipeline facility.

are permitted to adopt more stringent safety standards if they choose to do so, provided these standards do not conflict with federal regulations. Importantly, certification for intrastate pipelines is not granted at the discretion of PHMSA; by law, it is granted to any state that that requests it and that meets the certification requirements.

For interstate pipelines, a state may assume PHMSA's inspection authority over interstate pipelines within that state's borders (Interstate Agent Agreement), but it cannot assume PHMSA's standards-making or enforcement authorities for these pipelines. Thus, a state is not permitted to set more stringent safety standards for interstate pipelines, and any probable violations found during the state's inspection activities must be referred to PHMSA for potential enforcement action. It is important to note that regardless of state or federal preferences, PHMSA maintains sole legal authority to promulgate safety regulations for interstate hazardous liquids pipelines and to take enforcement actions for any violations thereof. *Table 1* provides a summary of this information, showing for each of the four levels of involvement whether the state or federal government serves as the lead entity for the various pipeline safety activities listed.

Table 1: Lead Government by State Program Status, Pipeline Type, and Oversight Activity Type

	Inspection (Intrastate)	Regulatory/Enforcement (Intrastate)	Inspection (Interstate)	Regulatory/Enforcement (Interstate)
No State Safety Program	Federal	Federal	Federal	Federal
Intrastate Agreement	State	Federal	Federal	Federal
Certification	State	State	Federal	Federal
Interstate Agent and Certification	State	State	State	Federal

For 2018, fifteen states will operate certified hazardous liquids programs, with five of the fifteen also acting as interstate agents. No state will operate under an intrastate agreement, a mechanism which historically is rarely used. A review of historical data compiled by MAE's Energy Security staff shows that state hazardous liquids pipeline safety program statuses change little from one year to the next. Over the past fifteen years, the number of certified hazardous liquids programs ranged from thirteen to fifteen, and the number of states with an interstate agent agreement was either five or six. The last time a state operated under an intrastate agreement for hazardous liquids pipelines was in 2010. State program statuses are listed in PHMSA's *Guidelines for States Participating in the Pipeline Safety Program.*[12] State statuses for 2018 are captured from the *Guidelines* and shown as *Figure 1*.

[12] https://www.phmsa.dot.gov/sites/phmsa.dot.gov/files/pictures/2018%20State%20Guidelines%20Final%20with%20Appendices%202017-12-31.pdf

Figure 1: State Hazardous Liquids Program Statuses for CY2018

State Agencies Under Section 60105(a) Certification (15)

Alabama	Maryland	Pennsylvania
Arizona	Minnesota	Texas
California (Fire Marshal)	New York	Virginia
Indiana	New Mexico	Washington
Louisiana	Oklahoma	West Virginia

State Agencies Acting as Interstate Agents (5)

Arizona	New York	Washington
Minnesota	Virginia	

Section 2: Analyses of Pipeline Safety Data

Understanding Hazardous Liquids

Before delving into the data analyses, a brief digression into what constitutes a "hazardous liquid" is warranted. Currently, a substance may be deemed a hazardous liquid either explicitly by statute or at the discretion of the Secretary of the Transportation.[13] For reporting purposes, PHMSA groups hazardous liquids currently transported via pipeline into five categories, which are listed and described in *Table 2*.

Table 2: Hazardous Liquids Transported via Pipeline, by PHMSA Commodity Category

Hazardous Liquid Category	Description
Crude Oil	Liquid petroleum produced from the ground
Refined Petroleum Products	Flammable, toxic, or corrosive products which are liquids at ambient conditions and are produced by the distilling and processing of crude oil or other unfinished hydrocarbons
Highly Volatile Liquids (HVL) or Other Flammable or Toxic Fluids	Liquids which produce a vapor cloud when released to the atmosphere and flammable or toxic fluids which are gases at ambient conditions
Carbon Dioxide (CO2)[14]	A fluid consisting of more than 90 percent carbon dioxide molecules compressed to a supercritical state
Biofuel	Liquid fuels derived from biological feedstock

[13] 49 USC § 60101(a)(4)

[14] By definition, carbon dioxide is not considered a hazardous liquid. However, it remains a regulated commodity under 49 CFR 195, the regulations which govern the transportation of hazardous liquids by pipeline. For simplicity, this paper will refer to all commodities regulated under Part 195, including carbon dioxide, as "hazardous liquids."

Methodology

Before any decision is made on whether to establish a Hazardous Liquids Pipeline Safety Program in Michigan, an important question to answer is whether available data indicates that doing so is likely result in improved pipeline safety outcomes. In attempting to answer this question, we'll rely primarily on PHMSA's Annual Report and Incident Data.[15] Our analyses were conducted in four discrete steps, each of which is discussed more fully now.

Step 1 -- Compilation of Incident Data

Under 49 CFR 195.54, each pipeline operator is required to report incidents[16] for each failure in a pipeline system in which there is:

- A release of the hazardous liquid being transported resulting in an explosion or fire not intentionally set by the operator;
- A release of five gallons or more of the hazardous liquid being transported;[17]
- One or more fatality or injury resulting in in-patient hospitalization;
- $50,000 or more in total incident costs, measured in 1984 dollars.

PHMSA categorizes reported incidents that reach more damaging thresholds[18] as "significant" and incidents which involve a serious injury or fatality as "serious." These labels are not mutually exclusive, but rather are increasingly narrow subsets of one another. More precisely, significant incidents are a subset of all reported incidents, and serious incidents are a subset of all significant incidents. Over the past 20 years (1998-2017), 6,847 hazardous liquids incidents have been reported to PHMSA nationwide, with approximately 40% receiving the "significant" designation and just under 1% being labeled "serious." A summary of this data for the nation and for Michigan is shown in *Table 3*.

[15] https://www.phmsa.dot.gov/data-and-statistics/pipeline/source-data

[16] Federal regulations refer to reportable events involving the transportation of natural and other gases as "incidents," while those involving hazardous liquids are referred to as "accidents." For this paper, we'll use the terms interchangeably.

[17] Releases between five gallons and five barrels are not reportable if they are maintenance related, confined to company property or right-of-way, cleaned up promptly, do not exceed certain pollution thresholds, and do not meet any other reportable criteria.

[18] Incidents are deemed "significant" if they cause over $50,000 (in 1984 dollars) of damages, release 5 or more barrels of HVL, release 50 or more barrels of non-HVL liquid, cause an unintentional fire or explosion, or cause a serious injury or fatality.

Table 3: Reported Hazardous Liquids Incidents by Type, 1998-2017

	All Reported Incidents		Significant Incidents		Serious Incidents	
	Nation	Michigan	Nation	Michigan	Nation	Michigan
1998	153	2	140	1	5	0
1999	167	3	147	3	9	0
2000	146	1	135	1	3	0
2001	130	3	108	2	6	0
2002	458	2	133	0	1	0
2003	432	5	122	3	2	0
2004	377	5	135	1	3	0
2005	369	3	129	1	4	0
2006	354	8	107	4	1	0
2007	332	8	109	0	5	0
2008	376	4	123	2	3	1
2009	342	4	110	1	3	0
2010	350	7	123	3	3	0
2011	344	4	139	2	1	0
2012	366	4	133	3	2	0
2013	401	7	166	3	4	0
2014	455	4	154	2	0	0
2015	460	2	181	1	1	0
2016	420	1	177	1	3	0
2017	415	8	157	1	1	0
Total	6,847	85	2,728	35	60	1

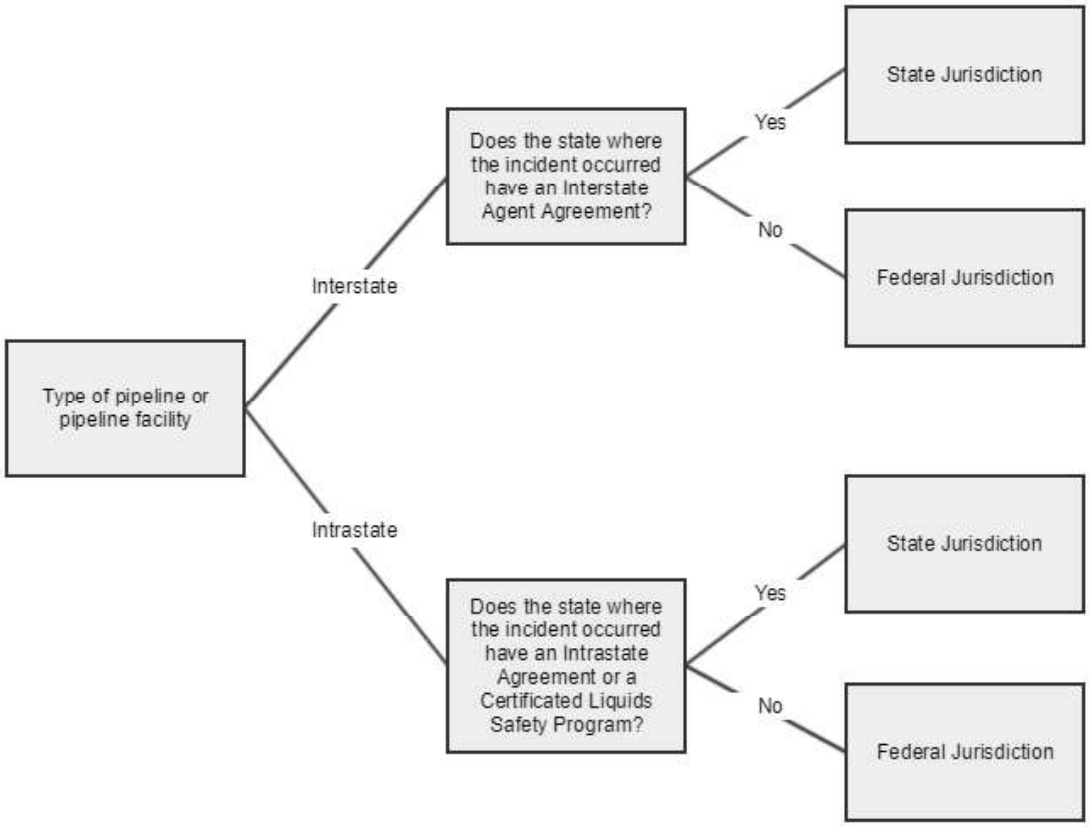
For our analyses, we've chosen to focus on "significant incidents" as our data of interest. We chose to focus specifically on significant incidents, rather than all reported incidents, largely for two reasons. First, any analysis based on "all reported incidents" is complicated by the fact that PHMSA's minimum reporting thresholds have changed several times over the years, whereas the thresholds that categorize an incident as significant have been more stable. Second, the vast majority of the economic, human health, and environmental damages associated with reportable incidents are captured in the significant incidents pool. For example, though significant incidents make up just 40% of all hazardous liquids incidents reported over the past 20 years, they account for over 99.1% of all barrels of liquid reported spilled nationally. In effect, restricting the analysis to significant incidents allows us to focus on incidents where meaningful societal costs are being incurred and which are therefore more pertinent to state interests.

Step 2 -- Determination of Primary Safety Jurisdiction

To reiterate, the fundamental question we're attempting to answer is whether pipelines predominately under state safety oversight tend to have better or worse safety outcomes than those under federal oversight. As was discussed previously, states can and do have varying levels of involvement in liquids pipeline safety. Accordingly, no obvious demarcation exists that clearly establishes the point at which

the state, rather than PHMSA, becomes the primary safety authority for a given pipeline. Nonetheless, for the purposes of this paper, we deem the agency responsible for inspecting a pipeline as being primarily responsible for ensuring that pipeline's safe operation. A decision tree depicting the process taken to assign primary safety jurisdiction is depicted in *Figure 2*.

Figure 2: Decision Tree to Assign Primary Safety Jurisdiction for Hazardous Liquids Pipelines



While several years of significant incident data are available, constraints imposed by other data series forced us to restrict our analysis to a 13-year period (2004-2016). Specifically, PHMSA does not maintain complete records of when the various states attained or relinquished their intrastate agreement, certification, and/or interstate agent agreement statuses. However, based on the information PHMSA was able to provide along with some minor assumptions from our team, we were able to reasonably estimate these statuses from the current year back to 2004. Additionally, as of the time of this writing, operators' Annual Reports for 2017 were not yet available on PHMSA's website, effectively restricting our analyses to the years 2004-2016.

PHMSA's data shows that 1,786 significant incidents occurred nationwide between 2004 and 2016. From this data, our team was able to ascribe 1,756 of those incidents to a given state. The incidents that were discarded either contained incomplete location data or occurred within the Outer Continental Shelf ("OCS"). From there, the incidents were cross-referenced with PHMSA's raw incident data to determine whether each incident pertained to an interstate or intrastate pipeline, which was

subsequently referenced to historical safety jurisdiction data to make a state/federal determination for each incident. Altogether, this processing resulted in final usable pool of 1,753 significant incidents.

Step 3 -- Analysis of Descriptive Statistics

Analysis

Inherent in our effort to compare federal and state pipeline safety performance is a key question about how best to measure such performance. For the purposes of this analysis, our team chose to evaluate pipeline safety performance based on the following six factors:

- number of serious injuries
- number of fatalities
- barrels of liquid spilled
- barrels of liquid lost
- incident costs
- incident frequency

A selection of descriptive statistics regarding the usable data pool are shown in *Table 4*.

Table 4: Summary Statistics for Significant Incidents Data, 2004-2016[19]

	Federal Jurisdiction	State Jurisdiction	Total
Significant Incidents	1,157	596	1,753
Crude Oil	476	264	740
Refined Products	403	176	579
HVL, Flammable, or Toxic	248	151	399
Carbon Dioxide	30	5	35
Fatalities	14	12	26
Serious Injuries	52	7	59
Barrels Spilled	1,027,958	449,844	1,477,801
Net Barrels Lost	437,881	270,558	708,440
Total Cost (2018 USD)	2,874,351,022	517,717,677	3,392,068,699
Avg. Miles Under Jurisdiction[20]	132,825	55,667	188,492
Interstate Miles	124,703	9,918	134,621
Intrastate Miles	8,122	45,749	53,871

[19] Data in *Table 4* and *Table 5* reflect only the 1,753 significant incidents in our final dataset.
[20] Incorporates year-to-year changes, from 2004-2016, in the number of hazardous liquids pipeline miles under jurisdiction.

For various reasons, any direct comparison of the data in *Table 4* is problematic. We argue that the federal and state pools are likely to differ in important ways which are unrelated to the competency or rigor of the safety agencies who oversee them. For example, it's reasonable to expect the pool with more miles of pipeline to have a greater number of reported significant incidents. Similarly, if all else is equal, we expect the pool containing disproportionately larger diameter pipelines to be predisposed to larger spill volumes, or that the pool containing a greater proportion of very old pipelines – or perhaps a higher proportion of very new ones – could be expected to have relatively more incidents.

To mitigate some of these issues and to enable a "first pass" comparison, additional statistics were calculated. These statistics are shown in *Table 5*.

Table 5: Additional Summary Statistics for Significant Incidents Data, 2004-2016

	Federal Jurisdiction	State Jurisdiction	Total
Per 1,000 Jurisdictional Miles			
Significant Incidents	8.71	10.71	9.30
Fatalities	0.11	0.22	0.14
Serious Injuries	0.39	0.13	0.31
Per Significant Incident			
Barrels Spilled	888	755	843
Net Barrels Lost	378	454	404
Total Cost (2018 USD)	2,484,314	868,654	1,935,008
Median Barrels Spilled	67	60	65
Median Net Barrels Lost	5	5	5
Median Total Cost (2018 USD)	196,064	188,216	192,985

Findings

As *Table 5* demonstrates, the results are mixed. By some measures, pipelines under state jurisdiction appear to be performing better than those under federal jurisdiction (e.g. total costs per incident), but by other measures they appear to be performing worse (e.g. number of incidents per jurisdictional mile). Additionally, as the Enbridge oil spill near Marshall, MI, demonstrates,[21] many of the "per incident" figures in *Table 5* are highly sensitive to the pull of extreme incidents. Despite having over 1,750 incidents in our dataset, the removal of a few key data points can change the magnitude of some metrics in *Table 5* drastically, and in some instances, it can change the direction of the difference as well. As such, our analysis of the foregoing descriptive statistics finds no clear evidence that hazardous liquids

[21] The cost of the Marshall Spill is over five times higher than the next most costly incident in our dataset, and it comprises approximately 28% of all costs incurred in the dataset.

pipelines under state jurisdiction are generally performing better (or worse) than those under PHMSA's jurisdiction.

Step 4 -- Regression Analysis

Analysis

To further evaluate the question at hand, we now turn to regression analysis. In doing so, we use multivariate log-linear regression models to determine if there is a statistically significant difference in certain safety-related outcomes for pipelines under state jurisdiction versus those under federal jurisdiction. For the purposes of this analysis, we focus on the following two outcome variables which will serve as proxies for overall pipeline safety:

- Total incident cost
- Total barrels of product released during a pipeline incident

We then create and employ two regression models to help us examine whether a pipeline being under state safety jurisdiction versus federal safety jurisdiction has a statistically significant impact on incident costs and total barrels released. The two models control for the effects of several other variables which could contribute either to incident costs and/or total barrels spilled, such as:

- pipeline diameter
- pipeline pressure
- whether the incident occurred onshore or offshore
- type of commodity spilled
- incident cause

A more detailed explanation of the regression models, our methodology, and statistical results can be found in Appendix A.

Findings

In both models the *Jurisdiction* dummy variable was not found to be statistically significant, suggesting that nationally, hazardous liquids pipelines under state jurisdiction are no more or less safe in terms of total incident cost or the quantity of barrels of hazardous liquids released than pipelines under federal jurisdiction. This is consistent with the findings from our Analysis of Descriptive Statistics, which also found no clear difference in overall safety performance between jurisdictions for the variables evaluated.

Before moving on, additional context about the above finding is warranted. First, it does not imply that an individual state's hazardous liquids program cannot – or is not currently – outperforming PHMSA. Rather, it concludes that state hazardous liquids programs collectively appear to be performing relatively evenly with PHMSA with respect to the metrics evaluated by our team. Indeed, Michigan may find it has certain advantages that other state programs and PHMSA do not, which could lead to improved liquids safety outcomes in Michigan. Second, the finding is tempered by the regression models' relatively low explanatory power, which suggests that there's likely a host of variables that were

not included in our models that also impact an incident's costs and/or release volumes. Third, even if we assume hazardous liquids pipeline safety outcomes under state oversight are roughly equal to those under PHMSA oversight, state programs provide other benefits that states may find exceed the program's cost to the state.

Section 3: Ramifications of Establishing a Hazardous Liquids Pipeline Safety Program in Michigan

Based on our analyses in Section 2, pipelines under state safety jurisdiction appear to be performing relatively evenly with those under federal safety jurisdiction. Apart from expected safety outcomes, there are a host of other factors which the state should consider before deciding to pursue a hazardous liquids safety program. Below we discuss several of these factors.

Background

Michigan has a long history in the safety regulation of pipelines. Michigan instituted its first pipeline safety regulations for natural gas pipelines in 1957 via MPSC Order No. D-3913. Michigan was involved in the adoption of the federal natural gas pipeline safety regulations in 1970, submitting comments during the federal rulemaking process. Much of the information discussed below is derived from the experiences of the MPSC staff who operate Michigan's Certified Gas Pipeline Safety Program. For the discussion below, it is assumed that if Michigan establishes a hazardous liquids pipeline safety program it would be housed under the MPSC and its provisions would be carried out by MPSC staff.[22]

Facilities

To some degree, Michigan maintains its involvement in intrastate and interstate natural gas pipeline safety because its program is well-established and MPSC staff has considerable experience working with Michigan's natural gas pipeline operators. Another important factor, though, is that Michigan's certified Gas Pipeline Safety Program allows the state to have full regulatory control over the bulk of Michigan's gas pipeline infrastructure. In Michigan, there are over 58,000 miles of natural gas mains and over 54,000 miles of service lines, all of which are regulated by the MPSC under its Certified Gas Pipeline Safety Program.[23] There are also nearly 370 miles of regulated gas gathering lines in Michigan, and all but about 10 of those miles are regulated by the MPSC.[24] With respect to gas transmission pipelines in Michigan, roughly 60 percent of the over 8,600 miles reported by operators to PHMSA in 2016 are attributed to intrastate pipelines, which means most of the gas transmission pipeline in the state also falls under the MPSC's regulatory purview.[25] In total, out of the more than 120,000 miles of regulated

[22] A non-MPSC led hazardous liquids pipeline safety program is also conceivable, though doing so would likely forego certain administrative efficiencies that would be expected if it were to join the existing gas safety program under the auspices of the MPSC.
[23] Per 2016 PHMSA Annual Reports, DOT Form PHMSA F 7100.2.1.
[24] Ibid.
[25] Ibid.

gas gathering, transmission and distribution pipelines in Michigan, the MPSC's gas safety program has full regulatory oversight of all but around 3,500 of those miles, with these remaining miles partially overseen by the MPSC through its Interstate Agent Agreement with PHMSA.

Conversely, based on data submitted by liquids operators to PHMSA for 2016, only around 12 percent of all regulated hazardous liquids pipeline miles in Michigan belong to intrastate pipelines.[26] As such, if Michigan was to establish a Certified Hazardous Liquids Pipeline Safety Program today, only a fraction of Michigan's regulated liquids pipelines – around 423 miles – would be subject to the full regulatory control of the state. The remaining miles could be inspected by the state under an Interstate Agent Agreement with PHMSA, but operators of these pipelines would only be required to follow the federal safety regulations, and the ultimate authority to enforce compliance with the standards would remain with PHMSA. Additionally, while interstate agents may provide input into plans to inspect interstate pipelines, these plans are ultimately set by PHMSA, and therefore are not guaranteed to reflect the state's policy preferences.

A comparison of Michigan's regulated gas and liquids pipeline mileage for 2016 is shown in *Table 6*. *Table 7* shows the percentage of these miles that the state would have inspection and/or regulatory authority over, depending on the type of liquids program Michigan pursues and/or is granted by PHMSA.

Table 6: Michigan Gas Pipeline and Liquids Pipeline Mileage, 2016[27]

	Intrastate Regulated Gathering	Interstate Regulated Gathering	Intrastate Transmission	Interstate Transmission	Distribution
Gas Pipelines	357	10	5,188	3,485	112,653
Liquids Pipelines	0	0	423	3,094	0

Table 7: Percentage of Mileage Hypothetically Subject to State Jurisdiction, 2016[28]

	Intrastate Agreement		Intrastate Program		Intrastate Program and Interstate Agreement	
	Inspection	Regulatory	Inspection	Regulatory	Inspection	Regulatory
Gas Pipelines	97%	0%	97%	97%	100%	97%
Liquids Pipelines	12%	0%	12%	12%	100%	12%

[26] Per 2016 PHMSA Annual Reports, DOT Form PHMSA F 7000-1.1.
[27] From operators' Annual Reports to PHMSA.
[28] Ibid.

Stated directly, the classification of Michigan's liquids pipelines hampers the state's ability to exert the same level of regulatory control over its hazardous liquids pipelines that it has over its gas pipelines. Also, with far fewer miles under its jurisdiction, a potential Certified Hazardous Liquids Pipeline Safety Program would not have the same scale as Michigan's existing gas program, which may produce operational challenges and contribute to higher per-mile program costs in the liquids program compared to those traditionally incurred in Michigan's existing gas program.

While having regulatory control over the bulk of the liquids pipelines in the state is certainly beneficial in helping to drive statewide pipeline safety practices and policy, is not in and of itself essential to justify the establishment of a liquids pipeline safety program. In deciding whether to establish a Certified Hazardous Liquids Pipeline Safety Program in Michigan, state policymakers must evaluate, among other things, the individual pipelines that would fall under state regulatory control under a hypothetical liquids program and the likelihood of the state obtaining authorization from PHMSA to inspect interstate pipelines. To the extent that the state leaders may be more concerned with specific pipelines, pipeline operators, or pipeline commodities, the state must evaluate whether these elements are likely to fall under the oversight of the envisioned state liquids program or whether they are likely to remain largely outside the state program's purview. This information is useful in helping the state understand whether a liquids safety program, or perhaps a different approach, is the most appropriate mechanism to achieve the state's pipeline safety goals.

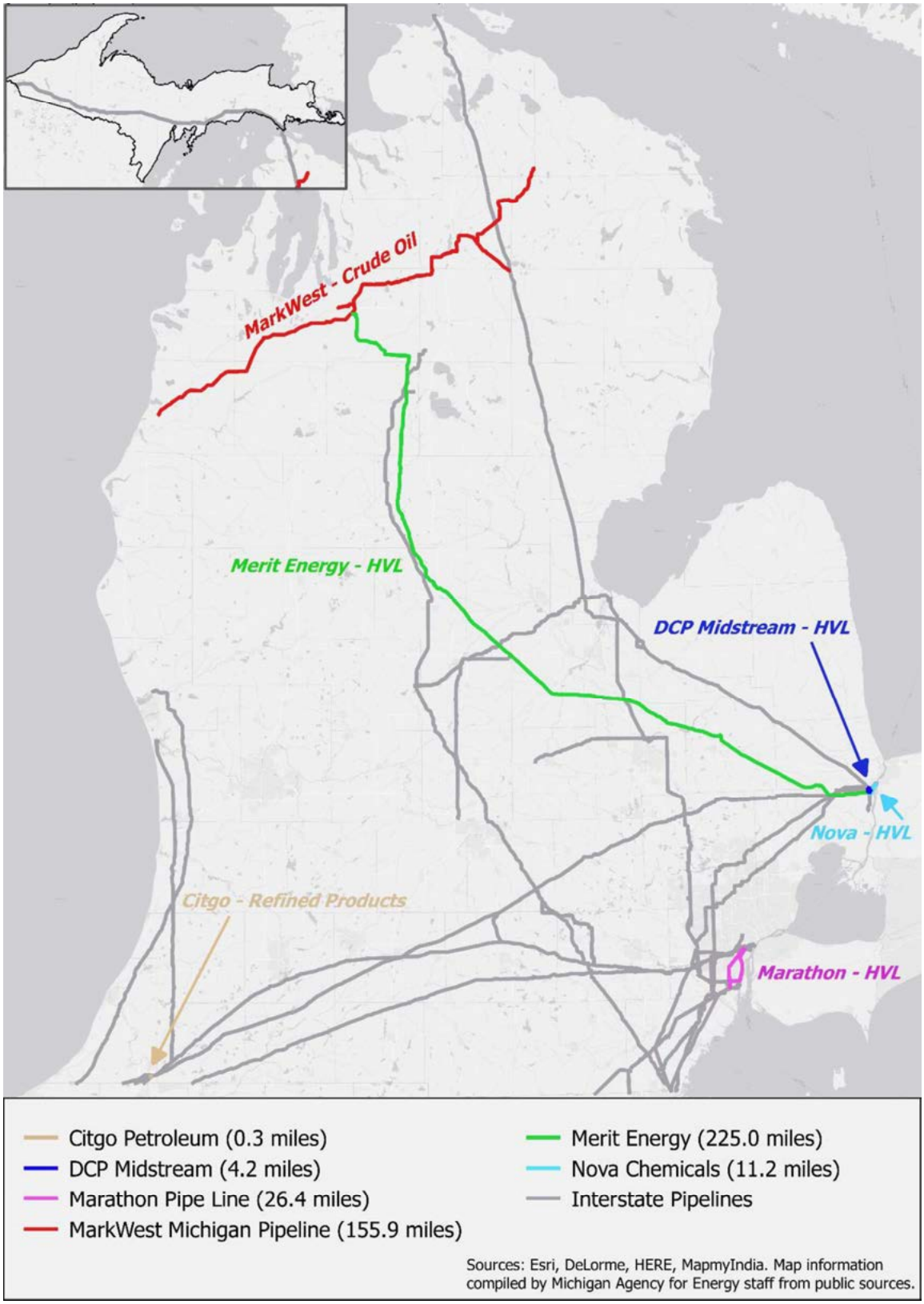
Table 8 provides an overview of Michigan's liquids pipeline mileage and tankage, by commodity type, as reported by pipeline operators for 2016. The data in *Table 8* is displayed graphically in *Figure 3,* which depicts Michigan's liquids pipelines. Michigan's intrastate pipelines, which consist of approximately 423 miles of pipeline, are highlighted and labeled in *Figure 3*. The operators of Michigan's intrastate pipelines, as well as the class of commodity transported, are also denoted. Recall that it is intrastate pipelines that are subject to state inspection and regulation under a Certified Hazardous Liquids Pipeline Safety Program, while interstate pipelines, denoted in gray in *Figure 3*, are always regulated by PHMSA, but may be inspected by the state if PHMSA permits the state to do so.

Table 8: Michigan's Hazardous Liquids Pipeline Mileage and Facilities, 2016[29]

Commodity	Operator Name	Intrastate Miles	Intrastate HCA Miles	Interstate Miles	Interstate HCA Miles	Total Miles	Miles of Gathering	Interstate Tanks	Intrastate Tanks	Total Tanks
REFINED PP	AMOCO OIL CO			162.0	79.40	162.0	0.0	0	0	0
HVL FLAMM TOXIC	BUCKEYE DEVELOPMENT & LOGISTICS, LLC			3.3	3.32	3.3	0.0	0	0	0
REFINED PP	BUCKEYE PARTNERS, LP			392.3	316.71	392.3	0.0	54	0	54
REFINED PP	CITGO PETROLEUM CORPORATION (TERMINALS)	0.3	0.25			0.3	0.0	0	5	5
HVL FLAMM TOXIC	DCP MIDSTREAM	4.2	2.33			4.2	0.0	0	0	0
CRUDE OIL	ENBRIDGE ENERGY, LIMITED PARTNERSHIP			1,073.0	382.00	1,073.0	0.0	7	0	7
CRUDE OIL	ENBRIDGE PIPELINES (TOLEDO) INC			137.0	69.00	137.0	0.0	2	0	2
HVL FLAMM TOXIC	KINDER MORGAN UTOPIA LLC			66.0	59.11	66.0	0.0	0	0	0
CRUDE OIL	MARATHON PIPE LINE LLC			61.4	61.40	61.4	0.0	8	0	8
REFINED PP	MARATHON PIPE LINE LLC			121.1	112.90	121.1	0.0	3	0	3
HVL FLAMM TOXIC	MARATHON PIPE LINE LLC	26.4	26.40			26.4	0.0	0	5	5
CRUDE OIL	MARKWEST MICHIGAN PIPELINE, LLC	155.9	27.48			155.9	0.0	0	3	3
HVL FLAMM TOXIC	MERIT ENERGY COMPANY	225.0	89.50			225.0	0.0	0	0	0
CRUDE OIL	MID - VALLEY PIPELINE CO			7.0	7.00	7.0	0.0	1	0	1
HVL FLAMM TOXIC	NOVA CHEMICALS (CANADA) LTD.	11.2	11.15			11.2	0.0	0	0	0
HVL FLAMM TOXIC	PLAINS MARKETING, L.P.			17.2	12.05	17.2	0.0	0	0	0
HVL FLAMM TOXIC	PLAINS PIPELINE, L.P.			61.6	51.70	61.6	0.0	0	0	0
CRUDE OIL	SUNOCO PIPELINE L.P.			117.6	107.40	117.6	0.0	6	0	6
REFINED PP	SUNOCO PIPELINE L.P.			52.5	49.40	52.5	0.0	2	0	2
HVL FLAMM TOXIC	SUNOCO PIPELINE L.P.			164.1	142.70	164.1	0.0	0	0	0
REFINED PP	WOLVERINE PIPELINE CO			658.0	324.69	658.0	0.0	4	0	4
Grand Total		**422.9**	**157.11**	**3,094.1**	**1,778.78**	**3,517.0**	**0.0**	**87**	**13**	**100**

[29] From PHMSA's Pipeline Mileage and Facilities online repository.

Figure 3: Michigan's Hazardous Liquids Pipelines, 2016



Staff and Training

Under PHMSA's guidelines,[30] a state participating in the safety oversight of pipelines within its borders must first determine the staffing levels it needs to complete all required inspections. Staffing determinations take into account the number of pipeline operators in the state, the number of operating districts for each operator, and characteristics of each operator and/or pipeline system. The MPSC's gas safety program currently consists of 11 field engineers. MPSC's gas safety staff estimates that a combination intrastate and interstate hazardous liquid pipeline safety program would require 1.5 additional field engineers to complete the required inspections. Additional staff would be required for administration and supervision of the program.

PHMSA's guidelines also outline required training for the supervision and inspection staff in the state program. To be fully qualified to conduct all liquid pipeline safety inspections, PHMSA currently requires an individual take 18 training courses plus additional web-based training courses. MPSC staff assesses it would take two to three years to train a new individual to be able to proficiently conduct liquid pipeline safety inspections.

Cost and Funding

MPSC staff estimates that a combination intrastate and interstate hazardous liquid pipeline safety program would require $350,000 worth of funding to support the field engineers and the administration and supervision of the program. This figure was derived via a per-inspector proration of the MPSC's gas safety program's actual costs in 2017 as well as its expected costs for 2018. Detailed cost estimates for a potential combined intrastate and interstate hazardous liquids pipeline safety program in Michigan are shown in *Table 9*.

The State currently does not have a funding source to support a hazardous liquids pipeline safety program. PHMSA's grant program will partially support a state liquids program, generally covering between 60-80% of state program costs. PHMSA grant amounts are subject to availability of federal funds, and in any event cannot exceed 80% of actual state program costs. State programs are also subject to audit, and states must ensure their program has an adequate amount of field staff and administrative staff to meet PHMSA grant requirements.

[30] https://www.phmsa.dot.gov/sites/phmsa.dot.gov/files/pictures/2018%20State%20Guidelines%20Final%20with%20Appendices%202017-12-31.pdf

Table 9: Cost Estimates for Combined Intrastate and Interstate Hazardous Liquids Program

DIRECT COSTS	2018 Gas Pipeline Safety Program Budget	# of FTE (insp-person year) allocated				2017 Gas Pipeline Safety Program Payment Request	# of FTE (insp-person year) allocated		
Compensation for Personnel Services		1.33	1.5	2			1.33	1.5	2
Supervisory personnel	$ 252,788	$ 30,564	$ 34,471	$ 45,961		$ 194,841	$ 28,352	$ 31,976	$ 42,635
Supervisory fringe benefits	$ 203,869	$ 24,650	$ 27,800	$ 37,067		$ 152,481	$ 22,188	$ 25,024	$ 33,366
Inspection/Investigation personnel	$ 780,505	$ 94,370	$ 106,433	$ 141,910		$ 616,229	$ 89,670	$ 101,132	$ 134,842
Inspection/Investigation fringe benefits	$ 627,253	$ 75,841	$ 85,535	$ 114,046		$ 505,741	$ 73,593	$ 82,999	$ 110,665
Damage Prevention/Technical personnel	$ 40,986	$ 4,956	$ 5,589	$ 7,452		$ 67,107	$ 9,765	$ 11,013	$ 14,684
Damage Prevention/Technical fringe benefits	$ 24,859	$ 3,006	$ 3,390	$ 4,520		$ 41,128	$ 5,985	$ 6,750	$ 9,000
Adminstrative personnel	$ 106,858	$ 12,920	$ 14,572	$ 19,429		$ 89,757	$ 13,061	$ 14,730	$ 19,640
Administrative fringe benefits	$ 94,782	$ 11,460	$ 12,925	$ 17,233		$ 78,230	$ 11,384	$ 12,839	$ 17,118
Activities									
Communication and Transportation Costs	$ 15,000	$ 1,814	$ 2,045	$ 2,727		$ 11,060	$ 1,609	$ 1,815	$ 2,420
Training and Education costs	$ -	$ -	$ -	$ -		$ -	$ -	$ -	$ -
Travel Costs	$ 120,000	$ 14,509	$ 16,364	$ 21,818		$ 101,718	$ 14,801	$ 16,693	$ 22,258
Materials and Equipment									
Materials including cost of computing devices	$ 115,305	$ 13,941	$ 15,723	$ 20,965		$ 78,501	$ 11,423	$ 12,883	$ 17,178
Equipment and other capital expenditures	$ 500,000					$ 500,000			
INDIRECT COSTS									
Indirect costs incurred by State Agency	$ 136,354	$ 16,486	$ 18,594	$ 24,792		$ 113,926	$ 16,578	$ 18,697	$ 24,929
TOTAL ESTIMATED COSTS	$ 3,018,559	$ 304,517	$ 343,440	$ 457,920		$ 2,550,720	$ 298,409	$ 336,551	$ 448,735

**Highlighted columns indicate program cost estimates derived from MPSC Staff's assumption of 1.5 FTE for liquids pipeline inspectors. Upper bound and lower bound cost estimates, based on 2 FTE and 1.33 FTE of liquids pipeline inspectors, respectively, are also provided.*

Statutory and Regulatory Considerations

To establish a hazardous liquids pipeline safety program in Michigan, a state statute must first be enacted to provide the authority to the state to conduct inspection and enforcement activities on hazardous liquids pipelines. A stable funding mechanism will also need to be created, whether by state law or otherwise, to carry out the authorities set forth in the above law.

As was noted previously, under federal law a state may assume safety jurisdiction over its intrastate pipelines if it meets specific requirements. On the other hand, recall that the authority to inspect interstate pipelines is granted at the discretion of PHMSA. In December 2014, PHMSA announced that it intended to rescind existing state Interstate Agent Agreements and not allow additional states to become interstate agents.[31] PHMSA officials later stated that the agency does not intend to discontinue existing Interstate Agent Agreements, but that it was sufficiently staffed to meet its inspection needs and it does not need additional interstate agents.[32] Further, a review of documents by MAE's Energy Security staff shows that the last time a new state reached an Interstate Agent Agreement with PHMSA to inspect hazardous liquids pipelines was at least 15 years ago, and perhaps much longer. A May 2018 report from the U.S. Government Accountability Office found four states in the past seven years who had requested Interstate Agent Agreements for gas and/or liquids pipelines but were denied.[33] With these developments in mind, there is considerable doubt whether PHMSA would choose to enter into an Interstate Agent Agreement with Michigan regarding its hazardous liquids pipelines. As such, if Michigan chooses to establish a hazardous liquids safety program, it must recognize that doing so may ultimately result in the majority of Michigan's liquids pipelines continuing to exist wholly outside of state safety jurisdiction.

In the event Michigan obtains intrastate certification but is denied an Interstate Agent Agreement with PHMSA, Michigan, upon request, is permitted to conduct a joint inspection with PHMSA of an interstate pipeline facility. This is a relatively new provision created by the Pipes Act of 2016, which as of April 2018, has not been requested by any state. Before it participates in a joint inspection, state leaders should know that some important caveats apply. First, the state must cover all costs associated with participating in joint inspections, as these costs, unlike traditional inspection costs, are not partially reimbursable via PHMSA grant funding. Second, the inspection plan is set by PHMSA, and state inspectors must follow the direction of PHMSA's lead inspector. Finally, upon completion of the joint inspection, states are not permitted to retain any inspection documents.

Information Access

For the pipelines they inspect or regulate under a state hazardous liquids program, state pipeline safety staff would have a greater level of access to certain types of pipeline information. This would include regular access to company inspection records, maintenance documentation, and operations and maintenance procedures. Additionally, staff would have access to company spill plans, have a direct opportunity to comment the plans, and could use their understanding of the plans to help the state be

[31] https://pubs.naruc.org/pub.cfm?id=536D11B0-2354-D714-51D5-9E24030A9570
[32] https://www.gao.gov/assets/700/692059.pdf
[33] Ibid.

better prepared in the event of an emergency. Staff would also have a "seat at the table" to participate in pipeline-related drills and exercises, which serve to increase overall state emergency preparedness.

Beyond direct access to information, drills, and exercises, it is anticipated that staff would, over time, build relationships with employees of liquids pipeline operators who could serve as resources to the state on various energy-related matters. These relationships may ultimately help the state obtain a better understanding of energy industry trends and developments which could support, hinder, or otherwise shape Michigan's energy policy objectives.

Timeline

Should Michigan decide to establish a hazardous liquids pipeline safety program, MPSC staff estimates the following time intervals would be required:

- The passing of state legislation for intrastate pipeline safety authority and funding is estimated to take one year.
- The state statute would have to allow for the adoption of the federal pipeline safety regulations and, if desired, additional state requirements, which is estimated to take an additional six months to one year.
- Training of new staff to be fully qualified to conduct liquids pipeline safety inspections is estimated to take two to three years.
- Once the staff are fully qualified, the state could apply to PHMSA for a certified intrastate liquids pipeline safety program, which is estimated to take an additional six months to one year, depending on the timing of when all the other requirements are completed.
- After the state pipeline safety program receives intrastate certification, the state would be eligible to apply for an Interstate Agent Agreement, which is estimated to take an additional six months to one year depending on the timing of the PHMSA Interstate Agent Agreement request and PHMSA's grant periods.

While some of the actions above could run concurrently, at a minimum MPSC staff estimates it would take three to four years to stand-up an intrastate liquids pipeline safety program in Michigan. Securing an Interstate Agent Agreement, in the unlikely event it is granted by PHMSA, would require an estimated additional six to twelve months.

Conclusion

As is discussed herein, there are a host of factors state leaders should consider before deciding whether to establish a hazardous liquids pipeline safety program. Each state has its own liquids pipeline infrastructure, cultural and natural resources, economic needs, and policy objectives, making the relative pros and cons of establishing a liquids pipeline safety program unique to each state. Michigan's leaders must consider their pipeline safety and energy policy objectives, and using the information provided here and elsewhere, evaluate whether a liquids safety program is the favored mechanism among the options available to the state to meet some or all those objectives.

Appendix A: Regression Analysis Discussion

Introduction

In this paper we use multivariate log-linear regression models to determine if there is a statistically significant difference in certain safety-related outcomes for pipelines under state jurisdiction versus those under federal jurisdiction. Multivariate linear regression is a statistical method that allows researchers to summarize and study the relationship between an endogenous variable – the "predicted" variable – and a set of exogenous "predictor" variables. In this analysis we focus specifically on two endogenous variables which will serve as proxies for overall pipeline safety:

- Total incident cost
- Total barrels of product released during a pipeline incident

From these variables we develop two regression models – the Total Cost Model and the Barrels Released Model – to help us examine whether a pipeline being under state versus federal safety jurisdiction has a statistically significant impact on expected incident costs or barrels released.

Data Discussion

The dataset used in the Analysis of Descriptive Statistics was largely reused for this analysis; however, to make it suitable for regression, some refinement of the data was necessary. Most notably, incidents that were missing data for key model variables were excluded. In general, these consisted of incidents where the total cost, released barrels, pipeline diameter, pipeline pressure, or jurisdiction were either not reported to PHMSA or could not be determined by MAE's Energy Security staff. Incidents where carbon dioxide was the reported commodity released were also excluded from the dataset due to the relatively small amount of cases involving that commodity. An analysis of standardized residuals did flag some cases that could potentially be outliers, but these cases were ultimately kept in the dataset after further evaluation found these cases to seemingly be valid and that their inclusion did not significantly alter the regression results (i.e. model explanatory power, standard errors, variable sign, variable significance).

Total Cost Model

The first model uses total incident cost, as reported to PHMSA, as the endogenous variable. The total incident cost reflects the estimated public and non-operator property damage, estimated cost of the operator's property damage and repairs, estimated cost of the commodity lost, estimated operator emergency response costs, estimated operator environmental remediation costs, and any other estimated costs associated with the pipeline incident. The exogenous variables used for the Total Cost Model include pipeline diameter, barrels of commodity released, commodity class dummy variables, a jurisdiction dummy variable, and an offshore dummy variable. Although the focus of this analysis is to determine the statistical significance of a jurisdictional characteristic on pipeline safety, it is important to include variables from the dataset that conceptually would also have an impact on the endogenous variable. For this model:

- Pipeline diameter is included in the Total Cost Model because larger diameter pipelines transporting larger quantities of hazardous liquids could potentially release larger volumes when an incident occurs, making said incident costlier;
- The number of barrels released during the incident is also included, as it is reasonable to believe that as the quantity of barrels released increases, so too will the total cost due to the value of the product released, as well as greater environmental remediation costs;
- The offshore dummy variable captures variation in total costs due to the pipeline incident being in an aquatic environment, as pipeline incidents in water can require more advanced cleanup techniques and prove more difficult considering waves, tides, and currents;
- Two commodity class dummy variables for crude oil and refined petroleum are also included, capturing the variation in total cost associated from the release of different commodities. A third commodity, highly volatile liquids (HVL), is used as the base for which the crude oil and refined petroleum products dummy variables will be interpreted.

Undoubtedly, there are a multitude of factors beyond those listed above that might contribute to incident costs; however, largely due to data constraints, the model is limited to the variables noted above. The total cost multivariate log-linear regression model takes the form of:

$$LN\_Total\_Cost = B_0 + B_1(Barrels\_Released) + B_2(Crude\_Oil) + B_3(Jurisdiction) + B_4(Offshore) + B_5(Pipe\_Diameter) + B_6(Refined)$$

where *LN_Total_Cost* is the natural logarithm of reported total incident cost in 2018 dollars, *Jurisdiction* is a dummy variable representing an incident involving a pipeline under state jurisdiction, *Pipe_Diameter* is the nominal pipe size measured in inches, *Barrels_Released* is the unintentional volume of the commodity released, *Offshore* is a dummy variable representing hazardous liquids pipeline incidents that occurred offshore, *Refined* is the dummy variable representing incidents where refined petroleum products (diesel, gasoline, fuel oil) were released, and *Crude_Oil* is the dummy variable representing incidents where crude oil was released.

Total Cost Model Results and Discussion

Below are the results from the Total Cost Model which include a correlation matrix (*Table A1*)[34] and a regression statistics, coefficient estimates, and an analysis of variance (ANOVA) summary (*Table A2*).

Table A1: Total Cost Model Variable Correlation Matrix

	LN Total Cost	*Barrels Released*	*Pipe Diameter*	*Refined*	*Crude Oil*	*Jurisdiction*	*Offshore*
LN Total Cost	1.000						
Barrels Released	0.317	1.000					
Pipe Diameter	0.256	0.098	1.000				
Refined	0.225	-0.098	-0.011	1.000			
Crude Oil	-0.058	-0.055	0.222	-0.636	1.000		
Jurisdiction	-0.064	-0.034	-0.061	-0.062	0.062	1.000	
Offshore	0.119	-0.002	0.039	-0.076	0.119	-0.047	1.000

[34] Importantly, *Table A1* also serves to verify the linear regression assumption of no perfect multicollinearity.

The results show that the strongest correlations with the endogenous variable (*LN_Total_Cost*) are *Barrels_Released* (0.317), *Pipe_Diameter* (0.256), and *Refined* (0.225). These three correlation coefficients indicate a positive, although weak linear relationship between the variables. For reference, correlation coefficients greater than +/- 0.7 are generally considered strong. The main variable of interest, *Jurisdiction*, has a negative and very weak correlation coefficient of -0.066. The weak correlation coefficients across the board are an early indication that the total cost regression model's explanatory power may be weak.

Table A2: Total Cost Model Summary

Model: Total Cost
Dependent Variable: LN_Total_Cost

R-Squared	Adj.R-Sqr.	Std.Err.Reg.	Std.Dep.Var.	# Fitted	# Missing	t(2.50%,969)	Confidence
0.244	0.239	1.551	1.778	976	0	1.962	95.0%

Variable	Coefficient	Std.Err.	t-Statistic	P-value	Lower95%	Upper95%	VIF	Std. Coeff.
Constant	11.310	0.132	85.882	0.000	11.052	11.569	0.000	0.000
Barrels_Released	0.000223	0.000019	11.790	0.000	0.000186	0.000260	1.058	0.339
Crude_Oil	0.452	0.137	3.292	0.001	0.183	0.722	1.906	0.127
Jurisdiction	-0.079	0.104	-0.759	0.448	-0.282	0.125	1.014	-0.021
Offshore	1.982	0.454	4.362	0.000	1.090	2.874	1.018	0.123
Pipe_Diameter	0.046	0.007020	6.501	0.000	0.032	0.059	1.114	0.192
Refined	1.333	0.143	9.304	0.000	1.052	1.614	1.802	0.349

Source	Deg. Freedom	Sum Squares	Mean Square	F-Statistic	P-value
Regression	6	750.512	125.085	52.011	0.000
Residual	969	2,330	2.405		
Total	975	3,081			

The above summary gives an R-squared value of 0.244 for the Total Cost Model. The R-squared gives the overall explanatory power of the model, and in the context of the Total Cost Model, it means that 24.4 percent of the variation in total cost can be attributed to the variation of the exogenous variables. The results from the ANOVA summary show a significant P-value at all confidence levels for the F-Statistic (52.011), therefore the hypothesis of zero slopes – that none of the exogenous variables are useful in predicting the endogenous variable – can be rejected. The slope coefficients for each exogenous variable are also shown in *Table A2* above. The Total Cost Model equation with associated slope coefficients is:

*LN_Total_Cost = 11.310 + 0.000223*Barrels_Released + 0.452*Crude_Oil - 0.079*Jurisdiction + 1.982*Offshore + 0.046*Pipe_Diameter + 1.333*Refined*

The P-Value for the main variable of interest, *Jurisdiction* (0.448), is not statistically significant at the 95 percent confidence level for the Total Cost Model. This means that jurisdictional authority did not explain variation in the total cost of hazardous liquids pipeline incidents. The remainder of the exogenous variables in the Total Cost Model are significant in explaining variation in total incident costs. Interpretations of the statistically significant exogenous variables for the Total Cost Model are presented below:

- **Barrels Released:** Holding all other variables constant, for every one-barrel increase in release quantity, total incident cost can be expected to increase by 0.02 percent.

- **Offshore:** Holding all other variables constant, offshore total incident costs are expected be 625 percent greater than onshore incident costs.
- **Pipe Diameter:** Holding all other variables constant, for every inch increase in pipeline diameter, total incident cost can be expected to increase by 4.71 percent.
- **Refined:** Holding all other variables constant, pipeline incidents involving refined petroleum products can be expected to cost 279 percent more than incidents involving highly volatile liquids.
- **Crude Oil:** Holding all other variables constant, pipeline incidents involving crude oil can be expected to cost 57 percent more than incidents involving highly volatile liquids.

Barrels Released Model

The Barrels Released log-linear multivariate regression model uses the number of barrels released during hazardous liquids pipeline incidents as the endogenous variable. The exogenous variables, which we suspect may impact the number of barrels released, include:

- A *Jurisdiction* dummy variable;
- An *Offshore* dummy variable;
- A variable for pipeline diameter (*Pipe_Diameter*);
- A variable for pipeline pressure (*Accident_PSIG*), and;
- Six dummy variables representing various causes for incidents, which are:
    - The *Corrosion* variable, for incidents that are caused by a failure of metal pipeline equipment that has been degraded by oxidization.
    - The *Excavation* variable, for incidents where the operator, the operator's contractor, or a third party was performing excavation at the time of the incident;
    - The *Incorrect_Operation* variable, for certain incidents caused by human error, including incorrectly opening or closing a valve, overfilling or overpressuring equipment, or mismarking underground pipeline equipment prior to excavation.
    - The *Material_Weld_Equip_Failure* variable, for incidents caused by the failure of pipeline components such as welds, joints, couplings, pipe seams, pipe bodies, seals, or valves because of improper manufacturing, construction, installation processes or because of in-service related stresses.
    - The *Natural_Force_Damage* variable, for incidents where earth movement, temperature, high winds, lightning, heavy rains/floods, or a similar natural force event was at fault for the release.
    - The *Other_Outside_Force_Damage* variable, for incidents caused by things such as electrical arching, fire/explosion, intentional damage, maritime activity, and vehicles not engaged in excavation.
    - A seventh variable named *All_Other_Causes*, which is excluded from the Barrels Released Model, serves as the base from which the six cause variables above will be interpreted. This variable includes incidents where the cause was unknown or could not be identified.

The Barrels Released multivariate log-linear regression model takes the form of:

$$LN\_Barrels\_Released = B_0 + B_1(Accident\_PSIG) + B_2(Corrosion) + B_3(Excavation\_Damage) + B_4(Incorrect\_Operation) + B_5(Jurisdiction) + B_6(Material\_Weld\_Equip\_Failure) + B_7(Natural\_Force\_Damage) + B_8(Offshore) + B_9(Other\_Outside\_Force\_Damage) + B_{10}(Pipe\_Diameter)$$

where *LN_Barrels_Released* is the natural logarithm of the quantity of barrels released, the *Jurisdiction*, *Offshore*, and *Pipe_Diameter* variables remain the same as when used in the Total Cost Model, the *Accident_PSIG* is the estimated pipeline pressure in psig[35] at the point and time of the incident, and the six cause variables collectively capture variation in the quantity of barrels released due to different incident causes.

Barrels Released Model Results and Discussion

Below are the results from the Barrels Released Model which include a correlation matrix (*Table A3*) and a regression statistics, coefficient estimates, and an analysis of variance (ANOVA) summary (*Table A4*).

Table A3: Barrels Released Model Variable Correlation Matrix

	LN_Barrels_ Released	*PIPE_DIAMETER*	*ACCIDENT_ PSIG*	*CORROSION*	*EXCAVATION*	*INCORRECT OPERATION*	*MATERIAL/WELD/ EQUIP FAILURE*	*NATURAL FORCE*	*OTHER OUTSIDE FORCE*	*Jurisdiction*	*Offshore*
LN_Barrels_Released	1.000										
PIPE_DIAMETER	-0.009	1.000									
ACCIDENT_PSIG	0.133	-0.110	1.000								
CORROSION	-0.117	0.021	-0.261	1.000							
EXCAVATION	0.225	-0.130	0.020	-0.390	1.000						
INCORRECT OPERATIOI	0.049	0.049	0.021	-0.150	-0.089	1.000					
MATERIAL/WELD/EQUI	-0.163	0.106	0.308	-0.473	-0.280	-0.108	1.000				
NATURAL FORCE DAMA	0.094	-0.057	-0.049	-0.185	-0.110	-0.042	-0.133	1.000			
OTHER OUTSIDE FORCE	0.030	-0.052	0.001	-0.179	-0.106	-0.041	-0.128	-0.050	1.000		
Jurisdiction	-0.014	-0.055	-0.033	0.111	-0.013	-0.044	-0.092	-0.044	0.037	1.000	
Offshore	-0.073	0.039	-0.069	-0.072	-0.030	-0.021	-0.065	0.319	-0.025	-0.046	1.000

Table A3 shows that the *Excavation* dummy (0.225), *Material_Weld_Equip_Failure* dummy (-0.163), and *Accident_PSIG* (0.133) variables have the strongest correlations with the endogenous variable. The correlation matrix shows weak relationships between the variables, particularly in our main exogenous variable of interest, *Jurisdiction*, which is near zero.

[35] Pounds per square inch gauge (psig), in this context, is a measure of the fluid pressure inside the pipeline relative to the outside pressure.

Table A4: Barrels Released Model Summary

Model: Barrels Released
Dependent Variable: LN_Barrels_Released

R-Squared	Adj.R-Sqr.	Std.Err.Reg.	Std.Dep.Var.	# Fitted	# Missing	t(2.50%,960)	Confidence
0.123	0.114	2.476	2.631	971	0	1.962	95.0%

Variable	Coefficient	Std.Err.	t-Statistic	P-value	Lower95%	Upper95%	VIF	Std. Coeff.
Constant	4.278	0.481	8.900	0.000	3.335	5.222	0.000	0.000
ACCIDENT_PSIG	0.001134	0.000210	5.410	0.000	0.000722	0.001545	1.157	0.176
CORROSION	-0.818	0.458	-1.786	0.074	-1.718	0.081	7.968	-0.152
EXCAVATION_DAMA(	0.678	0.479	1.416	0.157	-0.262	1.617	5.527	0.101
INCORRECT_OPERATI	-0.001652	0.622	-0.003	0.998	-1.222	1.219	1.952	-0.000112
Jurisdiction	-0.066	0.167	-0.397	0.692	-0.394	0.261	1.023	-0.012
MATERIAL_WELD_EQ	-1.611	0.472	-3.413	0.001	-2.537	-0.685	6.675	-0.266
NATURAL_FORCE_DA	1.089	0.573	1.901	0.058	-0.035	2.213	2.442	0.090
Offshore	-2.818	0.765	-3.682	0.000	-4.320	-1.316	1.133	-0.118
OTHER_OUTSIDE_FOI	-0.197	0.576	-0.342	0.733	-1.327	0.933	2.322	-0.016
PIPE_DIAMETER	0.022	0.011	2.040	0.042	0.000853	0.044	1.060	0.063

Source	Deg. Freedom	Sum Squares	Mean Square	F-Statistic	P-value
Regression	10	828.381	82.838	13.512	0.000
Residual	960	5,886	6.131		
Total	970	6,714			

The above summary gives an R-squared value of 0.123. This means that just 12.3 percent of the variation in *Barrels_Released* can be attributed to the variation of the exogenous variables. The results from the ANOVA summary show a significant P-value at all confidence levels for the F-statistic (13.512), therefore the hypothesis of zero slopes – that none of the exogenous variables being useful in the prediction of the endogenous variable – can be rejected. The slope coefficients for each exogenous variable are also shown in *Table A4* above. The Barrels Released Model equation with associated slope coefficients is:

*LN_Barrels_Released = 4.278 + 0.001134*ACCIDENT_PSIG - 0.818*CORROSION + 0.678*EXCAVATION_DAMAGE - 0.001652*INCORRECT_OPERATION - 0.066*Jurisdiction - 1.611*MATERIAL_WELD_EQUIP_FAILURE + 1.089*NATURAL_FORCE_DAMAGE - 2.818*Offshore - 0.197*OTHER_OUTSIDE_FORCE_DAMAGE + 0.022*PIPE_DIAMETER*

The associated P-value for *Jurisdiction* (0.695), is not statistically significant at the 95 percent confidence level for the Barrels Released Model. Thus, we find no statistically significant linear dependence of barrels released on jurisdiction. Corrosion (0.074), excavation damage (0.157), incorrect operation (0.998), natural force damage (0.058), and other outside force damage (0.733) were also not statistically significant at the 95 percent confidence level. The remainder of the exogenous variables in the model are significant in explaining variation in barrels released. Interpretations of the statistically significant exogenous variables for the Barrels Released Model are presented below:

- **Offshore:** Holding all other variables constant, incidents occurring offshore are expected to have 94 percent fewer unintentionally released barrels of hazardous liquids than incidents occurring onshore.

- **Material/Weld/Equipment Failure:** Holding all other variables constant, incidents caused by material/weld/equipment failure can be expected to have 80 percent fewer unintentionally released barrels of hazardous liquids than incidents caused by unidentified reasons.
- **Accident PSIG:** Holding all other variables constant, for every one-unit increase in pipeline pressure, the quantity of barrels released can be expected to increase by 0.11 percent.
- **Pipe Diameter:** Holding all other variables constant, for every one-inch increase in pipeline diameter, the quantity of barrels released can be expected to increase by 2.2 percent.

Regression Analysis Findings

In both models the *Jurisdiction* dummy variable was not found to be statistically significant, suggesting that nationally, hazardous liquids pipelines under state jurisdiction are no more or less safe in terms of total incident cost or the quantity of barrels of hazardous liquids released than pipelines under federal jurisdiction. This is consistent with the findings from the Analysis of Descriptive Statistics, which also found no clear difference in overall safety performance between jurisdictions for the variables evaluated.

These conclusions are tempered somewhat by the models' relatively low R-squared values. Low R-squared values can sometimes be an indication of model misspecification or that a model fails to include relevant variables. Regarding this analysis, however, it is believed that the low explanatory power of the models is likely attributable to the overall randomness and complexity of hazardous liquids pipeline incidents. We argue that there are likely a litany of variables which could plausibly impact an incident's costs and release volumes, making reliable prediction of these characteristics extremely difficult.

Another noteworthy finding from the regression analyses was that the offshore dummy variable was significant for both the Total Cost and Barrels Released models. The Total Cost Model showed that hazardous liquids pipeline incidents occurring offshore were significantly more expensive (625 percent) than onshore incidents, even though the Barrels Released Model showed that hazardous liquids pipeline incidents occurring offshore release 94 percent fewer barrels than onshore incidents. Additionally, though not unexpectedly, pipeline diameter was also significant in both models.

Appendix 3

Recommendations for Liquid Pipeline Siting Subcommittee Report

Recommendations for Liquid Pipeline Siting

Pipeline Safety Advisory Board Subcommittee

Travis Warner, Michigan Agency for Energy – Subcommittee Chair

Jennifer McKay, Tip of the Mitt Watershed Council – Subcommittee Member

Shawn Lyon, Marathon Pipeline LLC – Subcommittee Member

I. Background

At the June 12, 2017 meeting of the Michigan Pipeline Safety Advisory Board (PSAB), a subcommittee was created and tasked with addressing an item listed in Executive Order No. 2015-14 creating the PSAB. The charge below was the focus of this subcommittee.

> *4. Review and make recommendations on state policies and procedures regarding pipeline siting.*

The subcommittee was tasked with developing a document that addresses this charge and will be considered by the PSAB for further recommendation. As the designee on the PSAB for Michigan Public Service Commission Chairman, Sally Talberg, Travis Warner was designated to serve as chair of this subcommittee. Jennifer McKay, Policy Director for Tip of the Mitt Watershed Council, and Shawn Lyon, Vice President of Operations for Marathon Pipe Line LLC, volunteered and were designated as members of the subcommittee.

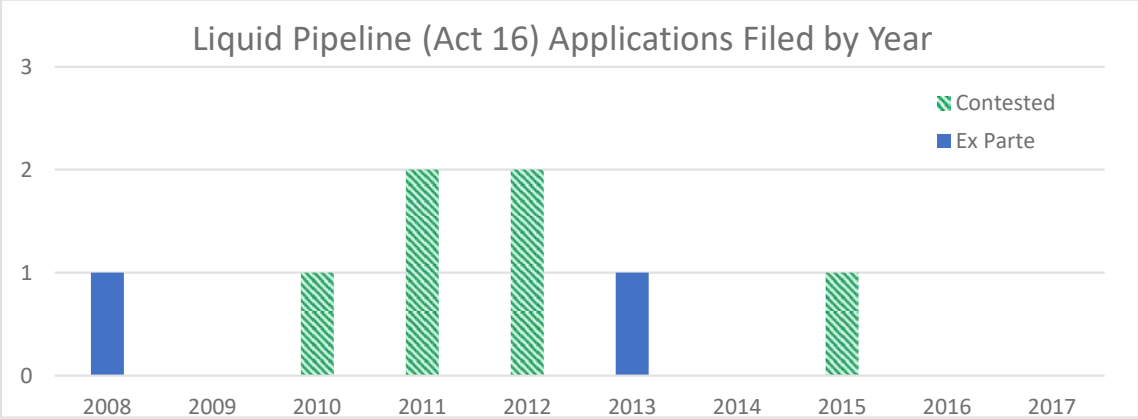
A. Hazardous Liquid Pipeline Siting

In the U.S., siting decisions for interstate and intrastate liquid pipelines are made at the state and local level. Unless the proposed project crosses federal lands, there are no required approvals from federal agencies prior to construction. State involvement varies significantly relating to liquid pipeline siting. Some states have virtually no involvement in siting while other states have an extensive review and approval processes. In Michigan, siting authority for crude oil and petroleum product pipeline siting is granted to the Michigan Public Service Commission ("MPSC" or "Commission") under Public Act 16 of 1929 (Act 16) MCL 483.1 et seq.

Act 16 grants the MPSC broad power to "control, investigate, and regulate a person....(b) engaging in the business of piping, transporting or storing crude oil or petroleum, or any of the products thereof, or carbon dioxide substances within this state." MCL 483.3(1)(b) Further the statute provides that a "person" as defined is "granted the right to condemn property by eminent domain….. (a) to transport crude oil or petroleum or carbon dioxide substances and (b) to locate, lay, construct, maintain and operate pipelines for the purposes of subdivision (a)." MCL 483.2 Act 16 also allows the Commission to "make all rules, regulations, and orders, necessary to give effect to and enforce the provisions of this act." MCL 483.8 To date, the Commission has not enacted any rules under Act 16. In addition to the

statute, Michigan Administrative Rule R 792.10447 contains minimum requirements for information that must be included in any application. This includes the name and address of the applicant; the city, village, or township affected; and the nature of the utility service to be furnished.

The MPSC has processed eight applications under Act 16 over the past decade. The graph below shows the number of applications filed by year to provide context for this document. During this time period, the MPSC has received an average of 0.8 liquid pipeline applications per year. It should be noted that four of the five applications processed between 2011 and 2013 related to construction of one pipeline, however, each application was handled independently by the MPSC. Also of note, all of the projects below were eventually approved by the MPSC either by its own approval or approval of a settlement agreement between the parties involved.



B. Current Hearing Process and Public Involvement

Once an application under Act 16 is received, MPSC staff review the application and make a determination if it can be handled on an *ex parte* basis, foregoing a full hearing process, and saving time and expense for all parties involved. Applications handled on an *ex parte* basis are typically shorter and smaller diameter projects for which the applicant has already acquired all the necessary rights of way. In these cases, MPSC staff work directly with the applicant to review the application and draft an approval order for submission to the Commission for consideration. Any project that requires new right of way or involves highly developed or environmentally sensitive areas triggers a formal administrative hearing, beginning with a prehearing conference. Upon scheduling a prehearing conference, the MPSC's Executive Secretary sets forth noticing requirements the applicant must meet prior to the prehearing conference. While noticing requirements for Act 16 applications are not detailed in the statute, as a matter of administrative practice, the Executive Secretary requires the applicant to provide notice to each landowner from whom it has not acquired the property rights for the proposed pipeline, and to all cities, incorporated villages, townships, and counties which may be traversed by the proposed pipeline. In addition, the Executive Secretary requires the notice of hearing to be published in daily newspapers in the counties that the proposed pipeline would traverse. Any interested parties may file petitions to intervene within the time frame designated in the notice of hearing. At the prehearing conference, the Administrative Law Judge (ALJ) sets a schedule for the case and rules on any petitions to intervene.

From this point, the hearing process proceeds according to the Rules for Practice and Procedure Before the Commission. After the evidentiary portion of the process, the Administrative Law Judge files a Proposal for Decision to be considered by the Commission for a final decision. In limited cases, the Commission may choose to forego the Proposal for Decision step and "read the record," shortening the time in which the final decision is made. At any point after an application is filed, the MPSC welcomes public comment in either written or verbal form. Comments are posted to the e-docket or included in the hearing transcript.

C. Current MPSC Basis for Decisions

Act 16 does not provide guidance relating to specific criteria that the Commission should consider in making its decision relating to pipeline applications. Historically, this has resulted in varying interpretations for how applications should be handled. In 2012, the Commission issued an order in docket no. U-17020, which stated:

> "…. Generally, the Commission will grant an application pursuant to Act 16 when it finds that (1) the applicant has demonstrated a public need for the proposed pipeline, (2) the proposed pipeline is designed and routed in a reasonable matter, and (3) the construction of the pipeline will meet or exceed current safety and engineering standards."

These points are broad and require additional context as they apply to real situations.

(1) The applicant has demonstrated a public need for the proposed pipeline.

This requirement is broad and includes a wide array of variables. Liquid pipelines are generally proposed to either replace aging infrastructure, or to satisfy a market imbalance by constructing additional infrastructure. In some cases, both needs may be met by a single project. The "public need" of a project is generally described as the short and long term local, statewide, regional, or national benefits to a project. These benefits are often difficult to quantify, and the protected nature of the industry adds to the difficulty of acquiring the information necessary to make this determination.

(2) The proposed pipeline is designed and routed in a reasonable manner.

The route proposed by the applicant is typically reviewed in detail by the MPSC staff. Route considerations typically involve human impacts and environmental impacts. Human impacts often relate to the proximity of the pipeline to dwellings, the number of landowners impacted, the amount of new right-of-way needed, and the inconvenience to landowners caused during construction. Under the Michigan Environmental Protection Act the MPSC must consider the impact of the proposed pipelines on the environment. Specifically, past case law explains that the MPSC must consider:

i. Whether the proposed project would impair the environment;
ii. Whether there was a feasible and prudent alternative to the impairment; and,
iii. Whether the impairment was consistent with the promotion of the public health, safety, and welfare in light of the state's paramount concern for the protection of its natural

resources from pollution, impairment or destruction. *State Hwy Comm v Vanderkloot,* 329 Mich 159, 185; 220 NW2d 416 (1974)

Environmental impacts generally consist of short and long-term impacts of the construction and operation of the pipeline. Short-term impacts may include tree clearing, interruptions to farming or other land use, waterbody crossings, and any other impacts to a previously undisturbed area. Long-term impacts of a safely operated pipeline are generally limited to pipeline and right of way maintenance but there is some amount of environmental risk due to the potential for a rupture or spill. The hearing process allows for parties in the case (in addition to MPSC staff) to provide testimony relating to the route and environmental impact. In many cases, staff has proposed alternative routes in its testimony or coordinated with the applicant and intervenors to make variations to the proposed route through a settlement agreement. In recent years, in part due to recommendations by the Michigan Petroleum Pipeline Task Force Report, the MPSC staff has solicited input from other state and federal agencies in reviewing applications, primarily with regard to routing. These agencies include the Michigan Department of Environmental Quality (MDEQ), the Michigan Department of Natural Resources (MDNR), the Michigan Department of Transportation (MDOT), the Pipeline and Hazardous Materials Safety Administration (PHMSA), and the Michigan State Historic Preservation Office (MSHPO). For recent pipeline applications, MPSC staff also hosted meetings and invited these agencies to review the route and discuss specific issues that warrant additional consideration. Staff utilized this information in testimony that was ultimately considered by the Commission in those decisions.

(3) The construction of the pipeline will meet or exceed current safety and engineering standards.

While this requirement is critically important to all pipeline construction, the MPSC currently does not oversee the safety of hazardous liquid pipelines. This oversight is currently managed by the U.S. Department of Transportation's PHMSA, acting through the Office of Pipeline Safety. The Office of Pipeline Safety is responsible for the enforcement of 49 CFR Part 195 which includes requirements for design, construction, pressure testing, operation and maintenance, operator qualification, and corrosion control. In a recent case, the MPSC staff asked PHMSA to review the proposed specifications and provided PHMSA's determination as an exhibit to testimony in the case. This was sufficient to satisfy this requirement. Although PHMSA is the governing body in these cases, this should remain a major consideration in Act 16 proceedings.

D. Staff Time and Expense

In 1973, the MPSC instituted a fee schedule for Act 16 applications. The fee was $100 for a pipeline under 25 miles in length and an additional $50 for each additional 25 miles. This fee schedule remained in effect until the Commission's order on March 10, 2017 in Case No. U-18115 adjusted the fee schedule. The resulting fees for an Act 16 filing approved by the order are $2,000 for a filing that can be handled *ex parte*, and $10,000 for a filing that is subject to the hearing process. Although the time requirement for pipeline cases can vary greatly, there was insufficient data available from past cases to create a more precise fee schedule. The Commission opted for a two-tier structure and stated that, "These changes will bring a much-needed update to the fee structure and will mitigate any concern that other regulated sectors are subsidizing gas producers and pipeline operators."

II. Consensus Subcommittee Recommendations

1) Promote public awareness and participation.

The process of siting pipelines can be overwhelming to members of the general public that have never been involved in a similar process. Without an effective means for getting questions answered, public stakeholders may be left confused by the potential impacts of a project and how they can participate. The subcommittee has several recommendations that the State should consider implementing to promote public awareness and participation:

a) Develop a comprehensive guide describing Michigan's siting process for pipelines. At a minimum, the guide should include:
   i. Relevant rules and statutes and how they apply. A focus should be on the MPSC's authority, eminent domain, the hearing process, etc.
   ii. Detailed explanation of the MPSC hearing process and typical schedule.
   iii. How and when the public may file written or verbal comments, petition to intervene, or otherwise participate in the process.
   iv. Information that should be included in an application.
   v. Criteria that the MPSC will consider in its decision.
b) If needed, the MPSC should schedule a separate hearing dedicated to receiving public comment.
c) Leverage the MPSC's updated e-docket system to make information easily accessible to the public on proposed pipeline projects.
d) Allow for the option to sign up for an email distribution list that would notify subscribers of applications or other relevant filings.
e) Require companies proposing a pipeline project to hold one or more public outreach events as determined in the pre-application meeting with MPSC staff, described further in Recommendation #3 below.
f) Designate and post contact information for a member (or members) of the MPSC staff as a resource for questions relating to each case.
g) Promote involvement from local governments and organizations with local interests and knowledge. Prioritize MPSC staff availability to meet with the applicant and/or other stakeholders and discuss concerns or considerations with the project.

2) Codify and improve noticing requirements.

As discussed above, any application that is not handled *ex parte* triggers a formal administrative hearing process and the MPSC's Executive Secretary schedules a Prehearing Conference and prescribes specific noticing requirements. Under the Michigan Administrative Hearing Rules, these notices must be provided no less than 14 days prior to the date set for the prehearing conference. While there are general noticing requirements within the Michigan Administrative Hearing Rules, requirements for who must be noticed for Act 16 applications are not defined and are instead set by the Executive Secretary for each case. Current practice is to require notification to affected landowners for which the company has not yet acquired rights of way and to include a copy of the notice of hearing in local newspapers. To

codify existing noticing practice, promote additional state agency involvement, and promote public involvement earlier in the process; the subcommittee recommends that:

a) The noticing requirements currently utilized by the MPSC's Executive Secretary for Act 16 applications be formalized through statute or rule. Specifically, applicants should be required to:
   i. Provide notice to each landowner from whom it has not acquired the property rights for the proposed pipeline.
   ii. Provide notice to all cities, incorporated villages, townships, and counties which may be traversed by the proposed pipeline.
   iii. Publish the notice of hearing in daily newspapers in the counties that the proposed pipeline would traverse.
b) The MPSC's Executive Secretary should include additional State agencies in noticing requirements for Act 16 applications. These agencies should include the MDEQ, MDNR, MDOT, MSHPO, and any additional agencies deemed appropriate by the Executive Secretary and the MPSC Case Coordinator.

3) Codify and improve application requirements.

The subcommittee recommends that application requirements should be added to Act 16 as an amendment or through new rules promulgated under the statute. This recommendation would promote complete application filings allowing a more efficient and thorough review by the public, the MPSC and its staff. This would provide an additional benefit to industry by clearly stating what information is expected to be included in an application. Specific recommendations include:

a) Require applicant to present a pre-application draft to MPSC staff and meet to discuss any obvious deficiencies prior to filing and a public outreach plan including dates and locations for public outreach events. The number and locations of public events should be appropriate for the project and should be approved by the MPSC Staff.
b) Require the following information to be included in Act 16 applications in addition to any other relevant considerations.

Proposed Application Requirements for Public Need Analysis

- Overall purpose of the project and the need that the project is intended to satisfy, including but not limited to:
  - Public safety
  - Energy reliability
  - Market imbalances
  - Economic drivers
  - Environmental stewardship
- Explanation of system level alternatives that were considered to meet the above needs and why they were not chosen as the preferred option. Alternatives may include:
  - No action
  - Utilizing available capacity in existing infrastructure
  - Upgrading or re-configuring existing facilities or infrastructure

- Short and long term market considerations for the product to be transported, which may include energy conservation efforts, future supply and demand trends, effects of governmental policy, etc.
- Anticipated benefits to local, state, and regional residents.
- Estimated construction costs of the project.

Proposed Application Requirements for Routing and Construction Analysis

- An explicit statement from the applicant that the project will comply with any and all federal and state safety requirements.
- Provide the Company's response plan for the proposed pipeline as required 49 CFR Part 194.
- A list of all required permits for the project, including the responsible agency and the application status.
- Complete engineering and operating specifications.
- Addresses for properties in which the pipeline will cross within 25 feet and details on methods for mitigating inconveniences caused by construction to homeowners and businesses.
- Road crossings and the type of construction proposed.
- Other underground facilities located within the proposed right of way.

Proposed Application Requirements for Alternative Route Analysis

- A description of major route alternatives including details relating to location, cost, technology to be employed, etc.
- A comparative environmental impact analysis for major route alternatives considered. At a minimum, the analysis should include a map, a description of the habitats traversed and proposed methods of installation for each route alternative.

Proposed Application Requirements for an Environmental Impact Review

- Explanation for how the company will avoid, minimize, and mitigate any impairments to the environment.
- Documented threatened or endangered species habitats located within the proposed right of way or would otherwise be affected by construction.
- Areas where invasive species have been observed or identified at proposed construction sites and mitigation methods that would be used to minimize the spread of the invasive species.
- Historical or culturally sensitive areas within the proposed right of way.
- Sensitive natural resources within the proposed right of way, including:
    - Federally designated wild and scenic rivers,
    - State or federally designated wilderness or environmental areas, and
    - Rare or unique ecological types.
- Proposed permanent right of way and temporary work space requirements.
- A re-vegetation and site restoration plan.
- Waterbody crossings and the type of construction proposed. (including wetland, river, stream, and drain crossings)
- Storm water management plan and erosion control methods.
- Recreational sites within the area affected by construction and operation of the facility.

4) Expand the environmental impact review process to include other state agencies.

The subcommittee recommends that the MPSC design a process for gathering and incorporating input from other state and federal agencies in a timely manner to inform the MPSC's decisions. Relevant agencies, including the MDEQ, MDNR, MDOT and MSHPO, should sign a memorandum of understanding with the MSPC to implement this process and dedicate necessary resources for cases that necessitate certain agency involvement. The goal would be to assist the Commission in determining the most feasible and prudent route and to avoid potential conflicts in agency-specific permitting processes that may arise after the MPSC's decision. Any eventual MPSC decision under Act 16 should not be construed to satisfy the requirements of any other statute or environmental review.

5) Codify the criteria used by the MPSC in making decisions.

Act 16 does not provide specific criteria for the Commission and its staff to consider in decisions relating to applications. The MPSC has used the three general requirements mentioned above to make its determination in recent cases. The subcommittee recommends that similar versions of those requirements listed below should be adopted as an amendment to Act 16 or as rules under the statute. These would provide consistent interpretation of the criteria that will be considered in future applications which will assist applicants in drafting applications and will help to guide MPSC staff's review.

(1) the applicant has demonstrated that the public need for the proposed pipeline outweighs the impact to the public and the environment.
(2) the proposed pipeline is designed and routed in a reasonable matter with no feasible and prudent alternative.
(3) the construction of the pipeline will meet or exceed current safety and engineering standards established and enforced by the Pipeline and Hazardous Materials Safety Administration.

6) Tribal Consultation

Proposed pipelines could impact tribal lands and property, as well as rights protected under treaties. Currently there is no formal Tribal consultation process with Michigan's federally recognized Tribes for pipeline siting. For each application that is filed, the subcommittee recommends that MPSC case coordinator should consult with the State and MPSC tribal liaisons and make a determination if formal tribal consultation is needed. Any consultation should involve participation from MPSC leadership and staff. Additionally, written record of the consultation should be submitted to the case docket.

7) Track staff time and expense required for review.

As discussed above, applicants are required to pay up to $10,000 for an application under Act 16. Costs associated with the application review typically consist of time requirements for multiple members of staff, staff's counsel, the ALJ, and the Commission. As discussed in Case No. U-18115, resources required to review applications vary significantly depending on the size and nature of the

project but the fees established in this case are sufficient to cover expenses for the majority of applications. That said, cases have infrequently exceeded this amount in the past. Staff resources to review applications have not been tracked historically so the incremental amount is not accurately known. The subcommittee recommends that all State staff involved in liquid pipeline siting cases begin tracking resource requirements for pipeline cases handled by the Commission. Tracking and maintaining basic data relating to these expenses would help to determine future fee increases or the financial impacts of changes in the review process.

III. Recommendations for Further Discussion

1) Siting of Crude Oil and Petroleum Product Pipelines in or beneath the Great Lakes

There are a number of pipelines within the Great Lakes Basin. There exists only one hazardous liquids pipeline in the open waters of the Great Lakes. Open waters of the Great Lakes is defined as the waters above lands covered per Part 325, Michigan's Submerged Lands Act of the NREPA: "the lands covered and affected by this part are all of the unpatented lake bottomlands and unpatented made lands in the Great Lakes, including the bays and harbors of the Great Lakes, belonging to the state or held in trust by it, including those lands that have been artificially filled in." A pipeline located in these open waters of the Great Lakes has the potential to undermine the health of the Great Lakes. To address this concern, the subcommittee agreed that three recommendation variations should be presented to the PSAB for further discussion. For the purpose of these recommendations, "pipeline" should be defined as those that fall under the current authority granted by Act 16.

Variations to consider:

1. Amend Act 16 to prohibit the authorization of pipelines on or beneath the lake bottomlands of the Great Lakes, per Part 325.
2. Amend Act 16 to prohibit the authorization of exposed pipelines on the lake bottomlands of the Great Lakes, per Part 325. Pipelines constructed beneath the lake bottomlands may be authorized if it can be shown that the risk of product reaching the Great Lakes is minimal and that the pipeline will be constructed and operated with minimal adverse impact to the environment and landowners. Further, construction could be prohibited if the pipeline would not meet a pre-determined depth threshold beneath the lakebed. If adopted, this depth threshold would require additional analysis and discussion.
3. Allow MPSC to determine appropriate siting for pipelines in Michigan based upon Act 16 and any associated rules. Ensure MPSC procedures provide appropriate environmental safeguards for the Great Lakes and preserve flexibility to accommodate future energy demands of all Michigan residents.

2) Environmental Justice Analysis

In February of 2017, Governor Rick Snyder created the Environmental Justice Work Group (EJWG). The EJWG was formed "to develop and provide recommendations to the Governor that improve environmental justice awareness and engagement in state and local agencies" and to "examine policy and recommend for implementation environmental justice guidance, training, curriculum, and policy that further increases quality of life for all Michiganders." A report generated by the EJWB in March, 2018 includes a list of twenty-four Policy Recommendations that are meant to provide a framework for Michigan in advancing environmental justice. Policy Recommendation #3, included below, could be interpreted to apply to pipeline projects.

3. *Require environmental justice analysis in permitting applications (consensus)*

- *The State shall require all environmental permit applicants (and transportation projects) to provide an environmental justice analysis that evaluates the impact, and any disproportionate impact, of the permitted activity on environmental justice communities, and any steps that can be taken to reduce or eliminate such impacts.*

The subcommittee discussed this to some extent but due to time constraints and the need for additional context surrounding the recommendation, has chosen not to adopt this as a consensus recommendation specific to Act 16 applications. Furthermore, the subcommittee has included this as a topic for additional discussion for the PSAB.

Appendix 4

MAE report on Line 5's impact on Michigan's energy supply

Line 5 Market Impacts/Alternatives

Energy Security Section
Michigan Agency for Energy

MiEnergy
Michigan Agency for Energy

Introduction

- At the Feb. 26, 2018 PSAB meeting, Alex Morese discussed some of the research his section has done evaluating the benefits Line 5 presents to Michigan's energy supply and alternative pathways for Michigan's energy needs should Line 5 become unavailable. It was requested that his oral presentation be written up for review.
- Some caveats:
  - The US petroleum market has shifted drastically over the last 10-12 years with increases in domestic production, new and repurposed pipelines and infrastructure, changing domestic and international demand, etc.
  - It is impossible to predict how the market would react to the loss of Line 5, so any alternatives are speculative in nature. Due to the unregulated nature of the petroleum market, the State has little control over market changes, rates, or investments.
  - Data has been used from Dynamic Risk's Alternatives analysis and publicly available sources such as the Department of Energy (DOE) and Energy Information Administration (EIA), and Michigan Department of Environmental Quality (MDEQ), etc.

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Introduction cont'd

- Our Approach
  - This is not approached from the standpoint that Line 5 is universally good or bad. We think, as many do, that the line presents both benefits and risks to Michigan.
  - Generally speaking, MAE Staff has been looking at this in two steps:
    - First, at a high level, answer the question "what does Michigan use Line 5 for?"
    - Second, for each of these use cases, evaluate the feasibility of Line 5 alternatives.
  - In this vein, we have settled on 4 major use cases for Line 5 which we have investigated further:
    - Adds propane supply to the UP via Rapid River terminal
    - Adds propane supply to the LP via Sarnia terminal
    - Provides transportation of Northern Michigan crude to the market
    - Supplies crude oil to Detroit and Toledo refineries

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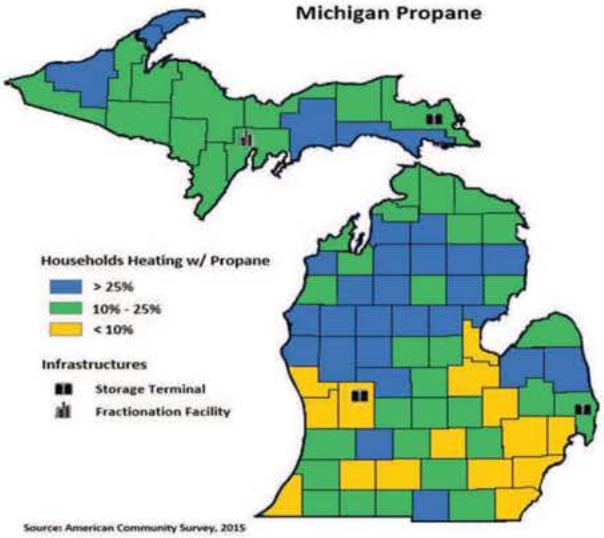
Residential Usage in MI

Data from the 2016 American Community Survey (Census Bureau) estimates that approximately 18% of UP households (22,000), use propane as a primary heat source. This compares with approximately 8% or 300,000 households in the lower peninsula.



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Michigan Propane Usage

- Dynamic Risk (DR) estimates that Rapid River can produce up to 30 million gallons of propane a year. If accurate, Rapid River has the capacity to produce enough propane to supply the majority of the UPs demand.
- It's impossible to specifically track the flow or production of propane based on publicly available data. Product made in one location may be transported elsewhere for sale, and visa versa.
- Specific company data from the main petroleum players in the state is required for further analysis. We have not been given access to this data.

	MI Households using Propane *	Average Usage	Estimated Annual Usage
Upper Peninsula	22,050	1,141	25,159,050
Lower Peninsula	296,979	1,141	338,853,039
Michigan (total)	**319,029**		**363,980,400 ****

* American Community Survey (ACS) 5-year estimate (2012-2016)
** 2011-2015 Average Annual Michigan LPG Consumption (Gallons)
Note: due to rounding, slight discrepancies may occur

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Overview of Plains Infrastructure

Plains Midstream owns and operates a significant amount of pertinent petroleum infrastructure in Michigan and Ontario, including:

	Storage Terminals	Fractionation/Storage
Michigan	Alto, Kincheloe, St. Clair	Rapid River
Ontario, Canada	Windsor	Sarnia

According to data from EIA survey form 814, nearly *70 percent* of reported Michigan propane imports in 2017 were by Plains Midstream.

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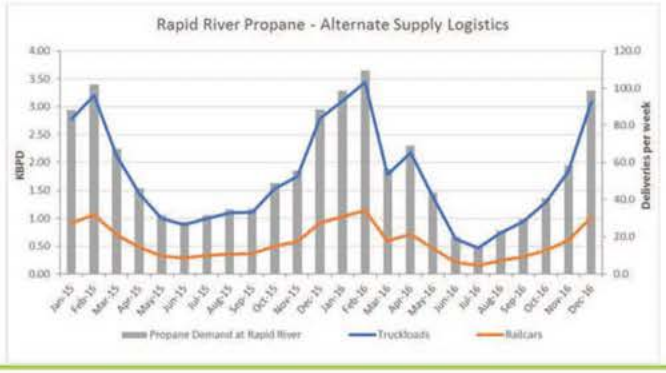
UP Propane Alternatives

- Owen (240 miles) and Superior (290 miles) Wisconsin are the nearest supply points in which a pipeline could be used to transport propane to Rapid River or the Upper Peninsula.
  - It is unknown whether either of these locations have adequate excess production capacity.
- Although technically possible, a new propane pipeline is likely infeasible due to economics (cost of construction and the seasonality of propane demand).
- The most viable alternative transportation methods likely include train and/or truck deliveries. Data in chart below taken from DR's Alternatives Analysis report and public sources.



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UP Propane by Rail

Transporting propane by rail is common in the Upper Midwest, including to Kincheloe in the Eastern Upper Peninsula, and to Alto in the Lower Peninsula.

- Using imagery from the Federal Rail Administration, the nearest Canadian National line appears about two miles by road. Options could include:
  - A new rail line delivering NGL or propane to Rapid River facilities.
  - Construction of rail spur for unloading of propane and moving/adding storage onsite.
- Rail transport is not immune to challenges. Inclement weather and track/yard congestion has the potential to cause delays to deliveries.
  - This could result in reduced reliability, increased price volatility, and higher prices than with Line 5.

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Lower Peninsula Propane

- A significant percentage (as much as 75%) of the propane *available* in the Lower Peninsula is derived from NGL that is shipped via Line 5 to Sarnia and returned to Michigan.
  - Difficult to nail down precise figures due to business confidentiality
  - Other states benefit from Michigan's storage and purchase propane for transport back to their respective territories
- Disruption to the delivery of NGL and production of propane in Sarnia would have immediate and serious impacts to Michigan and the region.
- Michigan has the ability to store large quantities of propane and other fuels at St. Clair and Marysville. Without alternative supply, these one-of-a-kind assets would be stranded and reduce our resiliency to supply disruptions.
  - Plains St. Clair storage terminal: 2 million barrels*
  - DCP Midstream Partners Marysville storage terminal: 8 million barrels*

** Storage figures are for all products, not just propane*

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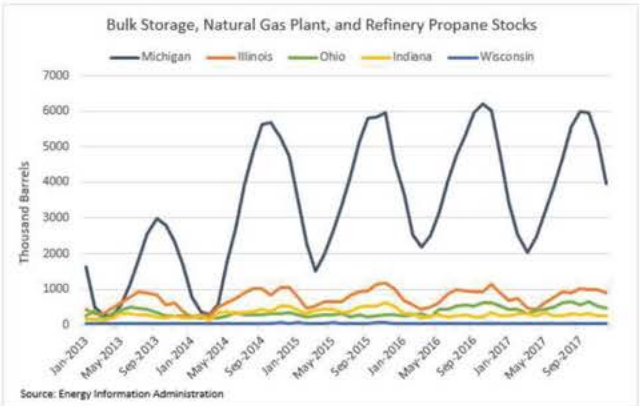
Propane Storage in Michigan

The chart below shows propane stocks for Michigan and several surrounding states. Michigan has historically kept more propane in storage compared to our neighbors. Stock levels preceding the heating season the past few years in Michigan have been near six million barrels, while some states remain well below one million barrels.



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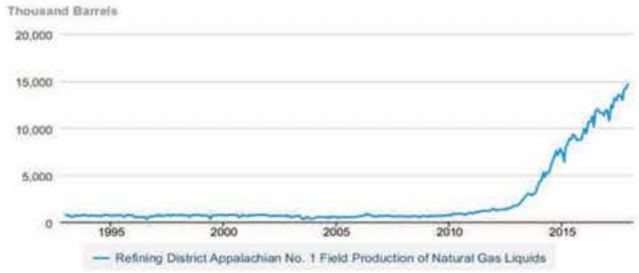
Sarnia NGL Alternative

NGL production/supply as a byproduct of natural gas shale plays in Pennsylvania and Ohio has risen and could likely replace deliveries to Sarnia via Line 5, however there is currently no means to move the product into Michigan. Additional pipeline capacity would be needed, and may be operating near the waters of the Great Lakes.

Refining District Appalachian No. 1 Field Production of Natural Gas Liquids



eia Source: U.S. Energy Information Administration

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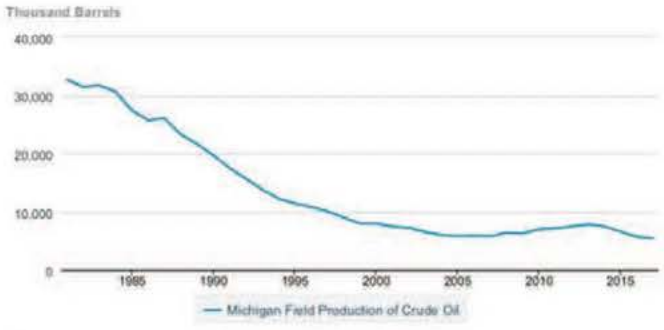
Michigan Crude Oil Production

- Many oil wells in Northern Michigan were drilled years ago and their production is declining. Without Line 5, marginal wells may no longer be economically viable. Increased transportation costs could effectively shorten the producing lives of these wells.



eia Source: U.S. Energy Information Administration

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MI Oil Production

- An analysis of the Michigan Department of Environmental Quality (MDEQ), Oil, Gas, and Mineral Division (OGMD) oil and gas production database indicates that nearly half of the producing oil wells included in the database as of December 2017, acquired production status prior to 1980.

Producing Oil Wells in Michigan, 2017

Decade Production Began	Number of Wells	% of Total	Cumulative %
1910's	157	3%	3%
1920's	1	0%	3%
1930's	411	8%	11%
1940's	934	17%	28%
1950's	631	12%	40%
1960's	165	3%	43%
1970's	264	5%	48%
1980's	1176	22%	70%
1990's	431	8%	78%
2000's	784	15%	92%
2010's	425	8%	100%
Total	5379		

Note: that the oil and gas production database does not include all production in the state, but does include all production in the database at the time it was last updated.

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Michigan Crude via Line 5

- In 2016, Michigan produced about 15,000 bpd of crude oil, and almost 2/3 of that (10,000 bpd) moved to market via Line 5.

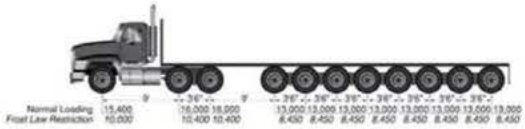
Year	Michigan Crude Oil Production (Barrels)	Markwest Michigan Pipeline Injections of Crude Oil Into Line 5 (Barrels)	Proportion Transported by Line 5
2012	7,445,000	3,412,058	46%
2013	7,771,000	3,548,243	46%
2014	7,406,000	3,516,970	47%
2015	6,528,000	3,648,778	56%
2016	5,616,000	3,426,902	61%

Sources: EIA & FERC Form 6 Filings

MiEnergy

Lewiston by Truck

- Without Line 5, Dynamic Risk estimated that transportation costs for Northern Michigan oil producers would rise by about $2.40/bbl.
  - This assumes that the product would be moved by truck to Marysville, if product was moved farther to Toledo or elsewhere, producers' costs would be even greater.
- According to the Alternatives Analysis, crude oil receipts into Line 5 from the Lewiston Terminal vary from 7-12 thousand bpd and equivalent truckloads of 30-50 per day would be needed for transportation.
  - 42 truckloads/day to move approximately 10,000 bpd
- MAE staff believes it may be possible to transport the 10,000 bpd with approximately 30 truckloads under no seasonal weight restrictions, and 63 truckloads with seasonal weight restrictions.



MiEnergy

Lewiston by Rail

- The Lake State Railway Company operates a state-owned rail line originating near Bay City, MI and terminating near Gaylord, MI. This rail line is approximately 16 miles (as the crow flies) west of the Lewiston Terminal and could potentially be used to transport Northern Michigan oil production to market. According to their website, various commodities can be shipped on this rail line, including petroleum products.
- This would require new rail spur construction for loading and offloading, similar to Rapid River.

Lake State Railway Company

Lake State Railway Company accessed at https://www.lsrc.com/services/servshipping/

MiEnergy

Alternative Refinery Supply

Exact figures on the percentage of crude oil Line 5 supplies to refineries in Toledo and Detroit are not known at this time.

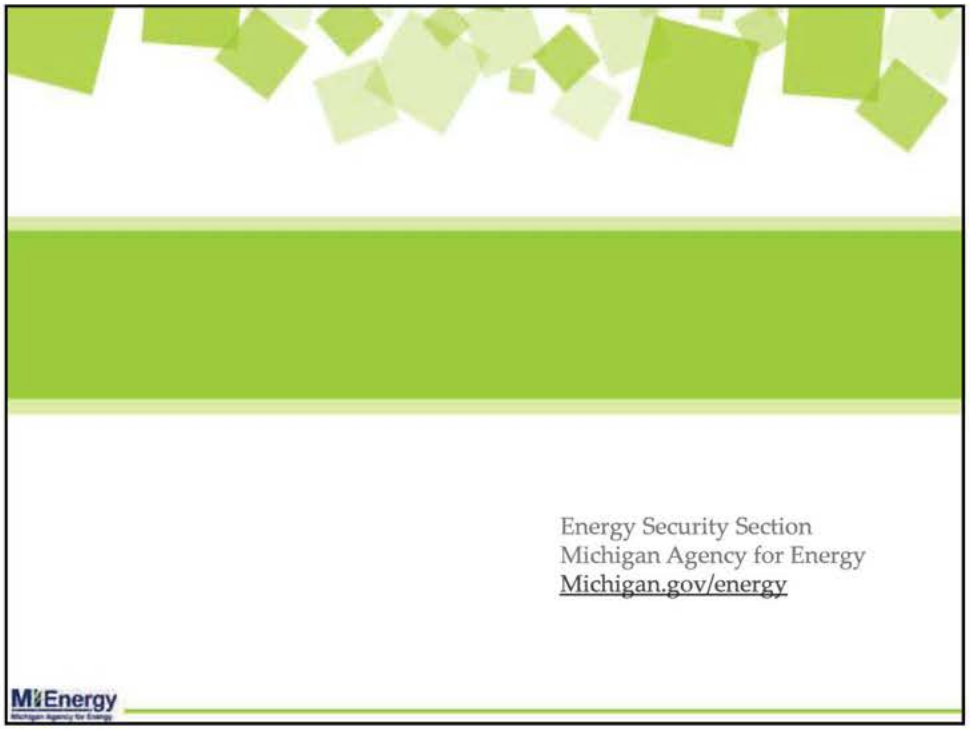
- It is likely that these refineries could find additional product via alternative routes, however this would strain capacity, raise prices, and contribute to a more fragile supply picture for the near future.
- Dynamic Risk estimated the cost impact to Michigan consumers at $.02 cents per gallon. It is important to understand that while the daily price fluctuates on average much more than this, what we are talking about is a consistent addition to the bottom line, a new floor. The long term price impact of that two cents equates to an additional expenditure of **120 million dollars/year** to Michigan consumers.
  - MI will consume approximately 6 billion gallons of gasoline and diesel fuel in 2018.

MiEnergy

Final Thoughts

- Outside of these specific use cases, Line 5 also has a regional impact on market prices. Even if Michigan had no direct use for Line 5 (i.e. it was a total pass through from Wisconsin to Ontario), the loss of Line 5 would cause crude and propane supply shortages elsewhere. Those shortages would raise demand for crude and refined products used in Michigan, which drives up prices in Michigan and the region.
- Additionally, if for whatever reason Line 5 and the products it transports were suddenly unavailable, there would be consequences to our energy security, likely resulting in a reduction in our resiliency and our ability to withstand future energy supply disruptions or market volatility.

MiEnergy


Energy Security Section
Michigan Agency for Energy
Michigan.gov/energy
MiEnergy

Appendix 5

St. Clair River Hazardous Liquid and Gas Pipelines

Informational Document

To: Michigan Pipeline Safety Advisory Board (PSAB) Members

Subject: Request for Information Regarding St. Clair River Hazard Liquid and Gas Pipelines

Summary: The intent of this document is to provide information to the PSAB members about the pipelines that are located in the St. Clair River near the city of Marysville in St. Clair County. The document was drafted as a response to a request for information regarding the pipelines from a member of the PSAB.

Hazardous Liquid Pipelines

Crossings

Exhibit A contains a St. Clair River Hazard Liquid Crossing Map and supplemental informational table that were created using data from public information within the National Pipeline Mapping System (NPMS).[1] In summary, there are 15 pipelines that cross under the St. Clair River in Marysville, Michigan and cross under the St. Clair River into Sarnia, Ontario, Canada.[2] 10 of the 15 pipelines are in service transporting crude oil (2), highly volatile liquids (2), liquefied petroleum gas (2) and natural gas liquids (4). The remaining five pipelines are retired or idle. Information or locations of final termination points of pipelines identified in Exhibit A was not collected.

Regulatory Framework

Generally, decisions regarding where hazardous liquid pipelines are located are made at the state level.[3] Under Michigan law, 1929 PA 16 ("Act 16")[4], the Public Service Commission (PSC) must approve the location of any crude oil or petroleum transportation pipeline constructed in Michigan, whether it is wholly intrastate or a portion of an interstate pipeline (except for private trunk or gathering pipelines). Pipelines crossing the international border must be approved through a permit issued by the U. S. Department of State.[5]

The regulation of petroleum pipeline safety is controlled at the federal level of government.[6] Further information regarding the laws, regulations, pipeline siting, reporting and safety regulations can be found in the Michigan Petroleum Pipeline Task Force Report released July 2015.

Emergency Response

At the local level, the city of Marysville Department of Public Safety maintains communication and relations with some pipeline operators. Pipeline owners or operators are required to provide local officials with information to aid in response planning[7]. In the case of an emergency, such as pipeline rupture, release or spill, the city would respond according to their general emergency response plan until an operator representative arrives to provide site specific information, unless pipeline specific information is available. At the county level, St. Clair County has a multi-hazard response plan that would be implemented in the case of a pipeline emergency. At the state level, the Michigan Emergency Management Plan contains procedures to be conducted by state agencies in the event of a pipeline

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[1] https://www.npms.phmsa.dot.gov/
[2] 3/9/2016 Meeting with city of Marysville, Mi Dept of Public Safety.
[3] Michigan Pipeline Task Force Report, pg 29, July 2015
http://www.michigan.gov/documents/deq/M_Petroleum_Pipeline_Report_2015-10_reducedsize_494297_7.pdf
[4] MCL 483.1 *et seq*.
[5] See http://www.state.gov/e/enr/applicant/applicants/index.htm
[6] Michigan Pipeline Task Force Report, pg 32, July 2015
[7] Public awareness requirements contained in 49 CFR 195.440 and 49 CFR 192.616

emergency[8]. Additionally, the Water Resources Division (WRD) of the Michigan Department of Environmental Quality (MDEQ) coordinates, plans and assists in the review of the Area Contingency Plan (ACP).

At the federal level, United State Coast Guard (USCG) actively maintains an Area Contingency Plan which is a reference document prepared for response to environmental emergencies.[9] An ACP will also contain a Geographic Response Plan (GRP), which is a more detailed response plan for a specific geographical area. The ACP and GRP are considered tools to ensure that all responders, from local to federal level, have access to area-specific information that will improve the response to an environmental emergency.[10] Exhibit B contains a map from the St. Clair River GRP of the USCG Sector Detroit ACP. The map identifies staging areas and collection points that would be utilized in the event of a pipeline emergency.

Natural Gas Pipelines

Crossings

In addition to the hazardous liquid crossings, there are 7 natural gas crossings of the St. Clair River. Unlike hazardous liquid crossings that are concentrated in the Marysville area because it is geographically suitable for pipeline crossings due to its distance from facilities located in Sarnia, Ontario, Canada[11], natural gas crossing are located in 3 locations along the St. Clair River (Exhibit C).

Regulatory Framework

The siting of interstate natural gas pipelines is regulated by the federal government, through the Federal Energy Regulatory Commission. The Michigan Public Service Commission regulates the siting only of intrastate natural gas pipelines.

Unlike hazardous liquid pipelines, the State of Michigan does regulate the safety of intrastate and interstate gas pipelines.[12] Further information regarding the laws, regulations, pipeline siting, reporting and safety regulations can be found in the Michigan Petroleum Pipeline Task Force Report released July 2015.

Emergency Response

Due to the characteristics of natural gas and the pressures where pipelines operate, emergency response to natural gas pipeline emergencies varies from hazardous liquid pipelines. At the local, county and state level, emergency response actions to natural gas pipeline emergencies would be similar to hazardous liquid pipelines with an elevated emphasis on public safety resulting in increased atmospheric monitoring of the release.[13]

Additional Pipeline Information

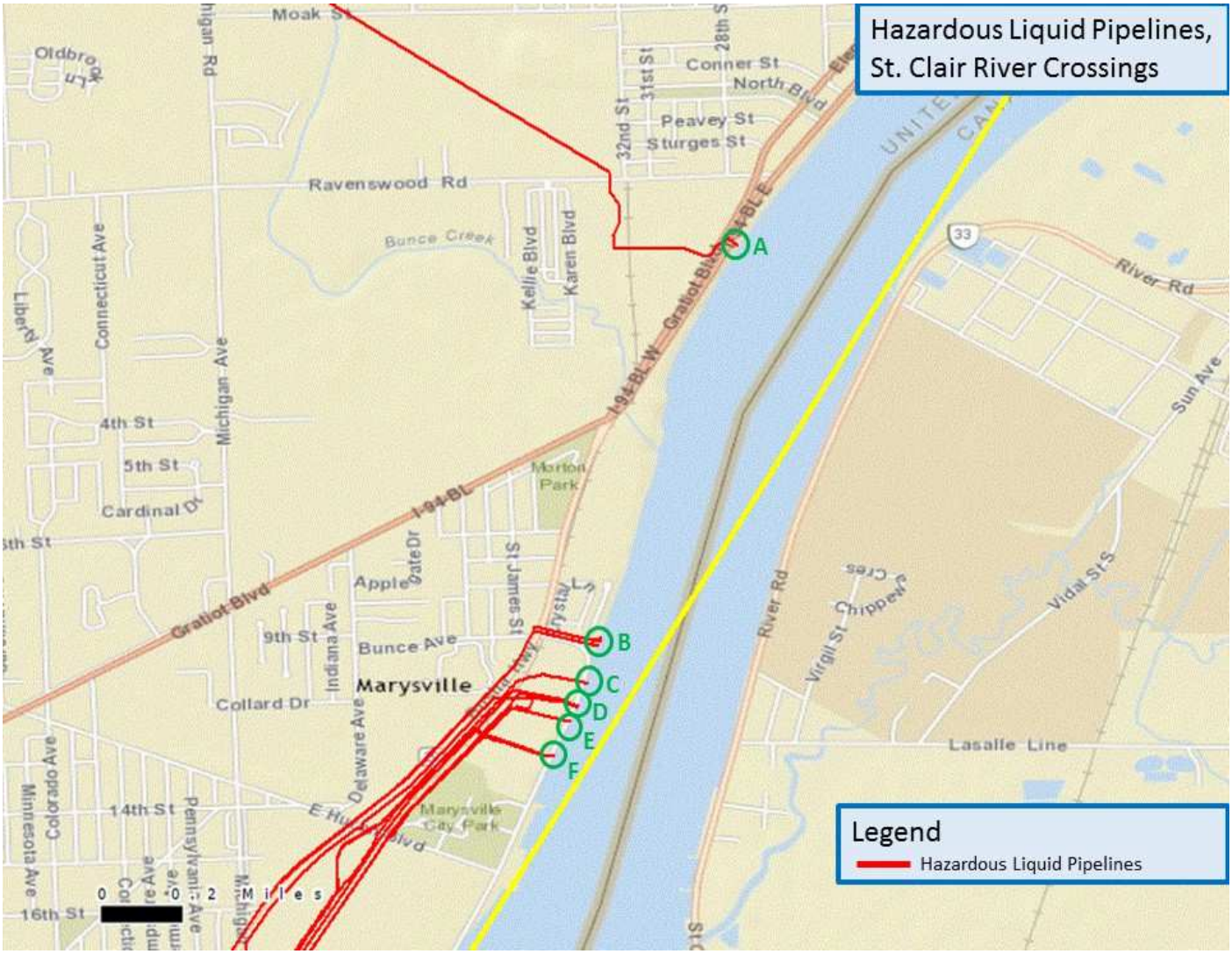
Exhibit D contains a map showing other pipelines located within St. Clair County.

Report Prepared by:
David Chislea
Michigan Public Service Commission
Matthew Goddard
Michigan Department of Environmental Quality

Data Collection by:
Travis Warner
Michigan Public Service Commission

[8] Michigan Pipeline Task Force Report, pg 37, July 2015
[9] https://www.epa.gov/oil-spills-prevention-and-preparedness-regulations/area-contingency-planning#area
[10] https://www.epa.gov/oil-spills-prevention-and-preparedness-regulations/area-contingency-planning#area
[11] 3/9/2016 Meeting with city of Marysville, Mi Dept of Public Safety.
[12] Michigan Pipeline Task Force Report, pg 33, July 2015
[13] 3/9/2016 Meeting with city of Marysville, Mi Dept of Public Safety.

Exhibit A



The map above was created using data from public information within the National Pipeline Mapping System (NPMS).

Notes

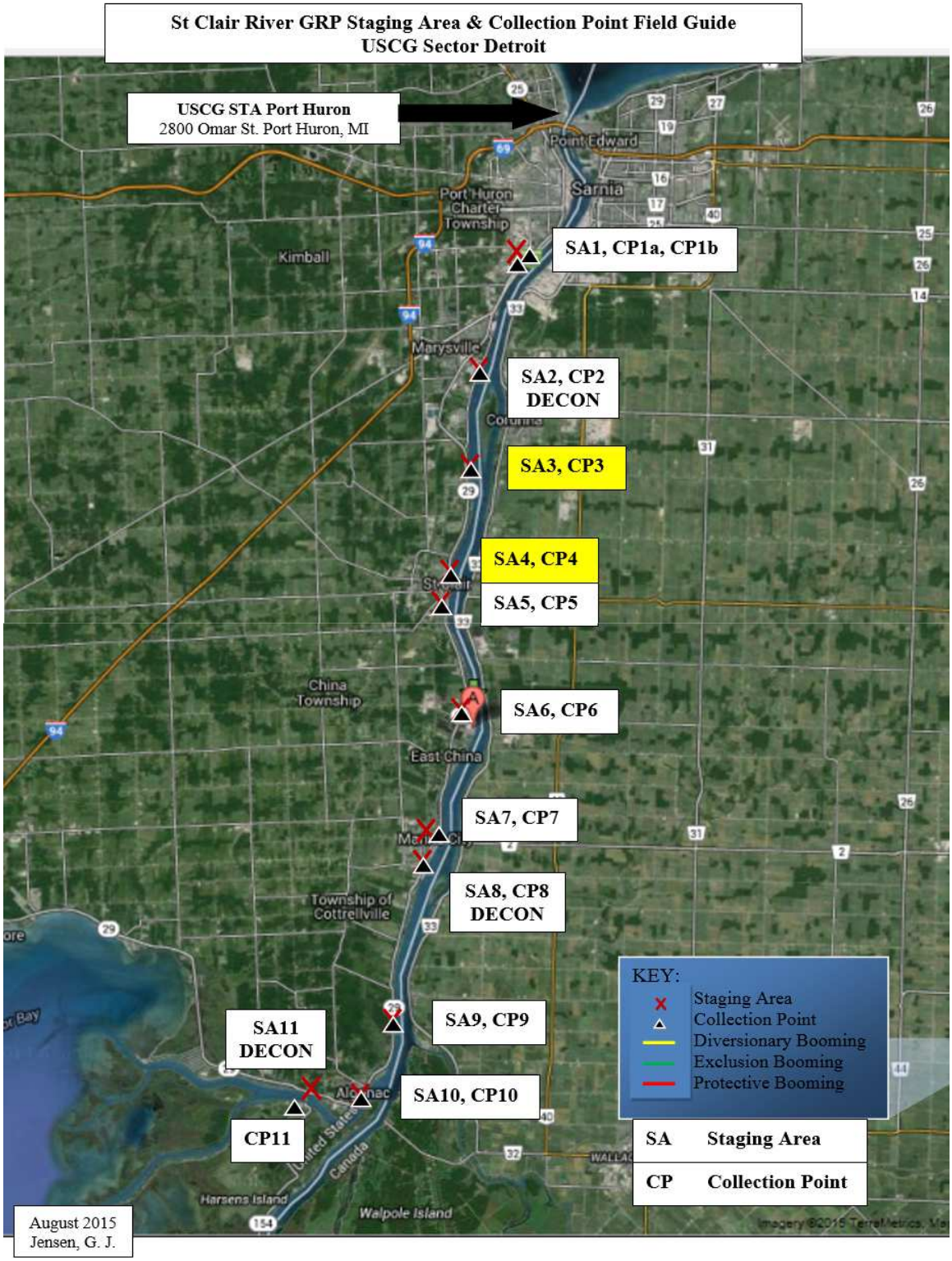
1. The pipeline denoted as "A" in the map above terminates on shore and does not cross the St. Clair River.
2. According to the recent application for Presidential Permits, Plains Marketing operates a total of six pipelines that cross the St. Clair River, two of which are not indicated on the National Pipeline Mapping System because they were never commissioned. The Presidential Permit Application can be found here: http://www.state.gov/e/enr/applicant/applicants/201605.htm

Exhibit A

Map Key	OPERATOR NAME	SYSTEM NAME	COMMODITY CATEGORY	INTERSTATE DESIGNATION	PIPELINE STATUS CODE
A	ABANDONED	MARYSVILLE/GREENWOOD OIL PIPELINE	Empty Liquid	N	Abandoned
B	PLAINS MARKETING, L.P.	SARNIA DOWNSTREAM PIPELINE LPG	Liquefied Petroleum Gas	Y	Retired
B	PLAINS MARKETING, L.P.	SARNIA DOWNSTREAM PIPELINE LPG	Liquefied Petroleum Gas	Y	In Service
B	PLAINS MARKETING, L.P.	SARNIA DOWNSTREAM PIPELINE LPG	Liquefied Petroleum Gas	Y	In Service
B	PLAINS MARKETING, L.P.	SARNIA DOWNSTREAM PIPELINE LPG	Liquefied Petroleum Gas	Y	Retired
C	ENBRIDGE ENERGY, LIMITED PARTNERSHIP	SUPERIOR & CHICAGO REGIONS	Crude Oil	Y	In Service
D	NOVA CHEMICALS (CANADA) LTD.	NOVA	Natural Gas Liquids	N	In Service
D	NOVA CHEMICALS (CANADA) LTD.	NOVA	Natural Gas Liquids	N	In Service
D	BUCKEYE DEVELOPMENT & LOGISTICS, LLC	R0255-A	Other HVLs (Butane)	Y	In Service
D	NOVA CHEMICALS (CANADA) LTD.	NOVA	Natural Gas Liquids	N	In Service
D	NOVA CHEMICALS (CANADA) LTD.	NOVA	Natural Gas Liquids	N	In Service
E	SUNOCO PIPELINE L.P.	REGION 03 - INKSTER	Other HVLs	Y	In Service
F	ENBRIDGE ENERGY, LIMITED PARTNERSHIP	CHICAGO REGION	Crude Oil	Y	Idle
F	ENBRIDGE ENERGY, LIMITED PARTNERSHIP	CHICAGO REGION	Crude Oil	Y	In Service

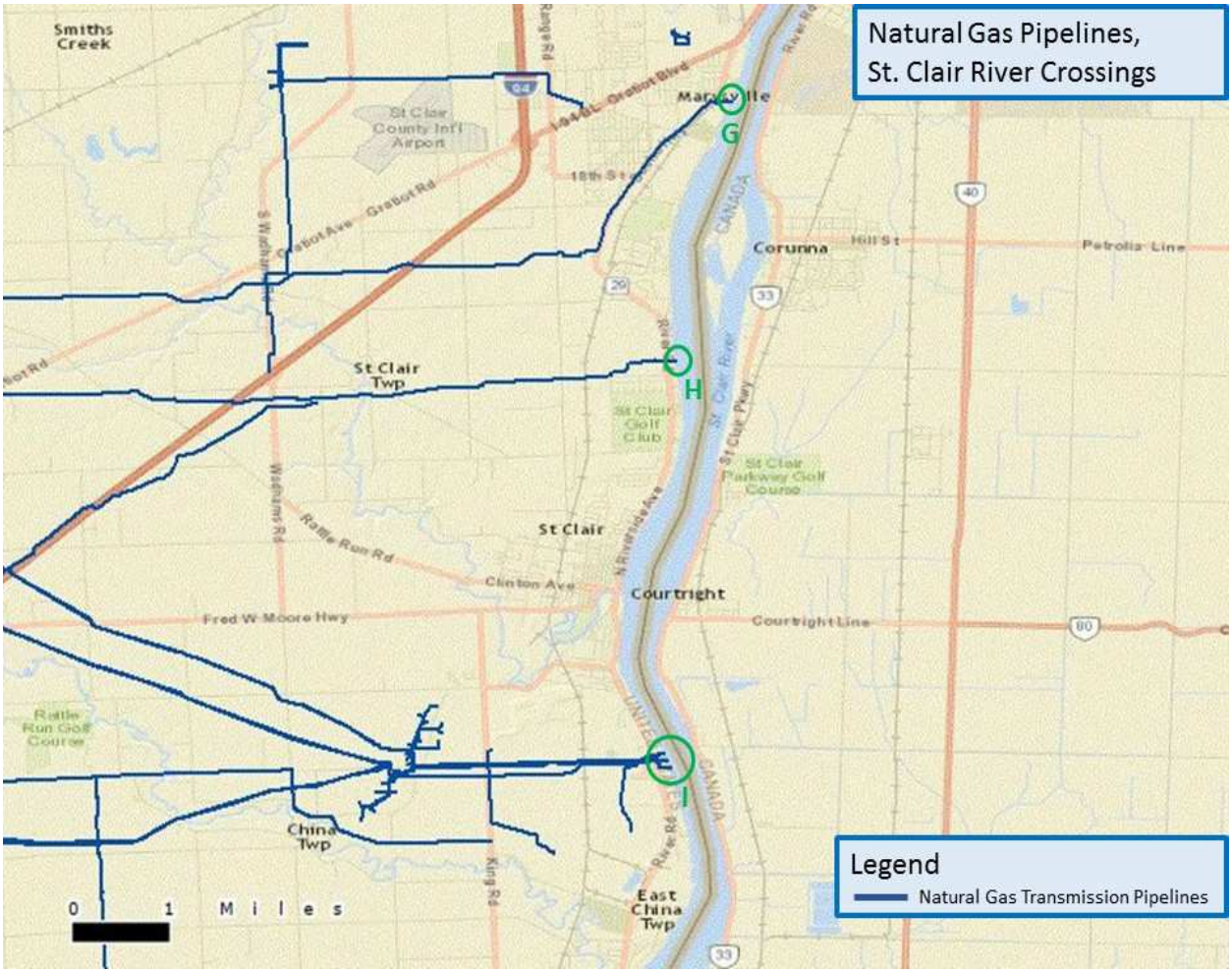
The table above was created using data from public information within the National Pipeline Mapping System (NPMS).

Exhibit B



Map Source: 2015 United States Coast Guard St. Clair River Geographic Response Plan

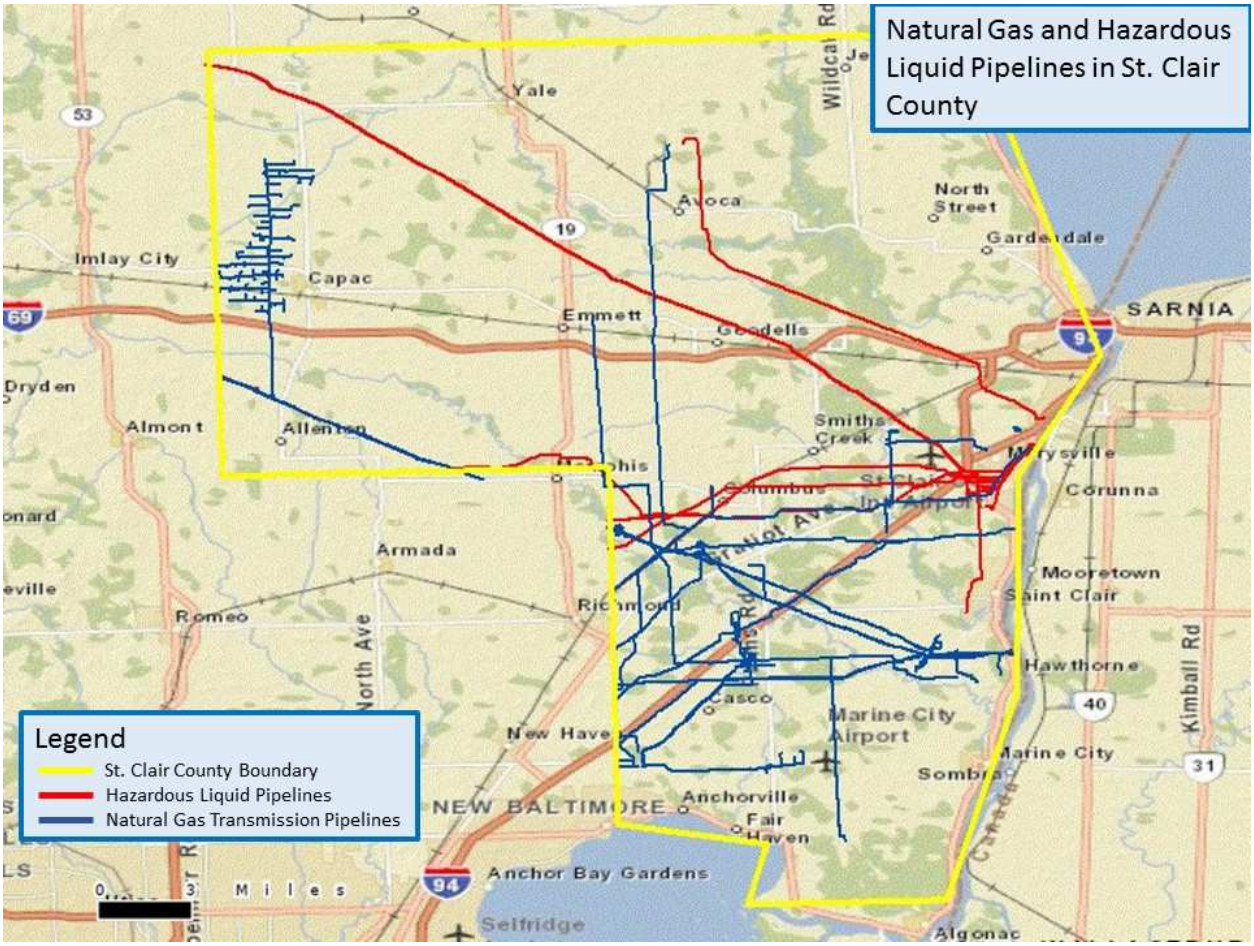
Exhibit C



The map above and table below were created using data from public information within the National Pipeline Mapping System (NPMS).

Map Key	OPERATOR NAME	SYSTEM NAME	COMMODITY CATEGORY	INTERSTATE DESIGNATION	PIPELINE STATUS CODE
G	PAA NATURAL GAS STORAGE, LLC	BLUEWATER NG	Natural Gas	Y	In Service
H	ANR PIPELINE CO	ANR	Natural Gas	Y	In Service
I	DTE GAS COMPANY	BELLE RIVER - ST. CLAIR	Natural Gas	N	In Service
I	VECTOR PIPELINE, L.P.	VECTOR PIPELINE L.P.	Natural Gas	Y	In Service
I	GREAT LAKES GAS TRANSMISSION CO	GLGT	Natural Gas	Y	In Service
I	GREAT LAKES GAS TRANSMISSION CO	GLGT	Natural Gas	Y	In Service
I	GREAT LAKES GAS TRANSMISSION CO	GLGT	Natural Gas	Y	In Service

Exhibit D



The map above and table below were created using data from public information within the National Pipeline Mapping System (NPMS).

Appendix 6

Full comments by various Board members on charges, Line 5

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Re: Concise Advice to Governor Snyder on Some of the Matters Before the Pipeline Safety Advisory Board
August 27, 2018

Dear Co-Chairs Keith and Heidi:

As Chairs of the Pipeline Safety Advisory Board, you have asked members to provide a concise 5-page summary of advice with regard to pipeline safety in the State of Michigan. This document is my response as the General Public representative appointed to the Board by the Governor. Because of the concise format requested, most of my advice is stated in conclusory terms, without extensive reference to specific information provided to the Board by the State, its consultants and the general public.

Overview

The issue how to develop a policy for Line 5 and similar pipelines in Michigan should be considered from three different time perspectives:

- The long term (the next 50 to 100 years), that is, the lifetime of the next three generations of Michiganders and the lifetime of pipeline infrastructure.
- The short term (roughly the next 5 to 10years), the period in which we may adopt policies for the medium and long term but major social, energy and infrastructure changes cannot be completed.
- The medium term is that period of time in which major social and structural changes can and will take place.

My comments are made in terms of those time perspectives.

Line 5

All decisions regarding Line 5 should be taken with a long-term view because they will have long-term consequences.

Line 5 at the Straits

Pipelines should not be located on the bottomlands of the Great Lakes or significant waterways leading to the Great Lakes, or other environmentally important and sensitive areas. In the short term, permits should not be issued that allow location on the bottomlands. In the medium to long term, the State should adopt and pursue policies likely to result in relocation of pipelines from those bottomlands.

Line 5 plays an important role in the regional energy supply network serving Midwest states and Canadian provinces. In the short term, it is needed to serve intrastate energy needs to supply propane to the UP and to deliver ever Michigan crude to market in the UP. There are not good alternatives available in the short term.

In the short term, because of Line 5's role in the regional energy supply network and in meeting our intra-state needs, shutting down Line 5 is not a practicable option.[1] But, in the short term, steps are needed to reduce the risks Line 5 poses. Several are discussed below.

[1] Because Michigan is dependent for its petroleum-based energy supply on petroleum pipelines passing through other states and provinces, it is in no position to argue, as some commenters have, that other states and provinces should not satisfy their energy needs using pipelines passing through Michigan.

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In the short, medium and long term, as long as Line 5 is in proximity of the Straits, its financial assurance requirement should be at least as great as the worst-case scenario in the recently completed Michigan Tech Risk Analysis – on the order of $2 billion. Likewise, the State should consider expanding the financial assurance requirement to cover releases from all of Line 5. There are too many locations, particularly along US 2 in the UP, where a release would reach Lake Michigan quickly.

In the medium term, while it is conceivable that Line 5 could be closed at the Straits and across the State, it does not seem likely for several reasons. Absent a voluntary business decision by Enbridge, termination of Line 5 will likely require condemnation by the State or a disaster in the Straits. Litigation to terminate the lease based on existing facts is likely to require an expensive legal battle taking many years with no certainty the State will win. In the meantime, other options to reduce the medium and long terms risks in the Straits will be on hold or deferred.

Both consulting teams retained by the State have concluded that in the short term there is not sufficient excess capacity in the regional pipeline network to absorb the volume presently carried by Line 5 without significant adverse impacts on price and availability of supply.

As soon as possible the State and Enbridge must reach a decision how to relocate Line 5 from the Straits' bottom lands because it is imperative that it be relocated given the enormous environmental risks Line 5 poses in its present configuration.

The alternatives to Line 5's present alignment at the Straits at their simplest are either develop alternative pipeline capacity that does not cross the Great Lakes, or cross the Great Lakes underneath the bottom lands (i.e., in a tunnel).

In the medium term, additional pipeline capacity may become available elsewhere but major pipelines have become difficult to approve and construct and are subject to vigorous legal challenge. The obstacles facing pipeline proposals are likely to increase with time. Accordingly, there is some risk in adopting a medium-term alternative premised on alternate pipeline capacity constructed within the time and with a cost to the consumer that will be a feasible substitute for Line 5. None of the factors affecting the construction of alternative pipeline supply are under the State's control.

A pipeline in a tunnel under the Straits is likely the most feasible and practicable approach to eliminating the current risks. A properly designed tunnel will eliminate most of the present risk. Most of the factors affecting construction of the tunnel are within the purview of the State and or Enbridge. A tunnel appears feasible from an engineering point of view. It offers the opportunity to co-locate other infrastructure like power lines and communication cable as well. Most important, if promptly commenced, a tunnel could be constructed in the short term (within 7 to 10 years), with the total elapsed time probably dependent on the amount of litigation opposing it.

Line 5 Elsewhere in Michigan

Any decision that permits Line 5 to continue to cross Michigan must address the entire length of the right of way, not just the Straits. The existing pipeline is 65 years old. It is not good for another 50 years. The entire pipeline should be replaced and all safety equipment modernized.

If a decision is reached between the State and Enbridge to construct a tunnel at the Straits or any other decision that permits Enbridge to continue to cross the Straits, then in the short term, Enbridge should begin to replace sections of the entire pipeline located in environmentally sensitive areas (like waterways leading to the Great Lakes) and relocate the pipeline to tunnels beneath waterways. This work can be completed in the short term, as demonstrated by Enbridge's

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replacement of Line 6/76 (several hundred miles) in a matter of about 3 years. In the short to medium term, the remainder of the pipeline should be replaced.

However, the process of replacing and modernizing Line 5 must not become an avenue to increase the capacity of Line 5. Ideally, Line 5's throughput capacity should be decreased toward the capacity originally approved.

In the short term, the present agreement between the State and Enbridge barring the transport of dibit in Line 5 should be made permanent.

In the medium term, the State would be wise to reduce or eliminate reliance on Line 5 for intrastate energy needs. That will simplify political considerations affecting future decision-making with regard to Line 5. In the medium term, it is likely feasible to reduce or eliminate dependence on Line 5 for propane in the UP and crude oil transport in the LP. Steady conversion from propane to alternative energy sources for heat in the UP coupled with development of alternate sources of propane supply should make that possible. In the LP, crude oil production in northern Michigan is declining and becoming less profitable. Reduced production may permit rail or truck to substitute for Line 5.

In the long term, shifts away from petroleum may reduce or eliminate the need for Line 5 in its entirety. Accordingly, the life of any future agreement with Enbridge should be limited to 50 years or less with no automatic right of renewal or extension.

Emergency Response

Everything I have seen supports the conclusion that there is not adequate response equipment or resources in or near the Straits for a quick and successful response to a major release from Line 5. While I have heard assurances that there are response plans and equipment in place, I have not heard any assurances from responders (other than Enbridge) that there are adequate resources available, particularly in adverse conditions.

In the short term, emergency response plans and equipment should be increased to respond to worst case scenarios east and west of the Mackinac Bridge. There are $2 billion in potential adverse consequences to be avoided or mitigated. Increasing response equipment will cost a tiny fraction of the damages we wish to avoid.

So long as Line 5 is on the bottomlands, a small (in percentage) annual expenditure by Enbridge in emergency preparedness equipment and training reserve would accomplish more than a $2 billion reserve for after-the-fact clean up. I defer to the experts to advise just what that increased expenditure should be to provide for a response to a worst-case release. Even 0.2% of $2 billion is $4 million per year for improved preparedness.

State/Enbridge Agreement, November 2017

The Michigan Tech Risk Analysis confirms that the adverse condition pipeline shutdown criteria in the Agreement are completely inadequate as previously pointed out by me and others at the December 11, 2017 Board meeting. Material presenting in Risk Analysis Appendix A-C4 shows that during 6 months of the year, about 25% of the hours have "Very High" wind conditions and during at least half the hours in the year wind conditions are High to Very High. The emergency response equipment now in the Straits is ineffective during those conditions. The Appendix states Very High wind conditions create wave heights over 6 feet which, according to the Appendix, agencies responsible for spill response in the Straits consider unsafe for on-the-water response efforts. In the short term, the pipeline adverse condition shut down criteria should be amended to include

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occurrence of High and Very High wind conditions (as those terms are defined in the Appendix.) **I regard that as perhaps the single most important action the State should take in the short term.**

Recommendations on Pipeline Siting

I strongly support the "Recommendations for Liquid Pipeline Siting" presented to the Board. In the short term, these recommendations should be implemented as a matter of priority. They will help assure in the medium to long term that permitted pipelines serve the State's long-term interests. They should apply to all pipeline applications that come before the MPSC.

They can be improved by requiring disclosure of the applicant's long-range plans behind the action for which a permit is sought, in order to provide a context to the application. Over the years, Enbridge has successfully piecemealed the capacity expansion of Line 5, doubling its approved throughput through incremental requests to improve pump stations, etc. While perhaps a valid business strategy under the current rules, this practice is not in the public interest and must be stopped.

The siting guidelines should recommend MPSC consider the short, medium and long term public need for the pipeline; whether the route is reasonable in the short, medium and long term; and whether the pipeline will meet or exceed current or reasonably anticipated safety and engineering standards. This expands the language in the MPSC's order in docket no. U-17020. That order should be amended to focus not on "pubic need" for the pipeline but on the public need for the material in the pipeline. To state the obvious, the public needs what is transported in the pipeline, not the pipe itself.

The applicant should specify the materials to be transported and the throughput. If the Michigan public needs 1 million gallons of gasoline a day through the pipeline, there is no public need for a pipeline sized for 5 million gallons per day, absent a long-range plan from the applicant that makes clear the request over-sizing is reasonable at the time of the application.

The description of materials to be transported in the pipeline should be as specific as possible, recognizing that some petroleum liquids are very similar in terms of use, toxicity, environmental risk, etc. Thus, limited generic grouping of materials might be justified.

The finding of pubic need and the permit as issued should be specific and limited to specific materials and a maximum throughput.

Finally, the MPSC should grant permits for a specific term. Pipelines last a long time but during the passage or years, risks, design standards and public values and needs can change radically. Line 5 is an example. A lease of the bottom lands in the early 1950s was consistent with sensibilities and technologies at the time but no one in 2018 would approve a major pipeline on the bottom lands of the Straits. Looking ahead, it is a fair question (raised by a number of commenters) whether we will need a petroleum pipeline in the long-term future. A long-term time-limited permit gives the applicant time to fully amortize the pipeline improvement, coupled with the knowledge the public right granted by the permit expires absent approval of a new permit application.

Outside of the MPSC review of pipeline permit applications, I recommend that the appropriate state departments identify those locations in Michigan where a confluence of smaller intrastate pipelines represent a collective risk. I have in mind the pipelines transporting aviation fuel to Metro Airport. A former client discovered more that 4 active and abandoned pipelines crossing its property. These pipelines are short, a few miles or less, but they converge and may cross major

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roads and waterways. I expect this situation occurs at other major airports in the state and possibly at other locations. These situations merit study to see if they pose risks collectively they may not pose individually.

Straits Pipeline Legislation – H.B. 5198

So long as this legislation applies only to the Straits of Mackinac, it is failed legislation and I oppose it.

The bill should be amended to apply to any pipelines which cross significant waterbodies or areas of significant environmental interest. Line 5 at the Straits is not the only problematic pipeline in Michigan; it is the poster child for the risks that other pipelines in Michigan pose.

PSAB Process and Transparency

I support strongly the creation of the Pipeline Advisory Board and similar boards.

I remain impressed by each of the individuals on the Board, whether private members or state employees. However, the PSAB was considerably less effective than I expected it to be and did not take full advantage of the expertise of the individuals the Governor appointed. On only one occasion was a subcommittee appointed to address a particular topic as a working group. The excellent "Recommendations for Liquid Pipeline Siting" emerging from that effort is a credit to the thoughtful work of the three authors (Travis Warner, Jennifer McKay and Shawn Lyon) and an example of what have been achieved on other topics. The Alternatives Analysis and the rejected Risk Analysis suffered greatly from lack of Board insight and expertise.

I regret to say the State's commitment to make the PSAB process transparent was largely unsuccessful. The record created of PSAB meetings was completely inadequate to reflect the excellent advice and discussion occurring at the meetings or to inform the public of the Board's deliberations. To make sure my comments were of record, I was forced to provide them in writing in advance or after each meeting. There was an inadequate record made of the public comments received at meetings. Many commenters had written comments with them at the podium but, despite my twice-repeated request, these individuals were not encouraged to provide those comments to the meeting secretary where they could be incorporated in the minutes.

My biggest concern is the Michigan Petroleum Pipelines website fails to include copies of the many very thoughtful and substantive comments received. I do not see a need to "docket" comments of the "me to" or conclusory "shut the pipeline down now" variety. However, there is a very real need to make the public aware of the substantive comments received and to maintain them in a format readily accessible to state agencies and staff, future boards, and the public. Twenty years ago, courts struggled with operating efficient electronic dockets, that is no longer the case, as evidenced by MPSC's excellent docket for contested cases. I cannot understand why that was not achieved for the PSAB's website.

I strongly support continuing the Michigan Petroleum website but only if its docketing system is expanded to include all substantive comments, reports and submissions received.

I have previously submitted several letters with advice on related topics. I request those letters be considered as well.

Sincerely,

R. Craig Hupp

To: Michigan Pipeline Safety Advisory Co-Chairs Creagh and Grether

From: Jennifer McKay
Policy Director, Tip of the Mitt Watershed Council and Member, Michigan Pipeline Safety Advisory Board

Date: August 27, 2018

RE: Comment on Petroleum Pipeline Taskforce Report charges and the Pipeline Safety Advisory Board Charges

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1. Review and make recommendations for statutory, regulatory, and contractual implementation of the Michigan Petroleum Pipeline Task Force Report.

   Specific Recommendations regarding the Straits Pipelines

   1. Prevent the Transportation of Heavy Crude Oil through the Straits Pipelines.

   Action: Strengthen the 2015 agreement that prevents Enbridge from transporting heaving crude through the Straits Pipeline in the future.
   Numerous public statements from the Administration and State agency directors indicate that Line 5 will not remain in its current state. The 2015 agreement permits the transport of heavy crude should the pipeline be re-engineered. Because Enbridge is likely to change the current engineering configuration and/or operating parameters, the 2015 agreement needs to be strengthened to ensure that heavy crude will not be transported through the Straits of Mackinac. The National Academies report, *Spills of Diluted Bitumen from Pipelines: A Comparative Study of Environmental Fate, Effects, and Response,* concludes that "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 oils." "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. This situation is highly problematic for spill response because there are few effective techniques for detection, containment, and recovery of oil that is submerged in the water column." Therefore, regardless of any change to pipeline configuration or operating parameters, Enbridge should not be permitted to transport heavy crude due to the unreasonable risk of ecological and economic harm.

   2. Require an Independent Risk Analysis and Adequate Financial Assurance for the Straits Pipelines.

   Action: Require Enbridge to maintain insurance or other financial assurance based upon the estimated total potential liability from a worst-case scenario spill from the Straits Pipelines identified upon completion of the final Independent Risk Analysis for the Straits Pipelines, led by Michigan Technological University.
   The 1953 Straits Pipelines Easement makes Enbridge liable for all damages or losses to public or private property resulting from its operations at the Straits. The Risk Analysis is the best attempt to quantify the damages that may result from a worst-case spill at the Straits. However, the Watershed Council believes assumptions made resulted in conservative estimates. In addition, the cost estimate provided in the Risk Analysis Report will still not represent all damages or losses as there are costs of irreversible damage to resources for which valuation estimates are not available. Therefore, to meet condition J(1) of the 1953 Easement, it is imperative that the maximum total potential liability identified in the Final Risk Analysis Report be required from Enbridge.

3. Require an Independent Analysis of Alternatives to the Existing Straits Pipelines.

4. Obtain Additional Information from Enbridge.

Action: The State should continue to use its authority under the 1953 Easement to regularly obtain information from Enbridge about its continued operations in Michigan.
In an effort to improve communication and transparency, Enbridge should be required to submit comprehensive monthly, semiannual or annual reports to the State with of all inspections, repairs, updates, incidents or spills, commodities transported, and any other relevant information the State may request or require. Reports should be posted on the Petroleum Pipeline Information website to meet the charge of increasing transparency and public engagement on pipelines.

Statewide Recommendations

1. Coordinate mapping of existing pipelines among state agencies.

Action: Ensure the pipeline data is reviewed and updated at least annually.
Access to accurate and consistent information about the location of pipelines in relation to other geographic information such as water bodies, other sensitive environmental features, land uses, and other infrastructure is vital to ensuring State agencies are prepared in the event of an emergency.

2. Ensure that state agencies collaborate on emergency planning and spill response.
3. Ensure coordinated emergency response training exercises and drills.
4. Ensure regular state consultation with the federal Pipeline and Hazardous Materials Safety Administration (PHMSA) on hazardous liquid (including petroleum) pipelines.

Action: Michigan Public Service Commission (MPSC) staff should observe and participate in interstate hazardous liquid pipeline inspections, at a minimum.
Because Michigan has a gas certification, the State is allowed by law to observe and participate in interstate pipeline inspections. The State should identify a dedicated funding mechanism to allow for MPSC to participate in joint inspections with PHMSA. In addition, the State should request participation in intrastate inspections and work with PHMSA to develop a program to accommodate such requests. It is further recommended that that the State have MPSC staff who will engage in the joint inspections go through the Hazardous Liquids Training Program. This would allow State staff to be better prepared to participate in interstate pipeline inspections with PHMSA and be ahead of the game should the State ever want to pursue establishing a Hazardous Liquids Pipeline Safety Program in Michigan in the future. According to PHMSA, the majority of the costs, approximately 70%, can be covered under the grant provided to the State. All of these actions would further Michigan's relationship with PHMSA, as well as pipeline operators within the State. This would allow for improved access to information, oversight, and increase state emergency preparedness.

5. Consider legislation requiring state review and approval of oil spill response plans, improved spill reporting, and more robust civil fines.

Action: Michigan's Governor needs to provide leadership and encourage the Legislature to enact strong legislation requiring state review and approval of oil spill prevention and response plans, improved spill reporting, and more robust civil fines.
House Bill 5198 was introduced in 2015 and House Bill 6201 was introduced in 2018 by Representative Chatfield to address the gaps identified in the Michigan Petroleum Pipeline Task Force

Report. However, the 2018 version of the bill is significantly weaker than the original 2015 bill. In particular, the provisions of the bill only apply to two pipelines in the State – Enbridge Energy's Line 5 and TransCanada's Great Lakes Gas Transmission Line – both located in the Straits of Mackinac rather than all pipeline infrastructure in Michigan. In addition, the 2018 bill does not include a per barrel fine and exempts prevention plans from the Freedom of Information Act. The changes in the 2018 version were made due to pushback by industry as well as a lack of leadership by the administration to advocate for the needed changes to Michigan's law.

To adequately address the gaps in Michigan law and achieve the goals put forth in the Michigan Petroleum Pipeline Task Force Report, House Bill 6201 should be modified accordingly:

- Provisions should be applicable to all transmission pipelines in Michigan.
- The spill prevention and response plans should be state-specific. PHMSA regulations allow pipeline operators to submit state-approved spill response plans to satisfy federal requirements. Michigan should improve the planning process by developing its own requirements taking into account Michigan's unique natural resources. The bill should also provide opportunities for public comment on plans to improve public engagement and transparency.
- Provide per barrel fines to serve as an incentive to prevent discharges and releases.
- Require notification of spills from pipelines to local response authorities, in addition to the Department.

In order for a strong pipeline bill to be enacted, the Governor and Administration will need to take an active role working with the Legislature and industry to support the necessary changes.

6. Evaluate whether to establish a Hazardous Liquids Pipeline Safety Program in Michigan.

Action: Michigan Public Service Commission (MPSC) staff should observe and participate in interstate pipeline inspections.

Michigan can achieve many of the benefits of a hazardous liquids programs, such as greater access to information and oversight, increased emergency preparedness, and building relationships with liquid pipeline operators in the State, by participating in joint inspections with PHMSA. Therefore, the State should have Michigan Public Service Commission (MPSC) staff observe and participate in interstate hazardous liquid pipeline inspections. See #4 above.

7. Consider legislation or rulemaking to improve siting process for new petroleum pipelines.

Action: Implement all of the consensus recommendations put forth in the report by the Liquid Pipeline Siting Subcommittee.

As a member of the Liquid Pipeline Siting Subcommittee, I support the consensus recommendations we worked hard to develop to improve pipeline siting in Michigan.

Action: Amend Act 16 to prohibit the authorization of pipelines on or beneath the lake bottomlands of the Great Lakes, per 325.

The overarching goal of Tip of the Mitt Watershed Council is no transportation of crude oil in, on, or under the Great Lakes. Whether by pipeline or vessel, a spill in the Great Lakes would be devastating to Michigan's natural resources, the health of our citizens and our economy. Therefore, we recommend that Act 16 be amended to prohibit the siting of crude oil pipelines on or beneath the bottomlands of the Great Lakes.

Action: Require the newly created Environmental Justice Interagency Work Group (EJIWG) to assist the MPSC in the development of environmental justice policies and procedures for pipeline projects.
The EJIWG, through its charge, can help the MPSC provide an environmental justice analysis that evaluates the impact, including any disproportionate impact, of a proposed pipeline project on environmental justice communities and steps that can be taken to reduce or eliminate such impacts, to further increase the quality of life for all Michiganders.

Action: Designate how Act 16 applies to pipeline maintenance activities and increases in capacity.
Act 16 only applies to new pipelines. There are many instances in which significant modifications are made to pipelines that can dramatically increase the risk to Michigan's environment and economy. Act 16 needs to be amended to account for activities that alter pipeline capacity or are significant enough to warrant review from MSPC.

Action: Require horizontal directional drilling for all new pipeline waterway crossings.
Horizontal directional drilling can minimize potential adverse impacts to Michigan's water resources and should be required for all future water crossings in Michigan.

Action: Develop procedure for how Tribal remains are addressed when found.
A process needs to be developed for the inadvertent discovery and return of human remains, valuable or sacred objects, and objects of cultural significance to Michigan's Native American Tribes.

8. Consider issuing an Executive Order creating an Advisory Committee on Pipeline Safety.

9. Create a continuing Petroleum Pipeline Information website.

Action: Provide a dedicated funding source to properly coordinate and maintain the Petroleum Pipeline Information website.

2. Identify areas of best practice in pipeline safety and siting across the United States that could be implemented in Michigan.

3. Review and make recommendations on state policies and procedures regarding emergency response and planning for pipelines.

Action: Amend laws as needed to allow to expedited approval of in situ burning as an emergency response tool.
In situ burning (ISB) may be able to remove large amounts of spilled oil before spreading and drifting of the spill fouls shorelines and threatens wildlife. In certain circumstances, such as oil spilled in ice conditions, burning may be the only viable response technique. Burn efficiencies of 50 to 90 percent can be expected, making this response method more efficient than other methods. In Region 5, the use of in situ burning as a response tool will always be within State waters and inland areas and consequently be subject to State law and policy. Currently, State law requires an emergency declaration from the State of Michigan Governor to use ISB. This could hinder, if not prevent, the use of ISB as an emergency response tool under the right environmental conditions at the time of the spill that would be acceptable to allow a burn.

Action: Require pipeline operators to attend Local Emergency Planning Committee (LEPC) and Regional Area Committee meeting at least once annually.
All emergencies start locally and end locally. Having operators attend LEPC and Regional Area Committee meetings serves as a link between the operator, the citizens and the government in emergency planning and preparedness for the community. It allows for vital relationships to be built and the opportunity for information exchange. It can serve to improve communication and collaboration which can ultimately enhance public safety and environmental protection.

Action: Require facility response plans to be reviewed and approved by State agencies.
Again, all emergencies start locally and end locally. By requiring State approval of facility response plans, the State can ensure Michigan's concerns are adequately addressed within each plan. In addition, the State could also require Geographic Response Plans (GRP) - pre-identified response strategies to protect sensitive, cultural and economic resources – such as the Straits of Mackinac or other waterways identified in the water crossing report for Line 5. This could also serve to improve public transparency and engagement by allowing for public comment on the response plans.

Action: Implement all recommendations put forth in July 23, 2018 memo provided to the PSAB members.

4. Review and make recommendations on state policies and procedures regarding pipeline siting.

   Action: See #7 above.

5. Review information submitted to the state in response to the Michigan Petroleum Pipeline Task Force Report.

   Action: The State should seek an agreement with TransCanada to prevent the conversion and transportation of crude oil and heavy oil in the Straits of Mackinac.
   The Advisory Board received correspondence from the Pipeline Safety Trust expressing concern about the potential for TransCanada to repurpose the Great Lakes Gas Transmission Line, located in the Straits of Mackinac, from natural gas to hazardous liquids that was not addressed. The agreement should prohibit TransCanada from converting the Great Lakes Gas Transmission Line to transport crude oil or hazardous liquids, including heavy oil, to prevent an unreasonable risk of harm to the environment and economy.

6. Provide recommendations to increase transparency and public engagement on pipelines.

   Action: Require information from major pipeline operators in the State regarding the continued operation of their pipeline systems.
   In an effort to improve communication and transparency, all transmission pipeline operators should be required to submit comprehensive annual reports to the State with of all inspections, repairs, updates, incidents or spills, commodities transported, and any other relevant information the State may request or require. Reports should be posted on the Petroleum Pipeline Information website to meet the charge of increasing transparency and public engagement on pipelines.

National Wildlife Federation
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August 27, 2018

To: Governor Snyder, Michigan Pipeline Safety Advisory Co-Chairs Grether and Creagh

From: Mike Shriberg, Ph.D.
Great Lakes Regional Executive Director, National Wildlife Federation
Member, Michigan Pipeline Safety Advisory Board

Re: Response to Request for Final Recommendations

Thank you for the continuing privilege of serving as a member representing conservation organizations on the Michigan Pipeline Safety Advisory Board (PSAB). As per the request of co-chairs Grether and Creagh, this memo provides written recommendations on 5 items of business for the PSAB. While these comments are being submitted individually and on behalf of the National Wildlife Federation (NWF), I also support all the comments of PSAB members Jennifer McKay, Chris Shepler and Craig Hupp.

A. Consider Legislation Requiring State Review and Approval of Oil Spill Response Plans, Improved Spill Reporting, and More Robust Civil Fines.

HB 6201 has positive elements and could be a step in the right direction because of its focus on spill prevention, contingency plans and accountability. However, the legislation as presented to the PSAB in the July 20, 2018 Memorandum from Director Cusask needs to be improved in the following ways in order to be effective:

1) Scope: The original bill included all pipelines while the current version only includes "Straits gas or oil pipelines". The original scope should be restored. For example, the section of Line 5 that parallels Lake Michigan in the Upper Peninsula hold similar risks to the Great Lakes as the Straits. Given the uniqueness and fragility of habitats across Michigan, there is no justification provided for the more narrow scope.
2) Definition of "sufficient": Much of the legislation relies on the definition of "sufficient personnel, materials and equipment" yet "sufficient" is not defined. Clarity is needed.
3) Tribal consultation: As pointed out by PSAB member Homer Mendota at the last meeting, tribal consultation is critical and should be clearly required.
4) Tie spill volume with fines: The original bill tied fines to the size of a spill, which is logical and necessary. This should be restored.

5) Remove FOIA exemption: Spill prevention plans should not be exempt from FOIA by rule. There are already sufficient protections in place for security and business interest concerns. Therefore, the line about prevention from FOIA should be removed.

With these changes, HB 6201 could be impactful for the state of Michigan and begin to set us on a better course in terms of regulatory structure and oversight.

B. Evaluate whether to establish a hazardous liquids pipeline safety program in Michigan.

The Michigan Agency for Energy whitepaper does an excellent job in laying out the scenarios and pros/cons for establishing a state hazardous liquids pipeline safety program. The bottom line is that, for a fairly limited investment by the state (approximately $70,000/year if the federal grant is at 80%), there is an opportunity to have more control over flow of information and establishing safe standards and practices, which the PSAB has learned has been a problem in evaluating Line 5 and other pipelines. Moreover, as PSAB member Jennifer McKay has pointed out, there is an opportunity for Michigan to observe and participate in interstate pipeline inspections, which the state should take advantage of immediately. The state should, at a minimum, utilize the observation role immediately while continuing to assess the benefits and costs of a full-scale program. One thing currently lacking in the federal regulatory regime is an assessment of end-of-life of pipelines.

C. Consider Legislation or Rulemaking to Improve Siting Process for New Petroleum Pipelines.

The PSAB siting subcommittee did an excellent and thorough job in laying out considerations to improve the siting process. Given the broad consensus on all but two recommendations, the state should move forward immediately to implement all of the consensus subcommittee recommendations, most of which do not require additional resources beyond existing staff time. In terms of the two recommendations "for further discussions":

1) *Siting of crude oil and petroleum product pipelines in or beneath the Great Lakes:* The state should opt for "variation 2" in the memo, which would prohibit exposed pipelines on the lake bottomlands of the Great Lakes but allow for potential construction beneath the Great Lakes bottomlands if certain criteria are met. Since oil drilling is prohibited on or under the Great Lakes, and since the Attorney General and others have said that Line 5 in the Straits could not be sited today, it makes sense to tighten down the regulatory framework.
2) *Environmental Justice Analysis:* The environmental justice analysis should be a required part of siting moving forward. This recommendation directly aligns with the Governor's Environmental Justice Working Group's recommendations and with following through on commitments that the state has made to treat people in a fair and just manner. Concerns about lack of a clear process should not stand in the way of progress – as mentioned at the last PSAB meeting, siting is a fairly infrequent yet important process and, therefore, can serve as a test case and learning opportunity without overwhelming state processes.

D. Review and make recommendations on state policies and procedures regarding emergency response and planning for pipelines. After review of the existing procedures and recommendations, please provide comments on the improving of policies and procedures regarding pipeline emergency response and planning.

The emergency response and planning procedure clarifications seem adequate although this is outside my area of expertise. As we learned from the April 1, 2018 anchor strike, there is much room for improvement in coordination and response times among the federal and state authorities as well as private entities. In particular, the "unified command" appeared to have significant communications challenges and may have, in fact, slowed down the assessment of Line 5's anchor strike, as was revealed in the U.S. Senate committee hearing on August 20. What is not clear from the report to the PSAB is the extent to which the "state policies on emergency response and planning for pipelines" are new, clarification of existing polices and/or SOPs, or codification of what is already in practice. This should be more clearly outlined and reported.

E. Recommendations on the future agreements with Enbridge on Line 5 – Straits Crossing

I appreciate that the state has solicited formal and informal input before making a "final" agreement with Enbridge Energy on the Line 5 Straits crossing. The process to derive the original agreement led to a lack of trust in the outcome given the closed door nature of the original agreement, consulting only one non-governmental member of the PSAB – Enbridge Energy.

The most important consideration in the future of Line 5 and in the future of any agreement is one which has not received attention thus far in a process where all of the information and reports have been funded by Enbridge Energy: What is in the best interests of the state of Michigan?

The risk analysis conducted by the consortium of universities did an outstanding job of modeling a range of scenarios. Even with unrealistically optimistic "worst case scenarios", the outcomes speak for themselves and equate to devastation for the Great Lakes, our economy and our way of life. These results should be weighed against the Coast Guard's admission during Congressional testimony that it is not "semper paratus" Moreover, as the PSAB process has unfolded, Enbridge has proven itself to not be a reliable and transparent partner, as the state pointed out specifically in multiple PSAB meetings. What we know is that the Straits section of Line 5 was designed for 50 years and is currently in its 65th year of operation. We also know that Line 5 has lacked the necessary structural supports for significant lengths of times, that coating has been damaged and still not repaired, that Line 5 has been hit by an anchor in just the past 4 months, that visual images show a rusty pipeline encrusted in biota, and that Line 5 has multiple incurable easement violations.

Unfortunately, the alternatives analysis by Dynamic Risk – which has been largely discredited by all parties – made major errors in perspective, assumptions, data acquisition and outcomes. As detailed in a letter to the PSAB at the time from 5 members (Shriberg, McKay, Hupp, Meadows and Shepler), Dynamic Risk's report had severe methodological flaws (such as miscalculation of "worst case spill" scenario and failure to accurately assess spill risk and impacts), lack key information and came to incorrect or inadequate solutions. However, the most significant error was one of perspective: Dynamic Risk assumed, for reasons that are not clear to me, that the state had a responsibility to ensure that all of Enbridge's product was still transported through Michigan even if Line 5 was no longer in the service. In other words, Dynamic Risk did

not assess what products and services of Line 5 are actually utilized in the state. Therefore, Dynamic Risk ignored alternatives that are beneficial for Michigan and provide substitutes for the services that Line 5 provides to the state if they were not scalable for all of Line 5's products.

The sum of the Enbridge-funded analyses are a low probability of a very high consequence event. The PSAB has debated the error bars around the probabilities and consequences but not the basic premise. The question that was never addressed by the Enbridge-funded reports are what are the benefits and costs of Line 5 to the state of Michigan. Therefore, NWF – with funding from the C.S. Mott Foundation – contracted with the leading independent experts (London Economics International) to analyze what the impacts to Michigan would be if Line 5 were to be decommissioned. These three reports are now submitted for the record and can be summarized as follows:

1) *Assessment of alternative methods of supplying propane to Michigan in the absence of Line 5*: LEI found that the lowest cost alternative to Line 5 to supply propane to the Upper Peninsula is to either truck product or utilize rail from Superior, WI to Rapid River, MI. The cost impacts to consumers would be "lost in the noise of typical propane price volatility" and would be in the range of $.05/gallon. The impact on the Lower Peninsula "may be negligible". There would be no likely risk to energy security or long-term propane supply as supply is growing faster than demand in the U.S. The potential small price increase for the Upper Peninsula could, in NWF's analysis, be easily made up for with a small increase in energy assistance dollars so that Michigan propane consumers wind up with a positive impact from Line 5 decommissioning. The LEI report is the detailed and authoritative source on propane, and directly questions the improper assumptions and calculations in Dynamic Risk's report, which did not focus on propane alternatives for Michigan.
2) *Michigan's crude oil production: Alternatives to Enbridge Line 5 for transportation:* LEI found that the small volume of Michigan crude oil production that utilizes Line 5 to get to market could utilize trucking directly to Marathon refinery instead. While this could increase costs by approximately $1.31/barrel for northern Michigan oil and less for central Michigan oil. This change is small compared to normal price volatility and "would be lost in the noise of typical crude oil price volatility". Moreover, if Line 5 were decommissioned, this oil would be in higher demand and, therefore, producers may be able to pass along the cost increase to refineries or other buyers.
3) *Michigan's refining sector: Alternatives to Enbridge Line 5 for transportation:* LEI found that there is enough excess capacity in other crude oil pipelines to make up for any losses at Detroit and Toledo-area refineries if Line 5 were to be decommissioned. However, downstream users have apportionment rights so the Detroit and Toledo-area refineries would need to supplement current supplies with Michigan-produced crude oil as well as Bakken crude oil delivered by rail. The total cost increase to customers would be a fraction of a cent/gallon for consumers, which would be "lost in the noise of typical weekly gasoline price volatility".

These new analyses come to an important conclusion: Michigan has substitutes for the services provided by Line 5. When compared with the $2 - $6 billion or more in costs plus inestimable cultural and aesthetic losses due to a spill, the choice is clear. There is no substitute for the Great Lakes and our way of life but there are clear and easy substitutes for the services that Line 5 provides to Michigan. Therefore, the state must begin the process of decommissioning Line 5. The Governor has the authority and responsibility to initiate this process immediately. NWF's recommends a phased approach:

Phase I – October 2018 – May 2019: Protect Michigan's interests while initiating decommissioning

The state immediately to begin the process to revoke the easement based on multiple incurable violations and lack of "due care". By beginning this process while preparing the alternatives outlined by LEI, the state would minimize any potential economic disruption. While initiating procedures to terminate the easement, the state could reach a stronger agreement with Enbridge for the next 8 months. As recommended by the majority of non-governmental stakeholders on the PSAB, the new agreement should:

1) Replace the definition of "Sustained Adverse Weather Conditions" with a new term "Significant Adverse Maritime Conditions" defined to include all maritime conditions based upon the identified sea state capabilities and operational limitations of watercraft and equipment that would prevent or significantly impair the effective containment and recovery of spilled oil or significantly exacerbate the spread of spilled oil. This should include "conditions in which median wave heights in the Straits of Mackinac over a continuous 60-minute period are greater than 3 feet based on 'Near-real Time Data' or in its absence 'Modeled Data,'" because this is the limit of emergency response equipment.
2) Add in a clause that Line 5 cannot operate until it is independently verified that all damage from the anchor strike has been repaired and that there are no remaining gaps in coating, including from new structural supports.

These changes need to be made under a revised agreement while proceeding with terminating the current easement. Under no circumstance should the state agree to a new easement.

Phase II – June 2019 – May 2024: Implement alternatives to Line 5 while continuing assessment of long-term solution to Enbridge's export desires

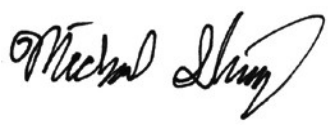
The substitutes for Line 5 should be in place by June 2019, thus allowing for a decommissioning prior to the winter of 2019/2020. During this next phase, the state should continue any finalization of plans for an alternative for Enbridge's export plans to transport oil and natural gas liquids through the state, including an assessment of a "utility tunnel". This assessment is best conducted when the state is already utilizing alternatives for state needs and, thus, is in a strong negotiating position with the utility companies for their non-Michigan needs.

Phase III – June 2024 – 2050: Implement long-term solution if needed

If the state and utility companies determine there is a public benefit and safe plan for a "utility tunnel" or other solution that does not cross the Great Lakes bottomlands, this is a reasonable timeframe for completion. Currently, the debate over a tunnel or trench is a diversion from the short-term and medium-term interests of the state, which are clearly not served by the Straits section of Line 5.

I look forward to a robust discussion of these recommendations. Thank you for your consideration.

Sincerely,



Mike Shriberg

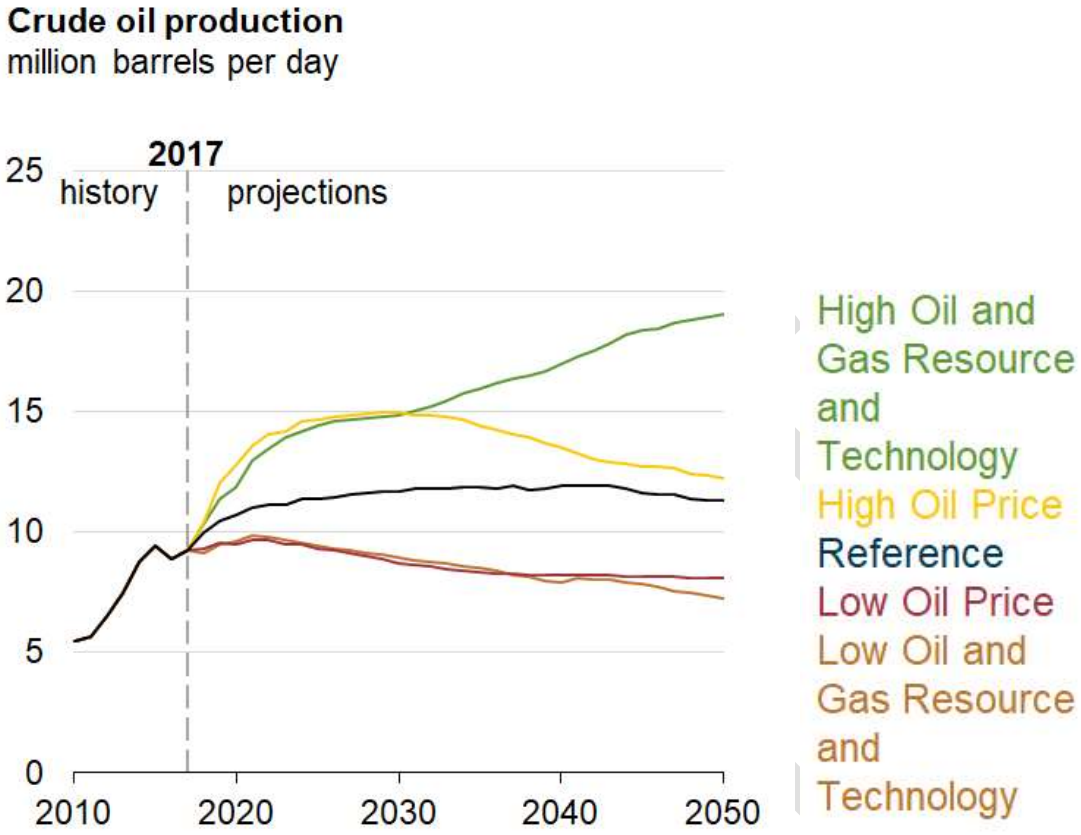
Comments from Jeffrey Pillon, Board member on Outstanding Petroleum Pipeline Task Force Reports/Pipeline Safety Advisory Board Charges
August 27, 2018

A. Consider Legislation Requiring State Review and Approval of Oil Spill Response Plans, Improved Spill Reporting, and More Robust Civil Fines.
    A. I have reviewed the summary of *HB 6201* *to amend 1994 PA 451, entitled "Natural Resources and Environmental Protection Act (NREPA)" addressed Oil Spill Response Plans. I have no position on the specific of the bill. However, this effort will explore and consider existing law and how it might be improved. Efforts to assure that the state of Michigan has an effective oil spill response plan are important and should be pursued.*
B. Evaluate whether to establish a hazardous liquids pipeline safety program in Michigan.
    A. *The last meeting of the Michigan Pipeline Safety Advisory Board I was in general agreement with Jennifer McKay's comments for Michigan to be more informally engaged in participating in inspections of pipelines with PHMSA and also allowing the state to observe and participate in interstate pipeline inspections. I also think it would be useful for Michigan staff to go through the hazardous liquids training program. I described this at the meeting as somewhat of a hybrid approach. After further consideration this approach would mean that the state of Michigan would have to bear the full cost of this activity whereas if it were to formally become responsible for an intrastate liquid pipelines safety program a significant portion of this cost would be reimbursed by the federal government. An informal approach would cost the state considerably more than formally engaging in the process. In addition the lead times for starting up the programs in either instance appear to be similar. Therefore I recommend the state establish an intrastate hazardous liquids pipeline safety program in Michigan to be funded by the federal government to the fullest extent possible. If the state of Michigan is truly concerned about the safety of liquid pipelines it should take over this responsibility which will also allow for a higher level of coordination with PHMSA with regards to interstate pipelines operating within Michigan.*
C. Consider Legislation or Rulemaking to Improve Siting Process for New Petroleum Pipelines.
    A. I have reviewed the "Recommendations for Liquid Pipeline Siting Pipeline Safety Advisory Board Subcommittee" The subcommittee did an excellent work and I support the Consensus Subcommittee Recommendations. This should be the focus of the MPSC efforts going forward. I do not support the "Recommendations for Further Discussion" at this time.
D. Review and make recommendations on state policies and procedures regarding emergency response and planning for pipelines.

A. *In the document titled "State Policies on Emergency Response and Planning for Pipelines" dated July 23, 2018 that was provided to the Board I suggest added further detail on planning for the response to energy supply disruptions. It should be expanded to include discussion of:*

1. *Information that describes the effects that should Line 5 be shut down due to any unanticipated reason for an extended period, it could have serious impact on petroleum product supply and prices in Michigan, Ontario and surrounding states. If this occurred during the winter months there is a significant potential for serious impact to propane supplies and prices that could impact residential customers and others. For further information see the July 20, 2018 draft "Independent Risk Analysis for the Straits Pipeline", Appendix GI-2 short-term impacts on petroleum supply from a line 5 disruption.*
2. *The Michigan Energy Assurance Plan and related support documents including the petroleum shortage response plans should be updated. An extensive review of this plan was prepared by ICF under contract to the State of Michigan and this information should be incorporated in the plan as appropriate. Following the update the plans should be the subject of an exercise to test the revised plan and further refined as may be needed.*
3. *Local Energy Assurance Planning should also be encourage by the states and provide and opportunity for further engagement at the local level that can enhance preparedness and awareness to the consequences of energy supply disruptions.*
4. *The Michigan Agency for Energy should continue its State Heating Oil and Propane Price Program in cooperation with the U. S. Energy Information Administration to monitor residential heating oil and propane prices and supply. This is a vital tool for monitoring these markets.*
5. *The Michigan Agency for Energy should continue its semi- annual Energy Appraisal. This provided important base line information as is extremely useful when energy supply disruptions occur. It also helps assure the retention of an analytical capability that is vitally important in assessing consequences.*
6. *Include a description of the Energy Emergency Assurance Coordinator program which provides for multistate coordination with other state energy agencies and which can assist in developing better situational awareness when events do disrupt energy supplies and can help for providing a more coordinated multistate response.*

Energy Information Administration Forecast, Annual Energy Outlook 2018 US Projections



News report on the prospects for new pipelines in Canada

OTTAWA (Reuters April 8, 2018 / 6:40 PM) - Kinder Morgan Canada (KML.TO) on Sunday suspended most work on a C$7.4 billion ($5.8 billion) oil pipeline expansion that has become the focus of protests, a move underscoring uncertainty over major energy projects in Canada.

Many in the energy industry are concerned about whether any new pipelines can be built in Canada, which sits on the world's third largest proven reserves of crude and is the single largest exporter of energy to the United States.

Although the federal government has the power to approve major pipelines, the 10 provinces enjoy broad responsibility for resource development. That can result in deadlock when a province opposes a decision made by Ottawa.

Relative capacity of Enbridge compared to other Canadian pipelines serving U.S. markets.

In table 6 Enbridge is identified as Lakehead the former name of the Enbridge line. This is from 'United States Fuel Resiliency" September 2014 prepared for the U.S. Department of Energy by Intek Inc. https://www.energy.gov/sites/prod/files/2015/04/f22/QER%20Analysis%20-%20United%20States%20Fuel%20Resiliency%20Volume%20I.pdf

Canadian Crude Oil Pipelines

Four major Canadian pipelines connect the hubs in Alberta, Canada with markets in the northern United States (Figure 12). These are the Enbridge Mainline, the Kinder Morgan Trans Mountain pipeline, the Kinder Morgan Express pipeline, and the TransCanada Keystone Pipeline (which is distinct from the proposed TransCanada Keystone XL Pipeline) (Table 6). Two additional pipelines, Spearhead and Mustang, bring Canadian crude deeper into PADD II. These pipelines have a combined capacity of nearly 4.0 MMBbl/d with plans to expand to over 5.4 MMBbl/d by 2017.

Table 6: Major Canadian Crude Pipelines

Map Key	Crude Oil Pipeline	Origin		Destination		Max Flow Capacity (MBbl/d)
		City		City	State	
C1	Express	Hardisty	CAN	Caspar	WY	280
C2	Transmountain - Puget Sound System	Edmonton	CAN	Puget Sound	WA	300
C3	Lakehead	Edmonton	CAN	Detroit	MI	2,500
C5	Butte-Bridger-Plains	Regina	CAN	Guernsey	WY	118
C34	Keystone	Hardisty	CAN	Wood River, Patoka, Cushing	IL, Il, OK	591

Figure 12: Major Canadian Crude Oil Pipeline Systems

Source: Canadian Association of Petroleum Producers (CAPP) - CIM Magazine April 2013

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MEMO

To: Michigan Pipeline Safety Advisory Board (PSAB)
c/o Holly Simons (DEQ)

From: Tony England, PhD

Date: 9/03/2018

Subject: Comments on the future of Line 5

Having read all information available to me through the PSAB, my comments focus upon Dan Cooper of HT Engineering's review of Dr. Edward Timm's assessment that Enbridge's Line 5 in the Mackinac Straights is unfit for service. While I have not had access to Timm's original document, the defense of Line 5 operations by Cooper offers a summary of Timm's concerns.

As related by Cooper, Timm believes that fatigue and corrosion during 65 years of operation have rendered "Line 5 unfit for service." His concern is that Line 5 under the Mackinac Straights has experienced physical and chemical stresses expected during 65 years of service and, to some extent, beyond those anticipated in its design. Examples of unanticipated stresses might include the recent discovery of unsupported spans requiring additional supports and the recent damage by a dragging anchor requiring installation of a protective sleeve. Uncertainties in Line 5's condition arising from this history renders current margins of Line 5's safety too uncertain to permit continued operations.

Mr. Cooper argues that Line 5's conservative design; the toughness of seamless, heavy-walled, steel pipe as used in the Straights; pipe inspections using the best current technologies; corrosion control; failure to detect fatigue cracks at girth welds in unsupported spans due to lateral pipe movement; and experience with such pipelines in many settings over the half-century of Line 5's operations justify continued use of Line 5 even at pump pressures higher than those initially proposed. The counter argument is that, while testing and monitoring technologies have improved with time, they have both a limited sensitivity to small flaws and a limited ability to detect insipient failure.

I further note that the public's tolerance for an oil spill in the Great Lakes is considerably lower than it was more than a half century ago when Line 5 was designed. Even if a new Line 5 under the Straights could be permitted today, it would almost certainly require use of pipe-in-pipe technology and barriers against physical contact by dragging anchors.

Apprehension associated with concerns that Line 5 has exceeded its design life means both that there are increasing uncertainties about its condition and that its design is increasingly dated.

The proposed utility tunnel is the most and, perhaps, only acceptable alternative to the current Line 5. A tunnel avoids risks of damage from dragging anchors; offers other utilities safer, more convenient, and more reliable linkages between Michigan's upper and lower peninsulas; provides a controlled environment for all utilities; allows access for testing and replacement; and comprises a secondary containment for pipeline failures. The problem facing this solution is that waning political will in the absence of another Kalamazoo spill, the cost of the tunnel, and resistance by those who see it as an investment in a continuing carbon economy could easily delay tunnel construction indefinitely. To counter this indecision, I believe permitting a continuation of Line 5 operations must include incentives to build the utility tunnel. For example, such an agreement for continued operations might require restrictions on pipeline pressures that become increasingly severe with time. Without such incentives, indecision could easily extend until an almost inevitable Line 5 failure occurs.

State Agency Comments on the Requested Pipeline Safety Advisory Board Charges and Pipeline Petroleum Task Force Report Recommendations.

Agencies include:

- Michigan Agency for Energy (MAE)
- Michigan Department of Environmental Quality (MDEQ)
- Michigan Department of Natural Resources (MDNR)
- Michigan Public Service Commission (MPSC)
- Michigan State Police (MSP)

Executive Order 2015-14, Charge #1:

Review and make recommendations for statutory, regulatory, and contractual implementation of the Michigan Petroleum Pipeline Task Force Report.

2015 Michigan Petroleum Pipeline Task Force Report, Statewide Recommendation #6:

Evaluate Whether to Establish a Hazardous Liquids Pipeline Safety Program in Michigan.

Staff from the Michigan Agency for Energy (MAE), in consultation with staff from the Michigan Public Service Commission (MPSC), conducted an analysis of this issue and delivered a whitepaper of its findings to the Pipeline Safety Advisory Board (PSAB) in July 2018. The whitepaper discusses the various forms a liquids pipeline safety program might take, along with the key advantages and drawbacks of the various options. MAE staff presented its findings to the Board at its August 2018 Meeting, where the issue was discussed in detail by Board members.

After due consideration of the information provided to the State and the discussions held by the Board, the Agencies recommend the following:

- The State should continue to seek ways to improve access to information about liquids pipelines in Michigan and to ensure the State remains connected to the decision-making processes surrounding such pipelines.
- The State should participate with PHMSA (Pipeline and Hazardous Materials Safety Administration) in the joint inspection of liquids pipelines in Michigan that pose the highest threat to public safety and to Michigan's natural resources.
- The State should consult with PHMSA and liquids pipeline operators to seek ways to increase the State's involvement in liquids pipeline-related exercises and drills.

Executive Order 2015-14, Charge #3:

Review and make recommendations on state policies and procedures regarding emergency response and planning for pipelines.

2015 Michigan Petroleum Pipeline Task Force Report, Statewide Recommendations #2 and #3:

 # 2 Ensure State Agencies Collaborate on Emergency Planning and Spill Response.

 # 3 Ensure Coordinated Emergency Response Training Exercises and Drills.

Staff from the Michigan State Police (MSP) and the Michigan Department of Environmental Quality (MDEQ) made recommendations on enhancing policies and procedures regarding coordination of emergency response and planning for pipelines and presented these to the PSAB at the August 2018 meeting. The MDNR, MAE and MPSC support the MPS and MDEQ in adopting these recommendations.

In review, the MSP/EMHSD (Emergency Management Homeland Security Division) reviews state level guidance for emergency response as the state of Michigan's Emergency Management Program. The US Coast Guard, Area Contingency Plans and US Environmental Protection Agency Inland Response Tactics Manual are reviewed routinely. Area specific contingency plans will be reviewed by state agencies to provide comment and review to these documents.

Executive Order 2015-14, Charge #4:

Review and make recommendations on State policies and procedures regarding pipeline siting.

A subcommittee was formed within the PSAB to address this topic. The subcommittee presented its recommendations in a report to the PSAB at the May 2018 meeting. The report outlines seven consensus recommendations and two additional topics for discussion. The Agencies recommend that the seven consensus recommendations outlined in this report should be reviewed and strongly considered for incorporation into the MPSC's procedures for siting liquid pipelines in Michigan. Further, the MPSC should pursue rulemaking and/or legislative action to the extent necessary for implementing these recommendations. The Agencies will address the two additional topics outlined in the report separately.

1) *Require an Environmental Justice Analysis for liquid pipeline applications as part of the MPSC's siting process*

The Environmental Justice Interagency Work Group (EJIWG) was created July of 2018 under Executive Directive 2018-3. A broad goal of the EJIWG is to identify state departments that could benefit from environmental justice policies and procedures and to assist these departments in developing such policies and procedures. The Agencies recommend that the MPSC consult with the recently created EJIWG to review the current pipeline siting process and determine if an Environmental Justice review is appropriate and how this concern might be best addressed in the future.

2) *Siting of crude oil and petroleum product pipelines in or beneath the Great Lakes*

For the purpose of discussion, the subcommittee put forth the option of prohibiting the siting of future pipelines in or beneath the Great Lakes. Due to uncertainty relating to future supply needs, construction techniques, safety measures and other components of pipeline siting, the Agencies do not recommend a prohibition of pipelines in or beneath the Great Lakes at this time. Instead, the Agencies recommend continued focus on a robust siting process that ensures protection of Michigan's natural resources as well as the safety and well-being of Michigan's citizens.

2015 Michigan Petroleum Pipeline Task Force Report, Statewide Recommendation #5

Consider Legislation Requiring State Review and Approval of Oil Spill Response Plans, Improved Spill Reporting, and More Robust Civil Fines.

HB 6201, introduced in July 2018, requires straits pipeline operators to submit spill prevention and contingency plans to the DEQ for review and approval and is part of a package of legislation related to creating and enforcing a no anchor zone in the Straits. A presentation on the content of original bill was made to the PSAB at the August 6, 2018 meeting. On October 3, 2018, the Michigan House of Representatives approved a substitute version of HB 6201 (HB 6201 (H-5)). House Bill 6201 now moves to the Senate for consideration. The agencies do not have a position on the legislation at this time.

Executive Order 2015-14, Charge #6:

Provide recommendations to increase transparency and public engagement on pipelines.

2015 Michigan Petroleum Pipeline Task Force Report, Statewide Recommendation #9:

Create a website related to petroleum pipelines that would provide a continuing repository for relevant information and links to provide the public with information.

The Michigan Petroleum Pipelines website (https://mipetroleumpipelines.com/) has been a useful tool in disseminating information about the Petroleum Safety Advisory Board (PSAB) and various reports associated with Enbridge's Line 5 and the Strait's crossing. It is the intention of the State of Michigan to continue supporting this website and redefine the content to a broader focus on liquid petroleum pipelines throughout the state, not just Line 5.

Based on feedback from PSAB members and internal knowledge of available resources, additional information that may be added to the site includes, but is not limited to:

- Maps of petroleum (liquid) pipelines in Michigan
- Laws, rules, and guidelines regarding liquid pipelines
- Public information and education primers
- Links to major pipeline cases before Michigan Public Service Commission (MPSC)
- Updates on future of Line 5

The update and maintenance of this website will be coordinated by the Michigan Agency for Energy, with cooperation from the Department of Environmental Quality (DEQ) and Department of Natural Resources (DNR). The State has recently updated their contract with the website host through 2020.

To: Governor Snyder, Michigan Pipeline Safety Advisory Co-Chairs Creagh and Grether

From: Jennifer McKay
Policy Director, Tip of the Mitt Watershed Council and Member, Michigan Pipeline Safety Advisory Board

Date: August 27, 2018

RE: Recommendations on the future of Enbridge's Line 5

Replacing Enbridge's dual Line 5 pipelines crossing the Straits of Mackinac

Tip of the Mitt Watershed Council does not agree that replacement of Enbridge Energy's Line 5 in or under the Straits of Mackinac is a wise decision for the future of Michigan's environment and economy. Replacement of Line 5 in the Straits, whether tunneled below the lakebed or trenched in secondary containment, will not eliminate the risk to the public trust waters of the Great Lakes. The inland portions of Line 5 will still remain, with nearly 400 sites where it crosses a waterbody in Michigan.

Of particular note, Line 5 will still traverse across the Upper Peninsula, along the U.S. 2 corridor, where there are a number of direct tributaries to Lake Michigan. A leak or rupture along this portion could still result in an oil spill into Lakes Michigan-Huron and the Straits of Mackinac, and the same containment and recovery difficulties would exist. The Draft Final Report Risk Analysis for the Straits Pipelines, prepared by Michigan Technological University, highlighted the risk associated with this inland portion of Line 5. U.S. Coast Guard (USCG) personnel and emergency managers both pointed to the stretch of the pipeline along U.S. Highway 2 near Lake Michigan's northern shore as their worst-case scenario, citing a combination of less robust technology such as pipeline wall thickness and monitoring equipment, as well as higher vulnerability to an errant strike and potential access problems for containment and cleanup equipment, as well as difficult terrain and environment for cleanup activities.

The inland portions can pose just as great, if not greater threat, due to the basic construction, operation, and maintenance of the line. The wall thickness of the inland pipeline is significantly less. It is 0.281 inches thick versus 0.813 inches at the Straits. Along with a thinner pipeline, it operates at a higher pressure. In addition, it has a side seam, which the Straits portion of pipe does not have. This seam can be subject to stress cracking and could cause the inland pipe to be more vulnerable. The inland portion is also not subject to the same inspection frequencies. If you look at historic dent summary, you will see that there are more dent features total and features per mile inland than in the Straits. Additionally, this is historically where Line 5 has experienced leaks and ruptures proving the vulnerability and risk of the inland portion of Line 5.

Therefore, simply replacing the Straits portion of the pipeline ultimately fails to eliminate the risk to the Great Lakes and Michigan's public trust waters.

Missing Analysis: Throughout all of the analyses conducted on Line 5, key questions that were never adequately addressed were how much of the commodities transported through Line 5 do the citizens and industries of Michigan utilize and what are the impacts if Line 5 were to be decommissioned. Mr. David Bryson, Senior VP Operations, Liquid Pipelines, Enbridge Inc. recently testified at a Senate Commerce field hearing on Monday, August 20th that only 30% of the product transported through Line

5 is used in Michigan. NWF contracted with London Economics International (LEI), with funding from the C.S. Mott Foundation, to analyze what the impacts to Michigan would be if Line 5 were to be decommissioned. The conclusion from the leading experts was that Michigan has substitutes for the services provided by Line 5 which would have no noticeable impact to our economy.

Recommendations:

With only 30% of product used in Michigan and high consequence of an oil spill throughout the entire State, alternative transportation options for the services provided should be pursued and the process to decommission Line 5 should begin.

As the process of decommissioning unfolds, the following recommendations should be immediately incorporated into a new agreement with Enbridge to provide the highest standards to protect Michigan's environment and economy in the near term:

- Require Enbridge to temporarily shut down Line 5 operations in the Straits until the rest of the Dual Pipelines in the Straits of Mackinac can be inspected and all of the bare steel and coating issues are fully repaired. The State should also require Enbridge to submit an independently verified report on the cause of the holidays and the relationship of the bare steel/calcareous deposits to girth welds.
- Modify the definition of "Sustained Adverse Weather Conditions" to "conditions in which median wave heights in the Straits of Mackinac over a continuous 60-minute period are greater than 3 feet based on 'Near-real Time Data' or in its absence 'Modeled Data,'" because the current emergency response equipment cannot effectively respond to oil spills in waves greater than such conditions.
- Replace the definition of "Sustained Adverse Weather Conditions" with a new term "Significant Adverse Maritime Conditions" defined to include all maritime conditions based upon sea state capabilities and operational limitations of watercraft and equipment that would prevent or significantly impair the effective containment and recovery of spilled oil or significantly exacerbate the spread of spilled oil.
- Increase in situ burn capability by requiring Enbridge to acquire and pre-deploy fire boom and air monitoring equipment, conduct trial burns at inland facilities to analyze air effects and residuals impacts in freshwater, and conduct research and development on residual containment and recovery technologies.
- Require Alternating Current Voltage Gradient Survey in conjunction with Alternating Current Attenuation, along with visual inspection by divers to improve assessment of the condition of pipe coating. It should be noted that Enbridge's choice of Cathodic Protection Close Interval Survey fails to actually detect areas of coating damage.
- Enhance leak detection of the dual Line 5 pipelines through Distributed Acoustic Sensing (DAS) on a pilot basis in the Straits, as well as use of Fluorescent Leak Detection after extreme weather events.
- Mitigate potential vessel anchor strikes to Line 5 at the Straits of Mackinac by requiring Enbridge to implement a holistic communication strategy, including an enhanced public awareness campaign, additional signage and physical marker buoys as well as full implementation of *Guardian:protect* with proactive advisory messages. We would note that the Watershed Council does not recommend an engineered gravel/rock cover due to the adverse impacts to

bottomlands, fish biota, commercial and tribal fisheries as well as the increased risk due to weight on pipe, inability to perform external inspections, and damage to structural integrity during installation.

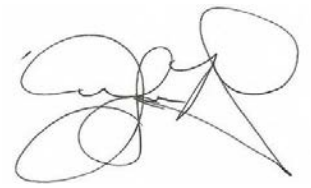
- To enhance safety and reduce potential impacts at Line 5 water crossings:
  - Implement all recommendations put forth in the report submitted by Enbridge.
  - Require more frequent inline inspections (ILI).
  - Require immediate inspections after major weather events.
  - Require improved leak detection systems.
  - Require real time monitoring for flood/storm events and proactive monitoring of snow levels prior to runoff.
  - Conduct additional analyses of crossings – include installation method, date of latest hydrotest, ILI dates and results, and field inspections (upstream obstructions, evidence of channel deepening or scour, visible erosion of stream banks).
  - Develop enforcement actions for not addressing known risks at water crossings.
  - Stockpile additional emergency response equipment at key identified water crossings.
  - Require development of tactical plans for key identified water crossings and conduct trainings with local emergency responders.
  - Add back-up energy supply/generator to valves near key water crossings.

The new agreement also should include timeframes for when the above measures need to be implemented. More importantly, the agreement needs to include a timeframe/deadline for the development of a plan to decommission Line 5 and implement alternatives to transport oil and natural gas liquids to serve the needs of the Michigan.

In addition to my comments, I would also like to voice my support for the comments submitted by fellow PSAB member, Mike Shriberg.

It has been an honor and privilege to serve on the Michigan Pipeline Advisory Board. Thank you for the opportunity to provide my insight and recommendations regarding the future of Line 5. Please let me know if you have any questions regarding the recommendations provided. I look forward to continued discussions on we can ensure oil and natural gas liquid transportation in Michigan is done in a manner that protects public health and safety and the state's economy and natural resources.

Sincerely



Jennifer McKay

Jeffrey R. Pillon, Member
Michigan Pipeline Safety Advisory Board

August 27, 2018

The Hon. Rick Snyder
Governor of the State of Michigan
Lansing , Michigan

Dear Governor Snyder:

I'm a member of the Michigan Pipeline Safety Advisory Board to which you appointed me to as a technical consultant. I thank you for this opportunity to serve on this board. As a matter of public policy it is vitally important to reducing the potential environmental risks and economic consequences of the Enbridge pipeline's on Straits of Mackinac and liquid petroleum and NGL pipelines in general. It is also important that we assure an adequate and reliable supply of petroleum products to the people and business in the State of Michigan and investments needed in the state aging infrastructure.

Based in my review of the extensive research and studies that have been done over the last few years I generally concur with the studies that the only viable alternative to the existing pipeline crossing the Straits of Mackinac is the construction of a tunnel for a new pipeline. This would then replace the existing pipelines on the bottom of the Straits. This is the best option for nearly eliminating the risk of a Line 5 oil spill into the Great Lakes. This proposal is detailed in the "Report to the State of Michigan on Alternatives for Replacing Enbridge dual Line 5 pipelines crossing the Straits of Mackinac[1]"(Alternative Study), dated June 15, 2018.

This new pipeline running through a tunnel under the Straits of Mackinac should be constructed as expeditiously as possible while assuring the necessary environmental and safety requirements are met. To the extent that permits might be expedited, to reduce the lead time, that should be considered as may be appropriate.

Oher critical pipeline water crossing points that present significant risks have also been studied and prioritized[2]. This work has produced an action plan for mitigation programs for each individual prioritized crossing. This work should continue and critical points of vulnerability at these locations remediated.

I have based these conclusions on the following facts.

- The cost to construct this tunnel and pipeline is estimated to be between $350 and $500 million. The environmental and economic risk of a worst-case scenario for a Line 5 leak is estimated at $1.8 billion[3]. This risk number in my view is at the low end of the range of potential impacts since the risk study stated it was unable to quantify a number of aspects of the environmental and economic impacts. The potential petroleum price impacts reflected in this number I believe are also under estimated.

[1] https://mipetroleumpipelines.com/document/enhancing-safety-and-reducing-potential-impacts-line-5-water-crossings
[2] ibid
[3] https://mipetroleumpipelines.com/document/risk-analysis-straits-pipelines

- Virtually all of the other alternatives that were examined were both more costly and did not reduce the risk to the degree that a tunnel would do so. In some instance while the environmental risk were reduced for the Straits of Mackinac, other new risks would be created elsewhere.
- There have been studies to suggest that the US and Canada had sufficient surplus capacity that would allow Line 5 to be shut down and rerouted through the existing pipeline network. Some of the analysis only considered the volumes required for use in Michigan. The "Alternatives Analysis for the Straits Pipelines" [4]report prepared by Dynamic Analysis" concluded this was not feasible and the "Independent Risk Analysis for the Straits Pipeline" (Risk Study) led by Michigan Technological University also indicated there was insufficient pipeline capacity to make up for the immediate shutdown of line 5[5].
- In my experience and professional opinion the price impacts of an immediate shutdown of Line 5 would produce much larger petroleum product and propane price impacts than shown in the alternatives or risk studies due to the relatively in elastic nature of the demand for propane and other petroleum products in the short term. For example, the draft Independent Risk Analysis for the Straits Pipeline, Appendix GI-2 Short-term Impacts on Petroleum Supply from a Line 5 Disruption shows the large price response from two events. BP had to shut down a large part of its Whiting refinery unexpectedly in August of 2015. This caused Chicago retail prices to jump 70 cents per gallon from August 10 to August 17 and did not return to August 10 levels until mid-September[6]. Michigan prices during this time also followed a similar price path. The polar vortex during the winter of 2013/2014 was caused high propane demand for crop drying, followed by severe cold weather and coupled with a reversal of the pipeline that suppled propane in the upper Midwest. The Michigan residential propane price spikes were large. In February 2014 prices peak at $3.76 a gallon compared to $2.02 in October 2013[7], a $1.74 increase. This caused serious hardship for propane customers because both there usage and prices when up dramatically.

I'm also basing my conclusions on my experience during the 36 years I worked for the State of Michigan. I was responsible for energy supply/demand forecasting , energy emergency planning, preparedness and response, and critical infrastructure protection where risk assessment was a critical component of this work. I dealt with many energy supply disruptions over this time and nearly all caused price shocks. Since I left the state of Michigan in 2009 I have served as Director of Energy Assurance for the National Association of State Energy Officials which works with states across the country to help them improve their energy emergency preparedness and response plans and efforts to protect and enhance the resiliency of critical energy infrastructure.

Finally, in a testimony given in 2017 to the Subcommittee on Energy, US House Committee on Energy and Commerce, Ms. Valerie Brader, former Executive Director of the Michigan Agency for Energy well summarizes Michigan's dependencies and vulnerabilities in the event of major energy disruption:

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[4] Alternatives Analysis for the Straits Pipelines October 26, 2013, page ES-10 found the use of existing pipeline infeasible. See: https://mipetroleumpipelines.com/document/alternatives-analysis-straits-pipeline-final-report

[5] "Independent Risk Analysis for the Straits Pipeline", Appendix GI-2 Short-term Impacts on Petroleum Supply from a Line 5 Disruption July 20, 2018, pages 75 says, "The supply network generally runs near capacity, which creates challenges in making up for lost volumes. With the loss of Line 5 light crude oil, other pipelines would typically increase their volumes of light crude deliveries, but it would be at the expense of their heavy crude oil deliveries. Thus, a Line 5 shutdown in the short term would not only limit light crude oil, but heavy crude as well to refineries in Illinois, Ohio, Michigan, and Canada."

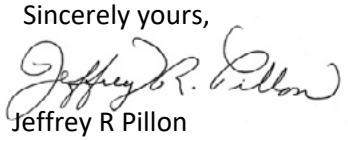
[6] Appendix GI-2 Short-term Impacts on Petroleum Supply from a Line 5 Disruption July 20, 2018, pages 72.

[7] https://www.michigan.gov/energy/0,4580,7-230-73789_83112_83114_85696---,00.html

> "…the petroleum market is highly interconnected. We rely on products produced or refined out of state or across the border in Canada, and other states and Canadian provinces rely on products produced in, or transported through, Michigan. For example, natural gas liquids such as propane are procured in part from western Canada; products are refined in neighboring states and shipped to Michigan via rail, truck, and pipeline; and Ontario's crude oil supplies are largely supplied via pipelines in Michigan. The interconnectivity of the petroleum market means that small events can create regional price shocks, and larger events can quickly cascade into a national crisis requiring federal action and assistance."

I hope you find these comments helpful as you work to make a final determination as to how the State of Michigan can best address the need to reduce the risk of the Enbridge pipeline line 5 to the Straits of Mackinac and improve the overall safety of petroleum pipelines in Michigan. I would be happy to address any questions you or your staff may have.

Sincerely yours,



Jeffrey R Pillon

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Shepler's Mackinac Island Ferry
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August 27, 2018

To: Governor Snyder, Michigan Pipeline Safety Advisory Board Co-Chairs Keith Creagh and Heidi Grether

From: Chris Shepler, President Shepler's Mackinac Island Ferry

Re: Request for Final Recommendations on Line 5

First and foremost, I would like to thank you for your confidence in me to be placed on the Michigan Pipeline Safety Advisory Board. This has been a true honor and privilege to serve under your leadership. Below are my thoughts on how Line 5 has affected our little family business (Shepler's Mackinac Island Ferry) in its decision making as we move forward with economic development, hiring of Cast Members and how we will be doing business in the future. I would also like to acknowledge that I support the comments of fellow Pipeline Safety Advisory Board members Michael Shriberg, Jennifer McKay and Craig Hupp.

Shepler's Mackinac Island Ferry is a seasonal business providing transportation to 550,000 guests yearly to and from Mackinac Island. We have witnessed an extreme amount of growth over the past two years and we continue to see more growth the summer of 2018. As you remember, you help christened the M.V. Miss Margy in 2015 which was built by Moran Iron Works of Onaway, Michigan. This project brought $4,000,000.00 of economic impact into Cheboygan and Presque Isle counties. As stated by Mr. Tom Moran, President and CEO or MIW, this project kept 40 families with a paycheck during the winter of 2014-2015. We are also looking at 4 more projects that will amount to upward of $9.5 million over the next 2 years, while currently finishing two parking lot projects in the amount of $2 million.

During our team discussions we talk about the reinvestment into our company and how that works in regards to timing and expense. The three projects that we are currently discussing include a new ferry boat, expanding our Mackinac Island Dock and finishing two current parking lots under construction in Mackinaw City (I would welcome you to a quick tour of our progression during your visit on Labor Day). We are also looking at purchasing land that's currently considered "blight" in St. Ignace. We are working with the City of St. Ignace to purchase and develop this 1.5 acres of land that would promote a fresher, brighter look of State Street. How does this relate to Line 5 and the decommissioning of the pipeline? Our strategic planning is completely parallel to whether or not oil continues to flow under the Straits of Mackinac through Line 5. The recent anchor strike on Line 5, earlier this summer, was a wakeup call for us. External and regional economic threats, such as Line 5, cause us to question decisions to borrow money and invest in redevelopment projects. Debt does not scare me, reinvesting into

the communities and business that we work and live in is a smart choice. However, business is tough enough when one can control the variables; the unknown variables are the ones that will kill a small company like ours as well as the small banks that we borrow from, not to mention the employment of 200 cast members.

The reinvestment mentioned above provides our company the proper tools to continue to provide a level of customer service that will insure future business for both us and Mackinac Island. Without this reinvestment, I believe our service model of "Quality Service, Every Guest, Every Day" will suffer and when we suffer, Mackinac Island will suffer. The point I am trying to make is…how does Shepler's Mackinac Island Ferry move forward with economic development and making sure our core values continue. Every conversation that we have internally, with our Leadership Team, about building something or expanding something…we always refer back to what is going to happen to Line 5? As we develop our 5 year strategic plan, all things including a new boat, expanding our Mackinac Island Dock (which is partially started) and purchasing property in St. Ignace is all currently on hold. We have stopped progressing as the threat of Line 5 and the serious threat of contamination is real. Instead the confidence we once had in building a ferry business, is now in "small mode" shrinking if you will. We have a responsibility to our banks to pay back the money that we have borrowed, we have a responsibility to our cast members to pay them for their work and we have a responsibility to our guests to provide the best possible service when they start their vacations in Northern Michigan. This responsibility we take very seriously, for a third generational family business, my job is to insure the viability of this business for generations to come. The only way that we can do this is to make sure we set ourselves up for success in a situation of dealing with an aging Pipeline that is 65 years old. Line 5 will not last forever and any tunnel project will take upwards of a decade to complete, so what is the contingency plan now to remove this immediate threat from our way of life?

Governor Snyder, thank you for your time in reading this correspondence. Thank you for being our leader over the past two terms. You have been an inspiration to all of us in Michigan, especially those that saw some tough times prior to you being elected as our Governor. I write to you from the heart, my technical knowledge is not up to speed with my peers, my policy knowledge is certainly lacking even though I try my best to stay on top of everything. The above is what I know and so I write what I know. We have an opportunity to mitigate our future of what Michigan is known for…clean water, beautiful beaches and an Island that is the most beautiful Island in the world. I call this PURE MICHIGAN.

Sincerely,

Christopher B. Shepler
President
Shepler's Mackinac Island Ferry.

BILL SCHUETTE
ATTORNEY GENERAL
STATE OF MICHIGAN

August 23, 2018

The Honorable Rick Snyder
Governor of Michigan
George W. Romney Building
P.O. Box 30013
Lansing, MI 48909

Dear Governor Snyder:

In 2014, I called for a comprehensive review of petroleum pipelines in the State of Michigan, with a focus on Enbridge's Line 5 where it crosses the Straits of Mackinac. I co-created and co-chaired the Michigan Petroleum Pipeline Task Force, which brought together several state agencies and sought input from the public and other interested parties. The Task Force's Report, issued in July 2015, made specific recommendations directed to Line 5, including preventing the transportation of heavy crude through the Straits, and conducting two studies critical to evaluating the future of Line 5 – a study to evaluate alternatives to Line 5 and a study to evaluate the economic risk presented by a leak from Line 5.

I took swift action on the first recommendation. Less than two months after the Task Force Report was issued, my office negotiated an agreement with Enbridge providing that the company would not transport heavy crude through the Straits under the current operating conditions set by the federal government. It was heavy tar sands crude oil that fouled the Kalamazoo River when Enbridge's Line 6B ruptured. The prohibition on Line 5 transporting heavy crude was an important first step because the Coast Guard has publicly stated that a spill of heavy crude oil could not be contained in the open waters of the Great Lakes.

The two studies unavoidably took longer. The process required to ensure that those reports were done right, and with adequate public input, took longer than I hoped. But the completion of those reports is near, with the recent release of a draft of the second of the two reports: an Independent Risk Analysis for the Straits Pipelines, a report from a group of experts led by Michigan Technological University professor, Guy Meadows. That report estimates the total damages from a Line 5 spill at almost $2 billion.

The first report, the Alternatives Analysis for the Straits Pipeline by Dynamic Risk, was made available for public comment in 2017. When that report was released, I issued a statement establishing five points that would govern my position on the future of Line 5:

- **Nothing Lasts Forever** – Line 5 is 65 years old, and there should be a specific and definite timetable for closing the pipeline. The alternatives analysis identified a tunnel as a viable option that would allow for the closure of the pipelines in the open water of the Straits.
- **Legislative Ban on Heavy Crude and Tar Sands** – while the agreement with Enbridge prevents transport of heavy crude under current operating conditions imposed by the federal government, it leaves open the possibility that Enbridge could request changes to those conditions. The legislature can make that ban ironclad.
- **Propane for the Upper Peninsula** – any action must ensure there is an adequate, seamless and reasonably priced supply of propane for U.P. households.
- **Michigan Energy** – Michigan's energy industry, and its associated jobs, must be protected.
- **Creation of the Michigan Pipeline Authority** – an authority should be established that would, among other things, oversee the eventual closure of Line 5 and address related issues, like propane supply and Michigan's other energy needs.

The recently released draft Risk Analysis has confirmed what most expected – a release from Line 5 in the Straits would be a catastrophe, environmentally and economically. That risk cannot be allowed to continue indefinitely. But the Alternatives Analysis demonstrates there are paths to address that risk. And my position remains that the most viable path is a tunnel that would remove the Straits portion of Line 5 from waters of the Great Lakes.

Simply shutting down Line 5 without ensuring a reasonably priced and reliable supply of propane for Upper Peninsula residents, and allowing continued energy production in Northern Michigan, is not a viable option. Even in the best case, it is undisputed that replacing Line 5 will impose hundreds of dollars a year in additional costs on U.P. residents. Likewise, there is no assurance of an alternate delivery system for oil produced in Northern Michigan, and any replacement system would also impose additional costs on Michigan oil producers (according to the Alternatives Analysis for the Straits Pipelines, approximately $2.40 a barrel). Those increased costs will likely cause many oil producers to cease production in Northern Michigan, causing a commensurate loss in Michigan jobs.

Constructing a tunnel in the bedrock under the Straits for Line 5 would preserve the existing systems for propane delivery and oil distribution in Michigan, and, in the words of the Alternatives Analysis, render the possibility of a spill from Line 5 "negligible." A tunnel also provides an opportunity to remove the other utilities (electric and natural gas) that currently run along the bottom of the Straits. As the recent anchor dragging incident in the Straits demonstrates, these wires and pipelines also present risks to the environment and the potential for significant costs to the customers they serve if damaged. Finally, a large infrastructure project like the tunnel would have the added benefit of bringing good paying jobs to Michigan workers.

But such a tunnel must be constructed as quickly as possible. That timeline needs to be compressed as much as possible. In addition, as outlined in my five points, there needs to be an authority or other entity that is singularly focused on and responsible for overseeing the construction of the tunnel, the decommissioning of Line 5, and ensuring that the impacts to U.P. residents and Michigan's energy producers is minimized.

The waters of the Great Lakes define our state's borders, provide jobs and opportunities for tourism and give parents a chance to teach their children to swim in their salt-free waters.

I encourage you to continue working towards a tunnel under the Straits as the best solution to ensure a path forward that protects our waters and residents.

Sincerely,

Bill Schuette
Attorney General

WDS/ab

cc: Director Keith Creagh
Director C. Heidi Grether

Appendix 7

Significant dates in recent Line 5 history

Significant Dates in Recent Line 5 History

Events that shaped where we are today

July 2010	About 21,000 barrels of heavy crude oil spill in a tributary of the Kalamazoo River near Marshall from Line 6B pipeline owned by Enbridge Energy Partners.
October 2012	National Wildlife Federation releases report on Line 5, calling the submerged pipeline in the Straits of Mackinac a hidden danger to Michigan's waterways. The report prompts increased attention and focus on the potential ecological and economic damage that could occur if the Line 5 pipeline running beneath the Straits of Mackinac failed.
January 2015	The Michigan Petroleum Pipeline Task Force is created to take a closer look at pipelines transporting petroleum products around the state, specifically Line 5.
May 2015	As a result of the 2010 oil spill in the Kalamazoo River – one of the largest inland spills in U.S. history – the state and Enbridge in May 2015 enter into a $75 million consent judgment.
July 2015	The Michigan Petroleum Pipeline Task Force produces the *Michigan Petroleum Pipeline Task Force Report* that includes 13 recommendations. Among them is undertaking two studies: An Independent Risk Analysis and Independent Alternatives Analysis of Line 5. Another recommendation is to create the Pipeline Safety Advisory Board.
September 2015	The state and Enbridge sign an agreement that prohibits the company from transporting heavy crude oil through the Straits dual pipelines in its current engineering configuration and under the current operating parameters. Enbridge must get state approval to transport heavy crude through the dual pipelines.
October 2015	The Pipeline Safety Advisory Board holds its first meeting.
July 2016	Enbridge enters a federal consent decree to resolve claims related to the Marshall spill. It agrees to pay $110 million on spill prevention and pipeline operations in the Great Lakes region and a $61 million fine. Cleanup efforts, estimated at more than $1 billion, are ongoing.
July 2016	The state announces the selection of the two contractors from among seven proposals to conduct the independent analyses of Enbridge's Line 5. Enbridge agrees to fully fund the studies, regardless of the findings.
March 2017	Enbridge tells the state, public and the PSAB that there are no gaps in the protective coating on the pipeline in the Straits.
June 2017	The state terminates a contract with Det Norske Veritas, Inc. (DNV GL), the firm preparing a risk analysis report on Line 5 due to a reported conflict of interest.
June 2017	Enbridge conducts hydrostatic test on Line 5, which includes strength and leak tests.
July 2017	Dynamic Risk Assessment Systems, Inc. submits to the state a draft of the Independent Alternatives Analysis, which studies the efficacy of various methods to transport the equivalent amount of natural gas liquids and light crude that move through Line 5 should the pipeline be closed. Four public feedback sessions held in Holt (2), Traverse City, and St. Ignace. Comments are also collected online.

August 2017	Enbridge reveals that there were two or three gaps, some the size of adhesive bandages, exposing the pipeline's bare metal to the waters in the Straits. The state demands a full report on the condition of the coating.
September 2017	Enbridge tells the state in its initial coating report that some of the gaps are larger than earlier stated. It also identifies white, calcareous deposits of unknown origin on the pipeline.
October 2017	The MAE, the MDEQ, and the MDNR learn Enbridge knew of damage in the protective coating on a portion of Line 5 in the Straits of Mackinac in 2014. The coating damage is believed to have occurred when Enbridge was installing anchors meant to better support the pipeline. The state orders Enbridge to inspect for coating damage near all of Line 5's anchor supports.
November 2017	After completing some of the state-ordered anchor inspections, Enbridge reveals to state officials that there were additional gaps in the protective coating of the pipeline. Inspections found gaps at the majority of 48 anchor locations that were inspected. There is a total of 128 anchors.
November 2017	After incorporating feedback from the public, Dynamic Risk submits the final version of its Independent Alternatives Analysis. Three public feedback sessions are scheduled in Taylor, Traverse City, and St. Ignace.
November 2017	First Agreement signed between the state and Enbridge including specific actions of Enbridge with hard deadlines for each action to make certain there is active examination, safety improvements and transparency for Line 5. Enbridge agrees to use horizontal directional drilling to drill below the St. Clair River near Port Huron to replace the existing segment of Line 5 which lies on the riverbed.
December 2017	Some members of the PSAB put forward resolutions seeking a modification of the definition of sustained adverse weather conditions that would force Enbridge to shut down Line 5, that Enbridge address protective pipeline coating gaps, and the state undertake other studies of the need for Line 5 and alternatives to using it.
January 2018	Gov. Rick Snyder acknowledges and rejects the PSAB resolutions and extends the deadline for a decision on the future of Line 5 to September 2018.
January 2018	Two subject matter experts are hired who will monitor Enbridge's work as it fulfills the requirements of its First Agreement with the state. Daniel Cooper and Michael A. Mooney will review and verify the company's data and participate fully in each of the evaluations.
February 2018	Contract signed for an Independent Risk Analysis led by Dr. Guy Meadows of Michigan Technological University, which will look at the worst-case Line 5 spill scenario and how much it would cost for clean-up and remediation.
March 2018	MDEQ approves permit for Enbridge to install 22 anchors on Line 5 to secure sections where lengths between anchors exceed the acceptable distance.
March 2018	Enbridge submits its biota investigation report to the U.S. EPA. Biota field work was completed in September 2017. The report addresses whether aquatic organisms are having an impact on the dual pipelines.
April 2018	Line 5 is damaged by what is believed to be a ship anchor that was dragged along the Straits bottom. Vessel activity in the area severed an ATC electrical transmission circuit between Michigan's peninsulas, severely damaged a second circuit, and is blamed for three dents to Line 5. Subsequently, Governor Snyder

	takes emergency action to make the Straits a "no anchor" zone and he asks the Coast Guard to take similar action.
May 2018	MTU students present to the PSAB the findings of their senior design project: Mackinac Straits Underground Utility Corridor.
June 2018	Enbridge submits to the state four reports required under the November 2017 agreement with the state: alternatives to Line 5, technology review, anchor strike mitigation, and identify priority waterways in Michigan the pipeline crosses.
July 2018	MTU team submits to the state a draft of the Independent Risk Analysis. Public feedback session scheduled for August in Harbor Springs and comments are also collected online.
September 2018	Final version of the Independent Risk Analysis, which incorporates feedback from the public, is submitted to the state.
October 2018	Second Agreement signed between state and Enbridge, paving way for the permanent closure of Line 5 after a utility corridor is constructed below the Straits. Agreement also calls for additional safety measures in the Straits as well as at 13 priority water crossings and 68 other crossings along the length of Line 5 in Michigan.
October 2018	Coast Guard puts into effect a regulated navigation area in the Straits that establishes maritime rules on when a ship can drop an anchor in the area of utility infrastructure or loiter in the waterways of the Straits.
November 2018	State presents its preliminary agreement outline to the Mackinac Bridge Authority relating to utility corridor construction under the Straits and eventual replacement of the dual pipelines.
December 2018	After opposition to the plan to have the Mackinac Bridge Authority oversee the construction and operation of a utility corridor in the Straits, talks commence on creating new state authority for the tunnel.
December 2018	The MDEQ issues a permit to Enbridge to install 48 anchor support structures on Line 5 in the Straits of Mackinac beginning in 2019.
December 2018	Gov. Rick Snyder signs legislation that creates the Mackinac Straits Corridor Authority to oversee construction of tunnel to house utility infrastructure, mainly Line 5, in the Straits of Mackinac.
December 2018	The three-member MSCA Board holds its first meeting Dec. 19. The Board approves an agreement with Enbridge to build the tunnel beneath the Straits to house a replacement segment for the Line 5 pipeline that sits on the bottom of the Straits and other utilities. The authority also approved the transfer of a property right that will allow Enbridge to construct the tunnel in bedrock below the Straits.