Enbridge Semi-Annual Report November 23, 2018 to May 22, 2019

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July 18, 2019

Enbridge Consent Decree (United States v. Enbridge Energy, Limited Partnership, et al., Case 1:16-cv-914)

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Glossary

A listing of many of the acronyms and initialisms in this report

ALD	Alternative Leak Detection
ALJ	Administrative Law Judge
AMSTEP	Area Maritime Security Training and Exercise Program
APE	Area of Potential Effect
APP	Agricultural Protection Plan
ART	Alarm Response Team
ATC	American Transmission Company
AUV	Autonomous Underwater Vehicle
AVB	Automated Volume Balance
BIWP	Biota Investigation Work Plan
BIA	Bureau of Indian Affairs
CCO	Control Centre Operations
CD	Consent Decree
CGR	Corrosion Growth Rate
CP	Cathodic Protection
CP CIS	Cathodic Protection Close Interval Survey
CRO	Control Room Operator
CWP	Covered Work Period
DOJ	Department of Justice
DPR	Discharge Pressure Restriction
DQA	Data Quality Assessment
DQR	Data Quality Review
DWSMAs	Minnesota Department of Drinking Water Supply Management Areas
EA	Engineering Assessment
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FEA	Finite Element Analysis
FHLA	Field Level Hazard Assessment
FMP	Fen Management Plan
FdL	Fond du Lac Band of Lake Superior Chippewa
FR	Future Report
FRE	Features Requiring Excavation
GW	Girth Weld
HCA	High Consequence Area
HDD	Horizontal Directional Drill
ICP	Integrated Contingency Plan
ICS	Incident Command System
IL	Illinois
ILI	In-Line Inspection
ILIMRR	In-Line Inspection Minimum Reporting Requirements
IMT	Incident Management Team
IN	Indiana
IR	Information Request
ITP	Independent Third Party
IVP	Intelligent Valve Placement
L3R	US Line 3 Replacement
LDA	Leak Detection Analyst
LDAM	Leak Detection Alarm Management
LDPIP	Leak Detection Project Integration Plan
LEPC	Local Emergency Planning Committee
MAOP	Maximum Allowed Operating Pressure

MBS	Mass Balance System
MI	Michigan
MSCA	Mackinac Straits Corridor Authority
MN	Minnesota
MDA	Minnesota Department of Agriculture
MDNR	Minnesota Department of Natural Resources
MFL	Magnetic Flux Leakage
MnDOT	Minnesota Department of Agriculture
MOP	Maximum Operating Pressure
MP	Milepost
MPCA	Minnesota Pollution Control Agency
MPUC	Minnesota Public Utilities Commission
NA	Not Applicable
ND	North Dakota
NDDH	North Dakota Department of Health
NDE	Non-destructive Examination
NDGF	North Dakota Game and Fish
NDPSC	North Dakota Public Service Commission
NDSWC	North Dakota State Water Commission
NHPA	National Historic Preservation Act
NTSB	National Transportation Safety Board
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historical Properties
NWT	Nominal Wall Thickness
NY	New York
OD	Outside Diameter
OSRO	Oil Spill Response Organization
OMM	Operations & Maintenance Manual
PHMSA	Pipeline Hazardous Materials Safety Administration
P	Paragraph
PI	Pipeline Integrity
PN	Priority Notification
PPR	Point Pressure Restriction
PT	Pressure Transmitter
PR	Pressure Restriction
RDS	Rupture Detection System
ROA	Record of Alarms
ROV	Remote Operated Vehicle
RPR	Rupture Pressure Ratio
SAR	Semi-Annual Report
SAWP	Screw Anchor Work Plan
SCADA	Supervisory Control and Data Acquisition
SCC	Stress Crack Corrosion
SHPO	State Historic Preservation Office
SML	Subject Matter Lead
SOA	Summary of Alarms
SoM	State of Michigan
SRAHC	Saginaw River All Hazards Committee
SRB	Sulfate Reducing Bacteria
STA	Senior Technical Advisor
TT	Temperature Transmitter
TTX	Table Top Exercises
US	United States
USACE	United States Army Corps of Engineers
USCG	United States Coast Guard

USFWS	United States Fish and Wildlife Service
USWM	Ultrasonic Wall Measurement
VCI	Vapor Corrosion Inhibitor
VSR	Verification Status Record
WI	Wisconsin
WCMP	Wisconsin Coastal Management Program
WDNR	Wisconsin Department of Natural Resources
WLOA	Weekly List of Alarms
WMA	Wildlife Management Area
WQC	Water Quality Certification
WT	Wall Thickness

Introduction

Enbridge[1] submits this fourth Semi-Annual Report (also referred to herein as "SAR" or "Report") in electronic and hard copy form in accordance with Section IX, Reporting Requirements, of the Consent Decree entered in United States v. Enbridge Energy, Limited Partnership, et al., Civ. No. 1:16-cv-00914 (referred to herein as "Consent Decree," "Decree," or "CD"). Specifically, this fourth SAR is submitted in accordance with Paragraph (P) 143, which requires Enbridge to submit a SAR documenting Enbridge's compliance with the Consent Decree for the fourth reporting period dated November 23, 2018 to May 22, 2019, no later than six months after the submittal of the third SAR. Enbridge's first SAR was submitted on January 18, 2018, the second on July 18, 2018, the third SAR on January 18, 2019, and this fourth SAR on July 18, 2019. As per Paragraph 150 of the Consent Decree, this fourth SAR is being served in accordance with Section XVI of the Consent Decree (Notices), and a copy is being supplied to the Independent Third Party (also referred to herein as the "ITP").

This fourth SAR summarizes the requirements in Subsections VII.A-J of the Consent Decree that became due and/or was required to be complied with by Enbridge during the fourth reporting period. This Report is organized by Paragraph and Subparagraph number of the Consent Decree. This SAR addresses on a Paragraph-by-Paragraph basis each injunctive requirement of the Consent Decree that became due during the fourth reporting period or for which reporting is required.

In accordance with Paragraph 144, this SAR provides the information that is required to be submitted to the United States under Paragraphs 29, 31, 49, 96, and Subparagraph 110.c, which each have specific SAR requirements. In accordance with Paragraph 144, Enbridge shall discuss, Paragraph-by-Paragraph, such matters as completion of milestones, problems encountered or anticipated in implementing the requirement (together with implemented or proposed solutions), status of permit applications, operation and maintenance issues, reports to state agencies, number, by type, planned for future repair or mitigation, and any significant changes or issues since the first SAR.

Enbridge is compliant with the Consent Decree requirements unless otherwise stated in the applicable section of the SAR, and this SAR includes the information and analysis required by Paragraph 145. Discharge information and post-incident reports required by Paragraphs 146 and 148 also are set forth in this SAR.

Enbridge has also enclosed appendices to this SAR, which provide further information on Enbridge's compliance with the Consent Decree, and/or include documents that are required to be submitted to the United States under Section IX. The Table of Contents identifies each of these appendices.

Summary of Activities

The following summarize some of the activities undertaken by Enbridge, since the start of the Consent Decree, in order to demonstrate compliance:

- Responded to over 850 information requests by the ITP
- Provided over 3000 individual documents demonstrating compliance to the ITP
- Over 150 Enbridge personnel directly involved in ITP compliance verification activities including interviews

[1] *As used herein, "Enbridge" refers to the following entities: Enbridge Energy, L.P., Enbridge Pipelines (Lakehead) L.L.C., Enbridge Energy Partners, L.P., Enbridge Energy Management, L.L.C., Enbridge Energy Company, Inc., Enbridge Employee Services, Inc., Enbridge Operational Services, Inc., Enbridge Pipelines Inc., and Enbridge Employee Services Canada Inc.*

- Completed nearly 80 high resolution in-line inspection programs
- Completed over 400 excavations
- Installed 8 new remotely controlled valves
- Completed 44 emergency response practice exercise activities in 2017 through May 22, 2019
- Completed 36 community outreach meetings in 2017 through May 22, 2019

Section A – Original US Line 6B

21. [Original US Line 6B]

As reported in the first SAR, the original Line 6B was permanently disconnected from the Enbridge system prior to the Effective Date of the Consent Decree and remains inoperable. This Consent Decree activity is complete. Enbridge continues to monitor Line 6B and will provide updates as warranted in future SARs.

Section B – Replacement of Line 3; Evaluation of Replacement of Line 10

22.a [Replacement of Line 3 in the United States]

Enbridge has been vigorously pursuing all avenues to complete the replacement of Line 3 as quickly as possible. As discussed further below, Enbridge has successfully obtained a Certificate of Need and Route Permit from the Minnesota Public Utilities Commission ("MPUC"), both of which are required before certain other state and federal approvals may be obtained. Enbridge initiated its effort to obtain the MPUC approvals in 2015. The MPUC has held, and Enbridge participated in, numerous public hearings, consultations, and other regulatory proceedings at that agency. MPUC proceedings were prolonged in large measure by opposition to the Line 3 replacement project from certain environmental interest groups and others, but on June 28, 2018 the MPUC voted to grant a Certificate of Need and a Route Permit to Enbridge. Since the June 28, 2018 MPUC decisions, several additional regulatory milestones have been achieved as summarized below:

- On August 3, 2018, Line 3 Replacement Project opponents petitioned the Minnesota Court of Appeals to review nine insular issues and declare the Environmental Impact Statement inadequate.
- Enbridge and the Fond du Lac Band entered into an agreement on August 31, 2018, enabling Enbridge to utilize the existing mainline corridor through the Fond du Lac reservation for the Line 3 Replacement Project.
- The MPUC issued a written order granting Enbridge the Line 3 Certificate of Need on September 5, 2018.
- The MPUC issued its written order granting Enbridge the Route Permit for Line 3 on October 26, 2018. The route authorized by the MPUC and agreed to by the Fond du Lac Band follows Enbridge's preferred route with a deviation at its southern end that avoids culturally sensitive sites in the Big Sandy Area and traverses the Fond du Lac Reservation.
- On November 19, 2018, the MPUC voted unanimously to deny petitions from project opponents to reconsider the MPUC's decision to grant the Certificate of Need. Prior to the vote to deny reconsideration, Commissioner Katie Sieben remarked that their decision to grant Enbridge the Certificate of Need is supported by a very thorough and comprehensive record. Ms. Sieben is currently Chair of the MPUC.

- On December 13, 2018, the MPUC voted unanimously to deny petitions from project opponents to reconsider the MPUC's decision to grant the Route Permit.
- On June 3, 2019,the Minnesota Court of Appeals, in its review of the Environmental Impact Statement (EIS) used to support the MPUC decisions, affirmed the adequacy of the EIS on eight of the nine issues before it. The issue of spill modeling within the Great Lakes (Lake Superior) watershed was remanded to the MPUC for further environmental analysis, which the MPUC has indicated it will be undertaking.[2]
- On July 3, 2019, a group of tribes and another party opposing Line 3 filed two separate petitions for review of the Court of Appeals decision with the Minnesota Supreme Court. The MPUC did not seek review by the Supreme Court of the Court of Appeals decision on the one remanded issue, and nor did Enbridge.

At this time, the Certificate of Need and Route Permit are temporarily ineffective due to the Minnesota Court of Appeals EIS decision. The MPUC's determinations in those dockets may be restored following completion of the Great Lakes (Lake Superior) watershed spill modeling analysis. By statute, the Minnesota Supreme Court has until September 3, 2019 to decide if it will accept review of the two July 3 petitions filed with it by Line 3 opponents. The status of primary permits and approvals for the Line 3 Replacement project are noted in Table 1 below:

Table 1: Permits/Approvals Required for Line 3 Replacement Project (U.S.)

Unit of Government	Type of Application	Reason Required	Permit Status
U.S. Army Corps of Engineers ("USACE") – St. Paul District	Section 404/10 Individual Permit	Authorizes discharge of dredged and fill material into waters of the United States, including wetlands, and crossing of navigable waters of the United States; USACE has engaged Tribes through its regulatory process	MN: Application Submitted WI: Received
USACE – Omaha District	Section 404/10 Nationwide Permit	Authorizes discharge of dredged and fill material into waters of the United States, including wetlands, and crossing of navigable waters of the United States	Application Submitted
USACE – St. Paul District	Section 408 Authorization	Authorizes crossing of USACE civil works projects	Authorization Request Submitted

[2] "*Where routing permit proceedings follow certificate of need proceedings, [the Minnesota Environmental Protection Act] requires that an EIS must be completed before a final decision is made on issuing a certificate of need." See In the Matter of the Application of North Dakota Pipeline Company LLC for a Certificate of Need and Route Permit for the Sandpiper Pipeline Project in Minnesota (A15-0016).*

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Table 1: Permits/Approvals Required for Line 3 Replacement Project (U.S.)			
Unit of Government	**Type of Application**	**Reason Required**	**Permit Status**
State Historic Preservation Office ("SHPO")	National Historic Preservation Act ("NHPA") Section 106 Clearance	Ensures adequate consideration of impacts to significant cultural resources but especially National Register of Historic Places ("NRHP")-eligible within the lead federal agency Area of Potential Effect ("APE"). SHPOs and Tribal Historic Preservation Offices are engaged through the USACE Section 404/10 process	MN: Consultation Ongoing ND: Consultation Ongoing WI: Consultation Complete
U.S. Fish & Wildlife Service ("USFWS")	Section 7 Endangered Species Act ("ESA") Consultation (federal threatened or endangered species)	Establishes conservation measures and authorizes, as needed, take of ESA-listed species; the USFWS is engaged through the USACE Section 10/404 process	MN: Consultations Ongoing ND: Consultation Complete WI: Consultation Complete
	Bald Eagle Nest Disturbance Permit	Allows for disturbance of a known bald eagle nest in proximity to construction activities	ND: Application Submitted MN: Permits Received
Bureau of Indian Affairs ("BIA")	Grant of Right-of-Way	Enbridge applied for easement approval to cross the Fond du Lac Reservation	Application Submitted[1]
Fond du Lac Band of Lake Superior Chippewa ("FdL")	Section 401 Water Quality Certification ("WQC")	Section 401 WQC required to issue the USACE Section 404/10 Permit	Received
	Standard Wetland Activity Permit	Authorizes impacts to wetlands and waterbodies within the external boundaries of the Reservation	Received
	Land Use Permit	Authorizes permitted uses in zoning districts within the Reservation	Application being prepared for submittal

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Table 1: Permits/Approvals Required for Line 3 Replacement Project (U.S.)			
Unit of Government	**Type of Application**	**Reason Required**	**Permit Status**
Minnesota Public Utilities Commission ("MPUC")	Certificate of Need	Determines need for the pipeline, including questions of size, type and timing	On hold pending modification to EIS as per court remand. Also see Footnote 2 on page 9.
	Route Permit	Authorizes construction of the pipeline along a specific route, subject to certain conditions	On hold pending modification to EIS as per court remand. Also see Footnote 2 on page 9.
Minnesota Department of Natural Resources ("MDNR")	License to Cross Public Waters	50-year license that allows for crossing of public waters with proposed utility	Application Submitted
	Work in Public Waters Permit	Authorizes in-water activities in public waters located on private lands	Applications Submitted
	License to Cross Public Lands	50-year license that allows for crossing of public lands with proposed utility	Application Submitted
	Access Roads Leases	Authorizes use of MDNR-managed access roads during construction and/or operation	Applications Submitted
	Endangered Species Permit	Outlines plans for avoidance, minimization, and mitigation of take of state-listed flora species and authorizes take of individuals	Application Submitted
	Gully 30 Calcareous Fen Management Plan ("FMP") Authorization	Outlines the site-specific construction, restoration, and monitoring requirements for this wetland crossing	Plan Submitted
	Individual Water Appropriation Permit for Construction Dewatering	Authorizes withdrawal of groundwater associated with dewatering of trench and excavations	Application Submitted

Table 1: Permits/Approvals Required for Line 3 Replacement Project (U.S.)			
Unit of Government	**Type of Application**	**Reason Required**	**Permit Status**
	Individual Water Appropriation Permit for HDD/Hydrostatic Testing	Authorizes withdrawal and use of water from surface sources to support horizontal directional drills ("HDDs"), hydrostatic testing, and dust suppression	Application Submitted
	Individual Water Appropriation Permit for Dust Suppression	Authorizes withdrawal and use of water from sources to support fugitive dust control	Application Submitted
	Individual Water Appropriation Permit for Construction Dewatering at Gully 30 Calcareous Fen	Authorizes withdrawal of groundwater associated with dewatering of excavations at the Gully 30 Calcareous Fen in accordance with the FMP	Application Submitted
Minnesota Pollution Control Agency ("MPCA")	Section 401 WQC and Antidegradation Assessment	Section 401 WQC required to issue the USACE Section 404/10 Permit	Application Submitted
	Clearbrook Terminal Air Quality Permit – Capped Emissions Permit	Authorizes construction and operation at the modified Clearbrook Terminal	Application Submitted
	National Pollutant Discharge Elimination System ("NPDES") Industrial Hydrostatic Discharge Permit and Antidegradation Analysis	Authorizes discharge of water from hydrostatic testing activities	Application Submitted

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Table 1: Permits/Approvals Required for Line 3 Replacement Project (U.S.)			
Unit of Government	**Type of Application**	**Reason Required**	**Permit Status**
	NPDES Construction Stormwater General Permit	Authorizes ground disturbance with approved protection measures to manage soil erosion and stormwater discharge on construction site; and removal of water that may accumulate in pipeline trench	To Be Filed 30 days prior to construction start
Minnesota Department of Agriculture ("MDA")	Agricultural Protection Plan ("APP")	Establishes measures for agricultural protection	Approved by MDA
Minnesota Department of Transportation ("MnDOT")	Road Crossing Permits	Authorizes crossings of state jurisdictional roadways	Received
	Temporary access/entrance	Authorizes access to private lands during construction from state	In receipt of 21 of 40 permits; anticipate receipt of remaining 19 permits Q3 2019
Red Lake, Two Rivers, and Middle-Snake Watershed Districts	Watershed District Permits	Authorizes crossing of legal drains and ditches within watershed	Received
Mississippi Headwaters Board	Compatibility Evaluation	Submittal ensures project crossings align with Minnesota Statutes 116C.57 subd.2c	Consultation Ongoing
Minnesota Department of Drinking Water Supply Management Areas ("DWSMAs")	Notification of crossing of DWSMAs	To ensure appropriate protective measures are implemented	Consultation Ongoing
North Dakota State Water Commission ("NDSWC")	Sovereign Lands Permit	Authorizes crossing of state Sovereign Lands and navigable waters	Received
	Temporary Water Permit / Water Withdrawal Permit	Coverage under a temporary water permit authorizes water use for HDDs, hydrostatic testing, and dust suppression	Received

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Table 1: Permits/Approvals Required for Line 3 Replacement Project (U.S.)			
Unit of Government	**Type of Application**	**Reason Required**	**Permit Status**
North Dakota Department of Health ("NDDH")	Section 401 WQC	Section 401 WQC required to issue the USACE Section 404/10 Permit	Received
	Construction Stormwater General Permit	Coverage under General Permit NDR10-0000 authorizes ground disturbance with approved protection measures to manage soil erosion and stormwater discharge on construction site	Received
	Temporary Dewatering / Hydrostatic Discharge Permit	Coverage under General Permit NDG-0700000 authorizes for temporary dewatering and hydrostatic test discharge activities	Received
Pembina County	Pembina County Floodplain Permit	Authorizes crossing of Pembina County floodplains	Received
North Dakota Game and Fish ("NDGF")	Duncklee Wildlife Management Area ("WMA") Consultation	Consult with NDGF to identify special seeding or restoration measures on WMA	Consultations Ongoing
Wisconsin Department of Natural Resources ("WDNR")	Chapter 30 Wetland Individual Permit / NR 103 Wetland Permit / WQC	Authorizes impacts to wetlands and waterbodies; Section 401 WQC required to issue the USACE Section 404/10 Permit	Received
	Protected Species Consultation and Incidental Take Permit	Outlines plans for avoidance, minimization, and mitigation of take of state-listed flora and fauna species and authorizes take of individual flora species	Received
	Superior Terminal Air Permit	Authorizes construction and operation at the modified Superior Terminal	Received
Wisconsin Coastal Management Program ("WCMP")	Consistency Review	Authorizes activities within the Coastal Management Zone	Received

Table 1: Permits/Approvals Required for Line 3 Replacement Project (U.S.)			
Unit of Government	**Type of Application**	**Reason Required**	**Permit Status**
City of Superior	Land Disturbing Permit – Pipeline and Superior Terminal	Authorizes ground disturbance with approved protection measures to manage soil erosion and stormwater discharge on construction site	Received
	Post-Construction Stormwater Management – Pipeline	To establish long-term, post construction runoff management requirements	Received

TABLE NOTE:

[1] *This Grant of a Right-of-Way certificate would extend and modify an existing easement for Enbridge Energy pipeline numbers 1, 2, 3, 4, and 67, and Southern Lights Line 13, as well as the repair of Line 4 within the exterior boundaries of the Fond du Lac Reservation in Carlton and St. Louis Counties, Minnesota. Enbridge will submit cultural resources survey data, valuation appraisals, and allotment easement consents to BIA in support of the application.*

Permitting:

Minnesota: Enbridge is awaiting the issuance of additional approvals necessary to replace Original US Line 3 in Minnesota. A number of local, county, state, and federal permits and approvals are required before the replacement of the approximate 340.4-mile segment of Line 3 in Minnesota can proceed. At this time all permit applications have been filed and are under review.

Enbridge filed its applications for a Certificate of Need and Route Permit with the MPUC on April 24, 2015. Information filed by Enbridge and parties to those proceedings can be found at MPUC docket nos. 14-916 (for the Certificate of Need) and 15-137 (for the Route Permit).[3] The MPUC's procedure to process Certificate of Need and Route Permit applications consists of: (i) a determination of the adequacy of the Environmental Impact Statement prepared by the Minnesota Department of Commerce to assess the potential direct, indirect, and cumulative impacts that may result from the replacement of Line 3 in Minnesota; and (ii) a merits proceeding to assess the need for the proposed replacement pipeline and the most appropriate routing for the pipeline.

In connection with the environmental review, on May 1, 2018, the MPUC issued a decision finding that the Environmental Impact Statement for the Line 3 replacement project prepared by the Minnesota Department of Commerce was "adequate" under Minnesota law and thus will be considered by the MPUC in its forthcoming decision on the merits of the pipeline project and its routing. On May 21, 2018, several project opponents filed petitions with the MPUC seeking reconsideration of that adequacy decision by the MPUC. Those requests for reconsideration were denied by the MPUC's written decision dated July 3, 2018.

In connection with the merits review, on April 23, 2018, the Administrative Law Judge ("ALJ") assigned to the MPUC proceeding submitted a report to the MPUC containing proposed findings of fact, conclusions of law and a

[3] The docket filings are available on the MPUC's website at https://www.edockets.state.mn.us/EFiling/edockets/searchDocuments.do?method=showeDocketsSearch&searchType=new.

recommendation concerning the Certificate of Need and Route Permit applications. The ALJ's Report found that there is a need for the project, but only if Enbridge replaces Line 3 along the existing right-of-way for the Original US Line 3, rather than along the different routing preferred by Enbridge. While Enbridge agrees with the conclusion on need for the replacement, Enbridge disputed the route recommendation in May 9, 2018 exceptions to the ALJ's report. Other parties also filed exceptions raising a variety of issues with the ALJ report.

In its exceptions, Enbridge explained that the route proposed by the ALJ will cross the reservations of two Native American tribes, one of which (i.e., the Leech Lake Reservation) has made clear that it will not entertain a replacement pipeline constructed within the boundaries of its tribal lands. Enbridge's preferred route respects their wishes and represents the least impact on Tribes and their cultural resources. It also avoids a National Forest, high population areas, drinking water supplies, and other environmentally sensitive areas. Further, the routing approved by the ALJ would require closure of the existing pipeline for long periods and create other constructability issues.

The MPUC met on June 18, 19, 26, 27, and 28, 2018 to allow parties an opportunity to make final arguments and respond to MPUC questions regarding the potential approval of the pipeline project. As previously discussed, an oral decision was issued by the MPUC on June 28 granting the Certificate of Need and a Route Permit. On August 3, 2018, Line 3 Replacement Project Opponents petitioned the Minnesota Court of Appeals to review nine insular issues and declare the Environmental Impact Statement inadequate. Subsequent to the June 28 MPUC decisions, Enbridge and the Fond du Lac Band entered into an agreement on August 31, 2018, enabling Enbridge to utilize the existing mainline corridor through the Fond du Lac reservation; the MPUC issued a written order granting Enbridge the Line 3 Certificate of Need on September 5, 2018; the MPUC issued a written order granting Enbridge the Route Permit for Line 3 on October 26, 2018; the MPUC voted unanimously to deny petitions from project opponents to reconsider the MPUC's decision to grant the Certificate of Need on November 19, 2018. The MPUC then voted unanimously to deny petitions from project opponents to reconsider the MPUC's decision to grant the Route Permit on December 13, 2018.

On June 3, 2019, while the Minnesota Court of Appeals affirmed the MPUC on eight of the nine issues before it., the issue of spill modeling within the Great Lakes (Lake Superior) watershed was remanded to the MPUC for further analysis. On July 3, 2019, two petitions for review by the Minnesota Supreme Court were filed by parties opposed to Line 3. By statute, the Minnesota Supreme Court has until September 3, 2019 to decide if it will grant the petitions for review and thus further consider the case, or deny the petitions, as Enbridge will urge.

At this time, the Certificate of Need and Route Permit are temporarily ineffective pending the further environmental review required by the Minnesota Court of Appeals EIS decision. The MPUC's determinations in those dockets may be restored following cure of the remanded Great Lakes (Lake Superior) watershed spill modeling analysis and a further MPUC finding that the revised EIS is adequate. The MPUC has indicated that it will be undertaking this further environmental review.

Parties that oppose the MPUC's issuance of a Certificate of Need and the Route Permit have filed court actions in the Minnesota Court of Appeals challenging the MPUC's issuance of a certificate of need and route permit. Enbridge has intervened in these cases to defend the MPUC's actions. The Court of Appeals cases are currently on hold pending completion of the updated environmental review ordered by the Court of Appeals as described above and further MPUC action.

North Dakota: As reported in previous SARs, on May 7, 2014, Enbridge received approval to replace Line 3 in North Dakota from the North Dakota Public Service Commission ("NDPSC"). In that year, Enbridge replaced an approximate 15-mile segment of Original Line 3 that extends from the U.S.-Canada border to the first U.S. mainline valve. Enbridge plans to replace the remaining 12.3-mile segment of Line 3 in North Dakota as soon as practicable and, for logistical reasons, in coordination with the much longer portion of Line 3 in Minnesota. In

order to proceed with that replacement, Enbridge will be required to file the necessary notifications with the NDPSC, informing the NDPSC that Enbridge intends to proceed with construction under the PSC's certification process. Most of the additional North Dakota Permits required for replacement of that segment have been obtained, except for authorizations under Nationwide Permit 12 at the USACE. Enbridge plans to move forward to replace the small remaining portion of Line 3 in North Dakota concurrently with replacement of the Minnesota section of Line 3.

Wisconsin: As reported in previous SARs, the Original Line 3 extends approximately 14 miles in the State of Wisconsin. Enbridge received from federal, state, and local authorities all approvals and permits necessary for the replacement of that 14-mile segment. Enbridge initiated construction of the replacement in July 2017. Construction of that segment is complete and the replacement, known as "Segment 18," went into service on May 25, 2018.

Construction Plans:

Table 2 below identifies key dates regarding Enbridge's plans to construct the Line 3 replacement. As shown in the table and as indicated above, construction of the portion of the Line 3 replacement in the State of Wisconsin has already been completed and was placed into service on May 25, 2018. Construction of the remaining replacement segments in North Dakota and Minnesota will commence following the receipt of the permits described in Table 1 above that are required for construction.

All mainline pipe has been procured and delivered to the appropriate pipe yards in Minnesota. Design engineering, handled internally by the Enbridge project team, is also substantially complete, although permitting may require minor route revisions or changes to installation methods for specific areas. Enbridge will provide additional details in the next SAR or subsequent SARs as such information becomes available.

Table 2: Line 3 Construction Milestone Schedule

Line 3 Milestone	Status	Notes
Mainline Design Reports	Completed before Q3, 2015	
Facilities Design	Completed Q1 2017	Design was updated to account for route modifications, changes to external codes and regulations, etc.
Procurement for major items – pipe, valves, transformers, etc.	Completed Q1 2018	Some items are still being manufactured, but all purchase orders have been issued.
Line 3 Construction – Segment 18 Wisconsin	Completed Q1 2018	
Segment 18 Tie-in	May 25, 2018	Commissioning of pipe segment was completed May 25, 2018
Superior Terminal Construction Start	Q3 2018	
Execution of Mainline and Facilities Construction Contracts	Q3-Q4 2019	
Line 3 Construction Start – North Dakota + Minnesota	Projected 2020	Pending permits. Note that a segment of

Table 2: Line 3 Construction Milestone Schedule		
Line 3 Milestone	**Status**	**Notes**
		Line 3 near the U.S.-Canada border in North Dakota has already been replaced.
Line 3 Construction Complete	Projected 2020	

22.b [Line 3 Deactivation]

Deactivation work is planned to commence once the Line 3 Replacement is mechanically complete, and the final clean-out and decommissioning of Original US Line 3 will be complete within one year thereafter, in accordance with Subparagraph 22.b.

On May 22, 2018 the Wisconsin portion of Line 3 (i.e., Segment 18) underwent line purge in preparation for the tie-ins and line fill of the replacement portion. Specifically, between May 24–26, tie-ins of Segment 18 were successfully completed and line fill occurred shortly thereafter. The deactivated Line 3 segment that was replaced by Segment 18 was then cleaned.

22.c [Original US Line 3 Maximum Operating Pressure ("MOP")]

Enbridge has limited the operating pressure of all Line 3 segments in accordance with MOP values specified at https://www.epa.gov/enbridge-spill-michigan/enbridge-revised-maximum-operating-pressure-values. Enbridge has not increased operating pressures above the specified MOP values; therefore, hydrostatic pressure tests were neither required to be conducted nor needed to be provided to the US Environmental Protection Agency ("EPA") with associated procedures and results. Enbridge has not exceeded the MOP values submitted to the EPA.

22.d [Requirements for the Use of Original US Line 3]

Portions of Original US Line 3 remain in service as of December 31, 2017. As a result, in this reporting period, Enbridge implemented the additional requirements specified under Subparagraph 22.d, which pertain to the continued use of Original US Line 3.

The In-Line Inspection ("ILI") of all portions of Original US Line 3 is scheduled on an annual basis, using the most appropriate tools for detecting, charactering, and sizing Crack Features, Corrosion Features, and Geometric Features. The ILI schedule, and the identification, excavation and mitigation or repairs of all Features Requiring Excavation ("FREs") are described in detail in this SAR under Subsection VII.D: In-Line Inspection Based Spill Prevention Program.

Enbridge conducted quarterly cleaning and biocide treatment of Original US Line 3 in 2018. During the current reporting period, Enbridge conducted quarterly biocide treatments on the Original US Line 3 as set forth in the table below.

Table 3: P22.e Original US Line 3 Biocide Treatments		
Segment	**Type of Tool Run**	**Completion Date (MM/DD/YYYY)**
Gretna to Clearbrook	Biocide treatment	2/19/2019
Clearbrook to Superior	Biocide treatment	2/25/2019

22.e [Prohibition Regarding the Use of Original US Line 3 Following Replacement]

The Original US Line 3 continues to operate. The following two portions of Line 3 have been replaced to date: (i) a 15.7-mile segment located in North Dakota, which was taken out of service in 2014; and (ii) the 14-mile Segment 18 located in Wisconsin, which was taken out of service in 2018. These two portions of the Original US Line 3 are not used at all, including to transport oil, gas, diluent or any hazardous substances.

23 [Line 10 Replacement Evaluation]

Enbridge believes that its September 20, 2017 Line 10 Report, as updated by its April 16, 2018 Revised Line 10 Report, is compliant with the requirement in Paragraph 23 of the Decree. This Paragraph requires Enbridge to submit a report evaluating replacement of the US portion of Line 10, including the segment of that pipeline that crosses the Niagara River. Enbridge's Report and update consist of such an evaluation undertaken consistent with Enbridge's integrity procedures governing repair versus replacement evaluations. As required by Paragraph 23, the Reports discuss the number, density, and severity of crack and corrosion features found on the US portion of Line 10 and compare these to the section of Line 10 to be replaced in Canada. Further, on April 16, 2018 Enbridge also submitted its responses to the ITP's Draft Preliminary Findings on the September 20, 2017 Line 10 Report.

During this reporting period, Enbridge provided a response on December 6, 2018, to 15 Information Requests submitted by the ITP on November 6, 2018. On April 8, 2019, Enbridge received the ITP's Evaluation of Enbridge US Line 10 Submittals Report. This Report identifies that "the Collective Information, taken as a whole, complies with the requirements of CD P23".

Section C – Hydrostatic Pressure Testing

No hydrostatic pressure tests were conducted pursuant to the terms of the Consent Decree during this reporting period (i.e., between November 23, 2018 and May 22, 2019). Therefore, the requirements specified in Paragraphs 24, 25, and 26 were not triggered and are not applicable to this SAR.

Details of the hydrostatic pressure test conducted in June 2017 on the portion of Line 5 that spans the Straits of Mackinac were provided in the first SAR dated January 18, 2018.

ENBRIDGE

Section D – In-Line Inspection Based Spill Prevention Program

(I) In-Line Inspections

27 [Timely Identification and Evaluation of All Features]

Enbridge's implementation of the requirements of Subsection VII.D.(I) (Paragraphs 27 to 31) for the timely identification and evaluation of features of significance is set forth in the paragraphs that follow.

Enbridge and the ITP have identified a difference in interpretation regarding the incorporation of circumferential cracking within the CD. Enbridge has also identified difficulties encountered, from a technical perspective, of applying the consent decree as written to circumferential cracking. Enbridge, the EPA, and the ITP continue to discuss ways to resolve this challenge.

28.a-b [Periodic In-Line Inspections and ILI Schedule]

Enbridge conducted fourteen (14) ILIs, per ILI tool technology, of ten segments of seven pipelines in the Lakehead System using appropriate ILI tools for the features of interest.

A complete list of ILI programs conducted during the reporting period for this SAR is provided in the table below.

Table 4: P28.a-b ILI Runs Completed During November 23, 2018 – May 22, 2019

Tool Run ID	Line	Segment	Tool Technology	Pull Date	Tool Type	Required Completion Date
4502	01	GF-CR	Gemini MFL	5/18/2019	Corrosion	7/18/2019
4502	01	GF-CR	Gemini CAL	5/18/2019	Geometry	7/18/2019
4508	02	GF-CR	UT Crack Detection	4/27/2019	Crack	9/14/2020
6387	05	ENO-EMA	MFL3	3/13/2019	Corrosion	3/20/2019
4536	05	ENO-EMA	Circumferential Crack Detection	3/6/2019	Crack	4/10/2019
4534	05	ENO-EMA	GeoPig	2/19/2019	Geometry	3/20/2019
4538	05	PE-IR	GeoPig	1/24/2019	Geometry	2/22/2023
6386	05	WNO-WMA	MFL3	3/14/2019	Corrosion	3/20/2019
4543	05	WNO-WMA	Circumferential Crack Detection	3/7/2019	Crack	4/11/2019
4541	05	WNO-WMA	GeoPig	2/20/2019	Geometry	3/20/2019
4804	06A	AM-GT	UT Crack Detection	3/23/2019	Crack	5/18/2020
4805	06A	PE-AM	UT Metal Loss	3/1/2019	Corrosion	4/22/2019
4555	10	EB-ENR	UT Metal Loss	3/6/2019	Corrosion	4/15/2019

Table 4: P28.a-b ILI Runs Completed During November 23, 2018 – May 22, 2019						
Tool Run ID	**Line**	**Segment**	**Tool Technology**	**Pull Date**	**Tool Type**	**Required Completion Date**
4610	61	PE-FN	Geometry	2/25/2019	Geometry	3/18/2019
4614	67	GF-CR	UT Crack Detection	5/9/2019	Crack	6/19/2019

Enbridge conducts ILIs on Lakehead System Pipelines using tools identified on the Enbridge Approved ILI Tool List which was submitted to the ITP. All ILIs currently required under Paragraphs 65 and 66 of the Decree for all Lakehead System Pipelines other than Line 2 crack inspections have been completed. The schedule for ILIs to detect crack features on Line 2 is addressed in the "Stipulation and Agreement Regarding Assessment and Payment of Stipulated Penalties Relating to Timeliness of Certain In-Line Inspection" which was filed with the Court on May 2, 2018 (referred to herein as the "ILI Stipulation").

Enbridge and the ITP have identified a difference in interpretation regarding the incorporation of circumferential cracking within the CD. Enbridge, the EPA, and the ITP continue to discuss ways to resolve this challenge.

28.c [Incomplete or Invalid ILI]

Enbridge's contracts with vendors that are retained to conduct ILIs on the Lakehead System reference the In-Line Inspection Minimum Reporting Requirements, ("ILIMRR" version 8.2, version date January 22, 2018). Prior to the Effective Date of the Consent Decree, all approved ILI vendors were sent the In-Line Inspection Reporting Profile Standard, with a version date of February 1, 2017 which contained the Consent Decree reporting requirements. The requirements that vendors must submit Data Quality Assessments ("DQA") according to the deadlines specified in the Consent Decree are specified in both the ILIMRR and In-Line Inspection Reporting Profile Standard. The ILIMRR is incorporated into the ILI vendors' overall contracts with Enbridge. In addition to the ILIMRR, ILI vendor contracts stipulate that all work under the contract is completed in accordance with the terms and conditions of the Consent Decree, and each ILI is contracted through Enbridge's contract Work Order Process.

In addition, Enbridge Lakehead System work order contracts, including those concerning ILIs, contained and continue to contain the following stipulating language:

"The following are specifically made part of this Work Order Contract and all work shall be performed in accordance with the following: Company's Consent Decree in United States of America v. Enbridge Energy, Limited Partnership, et al., Case No. 1:16-CV-914, available at https://www.epa.gov/sites/production/files/2017-06/documents/enbridgeentered-cd_0.pdf.

Notifications from vendors concerning four failed/partially failed ILI tool runs were received by Enbridge during this reporting period, as summarized in Table 5. The vendor followed proper protocol as specified in Enbridge's ILIMRR by promptly notifying Enbridge of the failed/partially failed ILI tool runs. Enbridge followed and will follow all necessary steps to complete a valid ILI within the timeframes specified in Paragraphs 65 and 66 of the Consent Decree. Paragraph 31 of this SAR includes detailed information about the incomplete or invalid ILI tool runs.

Table 5: P28.c Incomplete or Invalid ILIs and Rerun Dates[1]								
Tool Run ID	**Line**	**Segment**	**Tool**	**Inspection Deadline**	**Pull Date**	**Date of DQA Notification**	**Rerun Tool Run ID**	**Rerun Date**
4532	05	ENO-EMA	MFL3	3/20/2019	2/19/2019	3/1/2019	6387	3/13/2019
4539	05	WNO-WMA	MFL3	3/20/2019	2/20/2019	3/1/2019	6386	3/14/2019
4610[2]	61	PE-FN	Gemini MFL	6/26/2019	2/25/2019	3/1/2019	6388	4/27/2019
6388	61	PE-FN	MFL4 MFL	6/26/2019	4/27/2019	5/10/2019	6546	FR

TABLE NOTES:

[1] ILI run failure notifications received after May 22, 2019, the end of the reporting period for this SAR, will be reported with more detail in the next SAR.

[2] ILI run (Run ID 4610) combo tool was successful for geometry inspection (as reported in the table under P28 a-b). Corrosion inspection failed with a re-run (Run ID 6388) completed on April 27, 2019.

29 [12-Month ILI Schedule]

The following table includes each consent decree ILI tool run that is scheduled to be initiated on any pipeline during the period from May 23, 2019 to May 22, 2020 (i.e., the 12-month period after the reporting period covered by this SAR).

The Required Completion Dates shown in this table are consistent with the re-inspection interval requirements in Paragraphs 65 and 66 of the Consent Decree and the ILI Stipulation agreed to by EPA and Enbridge and filed with the Court on May 2, 2018.

Per the ILI Stipulation, Enbridge has been working with ILI vendors to develop and test a new crack ILI tool to detect Line 2 cracking features, with a particular focus on crack features on or adjacent to the pipeline's long seam weld.

A Research and Development inspection using the new crack inspection tool was completed in April 2019 for the Line 2 Gretna-to-Clearbrook segment to validate that the new ILI crack tool technology, modified to improve the accuracy and reliability of detecting the cracking features on Line 2, as agreed in the ILI Stipulation. As per the Stipulation, if analysis of the data confirms that the tool is capable to provide an acceptable level of reliability as applied to the detection and sizing of crack features on Line 2, Enbridge will submit a report to the EPA and ITP summarizing the evaluation of the new tool. Crack inspections are also scheduled for the remaining Line 2 segments of Clearbrook-to-Deer River and Deer River-to-Superior in later 2019 following confirmation of a successful Gretna-to-Clearbrook inspection. Additional details will be provided in the next SAR.

Table 6: P29 12-Month Lakehead ILI Schedule (May 23, 2019 – May 22, 2020)[1]					
Run ID	**Line**	**Segment**	**Tool Technology**	**Threat Monitored**	**Required Completion Date[2]**
4503	01	GF-CR	UCx	Crack	2/4/2020
TBD	02	CR-DR	In Development	Crack	9/22/2020[3]
TBD	02	DR-PW	In Development	Crack	9/21/2020[3]
TBD	02	GF-CR	In Development	Crack	9/14/2020[3]

Table 6: P29 12-Month Lakehead ILI Schedule (May 23, 2019 – May 22, 2020)[1]					
Run ID	**Line**	**Segment**	**Tool Technology**	**Threat Monitored**	**Required Completion Date[2]**
6396	03	CR-PW	MFL4	Corrosion	8/12/2019
6396	03	CR-PW	MFL4	Geometry	8/12/2019
6395	03	CR-PW	DUO CD	Crack	4/8/2019[4]
6394	03	GF-CR	MFL4	Corrosion	8/27/2019
6394	03	GF-CR	MFL4	Geometry	8/27/2019
6393	03	GF-CR	DUO CD	Crack	7/30/2019
6453	04	CS-DR	MFL DuDi	Corrosion	3/15/2021
6452	04	CS-DR	Kaliper K360	Geometry	4/27/2022
6489	04	DN-VG	MFL DuDi	Corrosion	2/6/2023
6052	04	DN-VG	Kaliper K360	Geometry	2/3/2020
6487	04	DR-FW	MFL DuDi	Corrosion	4/9/2020
6486	04	DR-FW	DuDi UCM	Corrosion	2/27/2023
6486	04	DR-FW	DuDi UCM	Crack	8/27/2020
6485	04	DR-FW	Kaliper K360	Geometry	2/10/2020
6488	04	FW-WR	MFL DuDi	Corrosion	7/18/2022
4519	04	FW-WR	Kaliper K360	Geometry	2/10/2020
6549	04	GF-DN	Kaliper K360	Geometry	3/22/2021
6551	04	PL-CR	MFL DuDi	Corrosion	3/29/2021
6550	04	PL-CR	Kaliper K360	Geometry	4/6/2021
6501	04	VG-PL	MFL DuDi	Corrosion	5/5/2021
6554	04	VG-PL	Kaliper K360	Geometry	4/5/2021
6539	04	WR-PW	Vectra	Corrosion	5/4/2020
6565	05	ENO-EMA	Vectra	Corrosion	3/12/2020
6563	05	ENO-EMA	UCc	Circ Cracking	3/5/2020
6564	05	ENO-EMA	GeoPig	Geometry	2/19/2020
4537	05	MA-BC	UCx	Crack	9/25/2019
6558	05	PE-IR	Caliper	Geometry	1/24/2022
6562	05	WNO-WMA	Vectra	Corrosion	3/13/2020
6560	05	WNO-WMA	UCc	Circ Cracking	3/6/2020
6561	05	WNO-WMA	GeoPig	Geometry	2/20/2020
5369	06A	AM-GT	Vectra - BHGE	Corrosion	7/8/2020

Table 6: P29 12-Month Lakehead ILI Schedule (May 23, 2019 – May 22, 2020)[1]					
Run ID	**Line**	**Segment**	**Tool Technology**	**Threat Monitored**	**Required Completion Date[2]**
4674	06A	AM-GT	USWM+	Corrosion	6/1/2020
4544	06A	PE-AM	Vectra - BHGE	Corrosion	3/30/2020
4676	06A	PE-AM	DUO CD - BHGE	Crack	4/6/2020
6548	10	EB-ENR	GEMINI	Corrosion	6/4/2021
6548	10	EB-ENR	GEMINI	Geometry	6/4/2021
6552	10	ENR-UT	MFL4	Corrosion	7/12/2021
6552	10	ENR-UT	MFL4	Geometry	5/17/2021
6557	10	WNR-EB	USWM	Corrosion	5/14/2021
6443	14	AM-MK	MFL4	Corrosion	1/27/2021
6443	14	AM-MK	MFL4	Geometry	1/6/2021
6547	14	AM-MK	UCx	Crack	7/26/2021
6498	14	PE-AM	MFL4	Corrosion	1/15/2021
6498	14	PE-AM	MFL4	Geometry	1/15/2021
6553	14	PE-AM	UCx	Crack	1/19/2021
6546	61	PE-FN	MFL-A	Corrosion	6/26/2019
4612	61	PE-FN	UCM	Crack	11/14/2019
4613	64	GL-GT	UC	Crack	12/9/2019
6556	65	GF-CR	MFL4	Corrosion	5/3/2021
6556	65	GF-CR	MFL4	Geometry	5/3/2021
6555	65	GF-CR	UC	Crack	4/6/2021
6504	67	CR-PW	GEMINI	Corrosion	6/3/2020
6504	67	CR-PW	GEMINI	Geometry	6/3/2020
6416	78	GT-SK	UC	Crack	6/24/2020
6418	78	SK-RW	CD+	Crack	3/13/2020

TABLE NOTE:

[1] Line 62 is idle therefore ILIs do not need to be run on that line while it remains out of operation; there is no ILI scheduled for Line 62 for this 12-month period. (More detail is available in SAR2, which was submitted on July 18, 2018.)

[2] ILI tools will be scheduled/run prior to the Required Completion Date. The Required Completion Dates comply with all applicable laws and regulations in addition to the Consent Decree requirements and requirements found in the "Stipulation and Agreement Regarding Assessment and Payment of Stipulated Penalties Relating to Timeliness of Certain In-Line Inspection" filed with the Court on May 2, 2018.

[3] *Line 2 crack ILI deadline is calculated based on the completion of the 2015 Hydrostatic Testing, as stipulated in the "Stipulation and Agreement Regarding Assessment and Payment of Stipulated Penalties Relating to Timeliness of Certain In-Line Inspection".*

[4] *Required completion date shown is based on EPA/ITP interpretation. Please refer to P144 '[Section D] Line 3 CR-PW Original Line 3 Crack Inspection - P29, 66' for more details.*

Changes to Previous 12-Month ILI Schedule (November 23, 2018 to November 22, 2019)

The following table outlines changes to Tool Runs associated with the previous 12-month Lakehead ILI schedule (November 23, 2018 to November 22, 2019).

Table 7: P29 Changes to Previous 12-Month ILI Schedule (November 23, 2018 to November 22, 2019)

Original Run ID	Revised Run ID	Line	Segment Name	Technology	Threat Monitored	Schedule Revision Comments
4532	6387	05	ENO-EMA	MFL3	Corrosion	Failed Run (Run ID 4532) from February 2019, rerun (Run ID 6387) was pulled on 3/13/2019.
4539	6386	05	WNO-WMA	MFL3	Corrosion	Failed Run (Run ID 4539) from February 2019, rerun (Run ID 6386) was pulled on 3/14/2019.
4610	6388	61	PE-FN	GEMINI	Geometry, Corrosion	Tool (Run ID 4610) was planned for both geometry and corrosion inspection. Run was completed in February 2019, with geometry inspection successfully completed, and corrosion rerun (Run ID 6388) was scheduled and completed in April 2019.
6388	6546	61	PE-FN	MFL4 MFL	Corrosion	Failed Run (Run ID 6388) from April 2019, a corrosion tool from another ILI vendor (Run ID 6546) has been scheduled for June 2019.

There were some challenges associated with successful ILI inspection of Line 61 as described in P144 '[Section D] Line 61 PR-FN Corrosion ILI Inspection Challenges - P29

30 [ILI Schedule Modification]

ILIs have been performed by Enbridge, as shown in Table 4 above, which is included in Enbridge's response to Subparagraphs 28.a-b. During this time period there were four failed / partially failed ILI runs that required a re-run, as discussed in Subparagraph 28.c of this SAR. The reruns of those ILIs have been described in Subparagraph 28.c, and the modifications are summarized in Table 7 above.

31 [ILI Compliance with Tool Specifications]

Enbridge reviewed vendor-provided Data Quality Assessment ("DQA") reports for each ILI performed and compared the reports against vendor tool specifications and other relevant information. Four ILIs did not meet vendor specifications during the current reporting period. The tables below provide: (1) a summary of ILIs that did

not meet ILI Vendor specifications for data quality; and (2) a detailed listing of each invalid ILI, including the reason it was deemed invalid and actions taken to prevent reoccurrence.

Table 8: P31 Incomplete or Invalid ILIs and Rerun Dates								
Tool Run ID	**Line**	**Segment**	**Tool**	**Inspection Deadline**	**Pull Date**	**Date of DQA Notification**	**Rerun Tool Run ID**	**Rerun Date**
4532	05	ENO-EMA	MFL3	3/20/2019	2/19/2019	3/1/2019	6387	3/13/2019
4539	05	WNO-WMA	MFL3	3/20/2019	2/20/2019	3/1/2019	6386	3/14/2019
4610[1]	61	PE-FN	Gemini MFL	6/26/2019	2/25/2019	3/1/2019	6388	4/27/2019
6388	61	PE-FN	MFL4 MFL[2]	6/26/2019	4/27/2019	5/10/2019	6546	FR

Table Notes:

[1] ILI run (Run ID 4610) combo tool was successful for geometry inspection (as reported in the table under P28 a-b). Corrosion inspection failed with a re-run (Run ID 6388) completed on April 27, 2019.

[2] MFL4 is a combo tool from BHGE and only the MFL inspection was required for this run due to the failed MFL corrosion run (Run ID 4610).

Details of each Incomplete or Invalid ILIs that occurred within the reporting period of this SAR are provided in the following tables.

Table 8-1: P31 Tool Run 4532	
Category	**Description**
Line Number	5
Segment Start Trap	North Straits – East
Segment End Trap	Mackinaw – East
Tool Technology	Corrosion
Tool Run Launch Date	February 19, 2019
Tool Run Receipt Date	February 19, 2019
Tool Pull Date	February 19, 2019
Date of DQA Notification	March 1, 2019
Description of DQA Issue	Data gaps
Cause of Issue	Faulty data recorder pack
Corrective Action	Data recorder pack replaced
Tool Rerun Required?	Yes

Table 8-1: P31 Tool Run 4532	
Category	**Description**
Tool Re-Run Date	March 13, 2019

Table 8-2: P31 Tool Run 4539	
Category	**Description**
Line Number	5
Segment Start Trap	North Straits – West
Segment End Trap	Mackinaw – West
Tool Technology	Corrosion
Tool Run Launch Date	February 20, 2019
Tool Run Receipt Date	February 20, 2019
Tool Pull Date	February 20, 2019
Date of DQA Notification	March 1, 2019
Description of DQA Issue	Data gaps
Cause of Issue	Faulty data recorder pack
Corrective Action	Data recorder pack replaced
Tool Rerun Required?	Yes
Tool Re-Run Date	March 14, 2019

Table 8-3: P31 Tool Run 4610	
Category	**Description**
Line Number	61
Segment Start Trap	Superior
Segment End Trap	Flanagan
Tool Technology	Corrosion
Tool Run Launch Date	April 22, 2019
Tool Run Receipt Date	April 26, 2019
Tool Pull Date	April 27, 2019
Date of DQA Notification	March 1, 2019

Table 8-3: P31 Tool Run 4610	
Category	**Description**
Description of DQA Issue	Approx. 10% corrosion data was missing
Cause of Issue	Faulty SMX box and sensor heads
Corrective Action	Re-run
Tool Rerun Required?	Yes (Corrosion ONLY)
Tool Re-Run Date	April 27, 2019

Table 8-4: P 31 Tool Run 6388	
Category	**Description**
Line Number	61
Segment Start Trap	Superior
Segment End Trap	Flanagan
Tool Technology	Corrosion
Tool Run Launch Date	April 22, 2019
Tool Run Receipt Date	April 26, 2019
Tool Pull Date	April 27, 2019
Date of DQA Notification	May 10, 2019
Description of DQA Issue	A total of 19.06 miles or 4.1% of corrosion data loss
Cause of Issue	2 Sets of 12 adjacent MFL primary sensors malfunctioned
Corrective Action	Re-run
Tool Rerun Required?	Yes
Tool Re-Run Date	FR

Five (5) ILIs had minor performance deficiencies and are summarized below. The tool performance summaries are provided below with details available in the Initial ILI Reports, and ILI Summary Documents.

Table 9: P31 ILIs with Minor Tool Performance Deficiencies[1]							
Tool Run ID	**Line**	**Segment**	**Tool**	**Inspection Deadline**	**Pull Date**	**ILI Tool Run Accepted?**	**Further Action Required?**
4045	1	CR-PW	UMP	9/25/2018	8/18/2018	Yes	No
4405	1	CR-PW	UC	2/25/2019	9/18/2018	Yes	No
3829	3	CR-PW	MFL4	8/20/2018	8/10/2018	Yes	No
3827	3	GF-CR	DUO CD	11/14/2018	7/30/2018	Yes	No
4447	3	GF-CR	MFL4	11/14/2018	8/27/2018	Yes	No

TABLE NOTE:

[1] Table includes ILIs that occurred in SAR3, Enbridge accepted the tool runs and their ILI Initial Report receipts and subsequent Data Quality Review and ILI assessment occurred in SAR4.

Line 1 CR-PW UMP (Tool Run ID 4045)

There were areas where the tool's speed exceeded the tool's maximum speed which impacted approximately 0.19% of the pipeline length. This changed the minimum detectable feature diameter from 0.20 in. up to 0.31 in. for internal metal loss and from 0.24 in. up to 0.35 in. for external metal loss features in the affected areas. The new detectable feature diameter was still meeting the reporting threshold, 0.39 in. This did not impact the ILI assessment and FRE identification therefore no further action was required.

Line 1 CR-PW UC (Tool Run ID 4405)

There were areas where the tool experienced over-rotation during this inspection. The ILI vendor took this into consideration when performing the ILI data assessment. No further action was required.

Line 3 CR-PW MFL4 Corrosion (Tool Run ID 3829)

During the inspection three adjacent MFL sensors failed resulting in a sensor gap with a width of 28mm. The ILI vendor updated the tool detection specification for the impacted areas of pipe. The depth detection specification changed from 4% to 6% for general corrosion and from 6% to 8% for pitting in the affected area. ILI assessment was conducted leveraging recent inspections of 2017 BHGE USWM+ and 2015 BHGE Gemini MFL that fully covered these limited areas impacted by the failed sensors. No further action was required.

Line 3 GF-CR DUOCD (Tool Run ID 3827)

Minor sensor issues were encountered during the inspection, impacting 0.69% of the pipe surface. The ILI vendor provided a revised tool performance specification for these areas. In addition, ILI data from the 2017 NDT UCM inspection was leveraged to help assess the areas with the sensor issues. No further action was required.

Line 3 GF-CR MFL Geometry (Tool Run ID 4447)

There were 6 out of 136 non-adjacent caliper channels that were malfunctioning during the inspection. Two adjacent caliper channels became slightly attenuated after passing through a stopple, and one channel was found intermittently degraded; however the tool specification was not impacted. The ILI assessment was conducted with no further action required.

(II) Review of ILI Data

32.a-c [Initial ILI Reports for Crack (120 days), Corrosion (90 days) and Geometric (60 days) Features]

The following table lists valid ILI tool runs for which the Initial ILI Reports were received between November 23, 2018 and May 22, 2019. Tool speed and tool performance were indicated in all reports listed.

Table 10: P32.a-c Valid In-line Inspection Runs with Initial ILI Report Received

Tool Run ID	Line	Segment	Tool	Report Type	Report Due Date	Report Received Date	Report Received On Time?
4405	01	CR-PW	UC	Crack	1/16/2019	1/15/2019	True
4447	03	GF-CR	MFL4	Corrosion	11/26/2018	11/23/2018	True
3827	03	GF-CR	DUO CD	Crack	11/27/2018	11/27/2018	True
4534	05	ENO-EMA	GeoPig - BHGE	Geometry	4/22/2019	4/18/2019	True
4538	05	PE-IR	GeoPig - BHGE	Geometry	3/25/2019	3/25/2019	True
4541	05	WNO-WMA	GeoPig - BHGE	Geometry	4/22/2019	4/18/2019	True
4610	61	PE-FN	GEMINI - BHGE	Geometry	4/26/2019	4/26/2019	True

TABLE NOTE:

The unsuccessful inspections that required ILI reruns as discussed in Paragraph 31 of this SAR have no report and are therefore not included in this table.

33 [Priority Features]

33.a [Immediate Priority Feature Notification Requirements]

Enbridge contracts require that vendors notify Enbridge of Priority Features as specified in Subparagraphs 33.a and 33.b.

The immediate priority feature notification requirements are documented in the ILIMRR, which forms part of all Enbridge contracts with vendors, as described above in Subparagraph 28.c.

Enbridge and the ITP have identified a difference in interpretation regarding the interpretation of Appendix A with regards to ovality features. Enbridge, the EPA, and the ITP continue to discuss ways to resolve this disagreement.

Enbridge identified a problem encountered with regards to metal loss priority notification reporting as described in P144 '[Section D] Metal Loss Priority Notification Reporting – P33.a'

33.b [Priority Feature Definition]

This information has not changed from the first SAR. Reporting criteria for what are deemed as Priority Features are outlined in the ILIMRR which is a contractual obligation for all ILI vendors. The ILI Reporting Profile Standard

has been provided to the ITP for compliance verification activities and specifies the following priority notification reporting criteria, which are consistent with Appendix A of the Consent Decree:

1. Features that the ILI Vendor may consider to be an immediate threat to the integrity of the pipeline.
2. Dent or geometric features greater than or equal to 5 percent of the outside diameter ("OD") of the pipe.
3. Metal loss features with peak depth greater than or equal to 75 percent of the nominal wall thickness of the pipe.
4. Metal loss features forecasted to reach a maximum depth of greater than or equal to 75 percent of nominal wall thickness with 365 calendar days.
5. Metal loss features with an effective area RPR less than or equal to 0.85
6. Unmatched metal loss features with a depth greater than or equal to 50 percent of the nominal wall thickness or actual wall thickness.
7. Crack features that meet or exceed the saturation limit of the crack detection tool.
8. Crack features greater than or equal to 2.5 mm/0.098 inch detected on the internal and external pipe surface at the same location.
9. Priority notification criteria specifically identified in a project work order. For example, the ILIMRR specifies Priority Notification Criteria for Ovalities, Wrinkles or Ovalities associated with Dents with a minimum ID less than or equal to the values shown in IIMRR Table 3 below. As discussed in Section IX (Reporting Requirements), Enbridge, EPA and the ITP continue to discuss the appropriate application of Appendix A with regards to ovality features.

ILIMRR version 8.2 Table 3: Inside Diameter Priority Notification Criteria for Ovalities and Other Deformation Features

NPS (inch)	Actual OD (inch)	Actual OD (mm)	Min ID (inch)	Min ID (mm)
6	6.625	168.28	5.2	131.2
8	8.625	219.08	7.1	179.3
10	10.75	273.05	9.1	230.3
12	12.75	323.85	11.0	279.4
16	16	406.4	14.3	362.0
18	18	457.2	15.8	400.1
20	20	508	17.9	454.7
22	22	558.8	19.7	500.6
24	24	609.6	21.5	546.1
26	26	660.4	23.5	596.9
30	30	762	27.1	687.8
34	34	863.6	31.1	789.9
36	36	914.4	33.0	837.0
42	42	1066.8	38.6	981.2
48	48	1219.2	44.4	1127.8

Upon receiving notice of any Priority Feature, Enbridge determines whether the feature was correctly identified and whether the feature was previously repaired or mitigated. After making such a determination, Enbridge then determines whether any Priority Feature is a Feature Requiring Excavation ("FRE") in accordance with Section VII.D(III) of the Consent Decree. All Priority Features that Enbridge determined to be FREs during this reporting period are summarized in Subparagraph 33.d.

Enbridge and the ITP have identified a difference in interpretation of Appendix A with regards to ovality features. Enbridge, the EPA, and the ITP continue to discuss ways to resolve this challenge.

33.c-d [Priority Feature Review and Mitigation if Required]

The following table identifies Priority Features for which Enbridge received notification from vendors during this reporting period. Each listed feature is then discussed in greater detail below the table. All priority features identified within this reporting period were reviewed timely and repair / mitigation actions were taken if required as reflected in the table.

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Table 11: P33.c-d Priority Features											
Run ID	**Line**	**Segment**	**Technology**	**Girth Weld (GW)**	**Date Priority Notification Received**	**Date Priority Notification Reviewed**	**Date of Discovery / Date Features Added to Dig List**	**Pressure Restriction Required?**	**Date Pressure Restriction Imposed**	**Repair / Mitigation Deadline**	**Date of Repair / Mitigation**
4405	1	CR-PW	Crack	40280	12/3/2018	12/7/2018	12/7/2018	Y	12/10/2018	1/7/2019	12/12/2018
				170980[1]	10/18/2018	10/24/2018	10/24/2018	N	NA	12/24/2018	12/13/2018
6110	1	CR-PW	MFL4 CAL	194260[1]	10/9/2018	10/10/2018	10/10/2018	N	NA	10/10/2019	12/13/2018
3827	3	GF-CR	DUOCD	146510[1]	11/13/2018	11/16/2018	11/16/2018	N	NA	11/18/2019	FR
				149430[1]	11/13/2018	11/16/2018	11/16/2018	N	NA	12/17/2018	12/6/2018
4534	5	ENO-EMA	GeoPig	3570	3/25/2019	3/26/2019	NA	NA	NA	NA	NA
4541	5	WNO-WMA	GeoPig	3540	4/1/2019	4/2/2019	NA	NA	NA	NA	NA
				6080	4/1/2019	4/2/2019	NA	NA	NA	NA	NA
				6100	4/1/2019	4/2/2019	NA	NA	NA	NA	NA

TABLE NOTE:

[1] The Priority Notifications were received in SAR3; the Priority Features were placed on Dig List in SAR3. The repair/mitigations were completed in the current reporting period of SAR4.

[2] "FR" indicates that this information is outside the reporting window of this SAR and will be included in a future SAR.

[3] "NA" in this table indicates that the features were not required to be added to the dig list (i.e. previously repaired or mitigated, or not did not meet repair or mitigation criteria) or that a pressure restriction was not required

Line 1 CR-PW NDT UC (Run ID 4405)

Girth Welds ("GW") 40280: Crack feature meeting Priority Feature reporting criteria was received on 12/3/2018, and the feature was reviewed and placed on Dig List on 12/7/2018. A Point Pressure Restriction ("PPR") was required; the PPR was imposed on 12/10/2018. This joint was repaired on 12/12/2018, which is earlier than the repair/mitigation deadline of 1/7/2019. This Priority feature was received after SAR 3 reporting period, 05/23/2018 – 11/22/2018, and so it was not included in SAR3.

GW170980 was reported in SAR3. The Priority feature on this joint was mitigated in SAR4 period and the Date of Repair/Mitigation is earlier than their Repair/Mitigation Deadline.

Line 1 CR-PW BHGE MFL4 Caliper (Run ID 6110)

Girth Welds ("GW") 194260: Dent feature meeting Priority Feature reporting criteria was received on 10/09/2018, and the feature was reviewed and placed on Dig List on 10/10/2018 with no PPR required. This Priority Feature was reported in SAR3, and was repaired with a sleeve on 12/13/2018 which is earlier than the repair/mitigation deadline.

Line 3 GF-CR DuoCD (Run ID 3827)

Girth Welds ("GW") 146510 and 149430: Priority features were received for the two GWs on 11/13/2018 and the PN features were reviewed on 11/16/2018, which were both reported in SAR3.

GW 149430 was repaired on 12/6/2018 which is earlier than the repair/mitigation deadline. The mitigation date of GW146510 will be reported in SAR5.

Line 5 ENO-EMA Geopig (Run ID 4534)

Girth Welds ("GW") 3570: A Priority feature was reported in 2019 Geopig by ILI vendor. The dent was caused by the Anchor Strike in April 2018 (details in SAR3) and was repaired in July 2018 so no further action is required.

Line 5 WNO-WMA Geopig (Run ID 4541)

Girth Welds ("GW") 3540: A dent feature meeting priority notification reporting criteria was reported in 2019 Geopig by BHGE. The dent was caused by the Anchor Strike in April 2018 and was repaired in July 2018 so no further action is required.

An ovality feature was reported on GW6080 and GW6100, respectively. Neither of them met excavation criteria so no further action is required.

An administrative PPR imposition delay was identified during this reporting period as described in P144 '[Section D] Line 6A AM-GT GW 144220 PPR ID 28601 Administrative PPR Imposition Delay - P33.c-d'. In addition, a Priority Feature Review challenge was identified as described in P144 '[Section D] Line 1 CR-PW NDT UC GW 40280 Priority Feature Review - P33.c-d'. During the same reporting period an empty dig list delayed approval occurred which is described in P144 '[Section D] Line 3 CR-PW 2018 BHGE DuoCD GW 133790 Priority Feature Dig List with no FREs – P33.c-d'.

34 [Data Quality Review]

Data quality reviews were completed within the timeframes required by the Consent Decree. ILI reports that did not meet Enbridge's quality standards are described below.

34.a [Preliminary Review of Initial ILI Report]

There were twelve (12) Initial ILI reports that were received and reviewed between November 23, 2018 and May 22, 2019. The preliminary review of the Initial ILI reports received before April 22, 2019 was completed within the 30 day timeframe provided under the Consent Decree. Five (5) Initial ILI reports (listed under Paragraph 31 **Table 6**) were received with minor tool performance deficiencies, which did not impact the ILI Data Quality and no data concerns were identified with these 5 Initial ILI reports and other Initial ILI reports listed below. The preliminary review of the Initial ILI reports received between April 23, 2019 and May 22, 2019 will be reported in the next Semi-Annual Report.

The following table illustrates the Data Quality Review ("DQR") timeline versus requirements in Subparagraph 34.a of the Consent Decree.

Table 12: P34.a Preliminary Review of Initial ILI Reports[1]									
Tool Run ID	**Line**	**Segment**	**Tool**	**Report Received Date**	**Report Type**	**Date Preliminary Review Required**	**Date Preliminary Review Completed[1]**	**Review Completed on Time?**	**Data Quality Concerns?**
6110	1	CR-PW	MFL4	11/9/2018	Corrosion	12/10/2018	12/10/2018	Yes	No
4045	1	CR-PW	UMP	11/15/2018	Corrosion	12/17/2018	12/17/2018	Yes	No
4405	1	CR-PW	UC	1/15/2019	Crack	2/14/2019	2/14/2019	Yes	No
3829	3	CR-PW	MFL4	11/8/2018	Corrosion	12/10/2018	12/10/2018	Yes	No
4447	3	GF-CR	MFL4	11/23/2018	Corrosion	12/24/2018	12/21/2018	Yes	No
3827	3	GF-CR	DUO CD	11/27/2018	Crack	12/27/2018	12/21/2018	Yes	No
4447	3	GF-CR	MFL4	10/25/2018	Geometry	11/26/2018	11/26/2018	Yes	No
4534	5	ENO-EMA	GeoPig	4/18/2019	Geometry	5/20/2019	5/17/2019	Yes	No
4538	5	PE-IR	GeoPig	3/25/2019	Geometry	4/24/2019	4/24/2019	Yes	No
4541	5	WNO-WMA	GeoPig	4/18/2019	Geometry	5/20/2019	5/17/2019	Yes	No
4610	61	PE-FN	GEMINI	4/26/2019	Geometry	5/28/2019	FR	FR	FR
4487	78	GT-SK	GEMINI	11/8/2018	Corrosion	12/10/2018	12/3/2018	Yes	No

TABLE NOTE:

[1] *"FR" indicates that this information is outside the reporting window of this SAR and will be included in a future SAR.*

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34.b [Evaluation of Features Requiring Excavation]

For ILI runs for which no data quality concerns were identified, Enbridge proceeded to evaluate the pipeline segments and/or features against the requirements in Subsection VII.D.(III) of the Consent Decree according to the Lakehead System Integrity Remediation process. **Table 16** in Paragraph 37 of this SAR identifies the timelines when FREs were identified and placed onto the Dig List during this SAR reporting period.

34.c [Resolution of Identified Data Quality Issues]

Through continued ILI reporting and data quality review, Enbridge identified ten (10) Initial ILI reports received in previous SARs that had issues and resolved the issues with ILI vendors. ILI vendors provided re-issued ILI reports to correct and improve the ILI reporting and data quality, as summarized in Table 13 below. ILI data issue details of the listed programs are discussed below, additional details are provided in the ILI Summary Document specific to each inspection, and made available to the ITP for verification purposes.

Table 13: P34.c ILI Reports with Reporting and/or Data Quality Issues1

Tool Run ID	Line	Segment	Tool	Report Type	Initial Report Received Date	Date Preliminary Review of Initial ILI Report Required	Date Preliminary Review of Initial ILI Report Completed	Data Quality Concerns Identified and Resolved
3830	03	CR-PW	AFD	Corrosion	10/19/2018	11/19/2018	11/14/2018	Yes
2351	04	DN-VG	DuDi UCM	Corrosion	5/8/2018	6/7/2018	6/7/2018	Yes
2346	04	DR-FW	DuDi UCM	Corrosion	5/28/2018	6/27/2018	6/26/2018	Yes
2358	04	PL-CR	DuDi UCM	Corrosion	5/18/2018	6/18/2018	6/18/2018	Yes
2381	04	WR-PW	DuDi UCM	Corrosion	6/7/2018	7/9/2018	7/9/2018	Yes
4473	10	ENR-UT	UMP	Corrosion	9/18/2018	10/18/2018	10/18/2018	Yes
6095	10	ENR-UT	MFL4	Corrosion	10/5/2018	11/5/2018	11/5/2018	Yes
4105	10	WNR-EB	MFL4	Corrosion	8/10/2018	9/10/2018	9/6/2018	Yes
2369	67	GF-CR	MFL4	Corrosion	6/29/2018	7/30/2018	7/30/2018	Yes
4489	78	SK-RW	UMP	Corrosion	4/11/2018	5/11/2018	5/11/2018	Yes

TABLE NOTE:

[1] Initial ILI reports were received in SAR2 and SAR3, reporting and/or data quality issued were identified and resolved in SAR4.

Line 3 CR-PW AFD (Tool Run ID 3830)

During the Data Quality Review, Enbridge identified that some of the features were reported incorrectly. The changes in Issue 2.1 do not require additional integrity actions as the changes will not have any effect on the previous assessment (Issue 2).

Issue 2.1 of the Line 3 CR-PW AFD report was received on 2/1/2019.

Line 4 DN-VG DuDi UCM Corrosion (Tool Run ID 2351)

During the detailed feature review, Enbridge identified that the ILI vendor didn't follow the ILIMRR in reporting effective depth and effective length. In Issue 2, ILI vendor updated the implementation of the RSTRENG Effective Area and Modified B31G pressure assessment based on the nominal wall thickness and the average pipe joint wall thickness ("WT") (USWM WT). There was no feature meeting FRE criteria found in Issue 2 assessment.

Issue 2 of the Line 4 DN-VG DuDi UCM Corrosion report was received on 5/22/2019.

Line 4 DR-FW DuDi UCM Corrosion (Tool Run ID 2346)

During the detailed feature review, Enbridge identified that the ILI vendor didn't follow the ILIMRR in reporting effective depth and effective length. In the issue 2, ILI vendor updated the implementation of the RSTRENG Effective Area and Modified B31G pressure assessment based on the nominal wall thickness and the average pipe joint wall thickness (USWM WT). There was no feature meeting FRE criteria found in Issue 2 assessment.

Issue 2 of the Line 4 DN-VG DuDi UCM Corrosion report was received on 5/22/2019.

Line 4 PL-CR DuDi UCM Corrosion (Tool Run ID 2358)

During the detailed feature review, Enbridge identified that the ILI vendor didn't follow the ILIMRR in reporting effective depth and effective length. In the issue 2, ILI vendor updated the implementation of the RSTRENG Effective Area and Modified B31G pressure assessment based on the nominal wall thickness and the average pipe joint wall thickness (USWM WT). There was no feature meeting FRE criteria found in Issue 2 assessment.

Issue 2 of the Line 4 PL-CR DuDi UCM Corrosion report was received on 5/22/2019.

Line 4 WR-PW DuDi UCM Corrosion (Tool Run ID 2381)

During the detailed feature review, Enbridge identified that the ILI vendor didn't follow the ILIMRR in reporting effective depth and effective length. In the issue 2, ILI vendor updated the implementation of the RSTRENG Effective Area and Modified B31G pressure assessment based on the nominal wall thickness and the average pipe joint wall thickness (USWM WT). There was no feature meeting FRE criteria found in Issue 2 assessment.

The issue 2 of the Line 4 WR-PW DuDi UCM Corrosion report was received on 5/22/2019.

L10 ENR-UT UMP (Tool Run ID 4473)

Issue 2 was requested to reflect the latest changes in the baseline pipebook for the segment completed by Engineering. Changes to NWT and pipe grade affected 179 joints in total out of which only 40 had active features reported. Overall there were no integrity results as a part of this re-issue.

During the detailed feature review in Issue 2, Enbridge identified that the ILI vendor didn't follow the ILIMRR in reporting effective depth and effective length. In Issue 3, ILI vendor updated the implementation of the RSTRENG

Effective Area and Modified B31G pressure assessment based on the nominal wall thickness and the average pipe joint wall thickness (USWM WT). Integrity assessment was on-going at the date of May 22, 2019.

Issue 3 of the Line 10 ENR-UT UMP Corrosion report was received on 5/22/2019.

L10 ENR-UT MLF4 Corrosion (Tool Run ID 6095)

In Issue 2, ILI vendor updated steel pipe grades and nominal wall thickness based on updated pipebook received from Enbridge. The vendor also reviewed pinholes and slotting features found in the pipe and reclassified them based on new findings. There are no features meeting FRE criteria found in Issue 2 assessment. Issue 2 of the Line 10 ENR-UT MFL4 Corrosion ILI report was received on 12/5/2018

L10 WNR-EB MFL4 Corrosion (Tool Run ID 4105)

Field findings from ILI runs on other lines identified changes in the sizing algorithm for pinholes and slotting features. As a result of these changes a re-issue was triggered for this ILI run.

Issue 2 of the Line 10 WNR-EB MFL4 Corrosion ILI report was received on 12/5/2018.

Line 67 GF-CR MFL4 Corrosion (Tool Run ID 2369)

Field findings from ILI runs on other lines identified changes in the sizing algorithm for pinholes and slotting features. As a result of these changes a re-issue was triggered for this ILI run.

Issue 2 of the Line 67 GF-CR MFL4 Corrosion ILI report was received on 12/5/2018.

Line 78 SK-RW UMP (Tool Run ID 4489)

During the detailed feature review, Enbridge identified that the ILI vendor didn't follow the ILIMRR in reporting effective depth and effective length.

Issue 2 of the Line 78 SK-RW UMP Corrosion ILI report was received on 5/22/2019.

34.d [ILI Data Quality Evaluation Timelines]

Enbridge procedures provide for analysts to complete all data quality evaluations of ILI data within 180 Days after the ILI tool is removed from the pipeline at the conclusion of any ILI investigation. During the reporting period of this SAR, all data was reviewed in a timely manner. As outlined in the Table 14 below, Enbridge completed data reviews for the runs (*see* "Yes" in "Quality Evaluations Completed Within 180 Days" column), and data reviews were ongoing for the runs for which the 180 Day period was still open at the end of this reporting period (*see* "FR" in "Quality Evaluations Completed Within 180 Days" column). Additional details regarding data review for some listed runs can be found in SAR4 Paragraph 34.c above (see "NA" in "Quality Evaluations Completed Within 180 Days" column).

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Table 14: P34.d Data Quality Evaluation Timelines1							
Tool Run ID	**Line**	**Segment**	**Tool**	**Pull Date**	**Report Type**	**Deadline to Complete All ILI Data Quality Evaluations**	**Quality Evaluations Completed Within 180 Days?[2,3]**
4045	01	CR-PW	UMP	8/18/2018	Corrosion	2/14/2019	Yes
4405	01	CR-PW	UC	9/18/2018	Crack	3/18/2019	Yes
6110	01	CR-PW	MFL4	8/15/2018	Corrosion	2/11/2019	Yes
4502	01	GF-CR	GEMINI	5/18/2019	Corrosion	11/14/2019	FR
4502	01	GF-CR	GEMINI	5/18/2019	Geometry	11/14/2019	FR
4508	02	GF-CR	NGCD	4/27/2019	Crack	10/24/2019	FR
3829	03	CR-PW	MFL4	8/10/2018	Corrosion	2/6/2019	Yes
3830	03	CR-PW	AFD	7/23/2018	Corrosion (Issue 2.1)	1/22/2019	NA
3827	03	GF-CR	DUO CD	7/30/2018	Crack	1/28/2019	Yes
4447	03	GF-CR	MFL4	8/27/2018	Corrosion	2/25/2019	Yes
4447	03	GF-CR	MFL4	8/27/2018	Geometry	2/25/2019	Yes
2351	04	DN-VG	DuDi UCM	2/7/2018	Corrosion (Issue 2)	8/6/2018	NA
2346	04	DR-FW	DuDi UCM	2/27/2018	Corrosion (Issue 2)	8/27/2018	NA
2358	04	PL-CR	DuDi UCM	2/20/2018	Corrosion (Issue 2)	8/20/2018	NA
2381	04	WR-PW	DuDi UCM	3/14/2018	Corrosion (Issue 2)	9/10/2018	NA
4534	05	ENO-EMA	GeoPig	2/19/2019	Geometry	8/19/2019	FR
4536	05	ENO-EMA	UCc	3/6/2019	Crack	9/3/2019	FR
6387	05	ENO-EMA	MFL3	3/13/2019	Corrosion	9/9/2019	FR
4538	05	PE-IR	GeoPig	1/24/2019	Geometry	7/23/2019	FR
4541	05	WNO-WMA	GeoPig	2/20/2019	Geometry	8/19/2019	FR
4543	05	WNO-WMA	UCc	3/7/2019	Crack	9/3/2019	FR
6386	05	WNO-WMA	MFL3	3/14/2019	Corrosion	9/10/2019	FR
4804	06A	AM-GT	DUO CD	3/23/2019	Crack	9/19/2019	FR
4805	06A	PE-AM	UMP	3/1/2019	Corrosion	8/28/2019	FR
4555	10	EB-ENR	USWM+	3/6/2019	Corrosion	9/3/2019	FR

Table 14: P34.d Data Quality Evaluation Timelines1							
Tool Run ID	**Line**	**Segment**	**Tool**	**Pull Date**	**Report Type**	**Deadline to Complete All ILI Data Quality Evaluations**	**Quality Evaluations Completed Within 180 Days?[2,3]**
4473	10	ENR-UT	UMP	6/27/2018	Corrosion (Issue 3)	12/24/2018	NA
6095	10	ENR-UT	MFL4	7/11/2018	Corrosion (Issue 2)	1/7/2019	NA
4105	10	WNR-EB	MFL4	5/15/2018	Corrosion (Issue 2)	11/13/2018	NA
4610	61	PE-FN	GEMINI	2/25/2019	Geometry	8/26/2019	FR
2369	67	GF-CR	MFL4	4/5/2018	Corrosion (Issue 2)	10/2/2018	NA
4614	67	GF-CR	UC	5/9/2019	Crack	11/5/2019	FR
4487	78	GT-SK	GEMINI	8/10/2018	Corrosion	2/6/2019	Yes
4489	78	SK-RW	UMP	1/12/2018	Corrosion (Issue 2)	7/11/2018	NA

TABLE NOTE:

[1] Runs with reports received on or before May 22, 2019 and ILI Data Quality Review performed after May 22, 2019 are included.

[2] "FR" indicates that this information is outside the reporting window of this SAR and will be included in a future SAR.

[3] "NA" indicates that these reports had data quality issues as described in Paragraph 34.c in this report.

34.e [Discrepancies between Two Successive ILI Runs]

Potential data quality concerns that specifically related to the previous assessment of the line segment were identified during Enbridge's preliminary review of some of the initial ILI Reports identified in **Table 15** below. A significant severity discrepancy is defined in the Consent Decree as: if at least 60% of the population of reported features are either (A) more severe than previously reported and more severe than predicted by the most recent assessment of anticipated feature growth, or (B) less severe than previously reported. A significant density discrepancy is defined in the Consent Decree as follows: if the number of reported features is at least 20% greater or 20% less than the number of features previously reported.

Table 15: P34.e Discrepancies between Two Successive ILI Runs							
Tool Run ID	**Line**	**Segment**	**Tool**	**Report Type**	**Severity Discrepancy?**	**Density Discrepancy?**	**Type of Features Requiring Excavation Discrepancy?**
4045	1	CR-PW	UMP	Corrosion	No	Yes	Yes
4405	1	CR-PW	UC	Crack	Yes	Yes	No
4447	3	GF-CR	MFL4	Corrosion	No	Yes	No
3827	3	GF-CR	DUO CD	Crack	Yes	Yes	No

Line 1 CR-PW UMP (Run ID 4045)

The subject Line 1 UMP report had decreased feature density compared to the previous 2018 MFL, and increased feature density compared to the previous 2013 MFL. The 2018 UMP reported 289 features with a depth greater than 40% while the 2018 MFL only reported 16 features with a depth greater than 40%. The UMP also reported internal corrosion features compared to previous MFL inspection.

The discrepancies in feature severity, density and classification are mostly due to the different tool technology (UMP ultrasonic vs MFL). There is no further action required.

Line 1 CR-PW UC (Run ID 4405)

The subject Line 1 report had increased feature density compared to the previous report because of the length reporting threshold changed to 0.984 inch for the 2018 UC inspection, from 1.06 inch for 2014 UC inspection. The 2014 inspection also experienced some degraded data issues (speed excursions and coupling loss) which would result in a lower reported feature population.

Line 3 GF-CR MFL4 Corrosion (Run ID 4447)

The subject Line 3 report had a decreased feature density for features with a depth greater than 40% when compared to the 2016 MFL4 inspection. The main reason is that the previous inspection did not classify whether a feature was a cluster or a single metal loss feature, so it could be including the same feature multiple times.

Line 3 GF-CR DUOCD (Run ID 3827)

The subject Line 3 report had decreased feature density compared to the previous report because the length reporting threshold changed to 1.77 inch for the current inspection, from 1.00 inch for the previous 2014 inspection.

34.f-g [Investigative Digs]

No investigative digs were required during this reporting period resulting from data qualities issues that were identified.

(III) Identification of Features Requiring Excavation

35 [Evaluation of Each Feature in Initial ILI Report for Feature Requiring Excavation]

Following each ILI tool run, Enbridge evaluated each feature identified in the Initial ILI Report to determine if the feature was an FRE.

36 [Feature Requiring Excavation Definition]

With respect to Crack and Corrosion features, Enbridge applies three methods to identify an FRE:

- Enbridge estimates the lowest pressure at which the feature is predicted to rupture or leak (i.e. Predicted Burst Pressure) using the procedures set forth in Subsection VII.D.(IV) of the Consent Decree.
- Enbridge estimates the amount of time remaining until the feature is predicted to rupture or leak (i.e. Remaining Life) using the procedures set forth in Subsection VII.D.(VI) of the Consent Decree.
- Enbridge considers other unique characteristics of a feature using the criteria set forth in Subsection VII.D.(V) of the Consent Decree. These methods are outlined in the procedure, PI-37 Fitness for Service Calculations and the Lakehead System Integrity Remediation process. The records of these methods being applied are in the Assessment Sheets for each ILI tool run and were referenced in the Compliance Registry Forms database.

With respect to Geometric features, Enbridge considers unique characteristics of the feature using the criteria set forth in Subsection VII.D.(V) of the Consent Decree as interpreted by Enbridge. This method is outlined in the procedure, PI-37 Fitness for Service Calculations. The records of this criteria being applied are in the Assessment Sheets for each ILI tool run and were referenced in the Compliance Registry Forms.

37 [Deadlines for Adding Features Requiring Excavation on the Dig List]

Following each successful Consent Decree ILI tool run, Enbridge identified all Crack, Corrosion, and Geometric features detected by the ILI tool runs that are FREs in accordance with the Lakehead System Integrity Remediation process. Enbridge added such features to an electronic list of features scheduled for excavation and repair or mitigation (i.e. Dig List) in accordance with the schedule outlined in Paragraph 37 of the Consent Decree.

All FREs identified based on their Predicted Burst Pressure or their Remaining Life were added to the Dig List within 5 days of calculating the Predicted Burst Pressure and the Remaining Life of the features in accordance with Subsection VII.D.(IV) of the Consent Decree.

All FREs identified based on interacting or intersecting criteria were added to the Dig List within 5 days of completing the preliminary review of the Initial ILI Report, in all cases where the preliminary review did not identify any data quality concerns related to the feature.

Table 16 below identifies the FREs that were identified during the reporting period of this SAR. Priority notifications are excluded from this table as they are included in Paragraph 33 of this SAR. ILI tool runs that did not discover any FREs are excluded from this table. Interacting deformation features re-evaluated per the EPA interpretation are also excluded from this table. Details on the process to identify FREs are included within the ILI Assessment Sheets.

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Table 16: P37 Deadlines for Placing Features Requiring Excavation on the Dig List												
Tool Run ID	**Line**	**Seg-ment**	**Tool**	**Threat Type**	**Pull Date**	**Burst Pressure Calculation Date**	**Remaining Life Calculation Date**	**Other Features Identified Date**	**Number of Features Identified**	**Date All Features Added to Dig List**	**Within 180 Days of Tool Pull Date?**	**Within 5 Days of Calculations ?**
4045	L0001	CR-PW	UMP	Corrosion	8/18/2018	12/17/2018	12/17/2018	12/17/2018	15	12/17/2018	Yes	Yes
4405	L0001	CR-PW	UC	Crack	9/18/2018	2/14/2019	2/14/2019	2/14/2019	25	2/14/2019	Yes	Yes
3830	L0003	CR-PW	AFD	Axial Grooving	7/23/2018	12/17/2018	12/17/2018	12/17/2018	20	12/17/2018	Yes	Yes
3830	L0003	CR-PW	AFD	Corrosion	7/23/2018	12/17/2018	12/17/2018	12/17/2018	4	12/17/2018	Yes	Yes
3830	L0003	CR-PW	AFD	Interacting	7/23/2018	12/17/2018	12/17/2018	12/17/2018	1	12/17/2018	Yes	Yes
3829	L0003	CR-PW	MFL4MFL	Corrosion	8/10/2018	12/10/2018	12/10/2018	12/10/2018	29	12/10/2018	Yes	Yes
3829	L0003	CR-PW	MFL4CAL	Interacting	8/10/2018	11/29/2018	11/29/2018	11/29/2018	1	11/29/2018	Yes	Yes
3827	L0003	GF-CR	DUOCD	Crack	7/30/2018	12/21/2018	12/21/2018	12/21/2018	8	12/24/2018	Yes	Yes
4447	L0003	GF-CR	MFL4MFL	Corrosion	8/27/2018	12/21/2018	12/21/2018	12/21/2018	18	12/21/2018	Yes	Yes
4538	L0005	PE-IR	GEOPIG	Interacting	1/24/2019	NA	NA	4/24/2019	1	4/24/2019	Yes	Yes
4443	L0006A	AM-GT	UMP	Corrosion	12/2/2017	5/29/2018	5/29/2018	NA	3	12/5/2018	Note 1	Note 1

TABLE NOTES:

Note 1: The three Line 6A Corrosion features were added onto the Dig List after Enbridge discussed the feature classification of "inactive" following vapor corrosion inhibitor (VCI) injected into the casing underneath which the features were located. The timeline of the feature placement onto Dig List was described in SAR3 Para 145 (Page 166).

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38 [Dig List Actions]

Enbridge has complied with the requirements of Paragraph 38, as set forth in the Subparagraphs below.

38.a [Excavation and Repair Deadlines]

For each FRE placed on the Dig List, Enbridge established excavation and repair deadlines that accounted for the level of threat posed by the feature and that complied with the dig criteria deadlines specified in Subsection VII.D.(V) of the Consent Decree. If a feature met more than one dig-selection criteria, Enbridge set the excavation and repair deadline in accordance with the shortest applicable timetable set forth in Subsection VII.D.(V) of the Consent Decree. This requirement is outlined in the Lakehead System Integrity Remediation process and deadlines can be found in the approved PI Listing or the Assessment Sheet for each ILI tool run.

38.b [Establish Pressure Restrictions if Required]

Enbridge's Lakehead System Integrity Remediation process and procedure PI-04 (Impose, Revise and Remove Pressure Restrictions) outline how any pressure restrictions (PRs) required for FREs are established pursuant to Subsection VII.D.(V) of the Consent Decree.

In any case that an FRE is subject to more than one PR under Subsection VII.D.(V) of the Consent Decree; Enbridge established the PR that results in the lowest operating pressure at the location of the feature.

The "PPR values" requirements were satisfied by limiting the discharge pressure at the nearest upstream pump station to a level that assured compliance with the PPR value at the location of the feature.

39.a-b [Field Measurements of Excavated Features]

The process to adhere to the requirements of Paragraph 39 is documented in Enbridge Operations & Maintenance Manuals ("OMMs") Book 3 sections B3_05-01-01 through B3_05-03-08.

The process to adhere to the requirement in Subparagraph 39.a is documented in the Lakehead System Integrity Remediation process.

During the reporting period of this SAR, Enbridge followed its OMMs to field assess all crack and geometry features, and all corrosion features with depth greater than 10%. Ten percent (10%) is the general corrosion ILI tool detection depth threshold.

Enbridge followed the Lakehead System Integrity Remediation process to excavate and repair or mitigate all identified FREs on the pipeline that were the subject of the ILI, in accordance with Subsection VII.D.(V) of the Consent Decree.

During excavations for FRE and any additional segments of pipeline, including investigative digs pursuant to Subparagraph 34.e of the Consent Decree, Enbridge obtained and recorded field measurements of all applicable features on the excavated segments and these were stored in OneSource as per Paragraph 77. All the approved Non-destructive examination ("NDE") reports were uploaded to the Enbridge Shared Drive for ITP access.

During the reporting period of this SAR, Enbridge did not discover any pipe segments that contained a high volume of unreported features as denoted in the Consent Decree. Hence, the requirements of Subparagraph 39.b were not applicable for this SAR.

One dig encountered a problem during execution as described in P144 '[Section D] Line 6A AM-GT Dig Re-Issue – P39'.

During this SAR reporting period, the FREs repaired and planned for repair are listed in Table 17 below.

Please note that Priority Features that were repaired are reported in Table 11 under Paragraph 33.c-d.

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Table 17: P39.a-b FREs Repaired and Planned for Repair										
Dig ID	Line	Segment	Girth Weld	Tool Run ID	Date of Repair / Mitigation	Crack Fea-tures	Cor-rosion Features	Axial Groo-ving Features	Geomet ric Feature s	Inter-acting Features
24853	L0001	CR - PW	20650	4045	1/16/2019		1			
24854	L0001	CR - PW	20820	4045	1/16/2019		1			
24855	L0001	CR - PW	57780	4045	2/9/2019		1			
24856	L0001	CR - PW	69640	4045	1/29/2019		1			
24857	L0001	CR - PW	71480	4045	5/13/2019		1			
24858	L0001	CR - PW	96820	4045	3/15/2019		1			
24859	L0001	CR - PW	100990	4045	3/15/2019		1			
24860	L0001	CR - PW	102610	4045	3/15/2019		1			
24861	L0001	CR - PW	102950	4045	3/15/2019		1			
24862	L0001	CR - PW	121630	4045	FR		1			
24863	L0001	CR - PW	144060	4045	1/30/2019		1			
24864	L0001	CR - PW	185170	4045	1/22/2019		1			
24865	L0001	CR - PW	187060	4045	1/23/2019		1			
24866	L0001	CR - PW	191630	4045	2/4/2019		1			
24867	L0001	CR - PW	207180	4045	3/11/2019		1			
25340	L0001	CR - PW	12010	4405	FR	1				
25341	L0001	CR - PW	32060	4405	FR	1				
25342	L0001	CR - PW	41650	4405	FR	1				
25343	L0001	CR - PW	98280	4405	FR	1				
25344	L0001	CR - PW	115710	4405	FR	1				
25345	L0001	CR - PW	119180	4405	FR	1				
25346	L0001	CR - PW	122610	4405	FR	1				
25347	L0001	CR - PW	126590	4405	FR	1				
25348	L0001	CR - PW	128650	4405	FR	1				
25349	L0001	CR - PW	131300	4405	FR	1				
25350	L0001	CR - PW	134870	4405	FR	1				
25351	L0001	CR - PW	151600	4405	FR	1				
25352	L0001	CR - PW	172170	4405	FR	1				
25353	L0001	CR - PW	176630	4405	FR	1				
25354	L0001	CR - PW	187180	4405	FR	1				
25355	L0001	CR - PW	194840	4405	FR	1				
25356	L0001	CR - PW	206150	4405	3/6/2019	1				
25357	L0001	CR - PW	207250	4405	3/11/2019	1				
25358	L0001	CR - PW	242340	4405	5/14/2019	1				

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Table 17: P39.a-b FREs Repaired and Planned for Repair										
Dig ID	Line	Segment	Girth Weld	Tool Run ID	Date of Repair / Mitigation	Crack Fea-tures	Cor-rosion Features	Axial Groo-ving Features	Geomet ric Feature s	Inter-acting Features
25359	L0001	CR - PW	249230	4405	FR	1				
25360	L0001	CR - PW	251130	4405	FR	1				
25361	L0001	CR - PW	253170	4405	FR	1				
25362	L0001	CR - PW	256500	4405	FR	1				
25363	L0001	CR - PW	259240	4405	3/13/2019	1				
25364	L0001	CR - PW	260360	4405	5/21/2019	1				
24576	L0001	CR - PW	54200	6110	12/12/2018				1	
24578	L0001	CR - PW	111730	6110	1/10/2019				1	
24581	L0001	CR - PW	202380	6110	1/11/2019				1	
24584	L0001	CR - PW	204600	6110	1/30/2019				1	
24585	L0001	CR - PW	208770	6110	1/30/2019				1	
24586	L0001	CR - PW	213040	6110	1/22/2019				1	
24587	L0001	CR - PW	214610	6110	1/11/2019				1	
24589	L0001	CR - PW	239090	6110	1/31/2019				1	
24769	L0003	CR - PW	196620	3829	12/1/2018					1
24795	L0003	CR - PW	57420	3829	1/23/2019		1			
24796	L0003	CR - PW	57450	3829	1/19/2019		1			
24797	L0003	CR - PW	57460	3829	1/17/2019		1			
24798	L0003	CR - PW	57490	3829	1/18/2019		1			
24799	L0003	CR - PW	57780	3829	2/6/2019		2			
24800	L0003	CR - PW	57960	3829	2/2/2019		1			
24801	L0003	CR - PW	58050	3829	2/1/2019		1			
24802	L0003	CR - PW	58060	3829	1/29/2019		1			
24803	L0003	CR - PW	58160	3829	2/1/2019		1			
24804	L0003	CR - PW	58180	3829	2/2/2019		2			
24805	L0003	CR - PW	58670	3829	FR		1			
24806	L0003	CR - PW	58930	3829	1/23/2019		1			
24807	L0003	CR - PW	59010	3829	1/18/2019		1			
24808	L0003	CR - PW	59130	3829	1/17/2019		2			
24809	L0003	CR - PW	59740	3829	3/16/2019		1			
24810	L0003	CR - PW	59760	3829	3/15/2019		1			
24811	L0003	CR - PW	59770	3829	3/14/2019		1			
24812	L0003	CR - PW	60040	3829	2/13/2019		1			
24813	L0003	CR - PW	60190	3829	2/11/2019		1			

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Table 17: P39.a-b FREs Repaired and Planned for Repair										
Dig ID	Line	Segment	Girth Weld	Tool Run ID	Date of Repair / Mitigation	Crack Fea-tures	Cor-rosion Features	Axial Groo-ving Features	Geomet ric Feature s	Inter-acting Features
24814	L0003	CR - PW	85990	3829	3/13/2019		1			
24815	L0003	CR - PW	104360	3829	3/14/2019		1			
24816	L0003	CR - PW	225550	3829	FR		1			
24817	L0003	CR - PW	225720	3829	5/18/2019		1			
24818	L0003	CR - PW	229330	3829	3/12/2019		1			
24819	L0003	CR - PW	238340	3829	5/9/2019		1			
24820	L0003	CR - PW	238580	3829	5/3/2019		1			
24829	L0003	CR - PW	4050	3830	FR			1		
24830	L0003	CR - PW	14280	3830	FR			1		
24831	L0003	CR - PW	31500	3830	1/23/2019			1		
24832	L0003	CR - PW	70970	3830	2/4/2019		1			
24833	L0003	CR - PW	134280	3830	3/7/2019		1			
24834	L0003	CR - PW	139450	3830	2/16/2019			1		
24835	L0003	CR - PW	143210	3830	2/9/2019			1		
24836	L0003	CR - PW	143280	3830	2/5/2019			1		
24837	L0003	CR - PW	143810	3830	2/1/2019		1			
24838	L0003	CR - PW	147700	3830	3/2/2019			1		
24839	L0003	CR - PW	154810	3830	3/2/2019			1		
24840	L0003	CR - PW	154960	3830	3/1/2019			1		
24841	L0003	CR - PW	160440	3830	FR			2		
24842	L0003	CR - PW	190400	3830	1/29/2019			1		
24843	L0003	CR - PW	228440	3830	2/5/2019			1		
24844	L0003	CR - PW	234250	3830	12/18/2018					1
24845	L0003	CR - PW	237390	3830	1/26/2019			1		
24846	L0003	CR - PW	238150	3830	5/15/2019			1		
24847	L0003	CR - PW	238450	3830	5/4/2019			1		
24848	L0003	CR - PW	238590	3830	5/2/2019			1		
24849	L0003	CR - PW	239490	3830	FR		1			
24850	L0003	CR - PW	240210	3830	2/5/2019			1		
24851	L0003	CR - PW	241600	3830	2/12/2019			1		
24852	L0003	CR - PW	241610	3830	2/12/2019			1		
24406	L0003	CR - PW	132420	3831	12/10/2018	1				
24520	L0003	GF - CR	152910	3826	11/20/2018		1			
24521	L0003	GF - CR	161860	3826	12/11/2018			1		

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Table 17: P39.a-b FREs Repaired and Planned for Repair										
Dig ID	Line	Segment	Girth Weld	Tool Run ID	Date of Repair / Mitigation	Crack Features	Corrosion Features	Axial Grooving Features	Geometric Features	Interacting Features
24522	L0003	GF - CR	183800	3826	11/26/2018		1			
24523	L0003	GF - CR	186530	3826	12/16/2018		1			
25084	L0003	GF - CR	150130	3827	FR	1				
25085	L0003	GF - CR	150860	3827	FR	1				
25086	L0003	GF - CR	152890	3827	FR	1				
25087	L0003	GF - CR	153720	3827	FR	1				
25088	L0003	GF - CR	153730	3827	FR	1				
25089	L0003	GF - CR	154120	3827	FR	1				
25090	L0003	GF - CR	161200	3827	2/8/2019	1				
25091	L0003	GF - CR	161850	3827	2/14/2019	1				
25069	L0003	GF - CR	42700	4447	2/21/2019		1			
25070	L0003	GF - CR	44350	4447	2/25/2019		1			
25071	L0003	GF - CR	74720	4447	3/1/2019		1			
25072	L0003	GF - CR	131090	4447	2/20/2019		1			
25073	L0003	GF - CR	133060	4447	2/22/2019		1			
25074	L0003	GF - CR	133160	4447	2/23/2019		1			
25075	L0003	GF - CR	147680	4447	2/20/2019		1			
25076	L0003	GF - CR	148600	4447	2/27/2019		4			
25077	L0003	GF - CR	148990	4447	2/26/2019		1			
25078	L0003	GF - CR	151780	4447	2/13/2019		1			
25079	L0003	GF - CR	151920	4447	2/15/2019		1			
25080	L0003	GF - CR	160470	4447	2/19/2019		1			
25081	L0003	GF - CR	160780	4447	2/25/2019		1			
25082	L0003	GF - CR	161000	4447	2/22/2019		1			
25083	L0003	GF - CR	192670	4447	2/14/2019		1			
23254	L0004	CR - CS	32820	2254	12/3/2018					1
23255	L0004	CR - CS	39160	2254	1/22/2019					1
23491	L0004	CS - DR	27690	4465	1/19/2019	1				
23492	L0004	CS - DR	27990	4465	1/17/2019	1				
23493	L0004	CS - DR	28050	4465	1/28/2019	1				
23494	L0004	CS - DR	28060	4465	1/28/2019	1				
23495	L0004	CS - DR	28070	4465	1/28/2019	1				
23496	L0004	CS - DR	28120	4465	2/12/2019	1				
23497	L0004	CS - DR	28220	4465	2/4/2019	1				

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Table 17: P39.a-b FREs Repaired and Planned for Repair										
Dig ID	Line	Segment	Girth Weld	Tool Run ID	Date of Repair / Mitigation	Crack Fea-tures	Cor-rosion Features	Axial Groo-ving Features	Geomet ric Feature s	Inter-acting Features
23498	L0004	CS - DR	28950	4465	2/6/2019	1				
23499	L0004	CS - DR	30540	4465	2/12/2019	1				
23500	L0004	CS - DR	30770	4465	2/27/2019	1				
23501	L0004	CS - DR	30790	4465	3/1/2019	1				
23502	L0004	CS - DR	32380	4465	1/14/2019	1				
24269	L0004	DR - FW	29630	2346	1/21/2019					1
24270	L0004	DR - FW	29670	2346	12/17/2018					1
24271	L0004	DR - FW	30600	2346	12/4/2018					1
24273	L0004	DR - FW	32780	2346	12/1/2018					3
24274	L0004	DR - FW	33340	2346	12/8/2018					1
24317	L0004	DR - FW	29730	2346	12/15/2018	1				
24318	L0004	DR - FW	32790	2346	12/4/2018	1				
24319	L0004	DR - FW	33420	2346	12/13/2018	1				
23897	L0004	FW - WR	16340	4466	12/10/2018	1				
23898	L0004	FW - WR	19250	4466	1/17/2019	1				
25935	L0005	PE - IR	34350	4538	5/9/2019					1
23931	L0006A	AM - GT	79740	4334	12/8/2018		1			
23941	L0006A	AM - GT	256490	4334	FR		1			
24096	L0006A	AM - GT	86600	4334	11/16/2018		1			
24097	L0006A	AM - GT	87890	4334	12/5/2018		1			
24098	L0006A	AM - GT	226360	4334	FR		1			
24099	L0006A	AM - GT	255100	4334	12/8/2018		1			
24104	L0006A	AM - GT	299220	4334	12/10/2018		1			
24106	L0006A	AM - GT	329780	4334	12/17/2018		1			
23677	L0006A	AM - GT	89180	4443	12/4/2018		1			
23686	L0006A	AM - GT	136750	4443	12/3/2018		1			
23701	L0006A	AM - GT	241040	4443	1/11/2019		1			
23702	L0006A	AM - GT	243240	4443	2/5/2019		1			
23703	L0006A	AM - GT	255130	4443	11/27/2018		1			
23709	L0006A	AM - GT	274947	4443	12/6/2018		1			
23713	L0006A	AM - GT	286210	4443	1/27/2019		1			
23724	L0006A	AM - GT	304370	4443	3/25/2019		2			
24781	L0006A	AM - GT	144210	4443	3/18/2019		1			
24782	L0006A	AM - GT	144220	4443	3/18/2019		2			

Table 17: P39.a-b FREs Repaired and Planned for Repair										
Dig ID	Line	Segment	Girth Weld	Tool Run ID	Date of Repair / Mitigation	Crack Fea-tures	Cor-rosion Features	Axial Groo-ving Features	Geomet ric Feature s	Inter-acting Features
23316	L0006A	PE - AM	64390	3809	1/29/2019	1				
23317	L0006A	PE - AM	64440	3809	2/4/2019	1				
23318	L0006A	PE - AM	64650	3809	1/31/2019	1				
23319	L0006A	PE - AM	65160	3809	1/24/2019	1				
23320	L0006A	PE - AM	65300	3809	1/26/2019	1				
23321	L0006A	PE - AM	65830	3809	1/22/2019	1				
23322	L0006A	PE - AM	68870	3809	2/7/2019	1				
23179	L0006A	PE - AM	45350	4182	1/10/2019		1			
23184	L0006A	PE - AM	117210	4182	1/19/2019		1			
23192	L0006A	PE - AM	186710	4182	1/14/2019		1			
23211	L0006A	PE - AM	249090	4182	1/12/2019		1			
24499	L0010	ENR - UT	18080	4473	3/14/2019		1			
24500	L0010	ENR - UT	21460	4473	3/20/2019		1			
24550	L0010	ENR - UT	10860	6095	3/14/2019		1			
24285	L0067	GF - CR	78130	2369	12/6/2018		1			
Total: 196						**58**	**97**	**21**	**8**	**12**

40 [Field Data Comparison to ILI Data]

The process to adhere to the requirements of Paragraph 40 and Subparagraphs 40.a, 40.b, 40.c, is documented in the Lakehead System Integrity Remediation process. Complete ILI programs with the associated Consent Decree digs completed within the reporting period for this SAR are listed in the table below.

Within 30 days after completing excavation of all FREs identified on a pipeline based on the Initial ILI Report, Enbridge completed the required analysis of the field data obtained during all excavations for all Consent Decree Digs.

More detail of NDE Report Receipt and Approval Dates, and their documentation is provided in Paragraph 144.

Table 18: P40 ILI Programs with Feature Requiring Excavation Repaired/Mitigated						
Tool Run ID	**Line**	**Segment**	**Tool**	**Report Type**	**Last NDE Report Approved Date**	**Analysis of Field Data/Statistical Analysis Date**
6110	L0001	CR - PW	MFL4CAL	CALIPER	4/22/2019	4/29/2019
4494	L0002	GF - CR	GEMINIMFL	MFL	11/29/2018	12/3/2018
3831	L0003	CR - PW	DUOCD	PHASEDARRAY	3/18/2019	3/25/2019
3829	L0003	CR - PW	MFL4CAL	CALIPER	12/19/2018	12/24/2018
4447	L0003	GF - CR	MFL4MFL	MFL	4/23/2019	4/29/2019
2254	L0004	CR - CS	UCMUTWM	UTWM	2/14/2019	2/18/2019
4465	L0004	CS - DR	UCMUTCD	UTCD	5/17/2019	5/22/2019
2346	L0004	DR - FW	UCMUTCD	UTCD	3/6/2019	3/11/2019
4466	L0004	FW - WR	UCMUTCD	UTCD	2/15/2019	2/18/2019
4334	L0006A	AM - GT	GEMINICAL	CALIPER	5/3/2019	FR
4182	L0006A	PE - AM	GEMINIMFL	MFL	3/6/2019	3/11/2019
3809	L0006A	PE - AM	DUOCD	PHASEDARRAY	4/23/2019	4/29/2019
4473	L0010	ENR - UT	UMP	UTWM	4/25/2019	4/29/2019
6095	L0010	ENR - UT	MFL4MFL	MFL	5/9/2019	5/15/2019
2369	L0067	GF - CR	MFL4MFL	MFL	12/24/2018	12/31/2018

Three ILI programs were incorrectly identified as requiring additional excavations as the result of an applied depth bias to the original program. The affected programs were Line 3 CR-PW 2017 GE USWM+, Line 3 GF-CR 2018 Rosen AFD, and Line 4 DN-VG 2018 NDT UCMUTWM. The depth bias applied to each program was less than the one tool tolerance threshold required by the Consent Decree. These digs are currently being cancelled after being incorrectly issued. The records indicating that additional digs were added were removed from the ShareDrive and were committed to be updated following the June 2019 ILI meeting. The cause for this problem was identified to be an incorrect interpretation of Paragraph 40. Since this occurrence, the requirements for adding additional digs resulting from field-confirmed field biases was discussed with Consent Decree subject matter leads and the subject matter experts. OneSource and eDig records are also in the process of being corrected to avoid future confusion.

Delayed approval of an ILI to field data comparison for which no action was required is described in P144 '[Section D] Verification and Documentation for Paragraph 40 – P40'. Unexpected approval times for NDE report receipt and approval dates are described in P144 '[Section D] NDE Report Receipt and Approval Dates – P40'.

41 [ILI Electronic Records]

Appendix B to the Lakehead System Integrity Program Logistics Exception process includes a table summarizing the electronic record repositories to meet the 14 criteria listed in Paragraph 41. These were uploaded to OneSource as per Subparagraph 78.a, further summarized in the Section F Report below.

For each ILI investigation conducted during this reporting period, Enbridge maintained electronic records relating to ILI data, including but not limited to all 14 categories of information listed in Paragraph 41 of the Consent Decree.

Enbridge procedures require that such ILI data records be maintained for at least 5 years after termination of the Consent Decree.

(IV) Predicted Burst Pressure/Fitness for Service

42 [Predicted Burst Pressure]

Enbridge calculated the Predicted Burst Pressure of all Crack[4] and Corrosion features identified by ILI tools, in accordance with the requirements of Subsection VII.D.(IV) of the Consent Decree. These requirements are reflected in the Lakehead System Integrity Remediation process.

43 [Predicted Burst Pressure Definition]

The Lakehead System Integrity Remediation process defines the Predicted Burst Pressure of a feature as the lowest pressure area in the pipeline at the location of the feature that is predicted to result in failure of the feature.

Enbridge calculated the Predicted Burst Pressure of ILI features in accordance with the inputs and procedures in Appendix B of the Consent Decree[4], which is consistent with procedures outlined in the Lakehead System Integrity Remediation process. Enbridge calculated the Predict Burst Pressure of NDE features, as described in Paragraph 144 [Section D] Crack and Corrosion Field Burst Pressure Calculations per Appendix B in the Consent Decree – P43'.

The ILI assessment sheets documented all the Burst Pressure calculations, including the methodology and all the inputs as stated above.

[4] *Enbridge has not applied Appendix B to evaluate circumferential Crack features as it is not suitable for such features.*

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44.a-b [Initial Predicted Burst Pressure Calculations and Initial Remaining Life Calculations]

The following table summarizes the timelines for completing initial Predicted Burst Pressure calculations and initial Remaining Life calculations for all Crack[5] or Corrosion features identified in reports that were received within the reporting period. Refer to Table under Paragraph 32.a-c for a list of all valid ILI runs with reports received within the reporting period.

Table 19: P 44.a-b Initial Predicted Burst Pressure and Initial Remaining Life Calculations

Tool Run ID	Line	Segment	Tool	Report Type	Pull Date	Date Preliminary Review Completed	Data Quality Concerns?	Calculation Deadline (1)	Calculation Deadline (2)	Burst Pressure Calculation Date	Remaining Life Calculation Date
4045	01	CR-PW	UMP	Corrosion	8/18/2018	12/17/2018	No	2/11/2019	2/11/2019	12/17/2018	12/17/2018
4405	01	CR-PW	UC	Crack	9/18/2018	2/14/2019	No	4/11/2019	3/12/2019	2/14/2019	2/14/2019
6110	01	CR-PW	MFL4	Corrosion	8/15/2018	12/10/2018	No	2/4/2019	2/6/2019	12/10/2018	12/10/2018
3829	03	CR-PW	MFL4	Corrosion	8/10/2018	12/10/2018	No	2/4/2019	2/1/2019	12/10/2018	12/10/2018
3827	03	GF-CR	DUO CD	Crack	7/30/2018	12/21/2018	No	2/15/2019	1/22/2019	12/21/2018	12/21/2018
4447	03	GF-CR	MFL4	Corrosion	8/27/2018	12/21/2018	No	2/15/2019	2/19/2019	12/21/2018	12/21/2018
4487	78	GT-SK	GEMINI	Corrosion	8/10/2018	12/3/2018	No	1/28/2019	2/1/2019	12/3/2018	12/3/2018

[5] *Enbridge has not applied Appendix B to evaluate circumferential Crack features as it is not suitable for such features.*

As shown in the Table above, all calculations were completed no later than the earlier of either: (1) eight weeks after completing data quality review with respect to the feature and/or pipeline section where the feature is located; or (2) 175 Days after the ILI tool was removed from the pipeline at the conclusion of the ILI run.

45 [Retention of Electronic Records]

As outlined in the Lakehead System Integrity Remediation process, Enbridge procedures require that the company maintain electronic records documenting all Predicted Burst Pressure calculations, and all Remaining Life calculations, including inputs and dates the calculations were completed with respect to particular features, until five years after termination of the Consent Decree.

(V) Dig Selection Criteria

46.a-d [Dig Selection Criteria]

Where Enbridge has identified features meeting dig selection criteria, it has within set timeframes, excavated, and repaired or mitigated such features in accordance with Tables 1 through 5 of the Consent Decree. A summary of each dig and the related timeframes are provided in **Table 20** below.

During each excavation required under this Paragraph, Enbridge inspected all excavated portions of the pipeline and collected field measurements of features on excavated portions of the pipeline. Enbridge determined, based on an analysis of field measurement values of feature length and depth and other relevant field observations, whether excavated portions of the pipeline contained any additional features not previously identified on the dig list that satisfy one or more of the dig selection criteria.

At the time of excavation, Enbridge repaired or mitigated the features based on an analysis of field measurement values for feature length and depth or other field observations, despite being placed on the Dig List based on an analysis of ILI-reported values for feature length and depth.

During this reporting period, Enbridge followed the Lakehead System Integrity Remediation process, which meets requirements set out in Paragraph 46 of the Consent Decree.

The feature repair and mitigation of the Priority Notification features are reported in Subparagraphs 33.c-d and therefore are not included in the table below.

Table 20: P46.a, c Identified Digs

Dig ID	Line	Seg-ment	Girth Weld	Tool Run ID	Technology	Date of Discovery / Feature Added to Dig List	Repair / Mitigation Deadline	Date of Repair / Mitigation[1]
24853	L0001	CR - PW	20650	4045	UTWM	12/17/2018	6/17/2019	1/16/2019
24854	L0001	CR - PW	20820	4045	UTWM	12/17/2018	6/17/2019	1/16/2019
24855	L0001	CR - PW	57780	4045	UTWM	12/17/2018	6/17/2019	2/9/2019
24856	L0001	CR - PW	69640	4045	UTWM	12/17/2018	6/17/2019	1/29/2019

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Table 20: P46.a, c Identified Digs								
Dig ID	**Line**	**Seg-ment**	**Girth Weld**	**Tool Run ID**	**Technology**	**Date of Discovery / Feature Added to Dig List**	**Repair / Mitigation Deadline**	**Date of Repair / Mitigation[1]**
24857	L0001	CR - PW	71480	4045	UTWM	12/17/2018	6/17/2019	5/13/2019
24858	L0001	CR - PW	96820	4045	UTWM	12/17/2018	6/17/2019	3/15/2019
24859	L0001	CR - PW	100990	4045	UTWM	12/17/2018	6/17/2019	3/15/2019
24860	L0001	CR - PW	102610	4045	UTWM	12/17/2018	6/17/2019	3/15/2019
24861	L0001	CR - PW	102950	4045	UTWM	12/17/2018	6/17/2019	3/15/2019
24862	L0001	CR - PW	121630	4045	UTWM	12/17/2018	6/17/2019	FR
24863	L0001	CR - PW	144060	4045	UTWM	12/17/2018	6/17/2019	1/30/2019
24864	L0001	CR - PW	185170	4045	UTWM	12/17/2018	6/17/2019	1/22/2019
24865	L0001	CR - PW	187060	4045	UTWM	12/17/2018	6/17/2019	1/23/2019
24866	L0001	CR - PW	191630	4045	UTWM	12/17/2018	6/17/2019	2/4/2019
24867	L0001	CR - PW	207180	4045	UTWM	12/17/2018	6/17/2019	3/11/2019
25340	L0001	CR - PW	12010	4405	UTCD	2/14/2019	2/14/2020	FR
25341	L0001	CR - PW	32060	4405	UTCD	2/14/2019	8/13/2019	FR
25342	L0001	CR - PW	41650	4405	UTCD	2/14/2019	2/14/2020	FR
25343	L0001	CR - PW	98280	4405	UTCD	2/14/2019	8/13/2019	FR
25344	L0001	CR - PW	115710	4405	UTCD	2/14/2019	8/13/2019	FR
25345	L0001	CR - PW	119180	4405	UTCD	2/14/2019	2/14/2020	FR
25346	L0001	CR - PW	122610	4405	UTCD	2/14/2019	2/14/2020	FR
25347	L0001	CR - PW	126590	4405	UTCD	2/14/2019	2/14/2020	FR
25348	L0001	CR - PW	128650	4405	UTCD	2/14/2019	2/14/2020	FR
25349	L0001	CR - PW	131300	4405	UTCD	2/14/2019	8/13/2019	FR
25350	L0001	CR - PW	134870	4405	UTCD	2/14/2019	8/13/2019	FR

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Table 20: P46.a, c Identified Digs								
Dig ID	**Line**	**Seg-ment**	**Girth Weld**	**Tool Run ID**	**Technology**	**Date of Discovery / Feature Added to Dig List**	**Repair / Mitigation Deadline**	**Date of Repair / Mitigation[1]**
25351	L0001	CR - PW	151600	4405	UTCD	2/14/2019	2/14/2020	FR
25352	L0001	CR - PW	172170	4405	UTCD	2/14/2019	2/14/2020	FR
25353	L0001	CR - PW	176630	4405	UTCD	2/14/2019	2/14/2020	FR
25354	L0001	CR - PW	187180	4405	UTCD	2/14/2019	2/14/2020	FR
25355	L0001	CR - PW	194840	4405	UTCD	2/14/2019	2/14/2020	FR
25356	L0001	CR - PW	206150	4405	UTCD	2/14/2019	2/14/2020	3/6/2019
25357	L0001	CR - PW	207250	4405	UTCD	2/14/2019	8/13/2019	3/11/2019
25358	L0001	CR - PW	242340	4405	UTCD	2/14/2019	8/13/2019	5/14/2019
25359	L0001	CR - PW	249230	4405	UTCD	2/14/2019	8/13/2019	FR
25360	L0001	CR - PW	251130	4405	UTCD	2/14/2019	2/28/2020	FR
25361	L0001	CR - PW	253170	4405	UTCD	2/14/2019	2/28/2020	FR
25362	L0001	CR - PW	256500	4405	UTCD	2/14/2019	8/13/2019	FR
25363	L0001	CR - PW	259240	4405	UTCD	2/14/2019	8/13/2019	3/13/2019
25364	L0001	CR - PW	260360	4405	UTCD	2/14/2019	8/13/2019	5/21/2019
24576	L0001	CR - PW	54200	6110	CALIPER	11/16/2018	11/18/2019	12/12/2018
24578	L0001	CR - PW	111730	6110	CALIPER	11/16/2018	5/15/2019	1/10/2019
24581	L0001	CR - PW	202380	6110	CALIPER	11/16/2018	11/18/2019	1/11/2019
24584	L0001	CR - PW	204600	6110	CALIPER	11/16/2018	11/18/2019	1/30/2019
24585	L0001	CR - PW	208770	6110	CALIPER	11/16/2018	11/18/2019	1/30/2019
24586	L0001	CR - PW	213040	6110	CALIPER	11/16/2018	11/18/2019	1/22/2019
24587	L0001	CR - PW	214610	6110	CALIPER	11/16/2018	11/18/2019	1/11/2019
24589	L0001	CR - PW	239090	6110	CALIPER	11/16/2018	11/18/2019	1/31/2019

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Table 20: P46.a, c Identified Digs								
Dig ID	**Line**	**Seg-ment**	**Girth Weld**	**Tool Run ID**	**Technology**	**Date of Discovery / Feature Added to Dig List**	**Repair / Mitigation Deadline**	**Date of Repair / Mitigation[1]**
24769	L0003	CR - PW	196620	3829	CALIPER	11/29/2018	1/28/2019	12/1/2018
24795	L0003	CR - PW	57420	3829	MFL	12/10/2018	6/10/2019	1/23/2019
24796	L0003	CR - PW	57450	3829	MFL	12/10/2018	6/10/2019	1/19/2019
24797	L0003	CR - PW	57460	3829	MFL	12/10/2018	6/10/2019	1/17/2019
24798	L0003	CR - PW	57490	3829	MFL	12/10/2018	6/10/2019	1/18/2019
24799	L0003	CR - PW	57780	3829	MFL	12/10/2018	6/10/2019	2/6/2019
24800	L0003	CR - PW	57960	3829	MFL	12/10/2018	6/10/2019	2/2/2019
24801	L0003	CR - PW	58050	3829	MFL	12/10/2018	6/10/2019	2/1/2019
24802	L0003	CR - PW	58060	3829	MFL	12/10/2018	6/10/2019	1/29/2019
24803	L0003	CR - PW	58160	3829	MFL	12/10/2018	6/10/2019	2/1/2019
24804	L0003	CR - PW	58180	3829	MFL	12/10/2018	6/10/2019	2/2/2019
24805	L0003	CR - PW	58670	3829	MFL	12/10/2018	6/10/2019	FR
24806	L0003	CR - PW	58930	3829	MFL	12/10/2018	6/10/2019	1/23/2019
24807	L0003	CR - PW	59010	3829	MFL	12/10/2018	6/10/2019	1/18/2019
24808	L0003	CR - PW	59130	3829	MFL	12/10/2018	6/10/2019	1/17/2019
24809	L0003	CR - PW	59740	3829	MFL	12/10/2018	6/10/2019	3/16/2019
24810	L0003	CR - PW	59760	3829	MFL	12/10/2018	6/10/2019	3/15/2019
24811	L0003	CR - PW	59770	3829	MFL	12/10/2018	6/10/2019	3/14/2019
24812	L0003	CR - PW	60040	3829	MFL	12/10/2018	6/10/2019	2/13/2019
24813	L0003	CR - PW	60190	3829	MFL	12/10/2018	6/10/2019	2/11/2019
24814	L0003	CR - PW	85990	3829	MFL	12/10/2018	6/10/2019	3/13/2019
24815	L0003	CR - PW	104360	3829	MFL	12/10/2018	6/10/2019	3/14/2019

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Table 20: P46.a, c Identified Digs								
Dig ID	**Line**	**Seg-ment**	**Girth Weld**	**Tool Run ID**	**Technology**	**Date of Discovery / Feature Added to Dig List**	**Repair / Mitigation Deadline**	**Date of Repair / Mitigation[1]**
24816	L0003	CR - PW	225550	3829	MFL	12/10/2018	6/10/2019	FR
24817	L0003	CR - PW	225720	3829	MFL	12/10/2018	6/10/2019	5/18/2019
24818	L0003	CR - PW	229330	3829	MFL	12/10/2018	6/10/2019	3/12/2019
24819	L0003	CR - PW	238340	3829	MFL	12/10/2018	6/10/2019	5/9/2019
24820	L0003	CR - PW	238580	3829	MFL	12/10/2018	6/10/2019	5/3/2019
24829	L0003	CR - PW	4050	3830	CMFL	12/17/2018	12/17/2019	FR
24830	L0003	CR - PW	14280	3830	CMFL	12/17/2018	12/17/2019	FR
24831	L0003	CR - PW	31500	3830	CMFL	12/17/2018	6/17/2019	1/23/2019
24832	L0003	CR - PW	70970	3830	CMFL	12/17/2018	6/17/2019	2/4/2019
24833	L0003	CR - PW	134280	3830	CMFL	12/17/2018	6/17/2019	3/7/2019
24834	L0003	CR - PW	139450	3830	CMFL	12/17/2018	6/17/2019	2/16/2019
24835	L0003	CR - PW	143210	3830	CMFL	12/17/2018	6/17/2019	2/9/2019
24836	L0003	CR - PW	143280	3830	CMFL	12/17/2018	6/17/2019	2/5/2019
24837	L0003	CR - PW	143810	3830	CMFL	12/17/2018	6/17/2019	2/1/2019
24838	L0003	CR - PW	147700	3830	CMFL	12/17/2018	6/17/2019	3/2/2019
24839	L0003	CR - PW	154810	3830	CMFL	12/17/2018	6/17/2019	3/2/2019
24840	L0003	CR - PW	154960	3830	CMFL	12/17/2018	6/17/2019	3/1/2019
24841	L0003	CR - PW	160440	3830	CMFL	12/17/2018	12/17/2019	FR
24842	L0003	CR - PW	190400	3830	CMFL	12/17/2018	6/17/2019	1/29/2019
24843	L0003	CR - PW	228440	3830	CMFL	12/17/2018	12/17/2019	2/5/2019
24844	L0003	CR - PW	234250	3830	CMFL	12/17/2018	6/17/2019	12/18/2018
24845	L0003	CR - PW	237390	3830	CMFL	12/17/2018	6/17/2019	1/26/2019

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Table 20: P46.a, c Identified Digs								
Dig ID	**Line**	**Seg-ment**	**Girth Weld**	**Tool Run ID**	**Technology**	**Date of Discovery / Feature Added to Dig List**	**Repair / Mitigation Deadline**	**Date of Repair / Mitigation[1]**
24846	L0003	CR - PW	238150	3830	CMFL	12/17/2018	6/17/2019	5/15/2019
24847	L0003	CR - PW	238450	3830	CMFL	12/17/2018	6/17/2019	5/4/2019
24848	L0003	CR - PW	238590	3830	CMFL	12/17/2018	6/17/2019	5/2/2019
24849	L0003	CR - PW	239490	3830	CMFL	12/17/2018	12/17/2019	FR
24850	L0003	CR - PW	240210	3830	CMFL	12/17/2018	12/17/2019	2/5/2019
24851	L0003	CR - PW	241600	3830	CMFL	12/17/2018	12/17/2019	2/12/2019
24852	L0003	CR - PW	241610	3830	CMFL	12/17/2018	12/17/2019	2/12/2019
24406	L0003	CR - PW	132420	3831	PHASED ARRAY	9/10/2018	9/10/2019	12/10/2018
24520	L0003	GF - CR	152910	3826	CMFL	10/30/2018	11/29/2018	11/20/2018
24521	L0003	GF - CR	161860	3826	CMFL	10/30/2018	4/29/2019	12/11/2018
24522	L0003	GF - CR	183800	3826	CMFL	10/30/2018	4/29/2019	11/26/2018
24523	L0003	GF - CR	186530	3826	CMFL	10/30/2018	10/30/2019	12/16/2018
25084	L0003	GF - CR	150130	3827	PHASED ARRAY	12/24/2018	12/24/2019	FR
25085	L0003	GF - CR	150860	3827	PHASED ARRAY	12/24/2018	12/24/2019	FR
25086	L0003	GF - CR	152890	3827	PHASED ARRAY	12/24/2018	12/24/2019	FR
25087	L0003	GF - CR	153720	3827	PHASED ARRAY	12/24/2018	12/24/2019	FR
25088	L0003	GF - CR	153730	3827	PHASED ARRAY	12/24/2018	12/24/2019	FR
25089	L0003	GF - CR	154120	3827	PHASED ARRAY	12/24/2018	12/24/2019	FR

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Table 20: P46.a, c Identified Digs								
Dig ID	**Line**	**Seg-ment**	**Girth Weld**	**Tool Run ID**	**Technology**	**Date of Discovery / Feature Added to Dig List**	**Repair / Mitigation Deadline**	**Date of Repair / Mitigation[1]**
25090	L0003	GF - CR	161200	3827	PHASED ARRAY	12/24/2018	12/24/2019	2/8/2019
25091	L0003	GF - CR	161850	3827	PHASED ARRAY	12/24/2018	12/24/2019	2/14/2019
25069	L0003	GF - CR	42700	4447	MFL	12/21/2018	6/19/2019	2/21/2019
25070	L0003	GF - CR	44350	4447	MFL	12/21/2018	6/19/2019	2/25/2019
25071	L0003	GF - CR	74720	4447	MFL	12/21/2018	6/19/2019	3/1/2019
25072	L0003	GF - CR	131090	4447	MFL	12/21/2018	6/19/2019	2/20/2019
25073	L0003	GF - CR	133060	4447	MFL	12/21/2018	6/19/2019	2/22/2019
25074	L0003	GF - CR	133160	4447	MFL	12/21/2018	6/19/2019	2/23/2019
25075	L0003	GF - CR	147680	4447	MFL	12/21/2018	6/19/2019	2/20/2019
25076	L0003	GF - CR	148600	4447	MFL	12/21/2018	6/19/2019	2/27/2019
25077	L0003	GF - CR	148990	4447	MFL	12/21/2018	6/19/2019	2/26/2019
25078	L0003	GF - CR	151780	4447	MFL	12/21/2018	6/19/2019	2/13/2019
25079	L0003	GF - CR	151920	4447	MFL	12/21/2018	6/19/2019	2/15/2019
25080	L0003	GF - CR	160470	4447	MFL	12/21/2018	6/19/2019	2/19/2019
25081	L0003	GF - CR	160780	4447	MFL	12/21/2018	6/19/2019	2/25/2019
25082	L0003	GF - CR	161000	4447	MFL	12/21/2018	6/19/2019	2/22/2019
25083	L0003	GF - CR	192670	4447	MFL	12/21/2018	6/19/2019	2/14/2019
23254	L0004	CR - CS	32820	2254	UTWM	2/15/2018	2/15/2019	12/3/2018
23255	L0004	CR - CS	39160	2254	UTWM	2/15/2018	2/15/2019	1/22/2019
23491	L0004	CS - DR	27690	4465	UTCD	3/21/2018	3/21/2019	1/19/2019
23492	L0004	CS - DR	27990	4465	UTCD	3/21/2018	3/21/2019	1/17/2019

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Table 20: P46.a, c Identified Digs								
Dig ID	**Line**	**Seg-ment**	**Girth Weld**	**Tool Run ID**	**Technology**	**Date of Discovery / Feature Added to Dig List**	**Repair / Mitigation Deadline**	**Date of Repair / Mitigation[1]**
23493	L0004	CS - DR	28050	4465	UTCD	3/21/2018	3/21/2019	1/28/2019
23494	L0004	CS - DR	28060	4465	UTCD	3/21/2018	3/21/2019	1/28/2019
23495	L0004	CS - DR	28070	4465	UTCD	3/21/2018	3/21/2019	1/28/2019
23496	L0004	CS - DR	28120	4465	UTCD	3/21/2018	3/21/2019	2/12/2019
23497	L0004	CS - DR	28220	4465	UTCD	3/21/2018	3/21/2019	2/4/2019
23498	L0004	CS - DR	28950	4465	UTCD	3/21/2018	3/21/2019	2/6/2019
23499	L0004	CS - DR	30540	4465	UTCD	3/21/2018	3/21/2019	2/12/2019
23500	L0004	CS - DR	30770	4465	UTCD	3/21/2018	3/21/2019	2/27/2019
23501	L0004	CS - DR	30790	4465	UTCD	3/21/2018	3/21/2019	3/1/2019
23502	L0004	CS - DR	32380	4465	UTCD	3/21/2018	3/21/2019	1/14/2019
24269	L0004	DR - FW	29630	2346	UTCD	7/31/2018	7/31/2019	1/21/2019
24270	L0004	DR - FW	29670	2346	UTCD	7/31/2018	7/31/2019	12/17/2018
24271	L0004	DR - FW	30600	2346	UTCD	7/31/2018	7/31/2019	12/4/2018
24273	L0004	DR - FW	32780	2346	UTCD	7/31/2018	1/28/2019	12/1/2018
24274	L0004	DR - FW	33340	2346	UTCD	7/31/2018	7/31/2019	12/8/2018
24317	L0004	DR - FW	29730	2346	UTCD	8/21/2018	7/31/2019	12/15/2018
24318	L0004	DR - FW	32790	2346	UTCD	8/21/2018	7/31/2019	12/4/2018
24319	L0004	DR - FW	33420	2346	UTCD	8/21/2018	7/31/2019	12/13/2018
23897	L0004	FW - WR	16340	4466	UTCD	5/8/2018	5/8/2019	12/10/2018
23898	L0004	FW - WR	19250	4466	UTCD	5/8/2018	5/8/2019	1/17/2019
25935	L0005	PE - IR	34350	4538	CALIPER	4/24/2019	5/24/2019	5/9/2019
23931	L0006A	AM - GT	79740	4334	MFL	5/11/2018	5/13/2019	12/8/2018

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Table 20: P46.a, c Identified Digs								
Dig ID	**Line**	**Seg-ment**	**Girth Weld**	**Tool Run ID**	**Technology**	**Date of Discovery / Feature Added to Dig List**	**Repair / Mitigation Deadline**	**Date of Repair / Mitigation[1]**
23941	L0006A	AM - GT	256490	4334	MFL	5/11/2018	7/20/2020	FR
24096	L0006A	AM - GT	86600	4334	MFL	7/6/2018	7/8/2019	11/16/2018
24097	L0006A	AM - GT	87890	4334	MFL	7/6/2018	7/8/2019	12/5/2018
24098	L0006A	AM - GT	226360	4334	MFL	7/6/2018	7/27/2020	FR
24099	L0006A	AM - GT	255100	4334	MFL	7/6/2018	1/2/2019	12/8/2018
24104	L0006A	AM - GT	299220	4334	MFL	7/6/2018	1/2/2019	12/10/2018
24106	L0006A	AM - GT	329780	4334	MFL	7/5/2018	1/2/2019	12/17/2018
23677	L0006A	AM - GT	89180	4443	UTWM	4/9/2018	4/9/2019	12/4/2018
23686	L0006A	AM - GT	136750	4443	UTWM	4/9/2018	4/9/2019	12/3/2018
23701	L0006A	AM - GT	241040	4443	UTWM	4/9/2018	4/9/2019	1/11/2019
23702	L0006A	AM - GT	243240	4443	UTWM	4/9/2018	4/9/2019	2/5/2019
23703	L0006A	AM - GT	255130	4443	UTWM	4/9/2018	4/9/2019	11/27/2018
23709	L0006A	AM - GT	274947	4443	UTWM	4/9/2018	4/9/2019	12/6/2018
23713	L0006A	AM - GT	286210	4443	UTWM	4/9/2018	4/9/2019	1/27/2019
23724	L0006A	AM - GT	304370	4443	UTWM	4/9/2018	4/9/2019	3/25/2019
24781	L0006A	AM - GT	144210	4443	UTWM	12/5/2018	4/8/2019	3/18/2019
24782	L0006A	AM - GT	144220	4443	UTWM	12/5/2018	4/8/2019	3/18/2019
23316	L0006A	PE - AM	64390	3809	PHASED ARRAY	3/9/2018	3/4/2019	1/29/2019
23317	L0006A	PE - AM	64440	3809	PHASED ARRAY	3/9/2018	3/4/2019	2/4/2019
23318	L0006A	PE - AM	64650	3809	PHASED ARRAY	3/9/2018	3/4/2019	1/31/2019

Table 20: P46.a, c Identified Digs								
Dig ID	**Line**	**Seg-ment**	**Girth Weld**	**Tool Run ID**	**Technology**	**Date of Discovery / Feature Added to Dig List**	**Repair / Mitigation Deadline**	**Date of Repair / Mitigation[1]**
23319	L0006A	PE - AM	65160	3809	PHASED ARRAY	3/9/2018	3/4/2019	1/24/2019
23320	L0006A	PE - AM	65300	3809	PHASED ARRAY	3/9/2018	3/4/2019	1/26/2019
23321	L0006A	PE - AM	65830	3809	PHASED ARRAY	3/9/2018	3/4/2019	1/22/2019
23322	L0006A	PE - AM	68870	3809	PHASED ARRAY	3/9/2018	3/4/2019	2/7/2019
23179	L0006A	PE - AM	45350	4182	MFL	2/5/2018	2/5/2019	1/10/2019
23184	L0006A	PE - AM	117210	4182	MFL	2/5/2018	2/5/2019	1/19/2019
23192	L0006A	PE - AM	186710	4182	MFL	2/5/2018	2/5/2019	1/14/2019
23211	L0006A	PE - AM	249090	4182	MFL	2/5/2018	2/5/2019	1/12/2019
24499	L0010	ENR - UT	18080	4473	UTWM	10/22/2018	4/22/2019	3/14/2019
24500	L0010	ENR - UT	21460	4473	UTWM	10/22/2018	4/22/2019	3/20/2019
24550	L0010	ENR - UT	10860	6095	MFL	11/7/2018	5/6/2019	3/14/2019
24285	L0067	GF - CR	78130	2369	MFL	8/3/2018	8/5/2019	12/6/2018

TABLE NOTES:

[1] *"FR" indicates that this information is outside the reporting window of this SAR and will be included in a future SAR.*

Where applicable, Enbridge established pressure restriction requirements and imposed PPRs in accordance with Consent Decree requirements[6] as summarized in the following table. Note that when the imposition deadline of a PPR was a weekend day or United States Federal holiday, the deadline was moved to the following business day in accordance with Definition (m) of the Consent Decree.

[6] *Enbridge has not applied Appendix B to evaluate circumferential Crack features as it is not suitable for such features.*

The Priority Notification features for which Enbridge imposed PPRs are reported in Subparagraphs 33.c-d and are therefore not included in the table below.

Table 21: P 46.b. d PPRs								
PR ID	**Line**	**Segment**	**Girth Weld**	**Date of Discovery**	**Repair / Mitigation Deadline (specified in Tables 1 to 5 of the Consent Decree)**	**PPR Imposition Date**	**Repair / Mitigation Date**	**PPR Removal Date[1]**
29198	L0001	CR - PW	32060	2/14/2019	8/13/2019	2/15/2019	FR	FR
29199	L0001	CR - PW	98280	2/14/2019	8/13/2019	2/15/2019	FR	FR
29200	L0001	CR - PW	115710	2/14/2019	8/13/2019	2/15/2019	FR	FR
29201	L0001	CR - PW	131300	2/14/2019	8/13/2019	2/15/2019	6/7/2019	FR
29202	L0001	CR - PW	134870	2/14/2019	8/13/2019	2/15/2019	FR	FR
29203	L0001	CR - PW	207250	2/14/2019	8/13/2019	2/15/2019	3/11/2019	FR
29204	L0001	CR - PW	242340	2/14/2019	8/13/2019	2/15/2019	5/14/2019	FR
29205	L0001	CR - PW	249230	2/14/2019	8/13/2019	2/15/2019	FR	FR
29206	L0001	CR - PW	251130	2/14/2019	2/28/2020	2/15/2019	FR	FR
29207	L0001	CR - PW	253170	2/14/2019	2/28/2020	2/15/2019	FR	FR
29208	L0001	CR - PW	256500	2/14/2019	8/13/2019	2/15/2019	FR	FR
29209	L0001	CR - PW	259240	2/14/2019	8/13/2019	2/15/2019	3/13/2019	FR
29210	L0001	CR - PW	260360	2/14/2019	8/13/2019	2/15/2019	2/21/2019	FR
27100	L0003	CR - PW	239920	12/26/2017	6/25/2018	12/28/2017	1/25/2018	FR
28597	L0003	CR - PW	234250	12/17/2018	6/17/2019	NA[2]	12/18/2018	12/19/2018
28124	L0004	DN - VG	39450	6/12/2018	6/12/2019	6/8/2018	9/5/2018	FR
28145	L0004	DR - FW	32780	7/31/2018	1/28/2019	8/2/2018	12/1/2018	FR
27954	L0004	FW - WR	25700	3/22/2018	3/22/2019	3/23/2018	10/23/2018	FR
27955	L0004	GF - DN	48150	3/22/2018	3/22/2019	3/23/2018	6/19/2018	FR
28144	L0004	VG - PL	37520	7/17/2018	1/14/2019	7/18/2018	10/29/2018	FR
27062	L0005	BC - RW	13220	12/18/2017	6/18/2018	12/19/2017	5/17/2018	FR
27064	L0005	BC - RW	26290	12/18/2017	12/18/2018	12/19/2017	8/22/2018	FR
27067	L0005	BC - RW	63420	12/18/2017	12/18/2018	12/19/2017	8/24/2018	FR

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Table 21: P 46.b. d PPRs								
PR ID	**Line**	**Segment**	**Girth Weld**	**Date of Discovery**	**Repair / Mitigation Deadline (specified in Tables 1 to 5 of the Consent Decree)**	**PPR Imposition Date**	**Repair / Mitigation Date**	**PPR Removal Date[1]**
28067	L0005	BC - RW	12760	5/1/2018	10/29/2018	5/2/2018	8/10/2018	FR
27978	L0005	IR - NO	65420	4/10/2018	10/9/2018	4/11/2018	8/4/2018	FR
27024	L0005	PE - IR	242570	10/27/2017	4/25/2018	10/30/2017	3/1/2018	FR
27098	L0005	PE - IR	116930	12/26/2017	6/25/2018	12/27/2017	6/22/2018	FR
27099	L0005	PE - IR	230050	12/26/2017	6/25/2018	12/27/2017	6/21/2018	FR
29722	L0005	PE - IR	34350	4/24/2019	5/24/2019	4/26/2019	5/9/2019	5/9/2019
27956	L0006A	AM - GT	72020	4/9/2018	4/9/2019	4/10/2018	5/19/2018	5/10/2019
27957	L0006A	AM - GT	89180	4/9/2018	4/9/2019	4/10/2018	12/4/2018	5/10/2019
27958	L0006A	AM - GT	99630	4/9/2018	4/9/2019	4/10/2018	8/22/2018	5/10/2019
27959	L0006A	AM - GT	100680	4/9/2018	4/9/2019	4/10/2018	8/27/2018	5/10/2019
27960	L0006A	AM - GT	111040	4/9/2018	4/9/2019	4/10/2018	8/25/2018	5/10/2019
27961	L0006A	AM - GT	130890	4/9/2018	4/9/2019	4/10/2018	9/20/2018	5/10/2019
27962	L0006A	AM - GT	151570	4/9/2018	4/9/2019	4/10/2018	9/15/2018	5/10/2019
27963	L0006A	AM - GT	153530	4/9/2018	10/9/2018	4/10/2018	9/20/2018	5/10/2019
27964	L0006A	AM - GT	157490	4/9/2018	4/9/2019	4/10/2018	9/29/2018	5/10/2019
27965	L0006A	AM - GT	163690	4/9/2018	4/9/2019	4/10/2018	10/6/2018	5/10/2019
27966	L0006A	AM - GT	165800	4/9/2018	4/9/2019	4/10/2018	9/17/2018	5/10/2019
27967	L0006A	AM - GT	198680	4/9/2018	10/9/2018	4/10/2018	6/26/2018	5/10/2019
27968	L0006A	AM - GT	257720	4/9/2018	10/9/2018	4/10/2018	10/4/2018	5/10/2019
27969	L0006A	AM - GT	261430	4/9/2018	10/9/2018	4/10/2018	10/5/2018	5/10/2019
27970	L0006A	AM - GT	273260	4/9/2018	10/9/2018	4/10/2018	8/21/2018	5/10/2019
27971	L0006A	AM - GT	273330	4/9/2018	10/9/2018	4/10/2018	8/24/2018	5/10/2019
27972	L0006A	AM - GT	274200	4/9/2018	10/9/2018	4/10/2018	9/8/2018	5/10/2019
27973	L0006A	AM - GT	277560	4/9/2018	10/9/2018	4/10/2018	9/14/2018	5/10/2019
27974	L0006A	AM - GT	279270	4/9/2018	10/9/2018	4/10/2018	8/17/2018	5/10/2019
27975	L0006A	AM - GT	279280	4/9/2018	10/9/2018	4/10/2018	8/18/2018	5/10/2019

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Table 21: P 46.b. d PPRs								
PR ID	**Line**	**Segment**	**Girth Weld**	**Date of Discovery**	**Repair / Mitigation Deadline (specified in Tables 1 to 5 of the Consent Decree)**	**PPR Imposition Date**	**Repair / Mitigation Date**	**PPR Removal Date[1]**
27976	L0006A	AM - GT	288040	4/9/2018	10/9/2018	4/10/2018	8/3/2018	5/10/2019
28088	L0006A	AM - GT	81970	5/11/2018	5/13/2019	5/15/2018	11/2/2018	5/10/2019
28089	L0006A	AM - GT	83110	5/11/2018	5/13/2019	5/15/2018	10/29/2018	5/10/2019
28090	L0006A	AM - GT	112360	5/11/2018	5/13/2019	5/15/2018	9/19/2018	5/10/2019
28091	L0006A	AM - GT	129350	5/11/2018	5/13/2019	5/15/2018	10/5/2018	5/10/2019
28092	L0006A	AM - GT	129910	5/11/2018	5/13/2019	5/15/2018	9/29/2018	5/10/2019
28093	L0006A	AM - GT	300010	5/11/2018	11/7/2018	5/15/2018	8/18/2018	5/10/2019
28094	L0006A	AM - GT	300310	5/11/2018	11/7/2018	5/15/2018	8/13/2018	5/10/2019
28095	L0006A	AM - GT	303870	5/11/2018	11/7/2018	5/15/2018	10/31/2018	5/10/2019
28130	L0006A	AM - GT	72030	7/6/2018	7/8/2019	7/6/2018	11/12/2018	5/10/2019
28131	L0006A	AM - GT	86600	7/6/2018	7/8/2019	7/6/2018	11/16/2018	5/10/2019
28132	L0006A	AM - GT	87890	7/6/2018	7/8/2019	7/6/2018	12/5/2018	5/10/2019
28133	L0006A	AM - GT	226360	7/6/2018	7/27/2020	7/6/2018	FR	FR
28134	L0006A	AM - GT	255100	7/6/2018	1/2/2019	7/6/2018	12/8/2018	5/10/2019
28135	L0006A	AM - GT	266590	7/6/2018	1/2/2019	7/6/2018	10/15/2018	5/10/2019
28136	L0006A	AM - GT	295880	7/6/2018	1/2/2019	7/6/2018	10/22/2018	5/10/2019
28137	L0006A	AM - GT	299220	7/6/2018	1/2/2019	7/6/2018	12/10/2018	5/10/2019
28138	L0006A	AM - GT	304990	7/6/2018	1/2/2019	7/6/2018	11/19/2018	5/10/2019
28601	L0006A	AM - GT	144220	12/5/2018	4/8/2019	12/21/2018	3/18/2019	5/10/2019
27828	L0006A	PE - AM	24530	2/5/2018	2/5/2019	2/7/2018	9/29/2018	FR
27829	L0006A	PE - AM	63000	2/5/2018	2/5/2019	2/7/2018	3/1/2018	FR
27830	L0006A	PE - AM	117210	2/5/2018	2/5/2019	2/7/2018	1/19/2019	FR
27831	L0006A	PE - AM	135390	2/5/2018	2/5/2019	2/7/2018	2/23/2018	FR
27832	L0006A	PE - AM	142960	2/5/2018	8/6/2018	2/7/2018	7/23/2018	FR
27833	L0006A	PE - AM	148400	2/5/2018	2/5/2019	2/7/2018	8/10/2018	FR
27834	L0006A	PE - AM	216510	2/5/2018	2/5/2019	2/7/2018	8/25/2018	FR

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Table 21: P 46.b. d PPRs								
PR ID	**Line**	**Segment**	**Girth Weld**	**Date of Discovery**	**Repair / Mitigation Deadline (specified in Tables 1 to 5 of the Consent Decree)**	**PPR Imposition Date**	**Repair / Mitigation Date**	**PPR Removal Date[1]**
27835	L0006A	PE - AM	223520	2/5/2018	2/5/2019	2/7/2018	9/17/2018	FR
27836	L0006A	PE - AM	226760	2/5/2018	2/5/2019	2/7/2018	6/29/2018	FR
27837	L0006A	PE - AM	226790	2/5/2018	2/5/2019	2/7/2018	6/30/2018	FR
27838	L0006A	PE - AM	230360	2/5/2018	2/5/2019	2/7/2018	8/21/2018	FR
27840	L0006A	PE - AM	236100	2/5/2018	2/5/2019	2/7/2018	10/31/2018	FR
27841	L0006A	PE - AM	271270	2/5/2018	2/5/2019	2/7/2018	7/30/2018	FR
27916	L0006A	PE - AM	1810	3/9/2018	9/5/2018	3/12/2018	8/7/2018	FR
27917	L0006A	PE - AM	7250	3/9/2018	9/5/2018	3/12/2018	6/15/2018	FR
27918	L0006A	PE - AM	13370	3/9/2018	9/5/2018	3/12/2018	7/20/2018	FR
27919	L0006A	PE - AM	14060	3/9/2018	9/5/2018	3/12/2018	6/12/2018	FR
27920	L0006A	PE - AM	14750	3/9/2018	9/5/2018	3/12/2018	7/13/2018	FR
27921	L0006A	PE - AM	32610	3/9/2018	9/5/2018	3/12/2018	6/23/2018	FR
27922	L0006A	PE - AM	64390	3/9/2018	3/4/2019	3/12/2018	1/29/2019	FR
27923	L0006A	PE - AM	64440	3/9/2018	3/4/2019	3/12/2018	2/4/2019	FR
27924	L0006A	PE - AM	64650	3/9/2018	3/4/2019	3/12/2018	1/31/2019	FR
27925	L0006A	PE - AM	65160	3/9/2018	3/4/2019	3/12/2018	1/24/2019	FR
27926	L0006A	PE - AM	65300	3/9/2018	3/4/2019	3/12/2018	1/26/2019	FR
27927	L0006A	PE - AM	65830	3/9/2018	3/4/2019	3/12/2018	1/22/2019	FR
27928	L0006A	PE - AM	68870	3/9/2018	3/4/2019	3/12/2018	2/7/2019	FR
27929	L0006A	PE - AM	91150	3/9/2018	9/5/2018	3/12/2018	6/22/2018	FR
27930	L0006A	PE - AM	102240	3/9/2018	9/5/2018	3/12/2018	7/25/2018	FR
27931	L0006A	PE - AM	104330	3/9/2018	9/5/2018	3/12/2018	7/18/2018	FR
27932	L0006A	PE - AM	148440	3/9/2018	9/5/2018	3/12/2018	8/16/2018	FR
27933	L0006A	PE - AM	154650	3/9/2018	9/5/2018	3/12/2018	8/23/2018	FR
27934	L0006A	PE - AM	164110	3/9/2018	9/5/2018	3/12/2018	8/9/2018	FR
27935	L0006A	PE - AM	167090	3/9/2018	9/5/2018	3/12/2018	6/19/2018	FR

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Table 21: P 46.b. d PPRs								
PR ID	**Line**	**Segment**	**Girth Weld**	**Date of Discovery**	**Repair / Mitigation Deadline (specified in Tables 1 to 5 of the Consent Decree)**	**PPR Imposition Date**	**Repair / Mitigation Date**	**PPR Removal Date[1]**
27936	L0006A	PE - AM	169660	3/9/2018	9/5/2018	3/12/2018	8/9/2018	FR
27937	L0006A	PE - AM	170290	3/9/2018	9/5/2018	3/12/2018	8/4/2018	FR
27938	L0006A	PE - AM	173380	3/9/2018	9/5/2018	3/12/2018	7/28/2018	FR
27939	L0006A	PE - AM	173450	3/9/2018	9/5/2018	3/12/2018	7/30/2018	FR
27940	L0006A	PE - AM	173540	3/9/2018	9/5/2018	3/12/2018	8/4/2018	FR
27941	L0006A	PE - AM	173790	3/9/2018	9/5/2018	3/12/2018	8/14/2018	FR
27942	L0006A	PE - AM	174300	3/9/2018	9/5/2018	3/12/2018	6/7/2018	FR
27943	L0006A	PE - AM	193860	3/9/2018	9/5/2018	3/12/2018	7/19/2018	FR
27944	L0006A	PE - AM	194100	3/9/2018	9/5/2018	3/12/2018	7/21/2018	FR
27945	L0006A	PE - AM	216150	3/9/2018	9/5/2018	3/12/2018	8/29/2018	FR
27946	L0006A	PE - AM	219110	3/9/2018	9/5/2018	3/12/2018	8/17/2018	FR
27947	L0006A	PE - AM	219830	3/9/2018	9/5/2018	3/12/2018	8/16/2018	FR
27948	L0006A	PE - AM	257870	3/9/2018	9/5/2018	3/12/2018	7/23/2018	FR
27949	L0006A	PE - AM	262700	3/9/2018	9/5/2018	3/12/2018	8/27/2018	FR
27950	L0006A	PE - AM	283440	3/9/2018	9/5/2018	3/12/2018	8/3/2018	FR
27951	L0006A	PE - AM	295120	3/9/2018	9/5/2018	3/12/2018	8/4/2018	FR
27952	L0006A	PE - AM	299650	3/9/2018	9/5/2018	3/12/2018	7/17/2018	FR
27953	L0006A	PE - AM	322910	3/9/2018	9/5/2018	3/12/2018	8/18/2018	FR

TABLE NOTES:

[1] PPR is removed after the Feature Requiring Pressure Restriction is repaired or mitigated. This PPR Removal Date can be before the Repair / Mitigation Date which is the repair and mitigation date of the entire dig package that may include other features not requiring pressure restriction.

[2] PR is no longer required after the Feature Requiring Pressure Restriction is repaired.

46.e [Alternate Plans and Alternate Pressure Restrictions]

Enbridge implemented one alternate plan which will extend a corrosion dig repair/mitigation timeline during the reporting period of this SAR.

46.f [Saturated Signal Crack Feature]

The alternate plan that implemented an extended dig deadline for a corrosion FRE was not for saturated signal crack features that present a rupture threat. None of the features had lLI-measured length equal to or longer than the leak-rupture boundary as determined in accordance PR-218-05404. For purposes of this Consent Decree, the leak-rupture boundary equals two times the value of the variable "c" as determined in equation numbers 9 and 10 at p. 25 of PR-218-05404 (May 2011).

46.g [Alternate Plans and Alternate Interim Pressure Restrictions]

Enbridge has complied with the requirements of Subparagraph 46.g as described below. During the period covered by this SAR, Enbridge submitted one Alternate Plan as authorized by Subparagraph 46.d. which details of the Alternate Plan are summarized in **Table 22**.

As discussed with the ITP and EPA in multiple meetings, Enbridge identified a corrosion feature meeting the Consent Decree excavation criteria on the Line 6A Adams to Griffith (AM-GT) segment with Upstream Girth Weld number of 226360. This feature was located under a State Highway I-72 Higgins Road Dundee Illinois. While exploring other options, Enbridge began planning for the excavation on August 3, 2018 and contacted the Illinois Department of Transportation (IDOT) regarding the proposed feature maintenance under the state highway. As a result, Enbridge assessed the feasibility of using Horizontal Directional Drilling (HDD) as the required mitigation methodology. This assessment included communicating with relevant permitting agencies and Right-of-Way (ROW) stakeholders. Due to the extraordinary scope and complexity of the HDD pipe replacement project, Enbridge submitted an Alternate Plan to describe why the original feature deadline will not be feasible and the timetables of the proposed HDD mitigation.

On December 12, 2018, Enbridge provided the EPA with notification that a potential delay beyond the company's control and within the time specified in Subparagraph 46.g.(2), Enbridge submitted to the EPA in writing of the Alternate Plan within on December 21, 2018. As set forth in the table under Para 46.I, the written notification provided to EPA included a copy of the Detailed Feature Review prepared as provided in Subparagraph 46.g(1) and Subparagraph 46.g(2).d, demonstrating that Enbridge will achieve a level of safety for the FRE covered by the Alternate Plan that is greater than or equal to the safety factor intended to be achieved through compliance with the requirements of this Subsection VII.D.(V) applicable to such feature or features.

46.h [Alternate Plans and Temporary Pressure Restrictions]

The Alternate Plan submitted contained as one element of the Plan a proposed temporary pressure restriction, consistent with Paragraph 46.h.

46.i. [Compliance with applicable laws and regulations]

The Alternate Plan implemented complies with applicable laws and regulations.

46.j [Alternate Plans and Alternate Pressure Restrictions Implementation]

Enbridge has begun implementing the Alternate Plan as described in the written notifications submitted to EPA pursuant to Subparagraph 46.g(2). The initial notification was submitted on December 12, 2018, and has since been supplemented following additional communications with EPA and the ITP.

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46.k [Documentation Maintenance]

Enbridge has maintained all documentation relating to the selection and implementation of the Alternate Plan. Enbridge is prepared to make such documents available to EPA upon request, consistent with the requirements of Section X (Information Collection and Retention).

46.l [Description of Alternate Plans and Alternate Pressure Restrictions]

Enbridge implemented one Alternate Plan during the reporting period of this SAR. Details are shown in **Table 22** below.

Table 22: P46.l Alternate Plans and Alternate Pressure Restrictions	
46.e. Alternate Plan or Alternate Pressure Restrictions submitted from effective date to the end of this SAR reporting period:	4 of maximum 40
46.e. Cumulative Excavations of Joints	4 of maximum 200
46.e. Maximum number of contiguous joints	1 of maximum 10

Table 22-1: Alternate Plan #4 Details Line 6A AM-GT GW 226360	
Alternate Plan Line	6A
Alternate Plan Tool Run	2018 GEMINI MFL
Alternate Plan Joint	226360
46.l. (iv) Date Engineering Assessment was Completed OR the original feature repair/mitigation deadline	December 20, 2018
46.l.(vii) Alternate Plan Implementation Date	December 21, 2018
46.l.(iv) Alternate Plan Reporting/Notification Date	December 12, 2018
Notification was within 10 days of EA completion or 10 days before Original Feature Mitigation Deadline	Yes
Recommended Alternative(s) to Repair/Mitigate the FRE	The target corrosion FRE is located under a State Highway I-72. This pipe segment will be replaced by Horizontal Directional Drilling (HDD) and the forecast HDD In-Service Date (ISD) is in July 2020.
Number of Features Requiring Excavation covered by the Alternate Plan	1
46.c.(1) Extraordinary Scope or Complexity	Yes
46.c.(2) Replacement of Segment	Yes
46.c.(3) Alternate Plan submitted for	Yes

46.c.(1)(2)	
46.d.(i) Significantly Impair Operability	No
46.d.(ii) Significant Adverse Effect on Pipeline Integrity	No

46.l(i) Alternate Plan Detailed Description:

This Alternate Plan (AP) is prepared as provided in Paragraph 46.c of the Consent Decree (CD). The Alternate Plan addresses issues relating to the excavation and mitigation of a Feature Requiring Excavation (FRE) as defined in Paragraph 36 of the Consent Decree.

The metal loss feature (CLS 246896) on Line 6A Adams to Griffith (AM-GT) Girth Weld (GW) 226360 was reported by the 2018 BH GEMINI (Issue 2) in-line inspection (ILI) run, and issued for excavation with a Date of Discovery (DoD) of July 6, 2018, and an original Excavation Deadline of January 2, 2019.

This feature was located underneath a State Highway I-72 Higgins Road in East Dundee Illinois, and the AP further assesses the subject feature, and recommends a method for extending the dig deadline due to the extraordinary scope of the feature mitigation by HDD, while maintaining an equivalent level of safety in accordance to Paragraph 46 of the Consent Decree.

46.l.(iii) Basis for selection of the Alternate Plan and alternate timetables

Due to the location of the target FRE, pipe replacement installed by HDD techniques is determined to be the alternate mitigation methodology to address the feature in question.
The ability of Enbridge to use HDD to repair the Feature will be confirmed once a third-party HDD feasibility report that includes geotechnical analysis to verify that the soil underneath I-72 will support HDD.
The HDD project is forecast to follow the schedule (alternate timetables) as described in the Alternate Plan which Enbridge communicated to the EPA in Q1 2019 AP4 Schedule Update meeting.

Project Milestone	**Tentative Completion Date (Q1 2019 Schedule Update)**
Development and Planning	3/15/2019
In-Service Date	**7/27/2020**
Project Close-out	1/8/2021

46.l(iv) detailed description of the analysis comparing the level of safety achieved by each such Alternate Plan with the level of safety that would be achieved through compliance with the requirements of Subsection VII.D.(V)

There is a low likelihood of the target Feature being a material threat over the next 2 years because there are multiple barriers already in place at this location. Such barriers include; advanced ILI schedule from January 8, 2020 to July 31, 2019, low operating pressure regime at target Feature location with last 60-day high of 468 psi, stable-to-static corrosion growth rate as identified from historical ILI review, and minimal to stable variance in average temperature from 2012 up to August 30, 2018.

46.l.(vi) description of activities undertaken by Enbridge during the reporting period to implement

Alternate Plan

In SAR4 reporting period, the activities undertaken by Enbridge are summarized as:

- February 8, 2019 – project engineering started.
- March 14, 2019 – Enbridge engaged Right-of-Way stakeholder (ComEd) regarding project construction worksite setback requirements.
- March 15, 2019 – completed site survey.
- March 26, 2019 – submitted Ecological Compliance Assessment Tool (EcoCAT) submitted for Sterns Road site. Received response from the Illinois Department of Natural Resources (IDNR) concluding that adverse effects to state listed species are unlikely.
- April 4, 2019 – EcoCAT submitted for State Highway I-72 crossing and Dundee Station Site. Received response from IDNR on April 24 for the Dundee site. An updated submittal occurred for the State Highway I-72 crossing based on the expansion of temporary workspace to the north to facilitate stringing the pipeline for the HDD. Response from the IDNR is pending.

May 10, 2019 – Enbridge and project contractor (Barr Engineering &Environment) participated in a conference call with the US Fish and Wildlife Service to discuss the findings of the on-site assessment to support analysis of potential affects to the Rusty Patched Bumblebee from construction activities associated with the project.

47 [Dig-Selection Criteria and Pressure Restriction Requirements for Crack Features]

Enbridge has set schedules for the excavation and repair or mitigation of each Crack feature that meets one (or more) of the Dig Selection Criteria set forth in Table 1 of the Consent Decree, in accordance with the timeframes specified in column 2 of Table 1, and the PR requirements specified in column 3 of Table 1. The following tables summarize the segments containing each Crack feature that meets the above criteria.

Enbridge also issued dig packages to excavate and repair or mitigate Crack features that intersected or interacted with Corrosion features, dents, or other Geometric features, and established appropriate pressure restrictions for such interacting features, as provided in Table 5 and Paragraph 59 of the Consent Decree.[7] For more information about these interacting features, see Paragraph 59 in this SAR. These features are not included in Table 23 and Table 24.

Table 23: P47 Crack Features Requiring Excavation

Dig ID	Line	Segment	Girth Weld	Date of Discovery / Feature Added to Dig List	Repair / Mitigation Deadline	Date of Repair / Mitigation
25340	L0001	CR - PW	12010	2/14/2019	2/14/2020	FR
25341	L0001	CR - PW	32060	2/14/2019	8/13/2019	FR
25342	L0001	CR - PW	41650	2/14/2019	2/14/2020	FR

[7] *Enbridge and EPA have identified a potential disagreement regarding interpretation of Subsection VII.D.(V) as applied to certain interacting or intersecting features addressed by P59 and Table 5. The discussion of Enbridge's compliance activities here and elsewhere is based on Enbridge's interpretation of requirements for intersecting or interacting features.*

Table 23: P47 Crack Features Requiring Excavation						
Dig ID	**Line**	**Segment**	**Girth Weld**	**Date of Discovery / Feature Added to Dig List**	**Repair / Mitigation Deadline**	**Date of Repair / Mitigation**
25343	L0001	CR - PW	98280	2/14/2019	8/13/2019	FR
25344	L0001	CR - PW	115710	2/14/2019	8/13/2019	FR
25345	L0001	CR - PW	119180	2/14/2019	2/14/2020	FR
25346	L0001	CR - PW	122610	2/14/2019	2/14/2020	FR
25347	L0001	CR - PW	126590	2/14/2019	2/14/2020	FR
25348	L0001	CR - PW	128650	2/14/2019	2/14/2020	FR
25349	L0001	CR - PW	131300	2/14/2019	8/13/2019	FR
25350	L0001	CR - PW	134870	2/14/2019	8/13/2019	FR
25351	L0001	CR - PW	151600	2/14/2019	2/14/2020	FR
25352	L0001	CR - PW	172170	2/14/2019	2/14/2020	FR
25353	L0001	CR - PW	176630	2/14/2019	2/14/2020	FR
25354	L0001	CR - PW	187180	2/14/2019	2/14/2020	FR
25355	L0001	CR - PW	194840	2/14/2019	2/14/2020	FR
25356	L0001	CR - PW	206150	2/14/2019	2/14/2020	3/6/2019
25357	L0001	CR - PW	207250	2/14/2019	8/13/2019	3/11/2019
25358	L0001	CR - PW	242340	2/14/2019	8/13/2019	5/14/2019
25359	L0001	CR - PW	249230	2/14/2019	8/13/2019	FR
25360	L0001	CR - PW	251130	2/14/2019	2/28/2020	FR
25361	L0001	CR - PW	253170	2/14/2019	2/28/2020	FR
25362	L0001	CR - PW	256500	2/14/2019	8/13/2019	FR
25363	L0001	CR - PW	259240	2/14/2019	8/13/2019	3/13/2019
25364	L0001	CR - PW	260360	2/14/2019	8/13/2019	5/21/2019
24406	L0003	CR - PW	132420	9/10/2018	9/10/2019	12/10/2018
25084	L0003	GF - CR	150130	12/24/2018	12/24/2019	FR
25085	L0003	GF - CR	150860	12/24/2018	12/24/2019	FR
25086	L0003	GF - CR	152890	12/24/2018	12/24/2019	FR
25087	L0003	GF - CR	153720	12/24/2018	12/24/2019	FR
25088	L0003	GF - CR	153730	12/24/2018	12/24/2019	FR
25089	L0003	GF - CR	154120	12/24/2018	12/24/2019	FR

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Table 23: P47 Crack Features Requiring Excavation						
Dig ID	**Line**	**Segment**	**Girth Weld**	**Date of Discovery / Feature Added to Dig List**	**Repair / Mitigation Deadline**	**Date of Repair / Mitigation**
25090	L0003	GF - CR	161200	12/24/2018	12/24/2019	2/8/2019
25091	L0003	GF - CR	161850	12/24/2018	12/24/2019	2/14/2019
23491	L0004	CS - DR	27690	3/21/2018	3/21/2019	1/19/2019
23492	L0004	CS - DR	27990	3/21/2018	3/21/2019	1/17/2019
23493	L0004	CS - DR	28050	3/21/2018	3/21/2019	1/28/2019
23494	L0004	CS - DR	28060	3/21/2018	3/21/2019	1/28/2019
23495	L0004	CS - DR	28070	3/21/2018	3/21/2019	1/28/2019
23496	L0004	CS - DR	28120	3/21/2018	3/21/2019	2/12/2019
23497	L0004	CS - DR	28220	3/21/2018	3/21/2019	2/4/2019
23498	L0004	CS - DR	28950	3/21/2018	3/21/2019	2/6/2019
23499	L0004	CS - DR	30540	3/21/2018	3/21/2019	2/12/2019
23500	L0004	CS - DR	30770	3/21/2018	3/21/2019	2/27/2019
23501	L0004	CS - DR	30790	3/21/2018	3/21/2019	3/1/2019
23502	L0004	CS - DR	32380	3/21/2018	3/21/2019	1/14/2019
24317	L0004	DR - FW	29730	8/21/2018	7/31/2019	12/15/2018
24318	L0004	DR - FW	32790	8/21/2018	7/31/2019	12/4/2018
24319	L0004	DR - FW	33420	8/21/2018	7/31/2019	12/13/2018
23897	L0004	FW - WR	16340	5/8/2018	5/8/2019	12/10/2018
23898	L0004	FW - WR	19250	5/8/2018	5/8/2019	1/17/2019
23316	L0006A	PE - AM	64390	3/9/2018	3/4/2019	1/29/2019
23317	L0006A	PE - AM	64440	3/9/2018	3/4/2019	2/4/2019
23318	L0006A	PE - AM	64650	3/9/2018	3/4/2019	1/31/2019
23319	L0006A	PE - AM	65160	3/9/2018	3/4/2019	1/24/2019
23320	L0006A	PE - AM	65300	3/9/2018	3/4/2019	1/26/2019
23321	L0006A	PE - AM	65830	3/9/2018	3/4/2019	1/22/2019
23322	L0006A	PE - AM	68870	3/9/2018	3/4/2019	2/7/2019

As per the Lakehead System Integrity Program Logistics Exception process, Enbridge established PRs within the timeframes identified in Table 1 and specified in Paragraph 47 of the Consent Decree.

The following table lists the pressure restrictions imposed due to these criteria as applicable to this SAR.

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Table 24: P47 Crack Feature Pressure Restrictions									
PR ID	Line	Segment	Girth Weld	Date of Discovery	Repair / Mitigation Deadline (specified in Tables 1 to 5 of the Consent Decree)	PPR Set (psi)	PPR Imposition Date	Repair / Mitigation Date	PPR Removal Date[1]
29198	L0001	CR - PW	32060	2/14/2019	8/13/2019	755	2/15/2019	FR	FR
29199	L0001	CR - PW	98280	2/14/2019	8/13/2019	802	2/15/2019	FR	FR
29200	L0001	CR - PW	115710	2/14/2019	8/13/2019	835	2/15/2019	FR	FR
29201	L0001	CR - PW	131300	2/14/2019	8/13/2019	806	2/15/2019	6/7/2019	FR
29202	L0001	CR - PW	134870	2/14/2019	8/13/2019	1181	2/15/2019		FR
29203	L0001	CR - PW	207250	2/14/2019	8/13/2019	711	2/15/2019	3/11/2019	FR
29204	L0001	CR - PW	242340	2/14/2019	8/13/2019	621	2/15/2019	5/14/2019	FR
29205	L0001	CR - PW	249230	2/14/2019	8/13/2019	807	2/15/2019	FR	FR
29206	L0001	CR - PW	251130	2/14/2019	2/28/2020	777	2/15/2019	FR	FR
29207	L0001	CR - PW	253170	2/14/2019	2/28/2020	892	2/15/2019	FR	FR
29208	L0001	CR - PW	256500	2/14/2019	8/13/2019	934	2/15/2019	FR	FR
29209	L0001	CR - PW	259240	2/14/2019	8/13/2019	936	2/15/2019	3/13/2019	FR
29210	L0001	CR - PW	260360	2/14/2019	8/13/2019	958	2/15/2019	5/21/2019	FR
28067	L0005	BC - RW	12760	5/1/2018	10/29/2018	687	5/2/2018	8/10/2018	FR
27978	L0005	IR - NO	65420	4/10/2018	10/9/2018	657	4/11/2018	8/4/2018	FR
27916	L0006A	PE - AM	1810	3/9/2018	9/5/2018	823	3/12/2018	8/7/2018	FR
27917	L0006A	PE - AM	7250	3/9/2018	9/5/2018	805	3/12/2018	6/15/2018	FR
27918	L0006A	PE - AM	13370	3/9/2018	9/5/2018	671	3/12/2018	7/20/2018	FR
27919	L0006A	PE - AM	14060	3/9/2018	9/5/2018	654	3/12/2018	6/12/2018	FR
27920	L0006A	PE - AM	14750	3/9/2018	9/5/2018	663	3/12/2018	7/13/2018	FR
27921	L0006A	PE - AM	32610	3/9/2018	9/5/2018	618	3/12/2018	6/23/2018	FR
27922	L0006A	PE - AM	64390	3/9/2018	3/4/2019	601	3/12/2018	1/29/2019	FR
27923	L0006A	PE - AM	64440	3/9/2018	3/4/2019	614	3/12/2018	2/4/2019	FR
27924	L0006A	PE - AM	64650	3/9/2018	3/4/2019	597	3/12/2018	1/31/2019	FR
27925	L0006A	PE - AM	65160	3/9/2018	3/4/2019	612	3/12/2018	1/24/2019	FR
27926	L0006A	PE - AM	65300	3/9/2018	3/4/2019	611	3/12/2018	1/26/2019	FR

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Table 24: P47 Crack Feature Pressure Restrictions									
PR ID	Line	Segment	Girth Weld	Date of Discovery	Repair / Mitigation Deadline (specified in Tables 1 to 5 of the Consent Decree)	PPR Set (psi)	PPR Imposition Date	Repair / Mitigation Date	PPR Removal Date[1]
27927	L0006A	PE - AM	65830	3/9/2018	3/4/2019	615	3/12/2018	1/22/2019	FR
27928	L0006A	PE - AM	68870	3/9/2018	3/4/2019	586	3/12/2018	2/7/2019	FR
27929	L0006A	PE - AM	91150	3/9/2018	9/5/2018	581	3/12/2018	6/22/2018	FR
27930	L0006A	PE - AM	102240	3/9/2018	9/5/2018	557	3/12/2018	7/25/2018	FR
27931	L0006A	PE - AM	104330	3/9/2018	9/5/2018	576	3/12/2018	7/18/2018	FR
27932	L0006A	PE - AM	148440	3/9/2018	9/5/2018	595	3/12/2018	8/16/2018	FR
27933	L0006A	PE - AM	154650	3/9/2018	9/5/2018	598	3/12/2018	8/23/2018	FR
27934	L0006A	PE - AM	164110	3/9/2018	9/5/2018	613	3/12/2018	8/9/2018	FR
27935	L0006A	PE - AM	167090	3/9/2018	9/5/2018	616	3/12/2018	6/19/2018	FR
27936	L0006A	PE - AM	169660	3/9/2018	9/5/2018	618	3/12/2018	8/9/2018	FR
27937	L0006A	PE - AM	170290	3/9/2018	9/5/2018	568	3/12/2018	8/4/2018	FR
27938	L0006A	PE - AM	173380	3/9/2018	9/5/2018	609	3/12/2018	7/28/2018	FR
27939	L0006A	PE - AM	173450	3/9/2018	9/5/2018	582	3/12/2018	7/30/2018	FR
27940	L0006A	PE - AM	173540	3/9/2018	9/5/2018	588	3/12/2018	8/4/2018	FR
27941	L0006A	PE - AM	173790	3/9/2018	9/5/2018	602	3/12/2018	8/14/2018	FR
27942	L0006A	PE - AM	174300	3/9/2018	9/5/2018	605	3/12/2018	6/7/2018	FR
27943	L0006A	PE - AM	193860	3/9/2018	9/5/2018	578	3/12/2018	7/19/2018	FR
27944	L0006A	PE - AM	194100	3/9/2018	9/5/2018	597	3/12/2018	7/21/2018	FR
27945	L0006A	PE - AM	216150	3/9/2018	9/5/2018	605	3/12/2018	8/29/2018	FR
27946	L0006A	PE - AM	219110	3/9/2018	9/5/2018	614	3/12/2018	8/17/2018	FR
27947	L0006A	PE - AM	219830	3/9/2018	9/5/2018	618	3/12/2018	8/16/2018	FR
27948	L0006A	PE - AM	257870	3/9/2018	9/5/2018	600	3/12/2018	7/23/2018	FR
27949	L0006A	PE - AM	262700	3/9/2018	9/5/2018	609	3/12/2018	8/27/2018	FR
27950	L0006A	PE - AM	283440	3/9/2018	9/5/2018	600	3/12/2018	8/3/2018	FR
27951	L0006A	PE - AM	295120	3/9/2018	9/5/2018	614	3/12/2018	8/4/2018	FR
27952	L0006A	PE - AM	299650	3/9/2018	9/5/2018	607	3/12/2018	7/17/2018	FR

Table 24: P47 Crack Feature Pressure Restrictions									
PR ID	**Line**	**Segment**	**Girth Weld**	**Date of Discovery**	**Repair / Mitigation Deadline (specified in Tables 1 to 5 of the Consent Decree)**	**PPR Set (psi)**	**PPR Imposition Date**	**Repair / Mitigation Date**	**PPR Removal Date[1]**
27953	L0006A	PE - AM	322910	3/9/2018	9/5/2018	616	3/12/2018	8/18/2018	FR

TABLE NOTES:

[1] PPR is removed after the Feature Requiring Pressure Restriction is repaired or mitigated. This PPR Removal Date can be before the Repair / Mitigation Date which is the repair and mitigation date of the entire dig package that may include other features not requiring pressure restriction.

[2] "FR" indicates that this information is outside the reporting window of this SAR and will be included in a future SAR.

48 [Crack Feature Mitigation Timelines]

During this reporting period, Enbridge determined the deadline for each feature repair / mitigation as the shortest deadline specified in Tables 1, 3, or 5 of the Consent Decree, and Enbridge established the lowest operating pressure at the location of the feature which is subject to more than one pressure restriction, as outlined in the Lakehead System Integrity Remediation process.

49 [Dig Timeline Extensions]

During this reporting period, Enbridge did not extend the dig deadline from 180 days to 365 days; however one dig extension may be required. Please refer to Paragraph 144 'Line 1 CR-PW Deadline Extension Features – P49.a' for additional detail.

50 [Corrosion Features]

Enbridge has set schedules for the excavation and repair or mitigation of each Corrosion feature that meets one (or more) of the Dig Selection Criteria set forth in Table 2 of the Consent Decree, in accordance with the timeframes specified in column 2 of Table 2 for corrosion features located in any HCA, and the timeframes specified in column 3 of Table 2 for corrosion features not located within an HCA. The following table summarizes the segments containing each Corrosion feature that meets the above criteria.

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Table 25: P50 Corrosion Features Requiring Excavation						
Dig ID	**Line**	**Segment**	**Girth Weld**	**Date of Discovery / Feature Added to Dig List**	**Repair / Mitigation Deadline**	**Date of Repair / Mitigation[1]**
24853	L0001	CR - PW	20650	12/17/2018	6/17/2019	1/16/2019
24854	L0001	CR - PW	20820	12/17/2018	6/17/2019	1/16/2019
24855	L0001	CR - PW	57780	12/17/2018	6/17/2019	2/9/2019
24856	L0001	CR - PW	69640	12/17/2018	6/17/2019	1/29/2019
24857	L0001	CR - PW	71480	12/17/2018	6/17/2019	5/13/2019
24858	L0001	CR - PW	96820	12/17/2018	6/17/2019	3/15/2019
24859	L0001	CR - PW	100990	12/17/2018	6/17/2019	3/15/2019
24860	L0001	CR - PW	102610	12/17/2018	6/17/2019	3/15/2019
24861	L0001	CR - PW	102950	12/17/2018	6/17/2019	3/15/2019
24862	L0001	CR - PW	121630	12/17/2018	6/17/2019	FR
24863	L0001	CR - PW	144060	12/17/2018	6/17/2019	1/30/2019
24864	L0001	CR - PW	185170	12/17/2018	6/17/2019	1/22/2019
24865	L0001	CR - PW	187060	12/17/2018	6/17/2019	1/23/2019
24866	L0001	CR - PW	191630	12/17/2018	6/17/2019	2/4/2019
24867	L0001	CR - PW	207180	12/17/2018	6/17/2019	3/11/2019
24795	L0003	CR - PW	57420	12/10/2018	6/10/2019	1/23/2019
24796	L0003	CR - PW	57450	12/10/2018	6/10/2019	1/19/2019
24797	L0003	CR - PW	57460	12/10/2018	6/10/2019	1/17/2019
24798	L0003	CR - PW	57490	12/10/2018	6/10/2019	1/18/2019
24799	L0003	CR - PW	57780	12/10/2018	6/10/2019	2/6/2019
24800	L0003	CR - PW	57960	12/10/2018	6/10/2019	2/2/2019
24801	L0003	CR - PW	58050	12/10/2018	6/10/2019	2/1/2019
24802	L0003	CR - PW	58060	12/10/2018	6/10/2019	1/29/2019
24803	L0003	CR - PW	58160	12/10/2018	6/10/2019	2/1/2019
24804	L0003	CR - PW	58180	12/10/2018	6/10/2019	2/2/2019
24805	L0003	CR - PW	58670	12/10/2018	6/10/2019	FR
24806	L0003	CR - PW	58930	12/10/2018	6/10/2019	1/23/2019
24807	L0003	CR - PW	59010	12/10/2018	6/10/2019	1/18/2019
24808	L0003	CR - PW	59130	12/10/2018	6/10/2019	1/17/2019

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Table 25: P50 Corrosion Features Requiring Excavation						
Dig ID	**Line**	**Segment**	**Girth Weld**	**Date of Discovery / Feature Added to Dig List**	**Repair / Mitigation Deadline**	**Date of Repair / Mitigation[1]**
24809	L0003	CR - PW	59740	12/10/2018	6/10/2019	3/16/2019
24810	L0003	CR - PW	59760	12/10/2018	6/10/2019	3/15/2019
24811	L0003	CR - PW	59770	12/10/2018	6/10/2019	3/14/2019
24812	L0003	CR - PW	60040	12/10/2018	6/10/2019	2/13/2019
24813	L0003	CR - PW	60190	12/10/2018	6/10/2019	2/11/2019
24814	L0003	CR - PW	85990	12/10/2018	6/10/2019	3/13/2019
24815	L0003	CR - PW	104360	12/10/2018	6/10/2019	3/14/2019
24816	L0003	CR - PW	225550	12/10/2018	6/10/2019	FR
24817	L0003	CR - PW	225720	12/10/2018	6/10/2019	5/18/2019
24818	L0003	CR - PW	229330	12/10/2018	6/10/2019	3/12/2019
24819	L0003	CR - PW	238340	12/10/2018	6/10/2019	5/9/2019
24820	L0003	CR - PW	238580	12/10/2018	6/10/2019	5/3/2019
24832	L0003	CR - PW	70970	12/17/2018	6/17/2019	2/4/2019
24833	L0003	CR - PW	134280	12/17/2018	6/17/2019	3/7/2019
24837	L0003	CR - PW	143810	12/17/2018	6/17/2019	2/1/2019
24849	L0003	CR - PW	239490	12/17/2018	12/17/2019	FR
24520	L0003	GF - CR	152910	10/30/2018	11/29/2018	11/20/2018
24522	L0003	GF - CR	183800	10/30/2018	4/29/2019	11/26/2018
24523	L0003	GF - CR	186530	10/30/2018	10/30/2019	12/16/2018
25069	L0003	GF - CR	42700	12/21/2018	6/19/2019	2/21/2019
25070	L0003	GF - CR	44350	12/21/2018	6/19/2019	2/25/2019
25071	L0003	GF - CR	74720	12/21/2018	6/19/2019	3/1/2019
25072	L0003	GF - CR	131090	12/21/2018	6/19/2019	2/20/2019
25073	L0003	GF - CR	133060	12/21/2018	6/19/2019	2/22/2019
25074	L0003	GF - CR	133160	12/21/2018	6/19/2019	2/23/2019
25075	L0003	GF - CR	147680	12/21/2018	6/19/2019	2/20/2019
25076	L0003	GF - CR	148600	12/21/2018	6/19/2019	2/27/2019
25077	L0003	GF - CR	148990	12/21/2018	6/19/2019	2/26/2019
25078	L0003	GF - CR	151780	12/21/2018	6/19/2019	2/13/2019

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Table 25: P50 Corrosion Features Requiring Excavation						
Dig ID	**Line**	**Segment**	**Girth Weld**	**Date of Discovery / Feature Added to Dig List**	**Repair / Mitigation Deadline**	**Date of Repair / Mitigation[1]**
25079	L0003	GF - CR	151920	12/21/2018	6/19/2019	2/15/2019
25080	L0003	GF - CR	160470	12/21/2018	6/19/2019	2/19/2019
25081	L0003	GF - CR	160780	12/21/2018	6/19/2019	2/25/2019
25082	L0003	GF - CR	161000	12/21/2018	6/19/2019	2/22/2019
25083	L0003	GF - CR	192670	12/21/2018	6/19/2019	2/14/2019
23677	L0006A	AM - GT	89180	4/9/2018	4/9/2019	12/4/2018
23686	L0006A	AM - GT	136750	4/9/2018	4/9/2019	12/3/2018
23701	L0006A	AM - GT	241040	4/9/2018	4/9/2019	1/11/2019
23702	L0006A	AM - GT	243240	4/9/2018	4/9/2019	2/5/2019
23703	L0006A	AM - GT	255130	4/9/2018	4/9/2019	11/27/2018
23709	L0006A	AM - GT	274947	4/9/2018	4/9/2019	12/6/2018
23713	L0006A	AM - GT	286210	4/9/2018	4/9/2019	1/27/2019
23724	L0006A	AM - GT	304370	4/9/2018	4/9/2019	3/25/2019
23931	L0006A	AM - GT	79740	5/11/2018	5/13/2019	12/8/2018
23941	L0006A	AM - GT	256490	5/11/2018	7/20/2020	FR
24096	L0006A	AM - GT	86600	7/6/2018	7/8/2019	11/16/2018
24097	L0006A	AM - GT	87890	7/6/2018	7/8/2019	12/5/2018
24098	L0006A	AM - GT	226360	7/6/2018	7/27/2020	FR
24099	L0006A	AM - GT	255100	7/6/2018	1/2/2019	12/8/2018
24104	L0006A	AM - GT	299220	7/6/2018	1/2/2019	12/10/2018
24106	L0006A	AM - GT	329780	7/5/2018	1/2/2019	12/17/2018
24781	L0006A	AM - GT	144210	12/5/2018	4/8/2019	3/18/2019
24782	L0006A	AM - GT	144220	12/5/2018	4/8/2019	3/18/2019
23179	L0006A	PE - AM	45350	2/5/2018	2/5/2019	1/10/2019
23184	L0006A	PE - AM	117210	2/5/2018	2/5/2019	1/19/2019
23192	L0006A	PE - AM	186710	2/5/2018	2/5/2019	1/14/2019
23211	L0006A	PE - AM	249090	2/5/2018	2/5/2019	1/12/2019
24499	L0010	ENR - UT	18080	10/22/2018	4/22/2019	3/14/2019
24500	L0010	ENR - UT	21460	10/22/2018	4/22/2019	3/20/2019

Table 25: P50 Corrosion Features Requiring Excavation						
Dig ID	**Line**	**Segment**	**Girth Weld**	**Date of Discovery / Feature Added to Dig List**	**Repair / Mitigation Deadline**	**Date of Repair / Mitigation[1]**
24550	L0010	ENR - UT	10860	11/7/2018	5/6/2019	3/14/2019
24285	L0067	GF - CR	78130	8/3/2018	8/5/2019	12/6/2018

TABLE NOTE:

[1] *"FR" indicates that this information is outside the reporting window of this SAR and will be included in a future SAR.*

Enbridge also issued dig packages to excavate and repair or mitigate Corrosion features that intersect or interact with Crack features, dents, or other Geometric features, and established appropriate pressure restrictions for such interacting features, as provided in Table 5 and Paragraph 59 of the Consent Decree.[8] For more information about these interacting features, see Paragraph 59 in this SAR. These features are not included in the above table.

51 [Corrosion Feature Mitigation Timelines]

During this reporting period, Enbridge determined the deadline for each feature repair / mitigation as the shortest deadline specified in Tables 2, 3, or 5 of the Consent Decree, and Enbridge established the lowest operating pressure at the location of the feature which is subject to more than one pressure restriction, as outlined in the Lakehead System Integrity Remediation process.

52 [Corrosion Feature Pressure Restrictions]

As per the Lakehead System Integrity Program Logistics Exception process, Enbridge established PRs within the timeframes identified in Table 2 of the Consent Decree and specified in Subparagraphs 52.a and 52.b (i.e. within 2 days after determining that any Corrosion feature had a depth greater than 80 percent of the wall thickness of the joint where the feature is located, or within 2 days after determining that any feature had a RPR less than 1.00 or a Predicted Burst Pressure that is less than 1.39 x MOP).

The following table lists the PRs imposed due to these criteria in this reporting period of the SAR. Note that where the imposition deadline for PPRs was on weekend or United States Federal holiday, the imposition deadlines was moved to the following business day in accordance with Definition (Par. 10.m) of the Consent Decree.

[8] *Enbridge and EPA have identified a difference in interpretation regarding Subsection VII.D.(V) as applied to certain interacting or intersecting features addressed by P59 and Table 5. The discussion of Enbridge's compliance activities here and elsewhere is based on Enbridge's interpretation of requirements for intersecting or interacting features.*

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Table 26: P52 Corrosion Feature Pressure Restrictions									
PR ID	**Line**	**Seg-ment**	**Girth Weld**	**Date of Discovery**	**Repair / Mitigation Deadline (specified in Tables 1 to 5 of the Consent Decree)**	**PPR Set (psi)**	**PPR Imposition Date**	**Repair / Mitigation Date**	**PPR Removal Date[1]**
28124	L0004	DN - VG	39450	6/12/2018	6/12/2019	615	6/8/2018	9/5/2018	FR
27954	L0004	FW - WR	25700	3/22/2018	3/22/2019	602	3/23/2018	10/23/2018	FR
27955	L0004	GF - DN	48150	3/22/2018	3/22/2019	630	3/23/2018	6/19/2018	FR
27062	L0005	BC - RW	13220	12/18/2017	6/18/2018	731	12/19/2017	5/17/2018	FR
27064	L0005	BC - RW	26290	12/18/2017	12/18/2018	680	12/19/2017	8/22/2018	FR
27067	L0005	BC - RW	63420	12/18/2017	12/18/2018	617	12/19/2017	8/24/2018	FR
27024	L0005	PE - IR	242570	10/27/2017	4/25/2018	696	10/30/2017	3/1/2018	FR
27956	L0006A	AM - GT	72020	4/9/2018	4/9/2019	599	4/10/2018	5/19/2018	5/10/2019
27957	L0006A	AM - GT	89180	4/9/2018	4/9/2019	599	4/10/2018	12/4/2018	5/10/2019
27958	L0006A	AM - GT	99630	4/9/2018	4/9/2019	596	4/10/2018	8/22/2018	5/10/2019
27959	L0006A	AM - GT	100680	4/9/2018	4/9/2019	601	4/10/2018	8/27/2018	5/10/2019
27960	L0006A	AM - GT	111040	4/9/2018	4/9/2019	614	4/10/2018	8/25/2018	5/10/2019
27961	L0006A	AM - GT	130890	4/9/2018	4/9/2019	610	4/10/2018	9/20/2018	5/10/2019
27962	L0006A	AM - GT	151570	4/9/2018	4/9/2019	614	4/10/2018	9/15/2018	5/10/2019
27963	L0006A	AM - GT	153530	4/9/2018	10/9/2018	595	4/10/2018	9/20/2018	5/10/2019
27964	L0006A	AM - GT	157490	4/9/2018	4/9/2019	596	4/10/2018	9/29/2018	5/10/2019
27965	L0006A	AM - GT	163690	4/9/2018	4/9/2019	605	4/10/2018	10/6/2018	5/10/2019
27966	L0006A	AM - GT	165800	4/9/2018	4/9/2019	588	4/10/2018	9/17/2018	5/10/2019
27967	L0006A	AM - GT	198680	4/9/2018	10/9/2018	614	4/10/2018	6/26/2018	5/10/2019
27968	L0006A	AM - GT	257720	4/9/2018	10/9/2018	601	4/10/2018	10/4/2018	5/10/2019

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Table 26: P52 Corrosion Feature Pressure Restrictions									
PR ID	**Line**	**Seg-ment**	**Girth Weld**	**Date of Discovery**	**Repair / Mitigation Deadline (specified in Tables 1 to 5 of the Consent Decree)**	**PPR Set (psi)**	**PPR Imposition Date**	**Repair / Mitigation Date**	**PPR Removal Date[1]**
27969	L0006A	AM - GT	261430	4/9/2018	10/9/2018	607	4/10/2018	10/5/2018	5/10/2019
27970	L0006A	AM - GT	273260	4/9/2018	10/9/2018	610	4/10/2018	8/21/2018	5/10/2019
27971	L0006A	AM - GT	273330	4/9/2018	10/9/2018	602	4/10/2018	8/24/2018	5/10/2019
27972	L0006A	AM - GT	274200	4/9/2018	10/9/2018	617	4/10/2018	9/8/2018	5/10/2019
27973	L0006A	AM - GT	277560	4/9/2018	10/9/2018	614	4/10/2018	9/14/2018	5/10/2019
27974	L0006A	AM - GT	279270	4/9/2018	10/9/2018	583	4/10/2018	8/17/2018	5/10/2019
27975	L0006A	AM - GT	279280	4/9/2018	10/9/2018	588	4/10/2018	8/18/2018	5/10/2019
27976	L0006A	AM - GT	288040	4/9/2018	10/9/2018	612	4/10/2018	8/3/2018	5/10/2019
28088	L0006A	AM - GT	81970	5/11/2018	5/13/2019	610	5/15/2018	11/2/2018	5/10/2019
28089	L0006A	AM - GT	83110	5/11/2018	5/13/2019	611	5/15/2018	10/29/2018	5/10/2019
28090	L0006A	AM - GT	112360	5/11/2018	5/13/2019	610	5/15/2018	9/19/2018	5/10/2019
28091	L0006A	AM - GT	129350	5/11/2018	5/13/2019	614	5/15/2018	10/5/2018	5/10/2019
28092	L0006A	AM - GT	129910	5/11/2018	5/13/2019	609	5/15/2018	9/29/2018	5/10/2019
28093	L0006A	AM - GT	300010	5/11/2018	11/7/2018	584	5/15/2018	8/18/2018	5/10/2019
28094	L0006A	AM - GT	300310	5/11/2018	11/7/2018	607	5/15/2018	8/13/2018	5/10/2019
28095	L0006A	AM - GT	303870	5/11/2018	11/7/2018	576	5/15/2018	10/31/2018	5/10/2019
28130	L0006A	AM - GT	72030	7/6/2018	7/8/2019	605	7/6/2018	11/12/2018	5/10/2019
28131	L0006A	AM - GT	86600	7/6/2018	7/8/2019	617	7/6/2018	11/16/2018	5/10/2019
28132	L0006A	AM - GT	87890	7/6/2018	7/8/2019	617	7/6/2018	12/5/2018	5/10/2019
28133	L0006A	AM - GT	226360	7/6/2018	7/27/2020	554	7/6/2018	FR	FR
28134	L0006A	AM - GT	255100	7/6/2018	1/2/2019	613	7/6/2018	12/8/2018	5/10/2019

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Table 26: P52 Corrosion Feature Pressure Restrictions									
PR ID	**Line**	**Seg-ment**	**Girth Weld**	**Date of Discovery**	**Repair / Mitigation Deadline (specified in Tables 1 to 5 of the Consent Decree)**	**PPR Set (psi)**	**PPR Imposition Date**	**Repair / Mitigation Date**	**PPR Removal Date[1]**
28135	L0006A	AM - GT	266590	7/6/2018	1/2/2019	614	7/6/2018	10/15/2018	5/10/2019
28136	L0006A	AM - GT	295880	7/6/2018	1/2/2019	616	7/6/2018	10/22/2018	5/10/2019
28137	L0006A	AM - GT	299220	7/6/2018	1/2/2019	616	7/6/2018	12/10/2018	5/10/2019
28138	L0006A	AM - GT	304990	7/6/2018	1/2/2019	617	7/6/2018	11/19/2018	5/10/2019
28601	L0006A	AM - GT	144220	12/5/2018	4/8/2019	550	12/21/2018	3/18/2019	5/10/2019
27828	L0006A	PE - AM	24530	2/5/2018	2/5/2019	604	2/7/2018	9/29/2018	FR
27829	L0006A	PE - AM	63000	2/5/2018	2/5/2019	615	2/7/2018	3/1/2018	FR
27830	L0006A	PE - AM	117210	2/5/2018	2/5/2019	596	2/7/2018	1/19/2019	FR
27831	L0006A	PE - AM	135390	2/5/2018	2/5/2019	616	2/7/2018	2/23/2018	FR
27832	L0006A	PE - AM	142960	2/5/2018	8/6/2018	595	2/7/2018	7/23/2018	FR
27833	L0006A	PE - AM	148400	2/5/2018	2/5/2019	614	2/7/2018	8/10/2018	FR
27834	L0006A	PE - AM	216510	2/5/2018	2/5/2019	615	2/7/2018	8/25/2018	FR
27835	L0006A	PE - AM	223520	2/5/2018	2/5/2019	616	2/7/2018	9/17/2018	FR
27836	L0006A	PE - AM	226760	2/5/2018	2/5/2019	609	2/7/2018	6/29/2018	FR
27837	L0006A	PE - AM	226790	2/5/2018	2/5/2019	609	2/7/2018	6/30/2018	FR
27838	L0006A	PE - AM	230360	2/5/2018	2/5/2019	609	2/7/2018	8/21/2018	FR
27840	L0006A	PE - AM	236100	2/5/2018	2/5/2019	606	2/7/2018	10/31/2018	FR
27841	L0006A	PE - AM	271270	2/5/2018	2/5/2019	603	2/7/2018	7/30/2018	FR

TABLE NOTES:

[1] PPR is removed after the Feature Requiring Pressure Restriction is repaired or mitigated. This PPR Removal Date can be before the Repair / Mitigation Date which is the repair and mitigation date of the entire dig package that may include other features not requiring pressure restriction.

[2] "FR" indicates that this information is outside the reporting window of this SAR and will be included in a future SAR.

53 [Dig Selection Criteria for Axial Slotting, Axial Grooving, Selective Seam Corrosion and Seam Weld Anomaly A/B Features]

During this reporting period, Axial Slotting, Axial Grooving and Selective Seam Corrosion, and Weld Anomaly A/B FREs were identified, as listed in the table below.

Table 27: P53 Digs for Axial Slotting, Axial Grooving, Selective Seam Corrosion and Seam Weld anomaly A/B Features

Dig ID	Line	Segment	Girth Weld	Date of Discovery / Feature Added to Dig List	Repair / Mitigation Deadline	Date of Repair / Mitigation[1]
24829	L0003	CR - PW	4050	12/17/2018	12/17/2019	FR
24830	L0003	CR - PW	14280	12/17/2018	12/17/2019	FR
24831	L0003	CR - PW	31500	12/17/2018	6/17/2019	1/23/2019
24834	L0003	CR - PW	139450	12/17/2018	6/17/2019	2/16/2019
24835	L0003	CR - PW	143210	12/17/2018	6/17/2019	2/9/2019
24836	L0003	CR - PW	143280	12/17/2018	6/17/2019	2/5/2019
24838	L0003	CR - PW	147700	12/17/2018	6/17/2019	3/2/2019
24839	L0003	CR - PW	154810	12/17/2018	6/17/2019	3/2/2019
24840	L0003	CR - PW	154960	12/17/2018	6/17/2019	3/1/2019
24841	L0003	CR - PW	160440	12/17/2018	12/17/2019	FR
24842	L0003	CR - PW	190400	12/17/2018	6/17/2019	1/29/2019
24843	L0003	CR - PW	228440	12/17/2018	12/17/2019	2/5/2019
24845	L0003	CR - PW	237390	12/17/2018	6/17/2019	1/26/2019
24846	L0003	CR - PW	238150	12/17/2018	6/17/2019	5/15/2019
24847	L0003	CR - PW	238450	12/17/2018	6/17/2019	5/4/2019
24848	L0003	CR - PW	238590	12/17/2018	6/17/2019	5/2/2019
24850	L0003	CR - PW	240210	12/17/2018	12/17/2019	2/5/2019
24851	L0003	CR - PW	241600	12/17/2018	12/17/2019	2/12/2019
24852	L0003	CR - PW	241610	12/17/2018	12/17/2019	2/12/2019
24521	L0003	GF - CR	161860	10/30/2018	4/29/2019	12/11/2018

TABLE NOTES:

[1] *"FR" indicates that this information is outside the reporting window of this SAR and will be included in a future SAR.*

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54 [Pressure Restrictions for Axial Slotting, Axial Grooving, Selective Seam Corrosion and Seam Weld Anomaly A/B Features]

During this reporting period, PRs required as a result of Axial Slotting, Axial Grooving, Selective Seam Corrosion features and Seam Weld anomaly A/B features were imposed, as identified in Table 28 below, in accordance with Table 3 of the Consent Decree.

Table 28: P54 Axial Slotting, Axial Grooving, and Selective Seam Corrosion, and Weld Anomaly A/B Feature Pressure Restrictions

PR ID	Line	Segment	Girth Weld	Date of Discovery	Repair / Mitigation Deadline (specified in Tables 1 to 5 of the Consent Decree)	PPR Set (psi)	PPR Imposition Date	Repair / Mitigation Date	PPR Removal Date[1]
27098	L0005	PE - IR	116930	12/26/2017	6/25/2018	677	12/27/2017	6/22/2018	FR[2]
27099	L0005	PE - IR	230050	12/26/2017	6/25/2018	654	12/27/2017	6/21/2018	FR

TABLE NOTES:

[1] PPR is removed after the Feature Requiring Pressure Restriction is repaired or mitigated. This PPR Removal Date can be before the Repair / Mitigation Date which is the repair and mitigation date of the entire dig package that may include other features not requiring pressure restriction.

[2] "FR" indicates that this information is outside the reporting window of this SAR and will be included in a future SAR.

55 [Dig Selection Criteria for Dents and other Geometric Features]

As outlined in the Lakehead System Remediation Exceptions process and documented in the ILI Assessment Sheets, Enbridge will excavate and repair or mitigate each dent that met one or more of the Dig Selection Criteria set forth in Table 4 of the Consent Decree, and establish pressure restrictions for identified interacting dents as provided in Paragraph 57. Enbridge will meet the timeframes specified in column 2 of Table 4 of the Consent Decree for features located within an HCA, or timeframes specified in column 3 of Table 4 in the Consent Decree for features not located within an HCA.

56 [Dent Mitigation Timelines]

As outlined in the Lakehead System Remediation Exceptions process and documented in the ILI Assessment Sheets, Enbridge procedures provide that Enbridge will determine the deadline of a dent feature repair or mitigation as the shortest deadline. The same process provides that Enbridge will establish the PR resulting in the lowest operating pressure at the location of the feature that was subject to more than one pressure restriction.

Table 29: P56 Dent Mitigation Timelines						
Dig ID	**Line**	**Segment**	**Girth Weld**	**Date of Discovery / Feature Added to Dig List**	**Repair / Mitigation Deadline**	**Date of Repair / Mitigation[1]**
24576	L0001	CR - PW	54200	11/16/2018	11/18/2019	12/12/2018
24578	L0001	CR - PW	111730	11/16/2018	5/15/2019	1/10/2019
24581	L0001	CR - PW	202380	11/16/2018	11/18/2019	1/11/2019
24584	L0001	CR - PW	204600	11/16/2018	11/18/2019	1/30/2019
24585	L0001	CR - PW	208770	11/16/2018	11/18/2019	1/30/2019
24586	L0001	CR - PW	213040	11/16/2018	11/18/2019	1/22/2019
24587	L0001	CR - PW	214610	11/16/2018	11/18/2019	1/11/2019
24589	L0001	CR - PW	239090	11/16/2018	11/18/2019	1/31/2019

TABLE NOTE:

[1] "FR" indicates that this information is outside the reporting window of this SAR and will be included in a future SAR.

57 [Dent Feature Pressure Restrictions]

There were no dent features requiring PRs during the reporting period of this SAR.

As outlined in the Lakehead System Remediation Exceptions process and documented in the ILI Assessment Sheets, Enbridge procedures provide that Enbridge will establish PRs for dents within the timeframes identified in Paragraph 57 of the Consent Decree:

a) Within 2 days after determining that any dent feature had a depth greater than 6 percent of nominal pipeline diameter (i.e. whether the dent was located on the top or bottom of the pipeline), Enbridge limited the operating pressure at the location of the dent to not more than 80 percent of the highest actual operating pressure at that location during the last 60 days.
b) After identifying any dent features located on the top of the pipeline that had a depth that was greater than or equal to 3 percent of the nominal diameter of the pipeline; in the case of a pipeline with a nominal diameter greater than or equal to 12 inches, or 0.250 inches; in the case of any pipeline with a nominal diameter less than 12 inches; Enbridge limited the operating pressure at the location of the feature to not more than 80 percent of the highest actual operating pressure at that location during the last 60 days if the feature was not repaired or mitigated within the applicable timeframe specified in Table 4 of the Consent Decree.

58 [Dig Selection Criteria for Interacting Features]

Within 30 days after receiving any Initial ILI Report, Enbridge reviewed OneSource (i.e. the integrated database specified under Paragraph 74 of this SAR) for the purpose of determining whether any feature reported by the ILI tool intersected or interacted with a feature of a different feature type that was detected during a previous ILI Tool Run but not repaired or mitigated. Enbridge excavated and repaired all such intersecting/interacting features that met the dig selection criteria set forth in Table 5 of the Consent Decree, within the applicable timeframes identified in columns 2 and 3 of Table 5.[9] Enbridge also established PRs as provided in Table 5 and Paragraph 59 of the

[9] *Enbridge and EPA have identified a difference in interpretation regarding Subsection VII.D.(V) as applied to certain interacting or intersecting features addressed by P59 and Table 5. The discussion of Enbridge's*

Consent Decree. For more information, see the discussion in the following Paragraph (Paragraph 59) of this SAR. The following table lists the intersecting/interacting features that were identified for excavation.

Enbridge, the ITP, EPA and DOJ are drafting a modification to the consent decree in regards to this Paragraph.

As a result of extensive discussions and negotiations between Enbridge, the ITP, EPA and DOJ, Enbridge has requested that ILI vendors report all deformations down to the tool tolerance of the geometric ILI tool. Historical consent decree geometric ILI reports are being revisited by the ILI vendors to add the small geometric features less than 2% that were not previously reported. Enbridge has also updated geometric ILI work orders to request that the vendor report all deformation down to tool tolerance.

compliance activities here and elsewhere is based on Enbridge's interpretation of requirements for intersecting or interacting features.

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Table 30: P58 Interacting Features Requiring Excavation										
Dig ID	Line	Segment	Girth Weld	Tool	Report Received Date	One-Source Load Date	Date of Discovery / Feature Added to Dig List	Repair / Mitigation Deadline	Type of Inter-acting features (tool)	Date of Repair / Mitigation[1]
24769	L0003	CR - PW	196620	CALIPER	11/1/2018	11/1/2018	11/29/2018	1/28/2019	2018 MFL4 MFL	12/1/2018
24844	L0003	CR - PW	234250	CFML	11/14/2018	11/14/2018	12/17/2018	6/17/2019	2018 MFL4 CAL	12/18/2018
23254	L0004	CR - CS	32820	UTWM	1/24/2018	1/25/2018	2/15/2018	2/15/2019	2013 NDT UCMUTCD	12/3/2018
23255	L0004	CR - CS	39160	UTWM	1/24/2018	1/25/2018	2/15/2018	2/15/2019	2013 NDT UCMUTCD	1/22/2019
24269	L0004	DR - FW	29630	UTCD	6/26/2018	6/28/2018	7/31/2018	7/31/2019	2018 NDT UCMUTWM	1/21/2019
24270	L0004	DR - FW	29670	UTCD	6/26/2018	6/28/2018	7/31/2018	7/31/2019	2018 NDT UCMUTWM	12/17/2018
24271	L0004	DR - FW	30600	UTCD	6/26/2018	6/28/2018	7/31/2018	7/31/2019	2018 NDT UCMUTWM	12/4/2018
24273	L0004	DR - FW	32780	UTCD	6/26/2018	6/28/2018	7/31/2018	1/28/2019	2018 NDT UCMUTWM	12/1/2018
24274	L0004	DR - FW	33340	UTCD	6/26/2018	6/28/2018	7/31/2018	7/31/2019	2018 NDT UCMUTWM	12/8/2018
25935	L0005	PE - IR	34350	CALIPER	3/25/2019	3/26/2019	4/24/2019	5/24/2019	2017 Gemini MFL	5/9/2019

TABLE NOTE:

[1] *"FR" indicates that this information is outside the reporting window of this SAR and will be included in a future SAR.*

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59 [Pressure Restrictions for Interacting Features]

Except when described in the discussion of Paragraph 46 above, Enbridge established the PRs within the timeframes identified in Table 5 and specified in Subparagraphs 59.a and 59.b of the Consent Decree for each interacting feature identified during the period of this SAR.[10] Within two days after determining that any intersecting or interacting Crack, and/or Corrosion feature had a Predicted Burst Pressure that is less than 1.25x Established MOP, Enbridge limited operating pressure at the location of the feature to not more than 80 percent of the Predicted Burst Pressure. Within two days after determining that any dent had an indication of cracking, metal loss or a stress riser, Enbridge limited operating pressure at the location of such feature to not more than 80 percent of the highest actual operating pressure at the location of the feature over the last 60 days.

Pressure restrictions can be removed upon completion of feature repair. Pressure restriction removal is a safety critical process that is completed at Enbridge's discretion and there is no requirement to remove a pressure restriction within a certain period of time after a feature is repaired.

Enbridge, the ITP, EPA and DOJ are drafting a modification to the consent decree in regards to this Paragraph.

Table 31: P59 Interacting Features Pressure Restrictions

PR ID	Line	Seg-ment	Girth Weld	Date of Discovery	Repair / Mitigation Deadline (specified in Tables 1 to 5 of the Consent Decree)	PPR Set (psi)	PPR Imposition Date	Repair / Mitigation Date	PPR Removal Date[1]
27100	L0003	CR - PW	239920	12/26/2017	6/25/2018	322	12/28/2017	1/25/2018	FR[2]
28597	L0003	CR - PW	234250	12/17/2018	6/17/2019	158	NA[3]	12/18/2018	12/19/2018
28145	L0004	DR - FW	32780	7/31/2018	1/28/2019	622	8/2/2018	12/1/2018	FR[2]
28144	L0004	VG - PL	37520	7/17/2018	1/14/2019	613	7/18/2018	10/29/2018	FR[2]
29722	L0005	PE - IR	34350	4/24/2019	5/24/2019	463	4/26/2019	5/9/2019	5/9/2019

TABLE NOTES:

[1] PPR is removed after the Feature Requiring Pressure Restriction is repaired or mitigated. This PPR Removal Date can be before the Repair / Mitigation Date which is the repair and mitigation date of the entire dig package that may include other features not requiring pressure restriction.

[10] *Enbridge and EPA have identified a difference in interpretation regarding Subsection VII.D.(V) as applied to certain interacting or intersecting features addressed by P59 and Table 5. The discussion of Enbridge's compliance activities here and elsewhere is based on Enbridge's interpretation of requirements for intersecting or interacting features.*

[2] *"FR" indicates that this information is outside the reporting window of this SAR and will be included in a future SAR.*

[3] *PR is no longer required after the Feature Requiring Pressure Restriction is repaired.*

(VI) Remaining Life Determinations/Re-inspection Intervals

60 [Remaining Life]

Enbridge completed the Remaining Life calculation for all detected crack and corrosion features that did not meet any of the dig selection criteria. These calculations are in the ILI Assessment Sheets. Paragraph 44 of the Consent Decree discusses required calculation timeframes. The following table summarizes the remaining life calculations completed during this reporting period.

Table 32: P60 Remaining Life Calculations

Tool Run ID	Line	Segment	Tool	Report Type	Remaining Life Calculation Completion Date
4045	01	CR-PW	UMP	Corrosion	12/17/2018
4405	01	CR-PW	UC	Crack	2/14/2019
6110	01	CR-PW	MFL4	Corrosion	12/10/2018
3829	03	CR-PW	MFL4	Corrosion	12/10/2018
3827	03	GF-CR	DUO CD	Crack	12/21/2018
4447	03	GF-CR	MFL4	Corrosion	12/21/2018
4487	78	GT-SK	GEMINI	Corrosion	12/3/2018

61 [Remaining Life Clarifications]

Paragraph 61 provides instances where the remaining life does not need to be calculated for a feature.

Pursuant to Paragraph 61, Enbridge does not always calculate the remaining life for repaired or mitigated crack features. Enbridge does not utilize the other exception criteria provided in Paragraph 61.

62 [Operating Pressure Used when Determining the Remaining Life of Crack Features]

Enbridge monitors and records the actual operating parameters of pipeline or pipeline segment pressure monthly to be used in the Crack feature Remaining Life Calculation as outlined in the Lakehead System Integrity Remediation process listed below:

a. In determining the number and magnitude of pressure cycles, Enbridge uses the worst cycling quarter between the most recent valid Crack ILI tool run and the immediately prior valid Crack ILI run. The worst cycling quarter reflects the worst combination of cycling frequency and cycling magnitude for the applicable line or line segment during the period between the successive ILI runs.

b. Enbridge did not increase the operating pressure limit in any segment of a Lakehead System pipeline after determining the Remaining Life of unrepaired Crack features in accordance with this Paragraph 62.

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63 [Crack Feature Remaining Life Calculations]

Enbridge used a fatigue crack growth model and a Stress Crack Corrosion ("SCC") crack growth model, and determined the remaining life with the model yielding the fastest projected growth rate and the shortest Remaining Life as documented in the Lakehead System Integrity Remediation process Table 2, Step 7.2.

The application of fatigue crack growth model and SCC growth model to yield the fastest projected growth rate and the shortest Remaining Life is illustrated in the ILI Assessment sheets.

Paragraph 44 of the Consent Decree discusses how all calculations are completed within the required timeframes. The following table summarizes the remaining life calculations completed during this reporting period.

Table 33: P63 Crack Feature Remaining Life Calculations

Tool Run ID	Line	Segment	Tool	Report Type	Remaining Life Calculation Completion Date
4405	01	CR-PW	UC	Crack	2/14/2019
3827	03	GF-CR	DUO CD	Crack	12/21/2018

64 [Corrosion Growth Rate]

Enbridge used a Corrosion Growth Rate ("CGR") based on back-to-back corrosion runs (if available), or a historical CGR estimate for newly constructed pipeline or pipeline segment with no less than 0.005 inch per year. The application of a CGR based on back-to-back corrosion runs, or a historical CGR estimate for newly constructed pipeline or pipeline segment with no less than 0.005 inch per year, is illustrated in more detail in the ILI Assessment sheets.

65 [Maximum Interval between Successive ILIs Based on Half-Life Criteria]

Other than crack inspections for Line 2, the maximum interval between successive ILIs to assess Crack and Corrosion features did not exceed one-half of the shortest Remaining Life of any unrerpaired Crack or Corrosion feature in the pipeline, calculated as described in Subsection VII.D.(VI) as of the end of the reporting period for this SAR. Crack inspections for Line 2 are governed by the Stipulation filed with the Court on May 2, 2018. Under the Stipulation, no crack inspections on Line 2 are due until 2020.

66 [Maximum Interval between Successive ILIs – Not to Exceed Five Years]

Other than crack inspections for Line 2, Enbridge determined the interval between successive Crack, Corrosion and Geometry ILIs. The maximum interval between successive ILIs does not exceed 5 years for all Lakehead pipeline segments. The 12-month ILI schedule (May 23, 2019 – May 22, 2020) is included in Paragraph 29 of this SAR and the ILI runs completed during the reporting period of this SAR are included in Paragraph 28. Crack inspections for Line 2 are governed by the Stipulation filed with the Court on May 2, 2018. Under the Stipulation, no crack inspections on Line 2 are due until 2020. Enbridge is completing ILIs for each feature type on an annual basis for Line 3 with a challenge as identified in P144 [Section D] Line 3 CR-PW Original Line 3 Crack Inspection - P29, 66.

Section E – Measures to Prevent Spills in the Straits of Mackinac

67 [Applicability]

A discussion of Enbridge's implementation of the requirements of Subsection VII.E (Paragraphs 67 to 73) to the two Line 5 4.09-mile, 20 inch diameter pipelines (referred to herein as the "Dual Pipelines") that cross the Straits of Mackinac ("Straits") is set forth in the following sections.

68 [Span Management Program]

68.a [Integrity Protection from Currents, Ice, Spans or Vessel Anchors – Span Management Program]

Protection from Currents and Ice

Enbridge operates and maintains the Dual Pipelines to ensure that neither ice nor currents impair the integrity of either pipeline. The Dual Pipelines are continuously submerged at a depth below the surface of the Straits where ice flows do not form and they are buried near the shoreline areas, which eliminates the potential for impairment of the integrity of the Dual Pipelines caused by ice. As a precaution, Enbridge also monitors the ice data published on the United States Coast Guard (USCG) website and performs routine surveys of the shoreline areas to ensure ice does not impair the Dual Pipelines.

Independent studies completed by Dynamic Risk Assessment Systems, Inc. (final report published on State of Michigan website at https://mipetroleumpipelines.com/document/alternatives-analysis-straits-pipeline-final-report) have confirmed that there is no risk to the Dual Pipelines from ice on the deeper portions of the pipelines and the burial medium protects the pipelines from ice in the shallow portions. Burial conditions are further confirmed through periodic visual inspections using Remote Operated Vehicle ("ROV") and Autonomous Underwater Vehicle ("AUV") surveys.

Protection from Spans

In addition to ensuring the Dual Pipelines are not threatened by ice flows, Enbridge operates and maintains the Dual Pipelines to ensure the pipelines are well-supported in areas where the pipeline is suspended above the lake bed ("spans"), in compliance with the conditions of the 1953 "Easement" with the State of Michigan, so as to eliminate any potential impairment of the integrity of the Dual Pipelines caused by currents. As mentioned above, Enbridge performs periodic visual inspections of the Dual Pipelines every two years to assure that span lengths do not exceed prescribed thresholds.

The results of the 2016 and 2018 visual inspections were reported in the SAR1 and SAR3, respectively. Additional visual inspections for spans will not be conducted until 2020, pursuant to the 24 month maximum interval prescribed in the Consent Decree Paragraph 68.f.

The planned 2019 screw anchor installation schedule falls beyond the SAR4 reporting period ending May 22, 2019. Enbridge's ongoing planning and preparation activities, including the management of permit application information requests, will continue into the SAR5 reporting period with installation activities also possibly resuming within the SAR5 reporting period.

Screw anchor pre-installation work commenced shortly after the commencement of the SAR5 reporting period (May 31, 2019). Enbridge is awaiting completion of US Army Corps of Engineers ("USACE") permitting to commence anchor installations. Accordingly, Enbridge's initial Covered Work Period (CWP) 5 execution activities will focus on pre-installation coating inspection and anchor location verification.

Protection from Vessel Anchor Strikes

Enbridge operates and maintains the Dual Pipelines to reduce the risk of a vessel's anchor puncturing, dragging or otherwise damaging the pipelines. Prior to and since the effective date of the Consent Decree, Enbridge has benefitted from and supported a number of initiatives aimed at reducing the risk of a vessel anchor strike within the Straits, including:

- "DO NOT ANCHOR" signage located on the north side of the Straits of Mackinac to warn vessels of the existence of infrastructure under the lake.
- Enbridge's engagements with the US Coast Guard ("USCG") at its Sault Ste. Marie facility to remain informed on USCG plans and initiatives aimed at protecting the Straits. This includes regular attendance at Northern Michigan Area Committee planning meetings that are facilitated by the USCG and include the EPA as a stakeholder.
- Enbridge, per its agreement with the State of Michigan, monitors, reports, and will shutdown operations of the Straits crossings during sustained adverse weather conditions, where wave heights near the crossing exceed eight feet.
- Execution of annual Geometry in-line inspections (ILIs) on the Dual Pipelines in compliance with the federal Protecting our Infrastructure of Pipelines and Enhancing Safety Act of 2016 ("Pipes Act"). These inspections identify mechanical damage that may pose a threat to the integrity of the pipeline, such as that which may be caused by an anchor strike.

In the SAR2 reporting period, on November 27, 2017, Enbridge entered into its 1st Line 5 Agreement with the State of Michigan. Section E of the 1st Agreement called for Enbridge to, no later than June 30, 2018, complete a report that assesses options to mitigate the risk of a vessel's anchor puncturing, dragging, or otherwise damaging the Dual Pipelines.

During the SAR3 reporting period, on June 28, 2018, Enbridge submitted, to the State of Michigan, its report on options to mitigate the risk of a vessel's anchors puncturing, dragging or otherwise damaging Enbridge's Dual Pipelines across the Straits, pursuant to the requirements of its 1st Line 5 Agreement with the State of Michigan. The Anchor Strike report has been posted on Enbridge's website and a copy was submitted as a matter of information to the EPA on June 29, 2018. Following issuance of the report, Enbridge entered into discussions with the State of Michigan to identify which identified mitigating options should be implemented to address State concern for the integrity of Line 5. The State and Enbridge agreed to work toward a second Line 5 Agreement to document the proposed path forward for protection of the Dual Pipelines in the Straits.

On October 3, 2018, Enbridge entered into its 2nd Line 5 Agreement with the State of Michigan as a means to document agreed upon mitigation to be undertaken by Enbridge for the continued safe operation of Line 5 in the State of Michigan. Section E - Implementation of Measures to Mitigate Potential Vessel Anchor Strike of the 2nd Line 5 Agreement called for Enbridge to provide one-time funding of up to $200,000 to be used for the acquisition and installation of video cameras at the Straits. Enbridge satisfied this requirement on November 28, 2018 by issuing $200,000 cheque to State of Michigan Department of Natural Resources. Beyond the provision of funds for cameras, the 2nd Line 5 Agreement does not contain additional requirements for Enbridge regarding implementation of anchor strike mitigation technologies as the 2nd Agreement outlines the State's preference to pursue replacement of Line 5 with a tunnel utility corridor and a new pipeline that would be constructed within the tunnel.

On October 19, 2018, also within the SAR3 reporting period, Enbridge met with ITP/EPA, regarding ITP's verification of Consent Decree Subparagraph 68.a Integrity Protection from Currents, Ice, Vessel Anchors, and Spans. During this online teleconference meeting Enbridge presented (via slides) the initiatives that it has supported, or is currently engaged with, related to reducing the risk of a vessel anchor strike impairing the Dual Pipelines. Enbridge and EPA agreed to meet on a quarterly basis to provide Enbridge the opportunity to update EPA on its progress with the initiatives.

Within the SAR4 reporting period, Enbridge met with EPA/ITP February 15, 2019 and again on May 31, 2019, just outside of the SAR4 reporting period to provide updates on the status of initiatives in four areas of activity (Operations, Technology, Regulatory, and Agreements with State of Michigan) aimed at reducing the risk of a vessel anchor strike. Below is a summary of the activities' status as reported to EPA/ITP on May 31, 2019:

Table 34: P68.a Line 5 Straits – Dual Pipelines Anchor Strike Mitigation Initiatives SAR4 Update		
Initiative Area	**Activity Description**	**Activity Status**
Operations	Markup of pipeline on National Oceanic and Atmospheric Administration's marine navigation maps	Complete. Available for reference.
	Enbridge's engagement with the Great Lakes' mariner associations and other maritime agencies	Ongoing
	Recurring Pipeline Patrol via bi-weekly flights over the Straits	Ongoing
Technology	Implementation of GE ThreatScan strike detection system for indication of pipeline impacts requiring operational response	Installed: Q4 2018 Target Testing: 2019-2020
	Implementation of Vesper Marine Guardian:protect Automatic Identification System ("AIS") for potential communication with vessels in the Straits regarding pipeline safety (e.g. no anchoring instructions)	Installed in December 2017. Vessel detection functionality is operational, however, Enbridge is gathering information required to demonstrate communication capabilities of the system's "Mark" and "Prevent" functions
	Investigation of Distributed Acoustic Sensing ("DAS") system – use of fiber optic cables to detect line strikes	Following review of received Request for Information responses, Enbridge determined that DAS technology is not sufficiently developed for use in a submerged environment such as the Straits. Enbridge will no longer pursue DAS until such time the technology is proven for the proposed application.

Table 34: P68.a Line 5 Straits – Dual Pipelines Anchor Strike Mitigation Initiatives SAR4 Update		
Initiative Area	**Activity Description**	**Activity Status**
Regulatory	State of Michigan ("SoM") Governor's approval of Department of Natural Resources Emergency Rule establishing a restricted anchor and vessel equipment zone in the Straits May 24, 2018 (No direct action by Enbridge)	Complete: May 24, 2018
	Enbridge provided support and feedback (via public commentary process) on United States Coast Guard (USCG)/Department of Homeland Security ("DHS") Final Rule "Regulated Navigation Area; Straits of Mackinac, Mackinaw City, MI" (Docket Number USCG–2018–0563) issued Oct. 1, 2018 and effective Oct. 31, 2018 impacting 33 CFR Part 165. The Final Rule restricts the deployment of anchors by vessels in the regulated navigation area.	Enbridge commentary submitted August 31, 2018 Complete: Final Rule Effective October 31, 2018.
	Collaboration with the State of Michigan legislature towards new marine navigation legislation for the Straits	Ongoing

Table 34: P68.a Line 5 Straits – Dual Pipelines Anchor Strike Mitigation Initiatives SAR4 Update		
Initiative Area	**Activity Description**	**Activity Status**
Agreements with the State of Michigan	Line 5 Agreements with the State of Michigan aimed at increasing "coordination between the State and Enbridge concerning the operation and maintenance of Enbridge's Line 5 pipeline located in the State of Michigan, including enhancing its operation in the interest of the citizens of Michigan". 1st Line 5 Agreement executed November 27, 2017 2nd Line 5 Agreement executed October 3, 2018. As part of the Second Agreement, Enbridge has provided $200,000 to the USCG for video cameras to monitor compliance with the USCG Restricted Navigation Area rules restricting the deployment of vessel anchors in the Straits. A 3rd Agreement and Tunnel Agreement were executed December 19, 2018, pursuant to replacement of the Dual Pipelines with a new pipeline inside of a shared utility tunnel below the Straits. Enbridge engagement with the State regarding 3rd Agreement and Tunnel Agreement works continues. Further, on June 6, 2019 Enbridge filed a legal action in the Michigan Court of Claims seeking a ruling that the statute is constitutional. On July 1, 2019, the State of Michigan initiated a legal action in the Michigan Circuit Court in Ingham County seeking a ruling that the 1953 Easement on which the Dual Pipelines rely should be voided as contrary to the public trust, a public nuisance and as contrary to the Michigan Environmental Protection Act. The State also filed in opposition to Enbridge in the Court of Claims action, seeking a summary determination of unconstitutionality. The June and July legal actions reported on here are outside the SAR4 reporting dates of November 23, 2018, to May 22, 2019, and are included to provide context. All of this litigation will take some considerable time to be resolved. Despite the litigation, Enbridge has continued to adhere to obligations it undertook in the Third Agreement and Tunnel Agreement, including: • April 4, 2019 submission of a work plan to, in conjunction with the Close Interval Surveys required under Section I.D of the Second Agreement, visually inspect pipeline coatings at sites to be specified in the work plan along the Dual Pipelines and to repair the coating at any and all sites where Bare Metal is identified. Continuation of Close Interval Surveys. • April 29, 2019 submission of the Draft Procurement and Contracting Execution Plan submitted to MSCA on April 29, 2019 as part of the April Progress Report • Geotechnical investigations of the lakebed within the proposed tunnel easement	Ongoing

Shipping Communication Technologies

In the spirit of continuation of the Line 5 Agreements and relating to the anchor strike prevention initiatives identified in the June 28, 2018 Anchor Strike Report, Enbridge further evaluated shipping communication technologies and protective barriers.

Enbridge, through engagement with 3rd party consultation groups and the USCG, identified Vesper Marine's web-based *Guardian:protect* system as a potential tool to actively monitor and communicate with vessels in the Straits when they are in close proximity to the Dual Pipelines. Please refer to the Enbridge Anchor Strike report for details of Enbridge's evaluation of the *Guardian:protect* system. Based on its evaluation, Enbridge opted to install the *Guardian:protect* system hardware at the Enbridge Mackinaw Station on the south shore of the Straits. The system is currently functioning in a test mode.

Just outside of the SAR4 reporting period, on May 23, 2019, Enbridge met with the USCG to discuss USCG's plans for holistic monitoring of the Straits and to gain an understanding of USCG's expectations of Enbridge related to execution of that holistic plan, including potential for implementation of vessel monitoring capabilities. USCG indicated that following its planned Ports and Waterways Safety Assessment (PWSA) at the Straits in July 2019, it would have a better understanding of the operational risks associated with marine traffic in the Straits, and would subsequently make a decision on how identified risks may be mitigated. USCG also advised Enbridge that it would provide Enbridge limited support, presumably through the application process, in executing a demonstration of the *Guardian:protect* system communication capabilities. Enbridge anticipates the Federal Communications Commission ("FCC") and USCG as key permitting agencies and requires USCG approval to seek the FCC permit(s) required. On June 27, 2019, Enbridge inquired of USCG to obtain a point of contact regarding permitting at the USCG local division and to understand the type of permitting required for demonstration of the *Guardian:protect* system communication capabilities. On July 1, 2019, USCG responded, indicating that they would inquire with their Navigation Center and subsequently update Enbridge. The June and July activities reported on here are outside the SAR4 reporting dates of November 23, 2018, to May 22, 2019, and are included to provide context.

Protective Barriers

Enbridge's assessment of the use of protective barriers to further protect the Dual Pipelines from any risks posed by a vessel anchor coming in direct contact with the Dual Pipelines concluded that an engineered gravel/rock protective cover would be the most effective barrier for protecting the Dual Pipelines against an anchor strike. Enbridge determined that an engineered protective cover can be expected to result in a 99 percent reduction in the combined probability of an anchor hitting or hooking the pipeline to approximately 8×10^{-6} per year.

Though identified as a potentially effective solution, State of Michigan concern associated with barrier construction environmental and ecological impacts, and concerns about the longevity of the solution have impeded further consideration of this option. Further, Enbridge's preferred solution remains construction of a tunnel to house a replacement for Line 5 across the Straits.

Ultimately, within the SAR4 reporting period, the decision to pursue the tunnel project was formalized via the 3rd Line 5 Agreement and the Tunnel Agreement, entered into between Enbridge and the State of Michigan on December 19, 2018 and State legislation, the Public Act 359, enacted to establish a new Mackinac Straits Corridor Authority to oversee the construction and operation of a new tunnel that would house Line 5's replacement and potentially other utility cables and pipelines.

Shortly following authentication of the 3rd Line 5 Agreement and the Tunnel Agreement, in January 2019, the State of Michigan swore in a new administration, replacing its Attorney General and Governor. On January 1, 2019, newly elected Michigan Governor Gretchen Whitmer requested a legal opinion from newly elected Attorney General Dana Nessel regarding the constitutionality of the Enbridge Line 5 pipeline legislation and the

new Mackinac Straits Corridor Authority created by outgoing governor, Rick Snyder. On March 29, 2019, Attorney General Nessel opined that the law that authorized the Tunnel Agreement is "unconstitutional," and that such status could be applied retroactively. Accordingly, Governor Whitmer quickly followed with an executive directive that ordered state agencies and departments "to halt any actions" related to Public Act 359. Since this time, Enbridge has been in negotiation with the new State administration to determine a path forward for Line 5. Despite the ongoing legal discussions surrounding the validity of the 3rd Agreement and Tunnel Agreement, Enbridge has continued to fulfill its obligations surrounding reporting and deliverables identified in the December 2018 agreements. It should be noted that these agreements do not include explicit requirements related to anchor strike mitigation.

Enbridge will continue to keep the ITP/EPA informed of next steps regarding implementation of any new anchor strike mitigation measures via future SAR and quarterly reporting.

April 2018 Third Party Anchor Strike

On April 1, 2018, the Dual Pipelines sustained damage as a result of what Enbridge believes to be a vessel anchor strike. The anchor strike resulted in damage to the American Transmission Company's ("ATC") submarine power transmission cables, and that incident was reported by ATC to the USCG. Enbridge was also notified of the ATC cable damage on April 3, 2018. As a precautionary measure Enbridge shut down Line 5 for a period of time as detailed in SAR2. Since the time of notification of the incident, Enbridge has supported the USCG investigation, and has taken steps to ensure the ongoing safe operation of the Dual Pipelines. Enbridge has also provided regular updates to stakeholders (including PHMSA, EPA and Michigan state agencies) regarding Enbridge's response to the anchor strike incident.

A summary of the actions taken by Enbridge in response to the event during the second SAR period was presented in the SAR2 report. In the SAR3 reporting period, Enbridge reported on activities undertaken related to its precautionary operation of the Dual Pipelines under the Point Pressure Restrictions (PPR), imposed as a result of the anchor strike, until final repairs were completed and the PPR's were removed and the pipelines returned to normal service on July 30, 2018.

In the SAR4 reporting period, on May 21, 2019, the National Transportation Safety Board (NTSB) issued a Marine Accident Brief detailing the anchor strike incident. The Brief identified that the probable cause of the anchor strike was the failure of the anchor detail to secure the barge's starboard anchor, and the improper adjustment of the anchor brake band after the engineering crew replaced the brake liner, the combination of which allowed the anchor and chain to pay out under way. The USCG investigation into the third party anchor strike has not yet been released.

Based on the NTSB probable causes identified, Enbridge has not identified any specific deficiency in its operation or damage prevention programming that, if modified, would have prevented the anchor strike. Enbridge is awaiting the USCG report and will again, based on the findings of that report, assess whether or not the report includes lessons learned for operators in the Straits that can be used to reduce the risk of a future anchor strike.

68.b [Screw Anchor Support]

As reported in SAR1, Enbridge and EPA filed with the Court the "First Modification" to the Consent Decree on June 1, 2017. The First Modification revised the deadline for installing screw anchors to account for the data/information generated as a result of the 2016 visual inspection. The First Modification states that Enbridge has until October 1, 2018, to install screw anchors on uncovered portions of the Dual Pipelines that: (1) are located in water deeper than 65 feet; and (2) are not subject to requirements applicable to portions of the Dual Pipelines where the pipe is suspended above the lakebed without supports for more than 75 feet.

Enbridge reported the results of the 2016 anchor installation program in SAR1, confirming that the distance between screw anchor supports on the Dual Pipelines complies with the 75-foot maximum span length criteria set forth in the Easement issued by the State of Michigan.

As a preventative measure to minimize the potential for the unsupported spans on the Dual Pipelines to exceed the 75-foot maximum span length criteria, Enbridge and EPA agreed to criteria for the installation of additional screw anchor supports. The scope, schedule, and associated procedures for the installation of those additional screw anchor supports is described in the 2018 Screw Anchor Work Plan (SAWP) that was submitted to EPA on May 17, 2018, and approved by the EPA on May 22, 2018.

A portion of the work described in the 2018 Screw Anchor Work Plan was originally planned to be completed in 2017, but was postponed due to permitting delays and to allow for such work to be completed at the same time as the planned installation of additional screw anchors in 2018. As a result, a total of 70 anchors had been planned for installation in 2018. Of the 70 anchors to be installed, Enbridge had already obtained installation permit approval for 22 anchors in late 2017, pursuant to its 2016 application. Despite having installation permits for 22 anchors, Enbridge identified, during the 2018 work execution window, the need for 3 additional excavation permits to be able to install anchors at three of the 22 sites. Additionally, and pursuant to the 2018 ROV visual inspections for spans, Enbridge determined that an additional 3 installation permits would be required to permit installation of the 2018-identified screw anchors. Accordingly, Enbridge submitted applications to install 48 anchors and to excavate 3 sites pursuant to anchor installation on March 15, 2018 and submitted installation applications for an additional 3 anchors on September 21, 2018.

Within the reporting period of the second SAR, Enbridge received federal and state permits required for the installation of 22 screw anchors; however, USACE's approval to install the additional 51 anchors remained pending. In accordance with Paragraph 175 of the Consent Decree, Enbridge notified EPA on May 22, 2018, that the USACE's issuance of permits required to install the additional 51 screw anchors may be delayed. Enbridge's notification to EPA was submitted following the USACE informing Enbridge on May 17 that it had "determined that the project does not qualify for nationwide permit authorization, and we will review it under our standard permit process." The USACE re-confirmed its position to Enbridge during a June 4, 2018 meeting in Detroit to discuss Enbridge's permit application.

Within the third SAR reporting period, in addition to Enbridge's May 22, 2018 notification of potential delay and in response to EPA inquiry, Enbridge provided EPA additional information regarding the USACE permitting process via correspondence from Steptoe & Johnson LLP (Steptoe) on May 25, 2018.

Further to Enbridge's May 22, 2018 notification of possible delay, Enbridge issued a letter to EPA on June 1, 2018 requesting that EPA confirm that "any delay beyond October 1, 2018 resulting from the Army Corps' refusal to permit the installation of required screw anchors results from an event arising from causes beyond the control of Enbridge, and qualifies as a Force Majeure event under P174 and P175 of the Consent Decree". EPA approved Enbridge's request to invoke Force Majeure on September 21, 2018, thereby extending Enbridge's timeline to install "any screw anchors required pursuant to Paragraph 68" to October 1, 2019.

Anchor installation for the 2018 program began May 22, 2018 with a target program completion date of October 1, 2018. This schedule was established based on the assumption that all required permitting for 70 anchors would be received by July 15, 2018. The proposed specific locations of the anchors to be installed in 2018 were provided to the marine contractor, Ballard, as well as the Independent Third Party (ITP) prior to commencement of work. Following consultation with the ITP, two screw anchors were installed more than 5 ft. from the initially planned locations. The screw anchor installation locations can be referenced in the 2018 Screw Anchor Work Plan Interim Report (2018 SAWP Interim Report) submitted to EPA on August 31, 2018 and revised on September 21, 2018.

Per Paragraph 68.e. of the Consent Decree, Enbridge is required to submit a final report to the EPA within 60 days of completion of the SAWP. As Enbridge was not able to install all of the required anchors during the

CWP 3, Enbridge obtained permission from EPA to prepare an interim report of 2018 activities outlining the screw anchor installation work completed to date, including any deviations from the SA Work Plan, to satisfy Paragraph 68.e. requirements. Enbridge submitted the original version of this interim report to EPA on August 31, 2018, as noted above, and submitted a revised version on September 21, 2018 to capture revisions clarifying information provided in a table summarizing screw anchor installation locations, as agreed to during a September 13, 2018 conference call between EPA, ITP, and Enbridge. This report will be supplemented with a final report following the completion of any screw anchor installations in 2019.

As communicated in the 2018 Screw Anchor Work Plan Interim Report, coating inspections were performed prior to screw anchor installation to ensure that saddles were not installed directly on calcareous deposits. Enbridge chose to complete coating repairs at two locations prior to the anchor installations due to calcareous deposits being discovered at the desired landing locations.

Despite the program delays associated with obtaining federal permits for 51 screw anchors, to date, Enbridge has installed a total of 19 of the 70 planned screw anchors referenced in the 2018 SAWP. The installation of the remaining 51 screw anchors has been deferred due to delays in Enbridge receiving permitting as described above.

Within the SAR4 reporting period (November 23, 2018 to May 22, 2019), due to the seasonal winter conditions Enbridge did not install any screw anchors on Line 5 as part of its Span Management program. Frozen lake conditions preclude screw anchor vessels from being on the water and divers from being submerged for periods sufficient for screw anchor installation. Accordingly, Enbridge has focused its efforts on ongoing planning and preparation activities, including the management of permit application information requests, contract administration, and regulatory reporting,

Enbridge's current anchor installation program scope of work includes the now-completed installation of 19 anchors installed in 2018, and an additional 51 anchors that are planned to be installed in 2019 (or later if permits are not timely received), per an agreement between EPA and Enbridge set forth in the proposed third modification to the Decree. USACE requested certain additional information from Enbridge on October 19, 2018, to which Enbridge responded on November 19, 2018.

The public comment period for the permit applications ended February 17, 2019. Based on comments received, Enbridge was not required to provide response to comments or additional information to USACE. On April 29, 2019, USACE notified Enbridge that they had granted an extension to Tribes in the State of Michigan to file commentary on the application until May 23, 2019. Subsequently, on May 31, 2019, USACE notified Enbridge that it had further extended the Tribes' commentary period to June 7, 2019. The May and June activities reported on here are outside the SAR4 reporting dates of November 23, 2018, to May 22, 2019, and are included to provide context.

At the time of the SAR4 reporting period, ending May 22, 2019, Enbridge had not been requested by USACE to provide response to Tribes' comments. Shortly thereafter, via letter dated June 11, 2019, USACE provided Enbridge a copy of the Tribes' comments, indicating Enbridge was not obligated to provide response to comments. Additionally in the letter, USACE issued Enbridge an information request related to screw anchor installation safety. Enbridge prepared a response to the information request, which was submitted during the SAR5 reporting period on June 24, 2019 and supplemented on June 26, 2019. Enbridge has also received a July 1, 2019 request for additional information from the USACE and is at present working on a response to be submitted as quickly as possible during the SAR5 reporting period.

68.c [Periodic Visual Inspections]

Enbridge's compliance with Subparagraph 68.c was previously reported in Enbridge's SAR1. As this section of the SAR3 focuses on the span management requirements of Paragraph 68.c, Biota inspection results are discussed under Paragraph 69 of this document.

Enbridge executed visual underwater inspections in 2018 using ROV between July 16, 2018 and July 24, 2018 and using AUV between June 27, 2018 and July 22, 2018 to confirm that the Dual Pipelines located within 65-feet of water or less are continuously covered on the floor of the Straits and to identify whether unsupported spans of more than 75 feet had developed in the Straits since the last ROV inspection in 2016.

Enbridge's marine consultant, Ballard, conducted its initial review of data in August 2018 and finalized its 2018 Straits of Mackinac Pipeline Inspection Report (2018 Ballard Report) on September 5, 2018. The 2018 Ballard Report indicated that no spans of more than 75 feet were observed by Ballard. Enbridge submitted a copy of the Ballard Report to EPA via correspondence from Steptoe on September 21, 2018. Detailed span information can be found in the 2018 Ballard Report attachments (ROV Span Data East/West Legs; Coverage Details).

68.d [Underwater Inspection Repairs]

Anchor installation for the 2018 program began May 22, 2018 with a target program completion date of October 1, 2018. This schedule was established based on the assumption that all required permitting for 70 anchors would be received by July 15, 2018. The proposed specific locations of the anchors to be installed in 2018 were provided to the marine contractor, Ballard, as well as the Independent Third Party (ITP) prior to commencement of work. Following consultation with the ITP, two screw anchors were installed more than 5 ft. from the initially planned locations. The screw anchor installation locations can be referenced in the 2018 Screw Anchor Work Plan Interim Report (2018 SAWP Interim Report) submitted to EPA on August 31, 2018 and revised on September 21, 2018.

68.e [Screw Anchor Report]

Per Paragraph 68.e. of the Consent Decree, Enbridge is required to submit a final report to the EPA within 60 days of completion of the SAWP, summarizing the findings of the underwater visual inspections and associated repair work (anchor installations). As Enbridge had received federal and state permits for only 19 of the planned 70 screw anchors at the time of construction kickoff, the installation of 51 of the planned screw anchors and resultant completion of the SAWP was in jeopardy of being delayed to 2019. Accordingly, EPA allowed Enbridge, to satisfy Paragraph 68.e. requirements, to prepare an interim report outlining the screw anchor installation work completed to date, including any deviations from the 2018 SAWP. The 2018 SAWP Interim Report would then be supplemented with a final report following the completion of the screw anchor installations in 2019.

Accordingly, pursuant to 68.b, Enbridge completed the installation of the 19 permitted anchors by July 2, 2018 and pursuant to 68.e, submitted the 2018 SAWP Interim Report to EPA on August 31, 2018. The SAWP Interim Report was re-issued to EPA on September 21, 2018 to capture revisions clarifying information provided in a table summarizing screw anchor installation locations, as agreed to during a September 13, 2018 conference call between EPA, ITP, and Enbridge.

As reported above under Section 68.c, Enbridge executed visual underwater inspections in 2018 using ROV between July 16, 2018 and July 24, 2018 and using AUV between June 27, 2018 and July 22, 2018 to determine if any additional screw anchor installations may be required pursuant to Paragraph 68.d.

Following receipt of the Ballard Report, Enbridge analyzed data collected by Ballard to determine whether spans have developed that would require installation of additional anchors to comply with the Third Proposed Modification of the Decree, once that Modification is approved by the Court. Enbridge's analysis showed that three additional anchors would be required under the Third Modification, assuming that it is approved as submitted to the Court:

Table 35: P68.e Line 5 Straits – 2018 Additional Anchor Installation Locations		
Proposed Anchor (per Third Modification)	**Chainage at Anchor (ft.)**	**Requirement Criteria**
EAP-29	2000311.71	Compliance with Subparagraph 68.b.(2)(A) of the Third Modification: installation of anchors in any area where spans are separated by a "touchdown length" where the pipeline rests on a sandy lake bottom for a distance of less than 40 feet
EAP-30	2007996.76	Compliance with Subparagraph 68.b.(2).(A) of the Third Modification: installation of anchors in any area where a span exceeds 65 feet.
WAP-21	2005083.24	Compliance with Subparagraph 68.b.(2).(A) of the Third Modification: installation of anchors in any area where spans are separated by a "touchdown length" where the pipeline rests on a sandy lake bottom for a distance of less than 40 feet

Enbridge submitted federal applications for permits to install the three newly identified screw anchors on September 21, 2018. As Enbridge had strong reason to believe that permits for installation of these three screw anchors would not be issued in time for installation by October 1, 2018, Enbridge requested that EPA consider these additional screw anchors be part of its pending June 1, 2018 force majeure request pursuant to 'i['i[17 4-75 of the Decree. EPA approved Enbridge's request for invocation of force majeure on September 21, 2018 and as a result, extended the deadline for installation of any screw anchors required pursuant to Paragraph 68 to October 1, 2019.

Following the 2018 ROV inspection, the current scope of the Screw Anchor Work Plan is summarized as follows:

Table 36: P68.e Line 5 Straits – Screw Anchor Work Plan Scope Summary			
Scope Description	**East Span**	**West Span**	**Total**
Anchors installed in 2018	5	14	19
Anchors Proposed in 2017 (to be installed in 2019 or as soon as possible following completion of permitting)	28	23	51
New Anchors Proposed Based on 2018 ROV Results	2	1	3
TOTAL	**35**	**38**	**73**

68.f [Periodic Visual Inspections of the Dual Pipelines]

Enbridge plans to complete another underwater visual inspection of each of the Dual Pipelines on or before July 31, 2020. Following that inspection, Enbridge will complete any necessary repairs in accordance with Subparagraph 68.d, and will prepare and submit any required reports in accordance with Subparagraph 68.e.

69.a Biota Investigation]

On August 14, 2017, Enbridge initiated implementation of the biota investigation work in accordance with the schedule set out in the Biota Investigation Work Plan ("BIWP"), as described in Subparagraph 69.b and approved by the EPA on June 13, 2017. The BIWP identified the necessary steps for Enbridge to further study the impact of biota and mussels on the Dual Pipelines. This work included review of the potential for the biota to create a corrosive environment and the potential impact of the weight of the biomass on the pipelines.

The timing of Enbridge's implementation of the BIWP is discussed in more detail in Subparagraph 69.c, including Enbridge's submission of the final Biota Investigation report to EPA.

69.b [Biota Investigation Work Plan]

Enbridge's compliance with Paragraph 69.b was previously reported in Enbridge's first SAR.

69.c [Biota Work Plan Implementation]

Enbridge implemented the BIWP in accordance with the schedule approved by EPA, as reported in the first SAR. In accordance with Subparagraph 69.c, Enbridge submitted a final report to EPA on March 29, 2018, summarizing the results of the Biota Investigation.

The final Biota Investigation report concludes that mussels and other biota have not impaired the Dual Pipelines; therefore, Enbridge is not required under Subparagraph 68.c to supplement the final Biota Investigation report with a proposed work plan.

On May 31, 2018, Enbridge provided responses to subsequent ITP information requests related to the Biota Investigation issued on May 3, 2018. As a matter of information, a copy of the final Biota Inspection report was provided to the State of Michigan on April 6, 2018.

The ITP issued a report, dated July 27, 2018, documenting their final review of the Enbridge March 29, 2018 BIWP Report. The ITP included a recommendation that the EPA approve the Enbridge report upon one of the following conditions:

- *That Enbridge provide additional factual evidence, along with an explanation of the technical basis, for the conclusion that there is no evidence that the biota is providing a more hospitable environment for the colonization of SRBs on the external coating of the pipelines*
- *That Enbridge revise their conclusions to align more accurately with the facts.*

On March 11, 2019, Enbridge submitted revisions to the BIWP report to the EPA addressing the ITP's recommendations. On March 12, 2019, the ITP recommended to the EPA that they approve Enbridge's submitted revisions.

70 [In-Line Inspections of the Dual Pipelines]

Enbridge's compliance with Paragraph 70 was previously reported in the first SAR. Enbridge considers this requirement to be complete; however, Enbridge will provide relevant updates, if any, in future SARs.

71 [Investigation and Repair of Axially-aligned Features]

Enbridge's compliance with Paragraph 71 was previously reported in the first SAR. As indicated in the first SAR, Enbridge completed a hydrostatic pressure test. Enbridge considers this requirement to be complete; however, Enbridge will provide relevant updates, if any, in future SARs.

72 [Pipeline Movement Investigation]

Enbridge's compliance with Paragraph 72 was previously reported in the first SAR. Enbridge continues to conduct annual circumferential crack inspections in accordance with the Pipes Act. No Features Requiring Excavation have been identified as a result of those inspections. Further reporting specific to the ILI inspections and corresponding assessment and results is included in SAR3, Section D.

73 [Quarterly Inspections Using Acoustic Leak Detection Tool]

During this SAR reporting period, Enbridge conducted inspections on each of the Dual Pipelines using an acoustic ILI tool that is capable of detecting sounds associated with small leaks as the tool travels through the pipelines, as shown in the following table.

The acoustic inspections of the Dual Pipelines conducted during this reporting period did not identify any auditory signals that are indicative of small leaks on the Dual Pipelines.

Table 37: P73 Acoustic Leak Detection

Segment	Quarter	Leak Detection Tool Run Date
Dual Pipelines (West and East)	Q1 2019	2/19/2019
Dual Pipelines (West and East)	Q2 2019	5/8/2019

Section F – Data Integration

74 [Feature Integration Database]

Enbridge has operated and maintained the feature integration database, referred to as “OneSource,” for all pipelines in the Lakehead System since August 14, 2013. OneSource integrates information about corrosion, crack and geometry features from multiple in-line investigations of the pipelines and field measurement devices. OneSource enables pipeline integrity-management personnel to identify and track any changes to any feature detected by an ILI tool on successive investigations (i.e. Tool Runs) of the pipeline. In addition, the Feature Match Macro tool uses data from OneSource and permits pipeline integrity personnel to identify and track changes to features detected by successive tool runs, including enabling personnel to evaluate features detected by different types of ILI tools that may overlap or otherwise interact.

75 [Integrity Management Personnel Access to Feature Integration Database]

Enbridge integrity management personnel, including, but not limited to, personnel responsible for identifying FREs, are able to access and view OneSource from their desktop computers and laptops. Personnel are able to search for and view a schematic image of each joint of each Lakehead System pipeline. The information provided with each schematic image has not changed from the information as presented in the first SAR.

A difficulty encountered when implementing this requirement is related to the ITP's access to the OneSource data. Currently, data covering all of the Enbridge-owned pipelines is included in OneSource – it is not limited only to the Lakehead System Pipelines that are subject to the terms of the Consent Decree. While this allows Enbridge to access and store the OneSource data consistently across its entire pipeline system, Enbridge is unable to provide a gateway to the ITP that includes only OneSource data for Lakehead System Pipelines covered by the Consent Decree. Enbridge has demonstrated that the data required under Paragraph 75 is readily accessible to personnel responsible for identifying FREs.

76 [Successive ILI Data Sets]

Enbridge's compliance with this Paragraph is fully explained in Enbridge's first SAR, and Enbridge's compliance with Paragraph 76 has not changed since the submission of the first SAR. As explained in the first SAR, with respect to each type of ILI Tool, the OneSource includes at least two successive ILI data sets – one data set from the most recently completed ILI Tool Run and another data set from the second most-recently completed ILI Tool Run.

77 [Update of OneSource Database]

The dates used to demonstrate Enbridge's compliance with this Paragraph are explained in Enbridge's first SAR and are still applicable to this SAR. Enbridge provided a demonstration of compliance in regards to Paragraph 77 on October 23, 2018. Enbridge completed all field investigations of the Consent Decree excavations related to the particular ILI Tool Runs and uploaded NDE reports into OneSource after the field investigation report was quality reviewed and approved by Enbridge as summarized in the following table. The 60 day deadline was met except for two Line 5 NDE reports that were uploaded later than 60 days after NDE report approval which are described in detail in Paragraph 145 '[Section F] Line 5 ENO-EMA and WNO-WMA GEOPIG NDE OneSource Upload Deadline – P77.d'. Software challenges that caused the incorrect dates to be reported in OneSource are described in Paragraph 144 '[Section F] Line 3 CR-PW DUOCD NDE OneSource Upload Deadline – P77.d' and '[Section F] Line 5 PE-IR 2017 USCD+ NDE Report OneSource Load Data Re-Upload – P77.d'.

Table 38: P77 OneSource NDE Updates

Tool Run ID	Line	Segment	Tool	Report Type	Last NDE Report Approved Date	OneSource Load Date
6110	L0001	CR - PW	MFL4CAL	Geometry	4/22/2019	5/21/2019
4494	L0002	GF - CR	GEMINIMFL	Corrosion	11/29/2018	12/7/2018
3829	L0003	CR - PW	MFL4CAL	Geometry	12/19/2018	1/2/2019
3831	L0003	CR - PW	DUOCD	Crack	3/18/2019	5/14/2019[1]
4447	L0003	GF - CR	MFL4MFL	Corrosion	4/23/2019	5/21/2019
2254	L0004	CR - CS	UCMUTWM	Corrosion	2/14/2019	3/26/2019
4465	L0004	CS - DR	UCMUTCD	Crack	5/17/2019	6/6/2019
2346	L0004	DR - FW	UCMUTCD	Crack	3/6/2019	5/6/2019
4466	L0004	FW - WR	UCMUTCD	Crack	2/15/2019	3/26/2019

Table 38: P77 OneSource NDE Updates						
Tool Run ID	**Line**	**Segment**	**Tool**	**Report Type**	**Last NDE Report Approved Date**	**OneSource Load Date**
4466	L0004	FW - WR	UCMUTWM	Corrosion	11/7/2018	11/27/2018
2323	L0004	VG - PL	UCMUTCD	Crack	11/13/2018	12/3/2018
6087	L0005	ENO - EMA	GEOPIG	Geometry	9/20/2018	6/5/2019[2]
2150	L0005	PE - IR	USCD+	Crack	9/27/2018	10/10/2018[3]
6088	L0005	WNO - WMA	GEOPIG	Geometry	9/19/2018	6/5/2019[2]
4334	L0006A	AM - GT	GEMINICAL	Geometry	5/3/2019	5/21/2019
4443	L0006A	AM - GT	UMP	Corrosion	5/8/2019	FR
3809	L0006A	PE - AM	DUOCD	Crack	4/23/2019	5/21/2019
4182	L0006A	PE - AM	GEMINIMFL	Corrosion	3/6/2019	5/6/2019
4473	L0010	ENR - UT	UMP	Corrosion	4/25/2019	5/21/2019
6095	L0010	ENR - UT	MFL4MFL	Corrosion	5/9/2019	5/21/2019
2369	L0067	GF - CR	MFL4MFL	Corrosion	12/24/2018	1/4/2019

TABLE NOTE:

[1] NDE report upload to OneSource on 5/14/2019, re-uploaded to OneSource on 5/21/2019. Please refer to Paragraph 144 '[Section F] Line 3 CR-PW DUOCD NDE Report OneSource Upload Deadline – P77.d'.

[2] NDE report upload to OneSource later than 60 days after approval refer to Paragraph 145 '[Section F] Line 5 ENO-EMA and WNO-WMA GEOPIG NDE Report OneSource Upload Deadline – P77.d'.

[3] NDE report uploaded to OneSource on 10/1/2018, re-uploaded to OneSource on 6/5/2019. Please refer to Paragraph 144 '[Section F] Line 5 PE-IR USCD+ NDE Report OneSource Upload Deadline – P77.d'.

78 [Mandatory Use of Data Integration Database to Prepare Dig List]

78.a [OneSource ILI Updates]

All new ILI reports have been uploaded to OneSource within 29 days after Enbridge's receipt of the Initial ILI report. The dates upon which the various ILI reports were received by Enbridge and uploaded to OneSource during this third SAR reporting period are listed in the following table.

Table 39: P78.a OneSource ILI Updates						
Tool Run ID	**Line**	**Segment**	**Tool**	**Report Type**	**Report Received Date**	**OneSource Load Date**
4405	01	CR-PW	UC	Crack	1/15/2019	1/17/2019
3827	03	GF-CR	DUO CD	Crack	11/27/2018	11/27/2018

Table 39: P78.a OneSource ILI Updates						
Tool Run ID	**Line**	**Segment**	**Tool**	**Report Type**	**Report Received Date**	**OneSource Load Date**
4447	03	GF-CR	MFL4	Corrosion	11/23/2018	11/23/2018
4534	05	ENO-EMA	GeoPig - BHGE	Geometry	4/18/2019	4/22/2019
6099	05	MA-BC	UCc	Crack	3/7/2019	3/11/2019
2724	05	PE-IR	UCc	Crack	3/29/2019	4/1/2019
4538	05	PE-IR	GeoPig - BHGE	Geometry	3/25/2019	3/26/2019
4541	05	WNO-WMA	GeoPig - BHGE	Geometry	4/18/2019	4/22/2019[1]
6176	06A	AM-GT	UCc	Crack	4/16/2019	4/16/2019
2305	06A	PE-AM	UCc	Crack	3/18/2019	3/18/2019
4610	61	PE-FN	GEMINI - BHGE	Geometry	4/26/2019	4/26/2019

TABLE NOTE:

[1] An issue was encountered when uploading this report to OneSource as reported in Paragraph 144 '[Section F] Line 5 WNO-WMA GeoPig OneSource Upload – P77.d'.

78.b [OneSource Interacting Features]

Enbridge completes ILI data review for the purpose of identifying any overlapping, or otherwise interacting, features that may qualify as FREs (in reference to Paragraph 35), within 180 days after the ILI tool is removed from the pipeline, as outlined in the "Lakehead System Integrity Remediation Process" Table 2, Step 7.0. The FREs resulting from this review are summarized in Paragraph 58. The following table summarizes the reviews completed during this reporting period.

Table 40:P78.b Interacting Feature Reviews						
Tool Run ID	**Line**	**Segment**	**Tool**	**Report Type**	**Pull Date**	**Interacting Feature Review**
4045	01	CR-PW	UMP	Corrosion	8/18/2018	12/17/2018
4405	01	CR-PW	UC	Crack	9/18/2018	2/14/2019
6110	01	CR-PW	MFL4	Corrosion	8/15/2018	12/10/2018
3829	03	CR-PW	MFL4	Corrosion	8/10/2018	12/10/2018
3827	03	GF-CR	DUO CD	Crack	7/30/2018	12/21/2018
4447	03	GF-CR	MFL4	Corrosion	8/27/2018	12/21/2018
4447	03	GF-CR	MFL4	Geometry	8/27/2018	11/26/2018

Table 40:P78.b Interacting Feature Reviews						
Tool Run ID	**Line**	**Segment**	**Tool**	**Report Type**	**Pull Date**	**Interacting Feature Review**
4534	05	ENO-EMA	GeoPig - BHGE	Geometry	2/19/2019	5/17/2019
6099	05	MA-BC	UCc	Crack	11/8/2018	4/8/2019
2724	05	PE-IR	UCc	Crack	11/29/2018	4/29/2019
4538	05	PE-IR	GeoPig - BHGE	Geometry	1/24/2019	4/24/2019
4541	05	WNO-WMA	GeoPig - BHGE	Geometry	2/20/2019	5/17/2019
6176	06A	AM-GT	UCc	Crack	12/17/2018	4/23/2019
2305	06A	PE-AM	UCc	Crack	11/16/2018	4/12/2019
4487	78	GT-SK	GEMINI	Corrosion	8/10/2018	12/3/2018

Section G – Leak Detection and Control Room Operations

(I) Assessment of Alternative Leak Detection Technologies

79-80 [Create and Submit ALD Report]

Based on ITP's Task 3 Verification Status Record ("VSR3") for Covered Work Period 3 ("CWP3")[11] dated April 8, 2019, Paragraphs 79-80 are considered "Complete"[12]; therefore, no further reporting is required for this and for future SARs.

(II) Report on Feasibility of Installing External Leak Detection System at the Straits of Mackinac

81-83 [Create and Submit ALD Mackinac Report]

Based on Independent Third Party ("ITP") Task 3 Verification Status Record ("VSR3") for Covered Work Period 3 ("CWP3") dated April 8, 2019, Paragraphs 81-83 are considered "Complete"; therefore, no further reporting is required for this and for future SARs.

[11] *CWP3 covers SAR3 time period from May 23, 2018 to November 22, 2018*
[12] *Per page 2 of VSR3 ITP report, "Complete – The ITP has verified that Enbridge completed the applicable CD Requirement in compliance with the CD and that no further verification is required." (Reference: 4.8.2019 CWP 3 Verification Status - FINAL – Confidential)*

(III) Requirements for New Lakehead Pipelines and Replacement Segments

84 [Applicability]

The New US Line 3 is considered a "New Lakehead Pipeline" as defined in Paragraph 84.a. Design requirements set forth in Subsection VII.G.(III) were applied to Enbridge's mainline leak detection equipment standard, which is being followed in the design engineering phase of the Line 3 Replacement project ("L3R").

Other than the ongoing L3R project, there are no other Replacement Segments or New Lakehead Pipelines executed during this reporting period.

85 [Installation of Flowmeters]

The L3R project has designed the New US Line 3 to include flow meters which will be installed at all locations where oil (a) enters into the pipeline, (b) leaves the pipeline, or (c) passes through a pump station. Once the flowmeters are installed, they will be commissioned on the Supervisory Control and Data Acquisition ("SCADA") system and integrated into MBS and Rupture Detection System ("RDS"), to continuously monitor flow data under all conditions, including during Startup and Shutdown.

As of the date of writing this semi-annual report, there are new US Line 3 MBS Segments that are expected to hold volumes of oil exceeding 45,000 cubic meters ("m3"). Enbridge will ensure that these segments will comply with the requirements set forth in Paragraphs 88 or 90.

86 [Installation of Flowmeters on Pipelines that Utilize In-line Batch Interface Tools]

The new US Line 3 has been designed to operate without the use of batch interface tools for the purpose of physically separating products in the pipeline; therefore, the requirement set forth under this Paragraph will not be applicable to L3R project.

87 [Installation of Other Instrumentation]

The L3R project has designed the New US Line 3 to include installation of the following instrumentation:

- Pressure transducer/transmitter will be installed at locations and segments as required by Paragraph 87.a.
- Skin-based temperature transducer/transmitter will be installed at locations and valve segments as required by Paragraph 87.b.

Once the instrumentation is installed on the new US Line 3, they will be commissioned on the SCADA system, and integrated into MBS and RDS to continuously provide real-time pressure and temperature data, including during Startup and Shutdown periods.

88 [Establishment of Material Balance System ("MBS") Segments]

Enbridge's definition of "MBS Segment" aligns with the definition in Paragraph 88.

The new US Line 3 will have MBS segments that are expected to have volumes of oil exceeding 45,000 m3. Enbridge has and will continue to use API 1149 calculations to estimate the sensitivity performance of the MBS Leak Detection System on the new US Line 3 during periods when fluid in the segment is in a steady state. Enbridge will conduct the appropriate tuning of the MBS in order to meet and demonstrate the sensitivity targets set forth in Paragraph 89.a including MBS segments with volumes of oil exceeding 45,000 m3 on the new US Line 3.

89 [Leak Detection Sensitivity Requirements]

Enbridge will continue to use criteria set forth in API 1149 to estimate the ability of the MBS Leak Detection System to achieve each of the steady state targets defined in Paragraph 89.a on the New US Line 3.

Paragraph 89.b is not applicable for this reporting period as there were no Replacement Segments or New Lakehead Pipelines other than the L3R project.

90 [Demonstration of Compliance with Leak Detection Sensitivity Design and Construction Requirements]

There is nothing to report on this Paragraph until the construction of the new US Line 3 is complete and new US Line 3 is tied into the leak detection system. Once the new US Line 3 is constructed and commissioned, Enbridge will prepare and coordinate the planning and execution of testing to demonstrate compliance with the leak detection sensitivity design and construction requirements defined in Paragraph 90.

There are no Replacement Segments or New Lakehead Pipelines for this reporting period other than the L3R project.

91 [Establishment and Optimization of Alarm Thresholds]

There is nothing to report on this Paragraph until the construction of the new US Line 3 is complete and tied into the control system. Also, other than the L3R project, there are no Replacement Segments or New Lakehead Pipelines for this reporting period.

Once Enbridge's new US Line 3 is constructed and commissioned, Enbridge will undertake the appropriate steps to ensure that requirements set forth in this Paragraph are met.

(IV) Leak Detection Requirements for Pipelines within the Lakehead System

92 [Operation of MBS Leak Detection System]

Enbridge maintains continuous and uninterrupted leak detection capability at all times on active Lakehead System Pipelines, including during periods of start-up and shutdown, except as exempted under Paragraph 93, and during the five-day 24-hour Alarm outage event outlined in Paragraph 103 and Paragraph 145. Enbridge has also included a description under Paragraph 144 '[Section G] January 30, 2019 Line 14 MBS Auto-Disabled on a Non-flowing Section, P92' of how it was able to add a section of the Line 14 pipeline that is shut-in during lateral deliveries to the MBS. Enbridge's continuous and uninterrupted leak detection capability is achieved through a number of measures including architectural, procedural, and quality controls. Since the Effective Date of the Consent Decree, leak detection alarm thresholds for steady state operations have been met and continue to meet the minimum alarm thresholds set forth in the table at Paragraph 91.

93 [Temporary Suspension of MBS Leak Detection Capabilities]

Enbridge continues to track the three categories of temporary MBS suspension that are specified in Subparagraphs 93.a-c. Ultrasonic flowmeter maintenance and flowmeter outage workflows are followed to track and coordinate planned (i.e., scheduled maintenance or repairs) and unplanned (i.e., unexpected failures beyond Enbridge's control) outages from start to finish. The ILI tool run procedure also ensures tracking of station flowmeter bypasses when in-line tools are being run, consistent with Paragraph 93.

Please refer to Appendix 1 for a list of occurrences of each type of instrumentation outage during this reporting period, including the reason(s) for any such outages. Note that there is one occurrence of an in-line inspection

("ILI") tool run on the Line 1 Plummer station that bypassed the flow meter in excess of the reportable 4-hour time period. Details of this event are provided in Paragraph 96.

94 [Overlapping MBS Segments]

Enbridge's overlapping volume balance algorithm automatically establishes and maintains leak detection capability in the event of a temporary loss or suspension of MBS leak detection capability within one or more MBS segments due to intermediate flow meter (i.e., flow meters not located in either injection or delivery) outage. The overlapping volume balance algorithm continues to maintain leak detection capability in overlapping MBS segments impacted by the outage until the leak detection capability is restored in all MBS segments.

The overlapping segments affected by the Line 1 Plummer ILI tool run flow meter bypass event were maintained until the bypass ended and the affected flow meter was restored. Details of this event are provided in Paragraph 96.

95 [Alternative Leak Detection Requirements]

Enbridge implements and maintains an API 1130-compliant ALD procedure in the event of any outage of MBS leak detection capability occurring as a result of the circumstances described in Subparagraphs 95.a and 95.b. Enbridge continuously operates the ALD method until the flowmeter outage is resolved and the MBS segments are restored to operation.

96 [Reporting of MBS Outages]

There is one reportable Bypass of ILI Tool event for the SAR4 reporting period that exceeded the Time Period to Restore MBS segment to Operation, which is as follows:

On March 13, 2019 a bypass of the Line 1 Plummer ("PL") station started at 8:51am MST to accommodate an ILI tool passing the station. While the station was bypassed, the PL flow meter was no longer being used by the MBS leak detection system. During the bypass, overlapping MBS segments were in place to provide leak detection capability. The bypass was ended at 7:34am MST on March 15 resulting in a total bypass time of 46 hours and 43 minutes. The line was shut down for a period of time during the bypass, accounting for 11 Hours and 1 minute of tolling. However, the total time the flow meter was out of service was 35 hours and 42 minutes, exceeding the 4-hour time period to restore in the Table in Paragraph 97 of the CD, thereby triggering the reporting requirement. This event was highlighted in the April 23, 2019 Monthly Technical Meeting with the ITP and EPA and is described in Paragraph 144 '[Section G] March 13, 2019 ILI bypass event at L1 Plummer station, exceeded 4-hour outage, P96' of this document. To avoid future events specific to this scenario, Enbridge has modified procedures associated with ILI tool runs to enhance the identification of isolated flow meters including those at stations without pumping units (i.e., Line 1 Plummer).

Enbridge ensures that it restores leak detection capability as soon as practicable following any outage in an MBS segment. This is achieved by following and continually improving Enbridge procedures and by using operating management tools to track and manage planned and unplanned flow meter outages and ILI tool runs.

97 [Reporting Requirements]

Refer to Appendix 1 for a table identifying the number of occurrences by type where MBS was temporarily suspended. As indicated in Paragraph 96 and Paragraph 144 '[Section G] March 13, 2019 ILI bypass event at L1 Plummer station, exceeded 4-hour outage, P96' of this document, one Bypass of ILI Tool event exceeded the Time Period to Restore MBS segment to Operation. .

98 [Tolling Requirements]

In accordance with Paragraph 98, Enbridge tolls the 4-hour time period for restoring the MBS segment to operation (as specified in and allowed under the table at Paragraph 97 in the CD) during any occurrence of an unplanned shutdown during the in-line tool run. The tolling period applied by Enbridge begins when the pipeline is shutdown and ends when pipeline operation is resumed. To comply with this Paragraph, Enbridge tracks station flowmeter bypasses when in-line tools are being run. As indicated in Paragraph 96, one Bypass of ILI Tool event exceeded the 4-hour time requirement to restore affected MBS segment to operation and appropriate tolling was applied (11 Hours and 1 minute).

99 [Installation of New Equipment at Remotely-Controlled Valves]

In June 2018, Enbridge completed development of a document entitled "Interpretation of Consent Decree Paragraphs 99, 100, 124," (hereinafter referred to as "the interpretation document") in order to clarify expectations and requirements of additional instrument installation. Clarification involved the following as defined in this section of the Consent Decree: what is a remotely-controlled valve, what constitutes an excavation, emergency vs. planned excavations, functionally identical equipment, and associated applicability to remote operation by Enbridge's control room. This interpretation document was reviewed with the ITP on July 3, 2018 and the ITP has not voiced disagreement.

The table below outlines the three projects (or digs) that have triggered the requirements of Paragraph 99 and these projects have installed the pressure and/or temperature transmitters in the reporting period.

Table 41: P99 Paragraph 99 Projects

Line	Milepost	Valve Tag No.	Installation Date	Triggers Paragraph 99?
4	974	E0974.38-4-V-1	Dec 2018 (TT) Feb 2019 (PT) Both on downstream side of valve	Yes. Valve was partially excavated, as were PT/TT locations on the downstream side of the valve only.
5	1645	E1645.93-5-V-1	Dec 2018 (PT, TT) Both on downstream side of valve	Yes. Valve was partially excavated, as were PT/TT locations on the downstream side of the valve only.
6A	418	C0418.23-6-V-1	Dec 2018 (TT)	Yes, TT only installed, as PT already existed on downstream side of valve, and only downstream side of valve was exposed during excavation.

As agreed during the March 13, 2019 meeting with the ITP, the updated Paragraph 99 Project Logbook will be provided within two weeks after release of SAR4.

100 [Requirements for Valve Excavation]

During the reporting period, no projects or digs were applicable to the Paragraph 100 exemptions of being conducted for emergency purposes or having functionally identical equipment. Please refer to Paragraph 144 '[Section G] Installation of New Equipment at Remotely-Controlled Valves, P100' for a description of valves that

were incorrectly classified as having functionally identical equipment when instead they were exempt valve types.

101 [Transient-State Sensitivity Analysis]

Based on ITP's Task 3 Verification Status Record ("VSR3") for Covered Work Period 3 ("CWP3") dated April 8, 2019, Paragraphs 79-80 are considered "Complete"; therefore, no further reporting is required for this or future SARs.

102 [Rupture Detection System Alarm]

The intent of the Rupture Detection System ("RDS") is to focus on detecting large releases with a very quick onset. Enbridge continuously operates its RDS at all times on all Lakehead System Pipelines during both steady-state and transient-state conditions. The RDS is integrated with Enbridge's SCADA system and MBS Leak Detection System.

A difference in interpretation of this Paragraph remains pertaining to whether Enbridge was obligated to include a factor based on an abnormal increase in flow rate when designing its RDS. However, within this reporting period, Enbridge has continued discussion and collaboration with the EPA and ITP in regard to evaluating potentially feasible options that could provide for the initiation of immediate shutdown upon an MBS alarm caused by an abnormal increase in flow rate, as opposed to being subject to a 10-minute evaluation period. In this regard, on February 12, 2019, Enbridge received proposed conditions from the EPA for proceeding with this alternate approach. On April 24, 2019, Enbridge presented a proposed solution which was followed by a project plan submitted on May 15, 2019. Enbridge believes that this proposal and subsequent plan constitute a reasonable path forward in addressing concerns with this Paragraph and the ITP has not voiced disagreement. Enbridge and the ITP have discussed the status of development of the modification to the MBS alarm, most recently on June 24, 2019.

Enbridge is committed to execution of the plan in collaboration with the ITP through defined touchpoints. Enbridge will continue to report on the status of this activity in the fifth SAR.

103 ["24-hour" Alarm]

103a-b The intent of the 24-hour alarm is to detect small releases. Enbridge implemented the 24-hour volume balance alarm (aka Automated Volume Balance or "AVB") on the Lakehead system and AVB was integrated with Enbridge's SCADA system in advance of the 270-day deadline specified in Paragraph 103. The AVB has been active at all times on all Lakehead lines, including during steady state and transient state operations, except during an event that occurred between December 7, 2018 and December 12, 2018 on Line 14. Summary of this event is outlined below and details are provided in Paragraph 145 '[Section G] 24-hour alarm on Line 14 was disabled from December 7, 2018 to Dec 12, 2018 (P103)'. Other than this event, Enbridge continuously monitors, tracks, and models the volume of oil for each MBS Segment over any rolling 24-hour period through AVB. Enbridge has a Leak Detection System assurance process, controls, and Control Room ("CCO") procedures in place to ensure that the MBS Leak Detection System (i.e., AVB) alarms if it cannot detect, or otherwise account for, 3 percent (or more) of oil pumped or injected into the MBS Segment over any rolling 24-hour period. Should this alarm occur, the Alarm Response Team executes the appropriate procedures in accordance with Paragraphs 108 and 109.

Line 14 Disabled 24-hour Alarm Event (Dec 7, 2018 to Dec 12, 2018)

Planned field work to replace a segment of pipe on Line 14 took place from December 5, 2018 to December 7, 2018. A Leak Detection Project Integration Plan ("LDPIP") was developed and implemented. During the course

of the project, the work plan changed due to operational constraints and the LDPIP was not updated to align with the changes which resulted in failure to properly track and communicate the need to temporarily disable AVB during project activities. AVB remained disabled on Line 14 for five days from the date the project was completed – December 7, 2018, to its discovery and correction on December 12, 2018.

To address future occurrences of similar events, Enbridge has added AVB into the Leak Detection Coverage alarms. In addition, procedural improvements have been implemented to make maintenance checks more prescriptive; and, LDPIP process roles and responsibilities and sign-offs are being reviewed and improvements will be made where necessary. This item is also reported with additional details under Paragraph 145 in this semi-annual report.

103.c ["24-hour" Alarm Optimization Study within one year of establishing the new 24-Hour alarm]

Enbridge conducted and completed a 24-hour Alarm optimization study on February 13, 2019, to optimize the alarm thresholds for each pipeline that is part of the Lakehead system. Enbridge submitted the results of the study to the EPA on April 12, 2019 for review and approval. The report set forth the results of the study and proposed alarm thresholds, which are within the 3% sensitivity requirement. Enbridge has implemented and continuously maintains the new thresholds for each Lakehead pipeline upon submission of the report and will continue to do so until EPA approval is obtained. As of the date this SAR is written, the ITP and the EPA are still reviewing the report; hence, no EPA approval or disapproval has yet been obtained.

103.d ["24-hour" Alarm Optimization Study within one year of Initial Linefill of New US Line 3 or any other New Lakehead Pipeline or Replacement Segment]

This requirement does not apply at this time as the New US Line 3 has not yet completed construction and linefill.

103.e [Simulated testing of the 24-hour alarm optimized threshold on two separate MBS segments]

Enbridge will be completing simulated leak testing of AVB in two separate MBS segments with the optimized thresholds no later than July 11, 2019, which is 90 days following submission of its proposal and implementation of the optimized thresholds per Paragraph 103c. A report will be developed outlining the results of the test and will be submitted to the EPA within 60 days after completing the test (September 9, 2019).

103.f [Submission of proposed plan and schedule for unsuccessful testing]

This requirement is dependent on Paragraph 103e; therefore, no update to this requirement until 103e is performed.

103.g [Compliance and exceptions of compliance to 24-hour alarm optimized threshold and reporting]

103.g(1)-(4). Enbridge continuously complies with the optimized thresholds in accordance with the study completed per Subparagraph c and maintains high reliability in its AVB system since the new optimized alarm thresholds were implemented in production. Enbridge has not seen any increase of false alarms that could trigger relaxing of the optimized alarm thresholds nor conducting a new optimization study that could result to new or temporary alarm thresholds.

103.g(5). Enbridge maintains high reliability of its AVB system since the new optimized alarm thresholds were implemented in production. Thus, Enbridge has not seen any increase of false alarms that could trigger this Subparagraph.

(V) Leak Detection Requirements for Control Room

104 [Applicability]

In order to ensure compliance with Section VII.G.V of the CD, Enbridge applies the term "alarm" or "alarms" to mean any and all alarms that are generated by the MBS leak detection system and by the RDS.

105 [Alarm Response Team]

Enbridge established and implemented an Alarm Response Team (“ART”) within 180 days of the Effective Date of the Consent Decree. The ART responds to all leak alarms, and the team is composed of the Control Room Operator (“CRO”), the Leak Detection Analyst (“LDA”), and the Senior Technical Advisor (“STA”).

106 [Remote Notification of Alarm Response Team]

Enbridge implemented the remote notification system that is specified under Paragraph 106 within 180 days after the Effective Date of the Consent Decree. In the event that any ART members have not electronically-acknowledged the alarm within two minutes after its onset, the remote notification system will notify those ART members with an automated remote telephone call that includes the alarms details (including the type of alarm, the time of its occurrence and the MBS segment that precipitated the alarm).

107 [Audible and Visual Alarms]

Enbridge implemented the audible and visual alarms required under Paragraph 107 within 180 days after the Effective Date of the Consent Decree. MBS and RDS alarms are automatically annunciated in an alarm window for all members of the ART. Alarms have a visual pulse accompanied by a strong beeping sound, indicating that an alarm requires attention. The pulse continues and beeping repeats every five seconds until the alarm is acknowledged by the ART member. ART members are trained to ensure that the alarm window remains open on their screens at all times. Unassessed alarms remain visible on their screens until assessments from ART members are complete upon execution of the alarm clearance procedures. If the assessment is not complete within the 10-minute timeframe, an audible and visual alert is generated to notify Alarm Recipients that the 10-minute period for evaluating the alarm has lapsed and a pipeline shutdown is required.

108 [Alarm Clearance Procedures]

Enbridge implemented the Alarm Clearance procedures required under Paragraph 108 within 180 days of the Effective Date of the Consent Decree. Alarm Clearance procedures have been employed and adhered to as described in Enbridge's response to Subparagraphs 108.a-f below.

108.a [Alarm Clearance Requirements]

The requirements of Subparagraph 108.a are incorporated into Enbridge's procedures to ensure that all alarms remain active unless and until: (1) the appropriate ART member(s) accounts for any cumulative imbalances (in which case the team member may invalidate the alarm); (2) all of the ART members independently rule out the possibility of a leak; or (3) the pipeline is shutdown.

108.b [Alarm Clearing Restrictions]

Enbridge procedures prohibit the ART from resolving or clearing an alarm through a manual, one-time adjustment to any alarm system or the inputs into any alarm systems. As per Subparagraph 108.b, Enbridge

procedures require that all leak alarms be analyzed until an investigation has been completed and an alarm is terminated in accordance with the requirements of Subparagraph 108.a.

108.c [Confirmation of Leak Detection System Functioning]

Enbridge implemented procedures to require the LDA to analyze and determine whether the leak detection system that generated the alarm is functioning properly. This process consists of determining whether any leak alarms have been caused by data errors input into the leak detection systems, system malfunctions, or other factors that could lead to an invalid leak alarm.

108.d [Independent Alarm Investigation]

Enbridge requires the CRO, in conjunction with the STA, to complete an investigation of the alarm, which is an investigation that is completed independently from the investigation that was conducted by the LDA. This analysis is conducted in conjunction with the Ten-Minute Rule to ensure that a final decision to invalidate the alarm is made within ten minutes after the alarm is generated. If a final decision to invalidate the alarm is not made within the ten-minute period following the alarm, the pipeline is shutdown. The final decision is made by the CRO, with the concurrence of the STA.

108.e [ART Procedures for Column Separation]

ART members are required to employ Enbridge column separation procedures when determining the cause of an alarm. Enbridge procedures accordingly mandate that a determination that an alarm was caused by Column Separation is not a permissible basis for clearing an Alarm unless the ART follows the procedures specified in Subparagraphs 109.b and 109.c.

108.f [Electronic Records of Alarm Response]

Enbridge implemented an electronic record keeping system for managing ART response information. All ART member responses are recorded and are documented as required by this Paragraph (see Appendix 2: Lakehead Leak Alarm Report). Each record – which is created at the end of each shift by each ART member choosing from specified alarm categories that are identified on an electronic menu – includes details of the alarm event including the type of alarm, reasons for clearing the alarm, and the procedures executed by members of the ART. Review of leak alarms are required by all incoming ART members during a shift change (i.e. subsequent shift). All records of alarms are retained for a minimum of five years.

109 [Unscheduled Shutdown in Response to an Alarm]

Within 50 days after the Effective Date of the Consent Decree, Enbridge implemented all of the procedures specified in Subparagraphs 109.a-d, as explained in more detail in the sections that follow.

109.a [Ten-Minute Rule]

Enbridge implemented operating procedures that require the CRO to shut down and sectionalize the pipeline immediately without further consultation or notification if the ART is unable to rule out the possibility of a leak or rupture within ten minutes of the start of an alarm.

109.b [Column Separation – Running Pipeline]

Enbridge implemented column separation procedures that require the CRO to shut down and sectionalize a running pipeline if within ten minutes from the start of the alarm the column separation continues or the

appropriate ART members have not: (1) determined the cause of the column separation, (2) accounted for any cumulative imbalances that triggered the alarm, and (3) ruled out a possibility of a leak or rupture. The procedures are not applicable where the alarm is caused by column separation that occurs during or after the shutdown of the pipeline, consistent with Paragraph 109.b.

109.c [Column Separation – Pipeline Shutdown]

Enbridge has implemented column separation procedures in accordance with Paragraph 109.c and appropriate alarm clearance procedures caused by column separation. Specifically, the calculation of the amount of time needed to fill the column separation and obtaining manager review and approval prior to restart in accordance with the table provided in this Subparagraph. Upon restart of any pipeline where the column fill time is exceeded, the CRO is immediately required to shut down and sectionalize the line. Upon shutdown, steps to investigate and verify the condition of the pipeline will be taken as required by this Paragraph.

109.d [Confirmed Leak Rule]

Enbridge implemented confirmed leak procedures, which require the CRO to immediately shut down and sectionalize the pipeline in the event that the ART determines that an Alarm is a confirmed leak or rupture, as defined under Subparagraphs 109.d.1-4. Unless a leak is ruled out, the CRO will shut down within ten minutes if leak conditions are observed upstream or downstream at a given location from SCADA data.

109.e [Shutdown and Restart Record]

Following the shutdown of a pipeline, Enbridge executes a procedural control and electronic recording measure process that: identifies the root cause of a leak alarm, verifies that applicable emergency procedures have been completed and electronically validated by the appropriate accountable parties, and generates a record of how the cause of the Alarm was determined and/or how the integrity of the line was verified, including the critical information that was considered in this decision-making process. In accordance with Subparagraph 109.e, Enbridge will not resume or restart pipeline operations until the procedural controls are executed and the recording of electronic information is validated by appropriate accountable parties. Electronic records of compliance with this Subparagraph are available as of December 31, 2016. Enbridge is compliant with this Paragraph and has not observed any instances where pipeline operations were resumed without meeting the requirements of this Subparagraph.

110 [Certification of Compliance with 10-Minute Rule and other Requirements of this Subsection]

110.a [Weekly List of Alarms]

In accordance with Subparagraph 110.a, Enbridge prepares an electronic weekly list of alarms (“WLOA”) as part of the Lakehead Leak Alarm Report. That WLOA is provided as Appendix 2. The WLOA includes the pipeline, the type of alarm, date of the alarm, the time at which the alarm began, and the time when the alarm was cleared.

110.b [Record of Alarms]

Enbridge complies with this requirement by preparing an electronic Record of Alarms (“ROA”) when an unscheduled shutdown occurs. The ROA includes critical facts relating to the Alarm, such as the positions of the Alarm Recipients (i.e., CRO, STA, LDA), the time that the alarm was received, the actions of the ART, when the shutdown commenced, when the shutdown was completed, the root cause, the type of alarm, the

procedures executed to determine the cause of the alarm, the justification for resumption of pumping operations, and the time that pumping operations resumed.

110.c [Alarm Submittal to EPA]

Enbridge complies with this requirement by including the WLOAs and ROAs occurring during the reporting period for all Lakehead System Pipelines as part of the Lakehead Alarm Report, enclosed hereto as Appendix 2. The Lakehead Leak Alarm Report also includes the Summary of Alarms ("SOA") noting the pipeline, the total number of alarms and the alarms that did not comply with Enbridge's Ten-Minute Rule. During this reporting period, Enbridge has complied with the Ten-Minute Rule and other requirements in Subsection VII.G.(V) when responding to leak detection system alarms. Therefore, no corrective actions needed to be taken.

110.d [Certification of Reporting Period]

To certify compliance for the reporting period of 180 days after the first SAR, the Vice-President, Pipeline Control has signed the Lakehead Leak Alarm Reports. This includes the information contained in the SOA, WLOA and ROA, which warrants that the information contained therein is true and accurate and that Enbridge has complied with the Ten-Minute Rule and other requirements of this subsection VII.G.(V), except for any non-compliances specifically listed in the SOA, which is none for this reporting period.

111 [Unscheduled Shutdown Procedures in Response to Other Events]

Enbridge has implemented procedural controls that ensure that all emergency phone calls received by the Control Center concerning a potential leak or rupture from a source other than an alarm are investigated within ten minutes of receipt of the call. In the event that the investigation uncovers evidence consistent with a leak or rupture by a Lakehead System pipeline, the CRO for the pipeline is required to immediately and without further consultation or notification to shut down and sectionalize the pipeline. Further, in addition to the requirements of the Consent Decree, Enbridge procedures independently require that while the investigation is required to be conducted as expeditiously as possible, if the investigation is not completed in ten minutes or if a potential leak is identified, the CRO will commence an emergency shutdown and sectionalize the affected pipeline or pipelines. Enbridge is compliant with this Paragraph, and has not observed any instances where pipeline operations deviated from the requirements of this Paragraph.

112 [Reporting of Events from Paragraph 111]

Information related to all incidents during the reporting period where Enbridge received information concerning a potential leak or rupture, including the information provided with each such notice, the start and end times of each respective investigation, and the conclusion and findings of each investigation, is provided in Appendix 3 to this SAR: Lakehead System Pipeline Incident Reporting.

Section H – Spill Response and Preparedness

113 [Immediate Action to Confirmed Pipeline Leak or Rupture]

Enbridge had two confirmed pipeline leaks or ruptures on the Lakehead System within the reporting period of more than one barrel. Enbridge had no confirmed pipeline leaks or ruptures of any harmful quantity that reached the waters of the United States or adjoining shorelines.

During the reporting period, four releases occurred on the Lakehead System that triggered PHMSA reporting requirements. The releases were reported to PHMSA in accordance with either 49 C.F.R. § 195.50(b), which

requires the reporting of any release of 5 gallons or more of hazardous liquid, or 49 C.F.R. § 195.50(e), which requires reporting if the initial estimated property damage, including the cost of clean-up and recovery, value of lost product, and/or damage to the property of the operator and/or others would exceed $50,000. With respect to each release, Enbridge proceeded without delay to dispatch trained personnel to the location of the rupture or leak and took action to prevent any migration of oil into waters of the United States, including shutting down the affected line.

Additional details regarding the reportable releases from Lakehead System Pipelines that occurred during this reporting period are provided in response to Paragraph 146.

114 [Required Actions]

Enbridge's compliance with Paragraph 114 is demonstrated by its compliance with Paragraphs 115 to 119, as explained below.

115 [Agreed Exercises]

In accordance with Paragraph 115, Enbridge conducted a functional exercise as part of the Cass Lake Agreed Exercise in 2017, and completed the field/equipment deployment portion of that Agreed Exercise in October 2018. Enbridge also conducted the Des Plaines Agreed Exercise in September 2018. Planning is underway for the Wisconsin River Agreed Exercise which is scheduled to occur September 18 and 19, 2019 in and around Wisconsin Rapids. For each agreed exercise, Enbridge conducts three planning meetings in accordance with Subparagraph 115.e(1). As part of its Exercise Program, Enbridge conducts additional exercise meetings where appropriate, such as a Concept and Objectives meeting and/or Master Scenario Events List meeting. Enbridge also conducts periodic touchpoint meetings via Skype to respond to and address any questions that may arise between the times that the face-to-face meetings are held. Additional information regarding each of these Agreed Exercises is provided below.

Cass Lake Agreed Exercise

Enbridge and the United States mutually agreed to a non-material second modification of the Consent Decree ("Second Modification") to modify the timing for the completion of activities associated with the Cass Lake Agreed Exercise. Specifically, the parties agreed through the Second Modification that was filed with the court on July 14, 2017, (Doc. No. 16) that the Cass Lake Agreed Exercise was to be completed by Enbridge in two parts. The Second Modification required that, in 2017, Enbridge was to conduct a functional exercise with mobilization and deployment of Enbridge's local Incident Management Team and a functioning command post employing the Incident Command System ("ICS") in 2017. The Second Modification required that, in 2018, Enbridge was to conduct a field exercise with equipment deployment at or near Cass Lake in accordance with the requirements of Subparagraph 115.a.

Enbridge fulfilled the functional exercise requirement of the Second Modification by conducting the Cass Lake Agreed Exercise on September 26 and 27, 2017. Details about the planning and implementation of the Cass Lake Agreed Exercise can be found in the first and second SAR. In accordance with Subparagraph 115.i, Enbridge distributed the Cass Lake After Action Report to the planning team on August 14, 2018, which was within 90 days of receiving the EPA comments on May 17, 2018.

In accordance with the Second Modification, Enbridge conducted a field exercise with equipment deployment at Cass Lake on October 3, 2018. Three planning meetings were held with federal, local and tribal representatives. The specific dates of the planning meetings were as follows:

- Initial Planning Meeting on May 10, 2018;
- Mid-Planning Meeting on June 21, 2018; and

- Final Planning Meeting on September 13, 2018.

On October 30, 2018 an After Action Meeting was held with planning participants. Based on the information provided at this meeting an After Action Report for the field portion was submitted to EPA on November 30, 2018.

Des Plaines Agreed Exercise

In accordance with Subparagraph 115.b(2), Enbridge held the Des Plaines Agreed Exercise on September 27, 2018. Additional details about the planning and implementation of the Des Plaines Agreed Exercise can be found in the second SAR. The specific dates of the planning meetings held during this reporting period are as follows:

- Master Scenario Events List Meeting on June 13, 2018; and
- Final Planning Meeting on July 13, 2018.

In accordance with Subparagraph 115.h, Enbridge organized and conducted an After Action Meeting on September 28, 2018, to review the Des Plaines Agreed Exercise for the purpose of identifying "lessons learned," and to make recommendations to improve future Agreed Exercises and response actions. As required under Subparagraph 115.h, Enbridge invited each planning participant to participate in that After Action Meeting. Controllers and evaluators also attended this meeting.

In accordance with Subparagraph 115.i, Enbridge submitted the draft Des Plaines Agreed Exercise After Action Report to EPA on November 27, 2018. That After Action Report set forth Enbridge's findings and conclusions regarding the Des Plaines Agreed Exercise.

Wisconsin River Agreed Exercise

In accordance with Subparagraph 115.b(3), Enbridge scheduled the Wisconsin River Agreed Exercise to occur on September 19, 2019. Planning for the Wisconsin River Agreed Exercise was initiated in July 2018. In accordance with Subparagraph 115.e(1), the first of the planning meetings was conducted on November 14, 2018, more than 10 months before the Wisconsin River Agreed Exercise. In accordance with Subparagraph 115.e(3), Enbridge coordinated with the planning participants during the initial meeting to develop the objectives, scenario, and participant list for the Wisconsin River Agreed Exercise. The specific dates of the planning meetings are as follows:

- Concept and Objectives on July 16, 2018;
- Initial Planning Meeting on November 14, 2018;
- Midterm Planning Meeting on February 12, 2019;
- Master Scenario Events List meeting on May 22, 2019; and
- Final Planning Meeting scheduled on August 21, 2019.

Based on input provided by the initial planning meeting attendees, Enbridge prepared a draft exercise plan for the Wisconsin River Agreed Exercise, which includes the scope, objectives, scenario, and participant list for the exercise. In accordance with Subparagraph 115.e(4), Enbridge submitted the Draft Wisconsin River Exercise Plan to EPA on November 28, 2018. In a letter dated February 11, EPA requested revisions to the Wisconsin River Exercise Plan by March 14. Enbridge submitted the revised Wisconsin River Exercise Plan to EPA on March 21.

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116 [Field Exercises, Table Top Exercises, and Community Outreach]

116.a [Annual Field Exercise and Table Top Exercise Requirements]

In accordance with Subparagraph 116.a, Enbridge conducted the following Field Exercises ("FDEs") during this reporting period:

- Plummer, MN on May 8;
- St. Clair, MI on May 22;

In accordance with Subparagraph 116.a, Enbridge conducted the following Table Top Exercises ("TTXs") during this reporting period:

- Delevan, WI on Feb 20;
- Thief River Falls on March 7;
- Mokena, IL on March 27;
- Bemidji, MN on April 10;
- Merrillville, IN on April 10 and ;
- Marysville, MI on May 21

116.b [Field Exercise Requirements]

In accordance with Subparagraph 116.b, each of the Field Exercises identified above consisted of training exercises conducted in the field to test and practice specific oil spill emergency response tactics used in the initial hours of an oil spill of at least 1,000 gallons into water.

Field deployment exercises test and practice the emergency response actions and tactics of both Enbridge & Government (Federal, Tribal, State, County, and Local) response personnel and equipment, in relation to a release of crude oil from an Enbridge pipeline. A scenario is required to initiate the appropriate level of emergency response within the organizations participating in the exercise. An after-action review (hot wash) is conducted at the conclusion of the exercise to identify areas that went well and areas that need improvement.

The standard schedule for a field exercise is as follows:

- Welcome and Safety Moment
- Operations and Safety Briefing
- Field Deployment
- Equipment Retrieval/Decontamination
- Hot Wash
- Closing Comments

Each Field Exercise included the following:

- A deployment of select equipment and personnel to water;
- A review of locations downstream of a spill where containment and recovery operations can occur; and
- Implementation of one or more containment and collection measures from the Enbridge's "Inland Spill Response Guide" at locations downstream of the potential spill entry point.

Further, in accordance with Subparagraph 115.b, an after action review and discussion was held after each of the Field Exercises, as explained in response to Subparagraph 116.a above.

Specific details for each exercise include:

Plummer, MN on May 8. This exercise was attended by 18 Enbridge employees and 3 external participants.

The objectives of this field exercise were as follows:

- **Objective 1**: Demonstrate the ability to deploy on-water containment and mitigation (recovery) tactics.
- **Objective 2**: Test Control Point SURCP0084 containment and recovery tactics and verify site information.
- **Objective 3:** Assess ability to utilize the Incident Command System to manage an equipment deployment.
- **Objective 4**: Educate and inform stakeholders about Enbridge's Response Capabilities.

Equipment used during the exercise included the spill response trailer, boom, and skimmers.

During the after action review and discussion at the end of the exercise both positive observations and areas for improvement were discussed and documented.

- Positive observations: Field Level Hazard Assessment ("FLHA")/Work Plan identified safety concerns in the primary anchoring/deployment location due to shoreline washout (erosion), and mitigated the tactics to a secondary anchoring site. The Internal workshop/TTX conducted the morning of the exercise was beneficial to the Enbridge employees. Crews conducted a fast, efficient deployment while being safe. All members of the crew pitched in when needed to ensure the deployment was successful. Communications were excellent during the deployment under less-than-ideal conditions. Equipment was in good condition and well organized. A specific observation was noted that pre-cut length of line had different colored "C" Clips at each end to indicate the different lengths. This allowed for easy identification of the line.
- Areas of improvement: Powered winches could have helped pull the boom due to the strong current. A lack of anchors (trees) in the secondary location made it necessary to use trucks (rear hitch) to be used. Further training or information on the use and attachment points of the hand lines would be helpful as well as additional training or information would be beneficial on the use of heaving lines in small waterway situations.

The items identified under the "Areas of improvement" category will be reviewed and addressed prior to the next Field Deployment Exercise. These items drive improvement of the response capabilities of the Midwest Region Field Response team in both field exercises and the unlikely event of a release.

St. Clair, MI on May 22. This exercise was attended by 30 Enbridge employees and 15 external participants.

The objectives of this field exercise were as follows:

- **Objective 1**: Demonstrate the ability to deploy on-water containment and mitigation (recovery) tactics.
- **Objective 2**: Test Control Points GLRCP0317 and GLRCP0320 containment and recovery tactics and verify site information.
- **Objective 3:** Assess ability to utilize the Incident Command System to manage an equipment deployment.
- **Objective 4**: Educate and inform stakeholders about Enbridge's Response Capabilities.

Equipment used during the exercise included Enbridge work boats, safety boats, skimmers and boom as well as equipment provided by T&T Marine, including a work boat, a fast water response trailer, and boom.

During the after action review and discussion at the end of the exercise both positive observations and areas for improvement were discussed and documented.

- Positive observations: Safety was emphasized in all phases of the deployment including the safe establishment of control points. New Enbridge employees took on key roles during the deployment and challenges setting the anchor at Control Point GLRCP0317 were overcome by making some key adjustments to positioning and use of additional equipment.
- Areas of improvement: Enbridge personnel indicated that more time should be spent training on boat handling and general boating operations. T&T Marine recommended a magnetic tool that can be used as a temporary tie-off point for boom which may be helpful in future deployments. It was also noted that a heavier ballast chain should be used in heavy current in order to improve the probability of successfully setting anchors.

The items identified under the "Areas of Improvement" category will be reviewed and addressed prior to the next Field Deployment Exercise. These items drive improvement of the response capabilities of the Great Lakes Region Field Response team in both field exercises and the unlikely event of a release.

116.c [Table-Top Exercise Requirements]

In accordance with Subparagraph 116.c, the Table Top Exercises identified under Subparagraph 116.a above were conducted to test and practice non-field oil spill emergency response processes and procedures.

The scope of each Table Top Exercise is to review the response capabilities of Enbridge, Local First Response agencies and community stakeholders in relation to a release of crude oil in a pipeline. It utilizes multiple Emergency Response Plans to map out the combined response to the incident using ICS and is based on a simulation of a realistic emergency situation that included a description of the situation (scenario) with communications between players and facilitator. It identifies all responding agencies, resources, the establishment of a Unified Command, and situational assessment, and how the incident would be documented during the initial response.

The Table Top Exercise structure consists of two modules; Module 1: Initial Notifications and Response (Reactive Phase) and Module 2: Mobilization and Sustained Response (Proactive Phase). Each module begins with a multimedia update that summarizes key events occurring within that time period. After the updates, participants review the situation and engage in group discussions of appropriate response issues. A formal hot wash and or after action reports are not required for Table Tops, however discussions are held during the exercise and discussion points are captured during or after the exercise.

The exercises included the following:

- A minimum spill scenario of at least 1,000 gallons from a Lakehead System Pipeline located in close proximity to water;
- Notifications of the spill to all the government entities, including tribal authorities, that are identified in the Enbridge Integrated Contingency Plan ("ICP");
- Both near and long term response actions to address the spill;
- Anticipated response times for Enbridge equipment and personnel;
- The risks that the spill scenario could pose to public health and the environment;
- Potential resources at risk; and
- Protective measures for the local community, including evacuation procedures, as identified in the Enbridge ICPs.

Specific details for each exercise include:

- **Delevan, WI on Feb 20** – The exercise was attended by 5 members of Enbridge's Incident Management Team ("IMT") and 1 external participant.

Discussion Point: A lack of external participants made it difficult to obtain local information. It was determined that the lack of attendance was due to poor weather conditions.

- **Thief River Falls on March 7** – The exercise was attended by 6 members of Enbridge's IMT and 5 external participants

  Discussion Point: Participants would have liked to have seen more participation from local government entities such as elected officials and possibly legal entities. Additionally, the Local Emergency Planning Committee ("LEPC") or MN equivalent would have benefited from attending the exercise.

- **Mokena, IL on March 27** -The exercise was attended by 5 members of Enbridge's IMT and 4 external participants.

  Discussion Point: Mokena Fire Department indicated that they would be requesting access to the Great Lakes Region Field Response Plan. Follow-up was necessary to ensure that the local fire department and Enbridge can sync radio communications

- **Bemidji, MN on April 10** -The exercise was attended by 4 members of Enbridge's IMT and 1 external participant.

  Discussion Point: It was observed that participants would have like to have seen more participation from local government and first responder entities. As with prior TTX's in 2019, a late winter storm hit the day of the TTX and is believed to have decreased attendance.

- **Merrillville, IN on April 10** - The exercise was attended by 9 members of Enbridge's IMT and 5 external participants.

  Discussion Point: EPA has a viewer that shows water intakes. Government agencies and private entities could utilize Homeland Security Information Network Platform to communicate during non-emergency and emergency situations.

- **Marysville, MI on May 21** - The exercise was attended by 7 members of Enbridge's IMT and 15 external participants:

  Discussion Point: Local responders indicated that they would like access to Control Point maps. The St. Clair Horizontal Directional Drilling project will dramatically decrease the potential for a release into the St. Clair River.

116.d [Field and Table-Top Invitees]

In accordance with Subparagraph 116.d, prior to conducting the Field and Table Top Exercises identified under Subparagraph 116.a above, Enbridge sent out invitations for the scheduled 2019 Table-Top and Field Exercises on December 18, 2018, to community, state and local first responders listed in CD Appendix C, as well as first responders located within 5 miles of the exercise scenario, resulting in a total of 852 invitations mailed.

The invitations provided recipients with more than four weeks prior notice of the exercise date when the exercise was to be conducted. The invitation also indicated that Enbridge would provide meals to persons who attended each exercise, and that the training would be provided at no cost to the invitees, excluding travel costs. Interested respondents were directed in the letter to an external-facing website wherein they could register for their interested exercises, in addition to being provided a contact telephone number and e-mail address. During the reporting period 29 registrations were submitted to the online system with no telephone or e-mail requests for additional information received.

Further, in accordance with Subparagraph 116.d, on December 18, 2018, Enbridge provided EPA with notice of all the Field and Table Top exercises to be conducted in 2019

116.e [Community Outreach Sessions]

During this reporting period, Enbridge continued to comply with Subparagraph 116.e of the Consent Decree regarding the required Community Outreach Session which reads:

> *e. In addition to the above exercises, Enbridge shall conduct or hire a contractor to conduct Community Outreach sessions regarding the hazards of the different oils in the Lakehead System and the location of Enbridge pipelines in the community and how such pipelines are marked. Specifically, within one year of the Effective Date, and for each year thereafter until the Decree is terminated, Enbridge shall hold at least 15 Community Outreach Sessions in 15 different communities where the Lakehead System is located. Enbridge shall also provide information at the Community Outreach sessions regarding: (i) how the community should respond in the event of a spill, (ii) how the community can obtain information in the event of a spill from Enbridge and government agencies, and (iii) how the community can report spills to Enbridge, EPA and the National Response Center.*

Enbridge conducted the following Community Outreach Sessions during this reporting period:

- Bemidji, MN on April 2
- Grand Rapids, MN on April 3
- Floodwood, MN on April 4
- Manistique, MI on April 30
- Saint Ignace, MI on May 1
- Cheboygan, MI on May 2.

For the Community Outreach Sessions identified above, a total of 12,450 invitations were sent to landowners, elected officials, media, the general public, and community leaders The general public was invited to attend through a series of advertisements placed for two weeks leading up to each event in local newspapers. There were a total of 459 documented attendees at these six sessions.

Each Community Outreach session was conducted in an open-house format with manned booths that provided attendees with valuable information on pipeline operations, product information, safety, preventative maintenance, integrity, emergency response, public awareness, damage prevention/right-of-way, and Enbridge's involvement in local communities. The sessions are held in a come-and-go style to allow participants the flexibility to attend when they are able and so they can spend as much or as little time as they would like on specific topics. Upon arrival, each attendee receives a package of information that is reviewed with them to convey the following information:

- Potential hazards of different oils transported by the Lakehead System;
- The location of Enbridge pipelines in proximity to the communities where the sessions were conducted;
- How Enbridge's pipelines are marked;
- How the community should respond in the event of a spill;
- How the community can obtain information in the event of a spill from Enbridge and government agencies; and
- How the community can report spills to Enbridge, EPA, and the National Response Center.

The Section H Appendix has copies of the primary, state-specific handouts reviewed with attendees upon registration and a list of available handouts provided during the community sessions is included in Appendix 4.

Finally, at each Community Outreach Session Enbridge solicits feedback from attendees through both printed evaluation cards and during one-on-one conversations. After each session, there is a post session debrief with the Enbridge teams to review the feedback cards, gather feedback they've received, and discuss the

conversations held at the various booths. An overwhelming majority of the feedback received, whether through the cards or conversations, were positive as attendees appreciated having access to Enbridge and to the information being provided. In Minnesota, topics frequently discussed by attendees were regarding the Enbridge Line 3 Replacement Project as well as leak detection, valve placement/operation, worst case spill scenarios, and emergency response times related to the existing pipelines. In Michigan, conversations and questions were primarily around the products Line 5 carries, Enbridge's emergency response plans/capabilities, what Enbridge is doing to protect the Straits of Mackinac now, and the proposed tunnel project to relocate Line 5.

117 [Control Point Plans]

In accordance with Subparagraph 117.a, Enbridge is preparing to have updated and maintained within three years after the Effective Date of the Consent Decree information for the Control Point locations set forth in Appendix D that identify containment and recovery points, as well as staging locations and other response-related locations, along the waters that could be impacted by a spill from a Lakehead System Pipeline. The Control Point information will include the specifics from Subparagraph 117.b, and will be organized in a format that is consistent with the example Control Point information that is provided as Appendix E to the Consent Decree.

In accordance with Subparagraph 117.c, Control Points for the Straits of Mackinac were submitted to EPA on May 23, 2018. The Control Point information submitted to date by Enbridge to EPA was provided in the electronic formats that are specified in Subparagraph 117.e.

In accordance with Subparagraph 117.d, Control Points for the Wisconsin River Agreed Exercise were submitted to EPA on May 23, 2018. The Control Point information submitted to date by Enbridge to EPA was provided in the electronic formats that are specified in Subparagraph 117.e.

In accordance with Subparagraph 117.d, Control Points for the Stockbridge Agreed Exercise were submitted to EPA on May 9, 2019. The Control Point information submitted to date by Enbridge to EPA was provided in the electronic formats specified in Subparagraph 117.e.

118 [Response Time]

In accordance with Paragraph 118, Enbridge has hired a contractor to, within three years of the Effective Date, complete a review of Enbridge and Oil Spill Response Organization ("OSRO") personnel and equipment available to respond to an oil spill from the Lakehead System. The scope of that review will assess whether Enbridge and its OSROs can respond and meet all personnel and equipment needs within the timeframes allotted in the maps contained in the Lakehead ICPs, and assess methodologies for estimating driving times. In accordance with Paragraph 118.c, Enbridge will submit a draft report to EPA within 180 days after the contractor completes its review of the response times contained in the ICP maps.

119 [Coordination with Governmental Planners]

Enbridge's coordination with governmental planners is described in its response to Subparagraphs 119.a to 119.k below.

119.a [Planning Meeting Participation]

In accordance with Subparagraph 119.a, Enbridge attended the following Area and Sub-Area Committee planning meetings that were held during this reporting period:

- Sault Ste. Marie Sub-Area Committee Meeting on March 21;

  - Enbridge Crisis Management and Emergency Response Operations Manager presented 'Line 5 In-Situ Burning' to the Committee. Discussions included Enbridge prevention and preparedness; including USCG no anchor zones, pipe inspections, pipe anchoring, and pressure testing. An update was also provided on the Straits of Mackinac Tunnel. Other topics covered by the committee included Inland Zone Plans, Swift Current Exercise and Use of Drones in Manistique, September, 2019- Lessons Learned, Detection of Oil Under Ice Cover and a briefing on the MarkWest/Marathon Table-Top in Kalkaska, MI Exercise.

- Duluth/Houghton Sub-Area Committee Meetings on March 26th and April 4th;
  - The Upper Peninsula Area Committee meeting held on March 26th was held in conjunction with the Preparedness for Response Exercise Program (Isle Royale) Workshop (see 119 b (2)). The meeting included highlights of the Workshop, an update on upcoming exercises including 5 Enbridge exercises (TTX and FDEs) and a roundtable discussion.
  - Key items discussed at the Port Area Committee Meeting on April 4th included the development of the Inland Area Contingency Plan for Western Lake Superior and an update on upcoming 2019 exercises and round table discussion. Enbridge communicated to the Committee it would be hosting an open house on June 12th.
- Detroit Sub Area Committee Meetings on April 17th and May 16th.
  - A Saginaw River All Hazards Committee ("SRAHC") meeting was attended by Enbridge on April 17th. Topics covered included member agency/industry reports provided by the Executive Committee membership, and updates from the Sub-Committee/working groups. An overview was provided on upcoming meetings and exercises including the 2019 upcoming Area Maritime Security Training and Exercise Program ("AMSTEP") exercises in the Bay City area. Other topics covered included Waterways Management Issues and a briefing on domestic terrorism/CT4. Enbridge Operations Manager, communicated that Enbridge would be conducting a Tabletop Exercise on May 21st with an equipment deployment on May 22nd in Marysville, MI, and another Tabletop Exercise on July 30th with an equipment deployment on 31 July in the Bay City area.
  - Enbridge attended the Northwest Ohio Southeast Michigan Area Committee held on May 16th. Topics covered included a presentation on the MV St. Clair Fire, agency and subcommittee reports, and presentations on the Statler Street Response (underground storage tank) and Area Contingency Plan updates. As part of the roundtable discussion Enbridge communicated an open invite to attend Enbridge exercises in Marysville May 21st May. There will be a Tabletop Exercise on May 21st with an equipment deployment on the St. Clair River May 22nd.
- Buffalo Area Committee on May 22nd
  - Official meeting minutes pending at time of the report.

Enbridge is a formal member of the Sault Ste. Marie Sub-Area Committee and has been working with the U.S. Coast Guard on in-situ burn planning and research for the Great Lakes.

119.b [Sub-Area Activities Participation]

Enbridge's participation in Sub-Area activities is discussed in its response to Subparagraphs 119.b(1) and 119.b(2) below.

119.b(1) [Field Exercise Participation]

In accordance with Subparagraph 119.b(1), Enbridge attended the following Sub-Area Committee field exercise during this reporting period:

- Enbridge did not receive any invitations to participate in any Field Exercises for this reporting period.

119.b(2) [Other Training Events Participation]

In accordance with Subparagraph 119.b(2), Enbridge attended the following Sub-Area Committee training event during this reporting period:

- Duluth/Houghton Sub-Area Committee Training event - Houghton PREP (Isle Royale) Workshop on March 26th.
    - This training event covered the development of an ICS form to be used in the initial response to a worst case discharge. Discussions included location of the IC Post, and additional staging areas and well as communication strategies and the establishment of a Joint Information Center.

119.c [Response Requirements to Sub-Area or Area Committee Recommendations]

No Sub-Area Committee or Area Committee for the Lakehead System has made written recommendations to Enbridge regarding its emergency preparedness plans and implementation. Thus, Enbridge had no obligation under Subparagraph 119.c to respond and/or revise its emergency preparedness plans or implementation during this reporting period.

119.d [Response Planning Meetings Requirements]

Enbridge did not receive a request during this reporting period to meet and discuss response planning strategies to ensure consistency with the Area Plan. Thus, Enbridge had no obligation under Subparagraph 119.d to schedule and attend a meeting with EPA, PHMSA, USCG, tribal representatives, and/or state or local authorities during this reporting period.

119.e-g [Plans and Prepositioned Emergency Response Locations and Equipment]

Requirements for Subparagraphs 119.e-g were fully satisfied during the first SAR reporting period, as explained in the first SAR.

119.h [Emergency Response Equipment]

Enbridge continues to maintain, in good working order, its prepositioned emergency response equipment and materials. During this reporting period, no equipment was used or expired and thus replacement of the materials was not warranted or required. Enbridge has purchased additional prepositioned equipment for the Straits of Mackinac and provided electronic written notice of these additions to EPA and the listed Area and Sub-Area Committees on December 14, 2018.

119.i [Inland Spill Response Guide on Website]

In accordance with Subparagraph 119.i, the “Inland Spill Response Guide” has been available on Enbridge’s website since May 23, 2017, at https://www.emergencyresponderinfo.com/.

119.j [Inland Spill Response Guide to EPA]

EPA requested a copy of the "Inland Spill Response Guide" on November 1, 2018, and Enbridge fulfilled this request on November 2, 2018.

119.k [Electronic Submittal of Documents]

Enbridge has provided electronic copies of all documents that are required to be submitted under Paragraph 119 in accordance with the electronic submittal requirements specified under Subparagraph 119.k.

120 [Incident Command System Training]

Enbridge's compliance with ICS training requirements is described in Enbridge's response to Subparagraphs 120.a to 120.c below.

120.a [Incident Command System Training Requirements]

Enbridge has ensured that, upon assigning a person to take on the following roles, each person has completed the training identified below prior to beginning such duties or within the timeframe specified under Subparagraph 120.a:

- Incident Commanders, Deputy Incident Commanders or Alternative Incident Commanders of any Regional Incident Management Team in any Lakehead ICP: ICS 100B - 400 and position- specific training;
- All other personnel listed as members of any Regional Incident Management Team in any Lakehead ICP: ICS 100B - 300 and position-specific training;
- Regional Emergency Response Coordinators: ICS 100B - 400 training;
    - During this reporting period one new Regional Emergency Response Coordinator was hired for the Midwest Region in the US. The employee completed all required ICS training including role specific prior to starting in March 2019. Two Emergency Management Department employees completed ICS 400 May 8th and were added as Regional Emergency Response Coordinators.
- All emergency management department personnel: ICS 100B – 300 training within 90 days of being assigned;
    - During this reporting period two employees were added to the Emergency Management Department. One in January and one in February. All new employees had completed ICS 300 and role specific training in prior positions.
- Any person designated as Vice President of U.S. Operations, or in an equivalent capacity: ICS 402 training; and
- Any other manager or executive who give direction to field personnel, or is responsible for making funding, personnel, or resource decisions during a spill response (if ICS 100B – 400 has not been taken): ICS 402 training.

Changes to the Incident Management Team lists due to retirements, change of employment, etc. will result in additional training being conducted for any replacement personnel. Additionally, Enbridge will track training dates for IMT positions that change.

120.b [ICS Training and Incident Management Team Personnel]

In accordance with Subparagraph 120.b, Enbridge has trained at least one employee for each Incident Management Team position as indicated in its ICP.

120.c [Training Requirements and Electronic Certification Documents]

In accordance with Subparagraph 120.c, Enbridge maintains electronic certification documents that confirm personnel training as described in Subparagraph 120.a.

Section I – New Remotely Controlled Valves

121-122. [Installation of 14 Remotely Controlled Valves]

The Consent Decree requires that Enbridge install 14 remotely-controlled valves over the term of the Decree. During the reporting period, the final 2018 valve (Milepost Number 1621) was commissioned. Enbridge obtained all permits necessary from the appropriate agencies to install the remotely-controlled valves on schedule.

Table 42: P121-122 Planned Valve Installation Program Overview		
Year	**Quantity and Line Number**	**Milepost Number**
2017 (Complete)	4 sites, Line 5	1473, 1487, 1601, 1715
2018 (Complete)	4 sites, Line 5	1416, 1518, 1429, 1621
2019	2 sites, Line 6A 2 sites, Line 14	427, 458 412, 430
2020	2 sites, Line 6A	80, 196

The valve installations completed in 2018 were installed within the milepost ("MP") ranges specified under Paragraph 122. During this reporting period, the remotely-controlled valve at MP 1621 was successfully commissioned on January 16, 2019.

Due to uncertainty in receiving permits in time for 2019 construction, the valve on Line 6A at MP 459.64 has been relocated to MP 458.92, a half-mile west of the original location. The land at MP 458.92 is owned by Sauk Village, a village in Cook County, Illinois, who signed an easement agreement in April 2019, authorizing the valve to be installed at that location. In addition, the area is not a wetland or on a floodplain, has utility capacity compatible with valve installation, and Enbridge's Intelligent Valve Placement ("IVP") report yielded a higher effectiveness score (293 versus 253) and greater maximum volume reduction (3,698 bbl versus 3,608 bbl) compared to the original location.

123. [Enbridge Computer Modeling for Valve Locations]

The locations for the installation of all remotely-controlled valves, including those identified in the table above, were identified by conducting an analysis using Enbridge's IVP methodology. The objective and guiding principle of the IVP methodology is to reduce the maximum potential release volume as much as reasonably practicable in the unlikely event of a pipeline release. To achieve this, the entire pipeline route is modeled, taking into account: the topography of the right-of-way; the elevation profile of the pipeline; the throughput and

operating pressure of the pipeline; and the location of watercourses. The IVP methodology also considers potential impacts of a pipeline release on sensitive features, or HCAs, including highly populated areas, other populated areas, reservoirs holding water intended for human consumption, commercially navigable waterways, and environmentally sensitive areas. HCAs include those that are directly affected by the pipeline and those that are affected by a transport mechanism such as overland or terrain transport, spray, and water transport.

The IVP methodology uses a risk-based approach for optimizing valve placement to reduce potential damage from accidental discharge to populated areas, water crossings, HCAs, and areas of high volume out. The process examines the pipeline segment by segment on an iterative basis until the lowest, reasonably practicable release volume between valves is achieved along the pipeline. The goal of the IVP methodology is to protect the public and the environment in the entire area, rather than focusing only on specific watercourse crossings.

The IVP also considers the impact to environmental resources caused by construction activities in relation to valve installation. Once potential valve locations are selected using the IVP risk-based approach, Enbridge will conduct a field verification of those locations. Field verification will evaluate the impact of construction to the environment, including the following factors: valve site access, constructability, and power and land availability. Final valve locations may be altered due to constructability issues and environmental impacts identified during field verification.

The information above was summarized in a report titled “DOJ Commitment Valves, Valve Analysis”, V3.0, dated January 18, 2017. The ITP was provided the report in response to information requests received from the ITP (under number I011). On July 25, 2017, an in-person meeting select ITP and Enbridge representatives were present to discuss the IVP methodology and answer the ITP’s questions pertaining to method, risk, and rationale.

124. [Valve Design and Closure]

Prior to requisition of the valves for installation in 2017, Enbridge subject matter experts examined each step of the valve closure process including initiating of command, communication of command to the remote facility, energizing of the actuator, and mechanical process to fully close and seal the valve. Considerations were made for each of these steps leading up to the start of mechanical closure, and subtracted from the total allowable command-to-sealed requirement, and the valves were specified on the Purchase Order to the manufacturer to close within that remaining time. Enbridge also specified on the Inspection and Test Plan that a valve closure timing test will be completed on at least one valve of each size to verify actuator open and close time. Enbridge inspectors were present to witness the shop closure timing test, and confirmed that the valves closed within the specified time, prior to shipment and delivery. The valves purchased, installed, and commissioned in 2018 were of the same type, size, and design as those in 2017. During wet commissioning of the valve at MP 1621, a timing test was conducted, and the valve fully closed and sealed within three minutes of the operator engaging the valve-closure mechanism, complying with the Consent Decree requirement.

During this SAR reporting period, Enbridge has completed the following milestones:

- Completion of 2019 material procurement activities
- Submittal of all environmental permit application for 2019 construction activities
- Receipt of environmental permits for MP458 and MP427
- Submittal of all land use permit applications for 2019 construction activities
- Receipt of land use permits for MP458 and MP427
- Completion of construction specifications and drawings for 2019 execution plan

- Completion of construction contract for 2019 execution plan
- Start of 2019 construction activities

Section J – Independent Third Party Consent Decree Compliance Verification

As reported in the first SAR dated January 2018 and the second SAR dated July 2018 Enbridge retained O.B. Harris, LLC as the ITP on January 11, 2017 to conduct a comprehensive verification of Enbridge's compliance with the requirements set forth in Section VII (Injunctive Measures), except for subsection VII.H (Spill Response & Preparedness) which Paragraph 125 excludes from the verification activities that are required to be performed by the ITP. Therefore, Enbridge's obligations under Paragraphs 125, 127-132.a and 134 have been satisfied. Enbridge will continue to report on required updates and/or changes to this injunctive measure in future SARs.

126. [ITP Access to Enbridge Lakehead System]

Enbridge continues to provide the ITP with full access to all facilities that are part of Enbridge's Lakehead System including any personnel, documents and databases to allow them to fully perform all activities and services required by the requirements of the Consent Decree.

132. [Enbridge – ITP Agreement Tasks 2, 3, 4, and 5]

In accordance with Paragraph 132, Enbridge continues to support the ITP in providing them additional information and responding to their requests to assist the ITP in completing the tasks required by Subparagraphs 132.b, c, d and e. Enbridge considers *Task 1 – Initial Project Planning Meeting with Region 5 in Chicago* to be complete and will no longer report on compliance with Subparagraph 132.a in future SARs.

133.b [Enbridge Response to ITP Verification Report]

The agreement between Enbridge and the ITP requires, as per Subparagraph 133.a, that the ITP prepare a written verification report that sets forth the findings, conclusions and recommendations, if any, as to each of the requirements of Section VII of the Consent Decree, excluding Subsection VII.H (Spill Response and Preparedness). The ITP provided the first such report on September 24, 2018. Enbridge's response to the Verification Report was submitted on December 24, 2018. The ITP responded to the Enbridge submittal on January 22, 2019, and stated that the results of the ITP's Verification Report would not be revised.

134.l [General Requirements – ITP Annual Certification]

On January 3, 2019, the ITP provided its annual certification to the United States, verifying that it complies with the General Requirements of Subparagraph 132.l.

135. [Enbridge Enforcement of the Agreement]

As reported in the first, second, and third SARs, Enbridge continues to enforce the terms of its written agreement with the ITP to ensure compliance with Section VII.J of the Consent Decree.

136. [ITP Replacement]

This Paragraph of the Consent Decree addresses replacement of the ITP, which is an issue that has not arisen since the Effective Date.

IX. – Reporting Requirements

144. [SAR Requirements]

This section summarizes information required by Paragraph 144 to the extent that the information is relevant to Enbridge's compliance with a requirement of the Decree and has not been reported separately above. Enbridge also recognizes that all of the matters listed in Paragraph 144 will not always be applicable relative to each of the Decree's requirements. Among matters listed in Paragraph 144 are the following:

i. Completion of milestones
ii. Problems encountered or anticipated in implementing the requirement (together with implemented or proposed solutions)
iii. Status of permit applications
iv. Operation and maintenance issues
v. Reports to State Agencies
vi. Number by types, of features repaired or mitigated during the reporting period and the number, by type, planned for future repair or mitigation
vii. Any significant changes or issues since the previous SAR

In many cases, the matters listed above have been reported in previous sections of the Report that relate to specific Decree requirements. However, Enbridge has selected the activities reported below to draw specific attention to challenges encountered during Reporting Period 3, pursuant to Paragraph 144.

Table 43: P144 Problems Encountered

Problem Encountered	Relevant Paragraph
[Section D] Line 61 PR-FN Corrosion ILI Inspection Challenges	Paragraph 29
[Section D] Line 3 CR-PW Original Line 3 Crack Inspection	Paragraph 29, 66
[Section D] Metal Loss Priority Notification Reporting	Paragraph 33.a
[Section D] Line 6A AM-GT GW 144220 PPR ID 28601 Administrative PPR Imposition Delay	Paragraph 33.c-d
[Section D] Line 1 CR-PW NDT UC GW 40280 Priority Feature Review	Paragraph 33.c-d
[Section D] Line 3 CR-PW 2018 BHGE DuoCD GW 133790 Priority Feature Dig List with no FREs	Paragraph 33.c-d
[Section D] Line 6A AM-GT Dig Re-Issue	Paragraph 39
[Section D] Verification and Documentation for Paragraph 40	Paragraph 40
[Section D] NDE Report Receipt and Approval Dates	Paragraph 40
[Section D] Crack and Corrosion Field Burst Pressure	Paragraph 43

Table 43: P144 Problems Encountered	
Problem Encountered	**Relevant Paragraph**
Calculations per Appendix B	
[Section D] Line 1 CR-PW Deadline Extension Features	Paragraph 49.a
[Section F] Line 5 PE-IR 2017 USCD+ NDE Report OneSource Load Data Re-Upload	Paragraph 77.d
[Section F] Line 3 CR-PW DUOCD NDE One Source Upload Deadline	Paragraph 77.d
Section F] Line 5 WNO-WMA GeoPig OneSource Upload – P77.d	Paragraph 77.d
[Section IX] Line 6A AM-GT Potential Delay	Paragraph 144
[Section G] January 30, 2019 Line 14 MBS Auto-Disabled on a Non-flowing Section	Paragraph 92
[Section G] March 13, 2019 ILI bypass event at L1 Plummer station, exceeded 4-hour outage	Paragraph 96
[Section G] March 25, 2019 Superior Network outage resulting in LDS Alarms	N/A
[Section G] Functionally Identical Equipment (Paragraph 100)	Paragraph 100

[Section D] Line 61 PR-FN Corrosion ILI Inspection Challenges - P29

Line 61 PR-FN corrosion inspection failed twice. A GEMINI corrosion-geometry combo tool was originally run on the segment on 2/21/2019, and while the geometry portion of the run was successful, the corrosion portion was not due to degraded data from the intermittent operation of various MFL sensors.

In an effort to meet the Consent Decree re-inspection deadline, Enbridge worked with the vendor to run a GEMINI MFL4 tool on 4/22/2019. This tool run failed part way through resulting in 29 km of missing data; of the data collected, sensors issues affected the quality of the data collected. Another vendor was contacted in an effort to meet the June 2019 ILI deadline. The run was completed on 6/3/2019 and the data was accepted, within the consent decree inspection deadline. The details of this program will be included in SAR5.

[Section D] Line 3 CR-PW Original Line 3 Crack Inspection - P29, 66

Enbridge is not required to run ILI tools within the final year of service of Line 3 and therefore had not scheduled ILI runs within the final year of service. The in-service date for Line 3 was revised in March 2019 which meant that Enbridge would need to run the ILI tools in 2019. Enbridge worked with the ILI vendors to successfully schedule all of the ILI runs to occur as soon as practicable and be completed in 2019.

[Section D] Metal Loss Priority Notification Reporting – P33.a

One of the priority notification criteria for metal loss ILI features is “metal loss features forecasted to reach a maximum depth of greater than or equal to 75 percent of the nominal wall thickness within 365 calendar days.” Based on inquiries from the ITP, it was discovered that most ILI runs used this priority notification criteria, however, eighteen corrosion programs did not. Enbridge retroactively applied a CGR to the runs that did not have the forecasting completed and no priority features were identified based on the “metal loss features

forecasted to reach a maximum depth of greater than or equal to 75 percent of the nominal wall thickness within 365 calendar days" criteria.

Enbridge discussed the issue with the vendor at a collaboration meeting on 5/7/2019 to ensure the metal loss features forecasted to reach a maximum depth of greater than or equal to 75 percent of the nominal wall thickness within 365 calendar days calculation is completed on all runs going forward. Enbridge is working on a modification to the minimum reporting requirements document, as well as internal vendor QA checks, to avoid repetition of this problem.

[Section D] Line 6A AM-GT GW 144220 PPR ID 28601 Administrative PPR Imposition Delay - P33.c-d

Line 6A has an active discharge pressure restriction (DPR) which limits the pressure of the line below MOP. This DPR actively limits the maximum allowable operating pressure (MAOP) for this entire segment, therefore limiting MAOP at the location of the Line 6A AM-GT feature on GW 144220 to 533.5 psi. This feature was placed on the Dig List on 12/05/2018; however the administrative PPR was imposed on 12/21/2018. The PPR required was 550 psi, which is above the MAOP, therefore the PPR was administrative only. Enbridge personnel were aware of the administrative requirement and explained that this was an administrative oversight. The imposition of administrative PPRs were discussed with SMLs and other affected groups in PI to ensure understanding of CD procedures.

[Section D] Line 1 CR-PW NDT UC GW 40280 Priority Feature Review - P33.c-d

As noted in Table 8 under Paragraph 33.c-d, an In-Line Inspection Reporting Requirements defined priority notification was reported on Line 1 CR-PW GW 40280 based on the NDT UC crack ILI run. The notifications were received on 12/03/2018 and features were reviewed and placed on the Dig List on 12/07/2018. The review process and subsequent placement of the feature on the dig list was completed within the Consent Decree timelines, however there is no documentation of the review required between identification of the feature and the approval of the dig list. There were two other priority notifications affiliated with this program that occurred in the SAR3 reporting period and were included in SAR3.

Enbridge has made documentation improvements to simplify the administrative process of documenting completion of related activities for verification.

[Section D] Line 3 CR-PW 2018 BHGE DuoCD GW 133790 Priority Feature Dig List with no FREs – P33.c-d

A priority notification on Line 3 CR-PW GW 133790 was identified by the 2018 BHGE DuoCD crack ILI tool and reported to Enbridge on 7/12/2018. The feature was assessed the same day and it was determined that the feature was not an FRE required by the Consent Decree, and did not meet any Enbridge excavation criteria. No integrity action was required; however the subject matter expert approval of the empty Priority Feature Dig List did not occur until 12/6/2018. The other priority notifications associated with this program were discussed in SAR3.

Enbridge continues to work on improving operational discipline in instances where no action is required. The group responsible for executing Consent Decree programs was re-trained on the required timelines and the required documentation. The priority notification process is currently being improved, including the development of a clear workflow through updated assessment sheets.

[Section D] Line 6A AM-GT Dig Re-Issue – P39

A feature on Line 6A AM-GT GW 286210 was identified as an FRE based on the 2017 UMP corrosion ILI program, with an excavation deadline of 4/9/2019. The target FRE was excavated and repaired as planned.

The excavated portion of the pipe also had one other corrosion feature outside of the NDE scope that did not require repair. The dig site access timeframe was limited, and the excavation and backfill was required to be performed quickly. The dig execution team contacted the Enbridge coating subject matter expert for guidance, and was informed that the NDE vendors were to assess the corrosion feature on the excavated portion of the pipe. However, due to expiring site access, the site was backfilled before completing the analysis on the corrosion feature that does not require repair. The consent decree requires that field measurement of all features on the excavated section of the pipeline must be obtained and recorded. Enbridge has since re-issued a dig package on 3/4/2019 for the same location to allow for proper assessment of the feature, and for coating repair. The deadline for the re-issue is 27/7/2019. This was not an oversight and the NDE vendor did not miss the feature, and instead was an issue related to site access. This event was investigated and was closed on 4/30/2019.

[Section D] Verification and Documentation for Paragraph 40 – P40

Following the approval of the last FRE NDE report, Enbridge practice is to complete the comparison of ILI to field data and perform a statistical analysis, as per the Lakehead System Integrity Remediation Process.

Once this analysis is complete, the subject matter lead for the line will review the data to determine if the ILI tool tended to understate the actual severity of the features and if so take the required action as detailed in Paragraph 40.

The statistical analysis comparison of ILI data to field data, and quantification of any bias were all completed within the required 30 day timeline. All of the statistical analyses completed identified that no action was required and that the ILI tool did not understate the actual severity of the features by more than one tool tolerance. As a result, no further action was required; however, the subject matter lead did not review and include the information in the program summary document. Enbridge has made improvements to internal processes to ensure both actions are completed within the 30 days. This effort will aid in the ITP's verification of this Paragraph through the program summary documents.

[Section D] NDE Report Receipt and Approval Dates – P40

The analysis of field data, including a statistical analysis occurs within 30 days after the date the last FRE NDE report is approved, as it is at this time that all FRE field data is confirmed and considered acceptable for further analysis. While the majority of NDE report approvals occur within a short period of time, exceptions were identified. These delays were typically the result of NDE vendor delay in completing revisions requests, or where multiple revisions are required.

While the analysis of field data, including the statistical analysis is typically completed as FRE reports are approved, the overall program bias cannot be finalized until all FRE data points approved and considered. If any significant safety outliers are identified as the analysis of data occurs with the availability of each NDE report, they would be acted on regardless of when the final FRE NDE approval has occurred.

[Section D] Crack and Corrosion Field Burst Pressure Calculations per Appendix B in the Consent Decree – P43

As presented to the EPA and the ITP on June 11, 2019, there is a discrepancy in how field NDE Burst Pressure Calculations are completed. Appendix B, A.4 outlines the wall thickness to be applied for the burst pressure calculations, which is applied as written for ILI feature assessment.

For field NDE Burst Pressure calculations per Appendix B, Enbridge currently follows industry best practice, using the wall thickness at the NDE indication as measured in the field by hand-held or automated UT measurements collected during the NDE process.

A.4.a can be generally applied in principle as the local wall thickness at the location of the indication is measured by hand-held or automated UT measurements, however joint wall thickness is not used as it is less accurate. A.4.b is not applied because the measured wall thickness value in the field is always used. In addition, nominal wall thickness is not relevant for cracks or corrosion located in the seam weld or girth weld, which is consistent with ASME B31G guidance. A.4.c is applied, as local wall thickness as detected through field NDE is used in all cases, including when the local wall thickness is lower than nominal.

[Section D] Line 1 CR-PW Deadline Extension Features – P49.a

Two features identified as FREs from the Line 1 CR-PW 2018 NDT UC crack tool run were added to the dig list on 2/14/2019. These features are on GW 251130 and GW 253170 and have a dig deadline of 8/13/2019.

Based on a preliminary environmental review, the location of these features is near a previously identified protected plant species in the vicinity of the Pokegama wetland. A survey to confirm whether or not the protected plant species was in the exact location of the digs is required; however, the survey cannot occur until July 2019. A dig extension was granted by Enbridge SMEs for these features prior to confirming whether or not the protected plant species was impacted. If the survey identifies that the protected plant species will not be impacted by the dig, the original dig deadline of 8/13/2019 will apply. If the protected plant would be impacted, Enbridge may be required to delay dig execution, not to exceed 2/14/2020.

[Section F] Line 5 PE-IR 2017 USCD+ NDE Report OneSource Load Data Re-Upload – P77.d

An NDE report for dig ID 23020 GW 154730 from the Line 5 PE-IR 2017 USCD+ program was uploaded into OneSource on 10/10/2018, as reported in SAR3. It was discovered that the OneSource Load Date for this program is showing 6/5/2019, which is incorrect.

The cause of this error is currently being investigated. Report revisions have not occurred since the original upload date.

[Section F] Line 3 CR-PW DUOCD NDE Report OneSource Upload Deadline - P77.d

The last NDE report Approval Date for the Line 3 CR-PW DUOCD program was 3/18/2019. The last Consent Decree NDE report was for Line 3 CR-PW DUOCD GW132420, and was uploaded to OneSource on 5/14/2019. One of the views in OneSource was showing a blank date for the OneSource upload date, prompting the report to be re-uploaded on 5/21/2019, which is the date currently displayed in user-end views in OneSource. The cause of this error is currently being investigated.

[Section F] Line 5 WNO-WMA GeoPig OneSource Upload – P77.d

When the Priority Notifications report for Line 5 WNO-WMA GeoPig was uploaded to OneSource on April 1, 2019, the issue was incorrectly entered as “1” when it should have been entered as “P1”. When the actual issue 1 report was uploaded on April 22, 2019, the system would not allow for an override of the original Issue 1 date which means that the OneSource date incorrectly shows April 1, 2019 as the Issue 1 Upload Date.

[Section IX] Line 6A AM-GT Potential Delay – P144

As per Paragraph 175, on March 11, 2019 Enbridge submitted an initial notice of potential delay for a feature located on Line 6A AM-GT GW304370, near Orland Park, IL. The feature was located in close proximity to a Commonwealth Edison electric transmission tower that required re-configuration of one of the guy wires prior to excavation. Enbridge identified that the guy wire relocation may not occur in time for FRE remediation to meet

the excavation deadline. However, the guy wire work required prior to excavation was completed in time to allow for the FRE excavation deadline to be met.

[Section G] January 30, 2019 Line 14 MBS Auto-Disabled on a Non-flowing Section - P92

On January 30, 2019, Griffith Takeoff ("GL") to Griffith Station ("GT") section of the Line 14 pipeline was shut-in while a delivery was occurring on the lateral section GL-MK (Mokena-"MK"). At 00:12:14 MST, a leak detection coverage alarm occurred on the overlapping MBS segment BL-GT (Burlington ("BL") (upstream of GL) to GT). The initial assessment determined that the cause of the coverage alarm was due to GL-GT section not having MBS coverage. Further analysis and investigation determined that this configuration was intended based on the legacy (pre-Consent Decree) MBS operational condition unique to this line. This legacy configuration was in place to automatically disable MBS for the non-flowing, shut-in section of the line to optimize reliability, given that no flow meter exists at the GL station. Per the consent decree definition, MBS Segment shall mean a section of pipeline that is bounded on each end by adjacent flowmeters. Although this section doesn't meet the consent decree definition of MBS segment, Enbridge has applied continuous improvement to incorporate this section into the MBS system during shut-in conditions. The MBS on the flowing lateral sections remained active at all times.

With the improved performance of the MBS today and part of continuous improvement, Enbridge has implemented an enhancement to address this operational condition while still maintaining the reliability of the MBS. This enhancement allows MBS to remain active at all times on this shut-in section.

[Section G] March 13, 2019 ILI bypass event at L1 Plummer station, exceeded 4-hour outage - P96

On March 13, 2019 a bypass of the Line 1 Plummer ("PL") station started at 8:51am MST to accommodate an in-line inspection ("ILI") tool passing the station. The line was shut down for a period of time during the bypass, accounting for 11 hours and 1 minute of tolling. The bypass was ended at 7:34am MST on March 15 resulting in a total bypass time of 46 hours and 43 minutes. Details of this event and corrective actions are described in Paragraph 96 in this semi-annual report.

[Section G] March 25, 2019 Superior Network outage resulting in LDS Alarms - N/A

Although this does not relate to a specific consent decree Paragraph, on March 25, 2019 a network outage occurred at the Enbridge Superior terminal facility that resulted in the shutdown of multiple Lakehead lines. The outage and associated shutdowns resulted in multiple false MBS and RDS alarms. All alarms that transpired as a result of this event occurred on pipelines that were already shutdown. Additionally, all alarms were investigated as per the procedures in paragraphs 108 and 109 and determined to be false before lines were restarted. All alarms are documented in the Record of Alarms, Weekly List of Alarms and were reviewed with the ITP during the April 23rd, 2019 monthly technical meeting,

[Section G] Installation of New Equipment at Remotely-Controlled Valves - P100

The ITP's February 13, 2019 GL item G-057 requested evidence to enable the ITP to verify that the requirements of paragraphs 99 and 100 are satisfied when valves are excavated. During discussions with the ITP on this GL, they asked Enbridge to prove that functionally identical equipment exists at two valve sites that were cited to have triggered Paragraph 100: Line 6A, MP 135, Valve C0135.55-6-BV-1 and Line 10, MP 1951, Valve 290-OV-2. In the course of gathering information to respond to this question, Enbridge investigated and confirmed that, in fact, both valves were of types that are exempt from Paragraph 99. The valve on Line 6A is a station bypass valve and the valve on Line 10 is located on the station side of the station suction isolation valve. Hence, Paragraph 100 was not applicable in these two instances. Enbridge is in the process of putting a formal workflow in place to support appropriate communication, assessment, and review for each instance of

a planned valve excavation. A response to this action item, with more detail, was sent to the ITP on July 3, 2019.

Status of Permit Applications for FREs

There are several permit applications associated with Alternate Plan 3 and Alternate Plan 4. The specific permits and the current status are discussed quarterly with the EPA and the ITP and through additional information requests.

Any significant changes or issues since the previous SAR

Change in Reporting for Combination ILI Tools

Enbridge changed the way combination ILI tools are reported in the ILI schedule. In previous SARs, combination tool (typically corrosion combined with deformation) deadlines were reported using the earliest deadline of the two threat types. However, in cases where the tool run was unsuccessful for one threat type, it was misleading as to whether or not the re-inspection interval was being met. To eliminate this confusion, re-inspection deadlines in the 12 month ILI schedule are now being reported by threat, instead of by tool.

145. [Non-Compliance]

A list of the potential non-compliances identified during the SAR4 reporting period is shown in **Table 44**, below.

Table 44: P145 List of Potential Non-Compliances

Potential Non-Compliance	Summary Location
[Section F] Line 5 ENO-EMA and WNO-WMA GEOPIG NDE One Source Upload Deadline	Paragraph 77.d
[Section G] 24-hour alarm on Line 14 was disabled from December 7, 2018 to Dec 12, 2018	Paragraph 103

[Section F] Line 5 ENO-EMA and WNO-WMA GEOPIG NDE Report One Source Upload Deadline - P77.d

The last NDE report Approval Date for the Line 5 ENO-EMA GEOPIG program was 9/20/2018 and for Line 5 WNO-WMA GEOPIG was 9/19/2018, however the NDE reports were not uploaded to OneSource by 11/19/2018 and 11/18/2019, respectively. This inspection was a result of the suspected anchor strike incident and was completed by underwater divers. The NDE reports were sent to Enbridge on 9/13/2018 and were reviewed and approved shortly after. The report for ENO-EMA was shared with the ITP via the ShareDrive on 9/19/2018 and the report for WNO-WMA was shared with the ITP on the ShareDrive on 9/20/2019, however they were not uploaded to OneSource until 6/5/2019. The cause for this event is that the NDE reports did not align with the templates required for OneSource upload and requires manual entry and review into Enbridge systems. A lessons learned session is scheduled on 7/11/2019. Enbridge has improved its quality control processes to ensure unique reports that do not align with existing templates are tracked and uploaded in a timely manner.

[Section G] 24-hour alarm on Line 14 was disabled from December 7, 2018 to Dec 12, 2018 - P103

The Automated Volume Balance (“AVB”) system, which is Enbridge’s implementation of the 24-hour alarm, remained disabled on the entire Line 14 five days beyond completion of planned project work – from December 7, 2018 to December 12, 2018. A Leak Detection Project Integration Plan (“LDPIP”) was developed and put in

place that outlined the plan for the replacement of a segment of pipe on Line 14 between December 5, 2018 and December 7, 2018. A component of the plan was to disable specific MBS and AVB sections for the duration of work by implementing overrides. These overrides were executed and tracked via the Leak Detection Alarm Management ("LDAM") tool. However, as the project progressed, the work plan changed due to operational constraints. In the course of updating and implementing the LDPIP to align with the changes in the work plan an override that was put in place to disable an AVB alarm was not tracked correctly. The disabled AVB alarm was not detected for five days after the work plan was completed. MBS overrides were tracked correctly and enabled immediately after the work was completed, which resulted in full MBS leak detection coverage.

Circumstances leading up to the event are as follows: When the work was completed on December 6th, it was determined that the LDPIP needed to change to accommodate operational adjustments on the new pipe section. The LDPIP was updated accordingly, however, the AVB overrides were missed, an incorrect version of the plan was uploaded and a notification to Support personnel was not updated to reflect the change. A verbal communication took place in regard to the MBS overrides, but not the AVB overrides. When the refill began around 01:41 on December 7th, MBS behaved as expected, but an AVB alarm rang in a few hours later (~04:01), which was invalidated due the ongoing field work. It was then recognized that disabling AVB globally on the line was required, and was performed in production at that time. When this change was made, another alarm rang in for a different line. As a result, the change was neither formally communicated to the group nor documented in LDAM. The change was noted in the shift change document, but the note did not provide enough details (e.g., how it was disabled). When the line refill finished around 05:00 on December 7th, MBS was re-enabled globally on the line and AVB was thought to be re-enabled on specific sections. However, the global AVB alarm setting remained disabled. The weekly maintenance checks on the line were done later that same day but failed to recognize the disabled status of AVB. Five days later, on December 12th, during an ad-hoc review of a system status report, it was discovered that the AVB alarms for Line 14 were globally disabled. The AVB alarms were immediately enabled (Dec 12, 2018 14:02:48) and follow-up checks were completed to ensure all layers of LDS for Line 14 were healthy and enabled.

The primary cause of this non-compliance was discovered following an internal investigation of the event. The AVB override was only communicated verbally to the Leak Detection Analyst ("LDA") on shift when the work plan was completed. There were no written or posted instructions on adding and removing the AVB override to ensure instructions could be referenced and checked. The tracking of the AVB override on LDAM was missed due to LDA focus on a high priority alarm (i.e., "valid with leak triggers") on another line.

The remedial actions completed to rectify the non-compliance and ensure ongoing compliance include, enabling AVB and ensure all LDS layers for Line 14 are active; ensuring LDAM overrides are updated and reflect all work completed for Line 14 cut-out project; reviewing disabled alarms every shift until an AVB coverage alarm is implemented; and, a reminder was sent out to all Leak Detection Support staff indicating production LD layers shall not be disabled unless approved in an LDPIP or by LD Escalation On-call.

To address future occurrences of similar events, Enbridge has added AVB into the Leak Detection Coverage alarms; has improved maintenance checks and reports to make checks more prescriptive; and, is reviewing the LDPIP process with impacted stakeholders to ensure the LDPIP clearly indicates that all project work is to stop and a new sign-off completed when the project or work scope changes, assigning a clear owner to follow through the complete LDPIP process, clarify roles and responsibilities of all involved in the LDPIP, and, a sign-off is completed when the project or work is finished.

146. [Discharges from a Lakehead System Pipeline]

Table 47 below identifies the two discharges from a Lakehead System Pipeline of one or more barrels of oil that occurred during the reporting period for this SAR, as well as any discharge of oil during the reporting period that reached any waterbody or waters of the United States or adjoining shoreline in a quantity as may be harmful.

Enbridge can confirm that these discharges did not reach any waterbody or waters of the United States or adjoining shoreline. Enbridge has committed to report all Post Incident Reports that were not previously requested and provided during the current SAR reporting period. The reports at issue appear in Appendix 5.

Table 45: P146 Discharges from a Lakehead System Pipeline		
Spill Date (MM/DD/YYYY)	3/16/2019	4/4/2019
National Response Center #	Not Required	1242662
Spill Location	Superior, Douglas County, WI	Superior, Douglas County, WI
MP#/Facility Name	Superior Terminal	Superior Terminal
Equipment or Line Number	Tank 21 Piping Flange	Tank 24 Header Line
Cause of spill	Material Failure of Pipe or Weld	Corrosion
Spill Material	Crude Oil	Crude Oil
Quantity of Spill	1.71 Barrels	2.00 Barrels
Distance Spill Travelled	80 feet	112 feet
Sheen, Sludge or Emulsion Observed	None	None
Name of Water that Spill Entered (if applicable)	Not Applicable	Not Applicable
Water Quality Standard Exceeded/Violated	Not Applicable	Not Applicable
Actions Taken or Planned to Address Spill	A pressure containing sleeve was welded over the crack and the line was placed back into service	A leak clamp was installed over the failure.
Actions Taken or Planned to Prevent Future Spills and Schedule for Future Actions	Facilities Integrity will discuss feasibility of complete removal and replacement of the failed flange and weld.	Tank 24 is currently out of service for an API 653 Inspection. The short piece of dead leg piping that failed will be removed from the system prior to Tank 24 going back into service.
Environmental Impacts from Spill	Soil (Solely on Enbridge Property)	Soil (Solely on Enbridge Property)
Root Cause	Construction, Installation, or Fabrication (Mechanical Stress)	Internal Corrosion

147. [Update on Discharges from a Lakehead System Pipeline reported in SAR 3, January 2019]

Updates to the discharges reported in the third SAR are italicized below.

Table 46: P147 Update on Discharges from a Lakehead System Pipeline	
Spill Date (MM/DD/YYYY)	7/26/2018
National Response Center #	Not Required
Spill Location	Superior, Douglas County, WI
MP#/Facility Name	Superior Terminal
Equipment or Line Number	Tank 10 Piping
Cause of spill	Corrosion
Spill Material	Crude Oil
Quantity of Spill	2.00 Barrels
Distance Spill Travelled	50 feet
Sheen, Sludge or Emulsion Observed	None
Name of Water that Spill Entered (if applicable)	Not Applicable
Water Quality Standard Exceeded/Violated	Not Applicable
Actions Taken or Planned to Address Spill	An 18" sleeve was welded to the pipe on July 27, 2018 and the line was returned to service.
Actions Taken or Planned to Prevent Future Spills and Schedule for Future Actions	After discovering the pinhole leak in the 6 o'clock position adjacent to the weld joining the 45 degree elbow to the pipe, an NDE analysis was completed on the second weld associated with the elbow and along the bottom of the pipe in the general vicinity of the leak. No other defects were discovered in the additional precautionary NDE analysis. A third party review of the sleeve that was installed was completed on December 19, 2018. *Enbridge provided the requested information to the third party reviewer related to the specified maximum cooling rate in the Enbridge Welding procedure. The information provided was determined to be suitable by the third party reviewer.*

Table 46: P147 Update on Discharges from a Lakehead System Pipeline	
Final Actions Taken or Planned to Prevent Future Spills and Schedule for Future Actions	No further action warranted
Environmental Impacts from Spill	Soil (Solely on Enbridge Property)
Preliminary Root Cause	Internal Corrosion
Final Root Cause	No change

148. [Copies of all Post Incident Reports]

See Appendix 5.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on any personal knowledge I may have and my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

FOR DEFENDANTS:

ENBRIDGE ENERGY, LIMITED PARTNERSHIP,
ENBRIDGE PIPELINES (LAKEHEAD) L.L.C.,
ENBRIDGE ENERGY PARTNERS, L.P.,
ENBRIDGE ENERGY MANAGEMENT, L.L.C.,
ENBRIDGE ENERGY COMPANY, INC., and
ENBRIDGE EMPLOYEE SERVICES, INC.,

[redacted]

[redacted] Vice President

FOR DEFENDANTS:

ENBRIDGE OPERATIONAL SERVICES, INC.,
ENBRIDGE PIPELINES INC., and
ENBRIDGE EMPLOYEE SERVICES CANADA INC.

[redacted]

[redacted] President

ENBRIDGE

Appendix 1 – Table of Temporary MBS Suspension [93-94, 96-97]

Reporting Period: November 23, 2018 to May 22, 2019

ENBRIDGE

Temporary MBS Suspension			
Reason for Instrumentation Outage	**Time Period to Restore MBS Segment to Operation (Requirement)**	**Number of Occurrences**	**Number of Occurrences Exceeding Time Period**
Instrumentation failure	10 days	17	0
Bypass of ILI Tool	4 hours	43	1
Scheduled maintenance or repairs	4 days	68	0

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Appendix 2 – Lakehead Leak Alarm Report [108,110,111]

Reporting Period: November 23, 2018 to May 22, 2019

Lakehead Leak Alarm Reports

- Summary of Alarms (SOA)
- Record of Alarms (ROA)
- Weekly List of Alarms (WLOA)
- Instrumentation Outage Report

Prepared by Pipeline Control

On May 30, 2019

For reporting period November 23, 2018 to May 22, 2019

Purpose of the Document

The following sections present four (4) reports from section **VII.G. LEAK DETECTION AND CONTROL ROOM OPERATIONS** of the Consent Decree.

The first three reports are for subsection **VII.G.V. Leak Detection Requirements for Control Room** of the decree. They list production MBS Leak Detection System (MBS) and Rupture Detection System (RDS) alarms in the Lakehead System:

1. The summary of alarms (“SOA”) lists the total number of Alarms per pipeline and states whether or not Enbridge complied with the 10-Minute Rule in responding to Alarms. With respect to each non-compliance, it provides a reference to the post incident report which states the reason for the non-compliance and identifies the corrective action, if any, taken to prevent a recurrence of the non-compliance.
2. The record of alarms (“ROA”) documents Unscheduled Shutdowns due to Alarms. Each record indicates an instance when the pipeline was shutdown with critical facts relating to the Alarm.
3. The weekly list of alarms (“WLOA”) include Alarms broken down by pipeline, the type of Alarm, the total number of Alarms for the reporting period, the date of the Alarm, the time at which it began, and the time when the Alarm was cleared.

The fourth report is for subsection **VII.G.IV. Leak Detection Requirements for Pipelines** within the Lakehead System of the decree. The report lists instances when the outage exceeded time periods set forth in paragraph VII.G.IV.97 of the decree.

4. The instrumentation outage report documents two of the three "Reason for Instrumentation Outage" listed in paragraph VII.G.IV.97 of the decree:
    - *Instrumentation Failure*
    - *Scheduled Maintenance or repairs*
    - *Bypass ILI Tool* is documented separately.

Timestamps in the reports are in 24-hour Mountain Standard Time format.

For specific detailed requirements of the reports, please to refer to the Consent Decree.

Terms of Reference

Terms of Reference Table: Special Terms and Reference from the Consent Decree

The following section define terms copied from the Consent Decree for convenience. Please refer to the Consent Decree in case of any discrepancies.

Consent Decree Reference	Term	Definition
IV.10.dd	Lakehead System	The portion of the Mainline System within the United States that is comprised of fourteen pipelines – Lines 1, 2B, 3, 4, 5, 6A, 6B, 10, 14, 61, 62, 64, 65, and 67 – and all New Lakehead Pipelines. *Note: Line 6B has been renamed to Line 78. 6B and 78 are equivalent and the same pipeline.*
IV.10.ii	Material Balance System or MBS Leak Detection System	The computational pipeline monitoring system used by Enbridge to detect leaks or ruptures in the Lakehead System.
IV.10.ggg	Shutdown	The operational period between (1) the initial cessation of pumping operations in a pipeline, or section of pipeline, through which oil has been actively flowing and (2) the point where the flow rate within the pipeline, or section of pipeline, is zero.
IV.10.iii	Startup	The operational period between (1) the commencement of pumping operations in a pipeline that had been previously shut down and (2) the point where oil in the pipeline achieves a Steady State.
VII.G.V.105	Alarm Response Team: CRO, LDA, STA	All Alarms shall be addressed by an Alarm Response Team, which shall be composed of the following individuals in the Control Room at the time that the Alarm occurs: 1. the Control Room operator (“CRO”) who is responsible for the pipeline that generates the alarm, 2. the leak detection analyst (“LD Analyst”), and 3. the senior technical advisor for that pipeline.

Terms of Reference Table: Special Terms referenced in these reports.

The following section define terms used by Enbridge for the purpose of these reports.

Consent Decree Reference	Term	Definition
VII.G.V.104	Alarm or Alarms	Alarm and Alarming Event are equivalent in these reports. An Alarming Event is an event with a single root cause but can generate one or more alarms. Enbridge documents alarms as events. In order to align with the information requested by the Consent Decree (such as root cause), Alarming Events are reported.
VII.G.V.108	Alarm Clearance	Alarm Clearance is the act of investigating whether an Alarm is truly a potential leak or a false alarm. The alarm clearance is a procedural act and not to be confused with the alarm status which is the binary state of in alarm state (ALM, often “1”) or returned to normal (RTN, often “0”).

I certify that for this reporting period, the information contained in the SOA, WLOA, and ROAs, is true and accurate, and Enbridge has complied with the 10-Minute Rule and other requirements of Subsection VII.G.(V).

Vice President, Pipeline Control

[redacted]

Name

[redacted]

[redacted]

Date

1. Summary of Alarms (“SOA”)

The records in this report each contain data that are referenced by the Consent Decree. The terms are explained in the following table.

Table 1a: Description of fields in this Report

Data	Description
Pipeline	Name (number) of the pipeline
Total Alarms	Total number of alarming events for reporting period
Total Non-Compliance	**(Alarming)** Number of times Enbridge did not comply with the 10-Minute Rule in responding to Alarms **(Non-Alarming)** Number of times Enbridge did not comply with the 10-Minute Rule in responding to potential leak or rupture from a source other than an Alarm
Reasons and Corrective Actions for each Non-Compliance	Reference to the Post Incident Report describing reason for the non-compliance and the corrective action, if any, taken to prevent a reoccurrence of the non-compliance. An empty reference indicates either zero non-compliance to the 10-minute rule or the Post Incident Report is not yet generated.

Table 1b: Summary of Alarms (Reporting Period: November 23, 2018 to May 22, 2019)

Pipeline	Total Alarms	Total Non-Compliance (Alarming)	Total Non-Compliance (Non-Alarming)	Reasons and Corrective Actions for each Non-Compliance
01	8	0	0	
02	18	0	0	
03	16	0	0	
04	15	0	0	
05	7	0	0	
06A	21	0	0	
10	4	0	0	
14	27	0	0	
61	7	0	0	
62	0	0	0	

Pipeline	Total Alarms	Total Non-Compliance (Alarming)	Total Non-Compliance (Non-Alarming)	Reasons and Corrective Actions for each Non-Compliance
64	0	0	0	
65	2	0	0	
67	4	0	0	
78	11	0	0	

2. Record of Alarm (“ROA”)

The records in this report each contain data that are referenced by the Consent Decree. The terms are explained in the following table.

Table 2a: Description of fields in this Report

Data	Description
Pipeline	Name (number) of the pipeline.
Alarming Event Start Time	Start of the Alarming Event that caused the alarm(s) to trigger. It is always the receipt time of the earliest alarm in an Alarming Event.
Alarm Received Time	Time that the alarm was received for each individual alarm within the Alarming Event. Each alarm is simultaneously received by all members of the alarm response team.
Alarm Assessed Time	Time that the alarm was assessed for each individual alarm within the Alarming Event. Each alarm is assessed by each independent member of the alarm response team; an alarm is considered assessed when all members of the alarm response team has assessed.
Root Cause	Cause and classification of the Alarm. An empty field indicates the root cause has not yet been documented.
CRO and STA Actions	Procedures executed by the control room operator (OP) and the senior technical advisor (STA) which define the positions (i.e. role) of the Alarm Recipients, the actions (or inactions) of the Alarm Response Team, and each fact considered in determining the cause of the Alarm. An empty field indicates the actions or procedures have not yet been documented.

Table 2a: Description of fields in this Report

LDA Actions	Procedures executed by the leak detection analyst (LDA) which define the positions (i.e. role) of the Alarm Recipients, the actions (or inactions) of the Alarm Response Team, and each fact considered in determining the cause of the Alarm. An empty field indicates the actions or procedures have not yet been documented.
Shutdown Commenced	Time the Unscheduled Shutdown commenced. An empty time indicates the Shutdown Commenced has not yet been documented.
Shutdown Completed	Time the Unscheduled Shutdown completed. An empty time indicates the Shutdown Completed has not yet been documented.
Justification for Resumption	Justification for resumption of pumping operations. An empty field indicates the Justification for Resumption has not yet been documented.
Startup Commenced	Time that pumping operations resumed. An empty time indicates the Startup Commenced has not yet been documented.
Were Procedures Followed	Certification of compliance with 10-Minute Rule. An empty field indicates the certification of compliance has not yet been documented.
Post Incident Report	Reference of Post-Incident Report if not in compliance with the 10-Minute Rule. An empty reference indicates the Post Incident Report is not needed or has not yet been documented.

Table 2b: Record of Alarm

Pipeline	01
Alarming Event Start Time	2019-03-13 16:59:59
MBS Alarm Received Time **MBS Alarm Assessed Time**	2019-03-13 16:59:59 2019-03-13 17:16:23
Root Cause	LDS Error
CRO and STA Actions	LDAM - Leak Detection System (LDS) Alarm - Non-Flowing Pipeline
LDA Actions	LD - MBS - Leak Alarm
Shutdown Commenced	Not Applicable - pipeline was already Shutdown and Sectionalized
Shutdown Completed	Not Applicable - pipeline was already Shutdown and Sectionalized
Justification for Resumption	After shutdown, alarm deemed invalid following LDA investigation and CCO investigation identified no leak triggers
Startup Commenced	2019-03-13 22:20:00
Were Procedures Followed	Yes
Post Incident Report	

Pipeline	01
Alarming Event Start Time	2019-03-25 11:00:11
RDS Alarm Received Time **RDS Alarm Assessed Time**	2019-03-25 11:00:11 2019-03-25 12:07:17
Root Cause	SCADA Problem
CRO and STA Actions	Rupture Detection Alarm - Pipeline
LDA Actions	LD - RDS - Rupture Alarm
Shutdown Commenced	Not Applicable - pipeline was already Shutdown and Sectionalized
Shutdown Completed	Not Applicable - pipeline was already Shutdown and Sectionalized
Justification for Resumption	CCO investigation identified no leak triggers - Regional and CCO admin approvals granted
Startup Commenced	2019-03-25 20:05:00
Were Procedures Followed	Yes
Post Incident Report	

Pipeline	01
Alarming Event Start Time	2019-05-16 14:36:49
MBS Alarm Received Time **MBS Alarm Assessed Time** **MBS Alarm Received Time** **MBS Alarm Assessed Time** **MBS Alarm Received Time** **MBS Alarm Assessed Time**	2019-05-16 14:36:49 2019-05-16 15:27:32 2019-05-16 14:38:20 2019-05-16 15:27:34 2019-05-16 14:39:50 2019-05-16 15:27:35
Root Cause	Instrument Error
CRO and STA Actions	LDAM - Leak Detection System (LDS) Alarm - Flowing Pipeline
LDA Actions	LD - MBS - Leak Alarm
Shutdown Commenced	2019-05-16 14:47:16* *Each alarm was assessed individually to rule out the possibility of a leak within 10 minutes of the alarm in the event. Shutdown was commenced immediately, not to exceed 60 seconds upon completion of the 10-minute timer. This is in accordance with the Ten-Minute Rule as explained to the ITP on Sept 2017 and Jan 2018.
Shutdown Completed	2019-05-16 15:03:24
Justification for Resumption	After shutdown, alarm deemed invalid following LDA investigation and CCO investigation identified no leak triggers
Startup Commenced	2019-05-16 18:17:00
Were Procedures Followed	Yes
Post Incident Report	

Pipeline	02
Alarming Event Start Time	2018-12-05 17:26:01
MBS Alarm Received Time **MBS Alarm Assessed Time**	2018-12-05 17:26:01 2018-12-05 21:22:39
Root Cause	LDS Error
CRO and STA Actions	LDAM - Leak Detection System (LDS) Alarm - Non-Flowing Pipeline
LDA Actions	LD - MBS - Leak Alarm
Shutdown Commenced	Not Applicable - pipeline was already Shutdown and Sectionalized
Shutdown Completed	Not Applicable - pipeline was already Shutdown and Sectionalized
Justification for Resumption	After shutdown, alarm deemed invalid following LDA investigation and CCO investigation identified no leak triggers
Startup Commenced	2018-12-05 21:45:24
Were Procedures Followed	Yes
Post Incident Report	

Pipeline	02
Alarming Event Start Time	2018-12-29 08:07:36
MBS Alarm Received Time **MBS Alarm Assessed Time**	2018-12-29 08:07:36 2018-12-29 08:13:32
Root Cause	Field Maintenance
CRO and STA Actions	LDAM - Leak Detection System (LDS) Alarm - Non-Flowing Pipeline
LDA Actions	LD - MBS - Leak Alarm
Shutdown Commenced	Not Applicable - pipeline was already Shutdown and Sectionalized
Shutdown Completed	Not Applicable - pipeline was already Shutdown and Sectionalized
Justification for Resumption	CCO investigation identified no leak triggers - Regional and CCO admin approvals granted
Startup Commenced	2018-12-29 11:39:33
Were Procedures Followed	Yes
Post Incident Report	

Pipeline	02
Alarming Event Start Time	2019-01-29 21:59:17
MBS Alarm Received Time **MBS Alarm Assessed Time** **MBS Alarm Received Time** **MBS Alarm Assessed Time**	2019-01-29 21:59:17 2019-01-29 22:06:05 2019-01-29 21:59:17 2019-01-29 22:06:07
Root Cause	Transient Condition
CRO and STA Actions	LDAM - Leak Detection System (LDS) Alarm - Flowing Pipeline
LDA Actions	LD - MBS - Leak Alarm
Shutdown Commenced	2019-01-29 21:54:41** **The line was in the process of shutting down when the alarm was generated. The 'Shutdown Commenced' time identifies when the shutdown was initiated.
Shutdown Completed	2019-01-29 22:19:35
Justification for Resumption	CCO investigation identified no leak triggers - Regional and CCO admin approvals granted
Startup Commenced	2019-01-30 01:35:00
Were Procedures Followed	Yes
Post Incident Report	

Pipeline	03
Alarming Event Start Time	2018-12-05 08:12:53
MBS Alarm Received Time **MBS Alarm Assessed Time**	2018-12-05 08:12:53 2018-12-05 08:22:57
Root Cause	Transient Condition
CRO and STA Actions	LDAM - Leak Detection System (LDS) Alarm - Flowing Pipeline
LDA Actions	LD - MBS - Leak Alarm
Shutdown Commenced	2018-12-05 08:23:04* *Each alarm was assessed individually to rule out the possibility of a leak within 10 minutes of the alarm in the event. Shutdown was commenced immediately, not to exceed 60 seconds upon completion of the 10-minute timer. This is in accordance with the Ten-Minute Rule as explained to the ITP on Sept 2017 and Jan 2018.
Shutdown Completed	2018-12-05 08:32:35
Justification for Resumption	Static Pressure Monitoring of System over 60 minutes and CCO investigation identified no additional leak triggers. Regional and CCO Admin approvals granted
Startup Commenced	2018-12-05 10:20:48
Were Procedures Followed	Yes
Post Incident Report	

Pipeline	03
Alarming Event Start Time	2019-02-08 19:38:05
MBS Alarm Received Time **MBS Alarm Assessed Time**	2019-02-08 19:38:05 2019-02-08 19:43:00
Root Cause	Column Separation
CRO and STA Actions	LDAM - Leak Detection System (LDS) Alarm - Non-Flowing Pipeline
LDA Actions	LD - MBS - Leak Alarm
Shutdown Commenced	Not Applicable - pipeline was already Shutdown and Sectionalized
Shutdown Completed	Not Applicable - pipeline was already Shutdown and Sectionalized
Justification for Resumption	Aerial Patrol Performed - Regional and CCO admin approvals granted After shutdown, alarm deemed valid following LDA investigation. Column separation investigated by CCO with no unexplained leak triggers Visual inspection performed by field staff - Regional and CCO Admin approvals granted
Startup Commenced	2019-02-09 14:35:00
Were Procedures Followed	Yes
Post Incident Report	

Pipeline	04
Alarming Event Start Time	2019-03-25 10:53:29
MBS Alarm Received Time **MBS Alarm Assessed Time**	2019-03-25 10:53:29 2019-03-25 11:02:29
Root Cause	Column Separation
CRO and STA Actions	LDAM - Leak Detection System (LDS) Alarm - Flowing Pipeline
LDA Actions	LD - MBS - Leak Alarm
Shutdown Commenced	2019-03-25 10:36:50** **The line was in the process of shutting down when the alarm was generated. The 'Shutdown Commenced' time identifies when the shutdown was initiated.
Shutdown Completed	2019-03-25 11:04:37
Justification for Resumption	CCO investigation identified no leak triggers - Regional and CCO admin approvals granted
Startup Commenced	2019-03-25 21:00:00
Were Procedures Followed	Yes
Post Incident Report	

Pipeline	04
Alarming Event Start Time	2019-03-25 11:00:04
RDS Alarm Received Time **RDS Alarm Assessed Time** **RDS Alarm Received Time** **RDS Alarm Assessed Time**	2019-03-25 11:00:04 2019-03-25 12:10:07 2019-03-25 11:00:08 2019-03-25 12:10:09
Root Cause	SCADA Problem
CRO and STA Actions	Rupture Detection Alarm - Pipeline
LDA Actions	LD - RDS - Rupture Alarm
Shutdown Commenced	Not Applicable - pipeline was already Shutdown and Sectionalized
Shutdown Completed	Not Applicable - pipeline was already Shutdown and Sectionalized
Justification for Resumption	CCO investigation identified no leak triggers - Regional and CCO admin approvals granted
Startup Commenced	2019-03-25 21:15:00
Were Procedures Followed	Yes
Post Incident Report	

Pipeline	04
Alarming Event Start Time	2019-03-25 13:02:36
MBS Alarm Received Time **MBS Alarm Assessed Time** **MBS Alarm Received Time** **MBS Alarm Assessed Time**	2019-03-25 13:02:36 2019-03-25 13:07:53 2019-03-25 15:55:11 2019-03-25 15:58:49
Root Cause	Column Separation
CRO and STA Actions	LDAM - Leak Detection System (LDS) Alarm - Non-Flowing Pipeline
LDA Actions	LD - MBS - Leak Alarm
Shutdown Commenced	Not Applicable - pipeline was already Shutdown and Sectionalized
Shutdown Completed	Not Applicable - pipeline was already Shutdown and Sectionalized
Justification for Resumption	After shutdown, alarm deemed valid following LDA investigation. Column separation investigated by CCO with no unexplained leak triggers
Startup Commenced	2019-03-25 21:15:00
Were Procedures Followed	Yes
Post Incident Report	

Pipeline	04
Alarming Event Start Time	2019-03-25 19:40:47
MBS Alarm Received Time **MBS Alarm Assessed Time**	2019-03-25 19:40:47 2019-03-25 19:47:18
Root Cause	Column Separation
CRO and STA Actions	LDAM - Leak Detection System (LDS) Alarm - Non-Flowing Pipeline
LDA Actions	LD - MBS - Leak Alarm
Shutdown Commenced	Not Applicable - pipeline was already Shutdown and Sectionalized
Shutdown Completed	Not Applicable - pipeline was already Shutdown and Sectionalized
Justification for Resumption	After shutdown, alarm deemed valid following LDA investigation. Column separation investigated by CCO with no unexplained leak triggers
Startup Commenced	2019-03-25 21:15:00
Were Procedures Followed	Yes
Post Incident Report	

Pipeline	05
Alarming Event Start Time	2018-12-05 10:30:20
MBS Alarm Received Time **MBS Alarm Assessed Time** **MBS Alarm Received Time** **MBS Alarm Assessed Time**	2018-12-05 10:30:20 2018-12-05 11:20:57 2018-12-05 10:32:20 2018-12-05 11:46:59
Root Cause	Transient Condition
CRO and STA Actions	LDAM - Leak Detection System (LDS) Alarm - Flowing Pipeline
LDA Actions	LD - MBS - Leak Alarm
Shutdown Commenced	2018-12-05 10:31:08
Shutdown Completed	2018-12-05 10:56:15
Justification for Resumption	CCO investigation identified no leak triggers - Regional and CCO admin approvals granted
Startup Commenced	2018-12-06 13:42:35
Were Procedures Followed	Yes
Post Incident Report	

Pipeline	06A
Alarming Event Start Time	2019-03-25 11:00:35
RDS Alarm Received Time **RDS Alarm Assessed Time** **RDS Alarm Received Time** **RDS Alarm Assessed Time**	2019-03-25 11:00:35 2019-03-25 12:12:59 2019-03-25 11:00:38 2019-03-25 12:13:00
Root Cause	SCADA Problem
CRO and STA Actions	Rupture Detection Alarm - Pipeline
LDA Actions	LD - RDS - Rupture Alarm
Shutdown Commenced	Not Applicable - pipeline was already Shutdown and Sectionalized
Shutdown Completed	Not Applicable - pipeline was already Shutdown and Sectionalized
Justification for Resumption	CCO investigation identified no leak triggers - Regional and CCO admin approvals granted
Startup Commenced	2019-03-25 16:45:00
Were Procedures Followed	Yes
Post Incident Report	

Pipeline	06A
Alarming Event Start Time	2019-03-25 15:24:07
MBS Alarm Received Time **MBS Alarm Assessed Time**	2019-03-25 15:24:07 2019-03-25 15:27:51
Root Cause	Column Separation
CRO and STA Actions	LDAM - Leak Detection System (LDS) Alarm - Non-Flowing Pipeline
LDA Actions	LD - MBS - Leak Alarm
Shutdown Commenced	Not Applicable - pipeline was already Shutdown and Sectionalized
Shutdown Completed	Not Applicable - pipeline was already Shutdown and Sectionalized
Justification for Resumption	After shutdown, alarm deemed valid following LDA investigation. Column separation investigated by CCO with no unexplained leak triggers
Startup Commenced	2019-03-25 16:45:00
Were Procedures Followed	Yes
Post Incident Report	

Pipeline	06A
Alarming Event Start Time	2019-04-11 12:29:58
MBS Alarm Received Time **MBS Alarm Assessed Time** **MBS Alarm Received Time** **MBS Alarm Assessed Time**	2019-04-11 12:29:58 2019-04-11 14:20:44 2019-04-11 12:32:29 2019-04-11 14:20:46
Root Cause	Column Separation
CRO and STA Actions	LDAM - Leak Detection System (LDS) Alarm - Non-Flowing Pipeline
LDA Actions	LD - MBS - Leak Alarm
Shutdown Commenced	Not Applicable - pipeline was already Shutdown and Sectionalized
Shutdown Completed	Not Applicable - pipeline was already Shutdown and Sectionalized
Justification for Resumption	Visual inspection performed by field staff - Regional and CCO Admin approvals granted
Startup Commenced	2019-04-11 18:00:00
Were Procedures Followed	Yes
Post Incident Report	

Pipeline	06A
Alarming Event Start Time	2019-04-11 13:26:31
MBS Alarm Received Time **MBS Alarm Assessed Time**	2019-04-11 13:26:31 2019-04-11 13:36:36
Root Cause	Column Separation
CRO and STA Actions	LDAM - Leak Detection System (LDS) Alarm - Non-Flowing Pipeline
LDA Actions	LD - MBS - Leak Alarm
Shutdown Commenced	Not Applicable - pipeline was already Shutdown and Sectionalized
Shutdown Completed	Not Applicable - pipeline was already Shutdown and Sectionalized
Justification for Resumption	After shutdown, alarm deemed valid following LDA investigation. Column separation investigated by CCO with no unexplained leak triggers
Startup Commenced	2019-04-11 18:00:00
Were Procedures Followed	Yes
Post Incident Report	

Pipeline	06A
Alarming Event Start Time	2019-04-23 17:31:20
MBS Alarm Received Time **MBS Alarm Assessed Time** **MBS Alarm Received Time** **MBS Alarm Assessed Time**	2019-04-23 17:31:20 2019-04-23 17:35:43 2019-04-23 17:44:50 2019-04-23 17:47:40
Root Cause	Column Separation
CRO and STA Actions	LDAM - Leak Detection System (LDS) Alarm - Non-Flowing Pipeline
LDA Actions	LD - MBS - Leak Alarm
Shutdown Commenced	Not Applicable - pipeline was already Shutdown and Sectionalized
Shutdown Completed	Not Applicable - pipeline was already Shutdown and Sectionalized
Justification for Resumption	After shutdown, alarm deemed valid following LDA investigation. Column separation investigated by CCO with no unexplained leak triggers
Startup Commenced	2019-04-23 19:30:00
Were Procedures Followed	Yes
Post Incident Report	

Pipeline	14
Alarming Event Start Time	2019-01-21 06:54:10
MBS Alarm Received Time **MBS Alarm Assessed Time** **MBS Alarm Received Time** **MBS Alarm Assessed Time** **MBS Alarm Received Time** **MBS Alarm Assessed Time** **MBS Alarm Received Time** **MBS Alarm Assessed Time**	2019-01-21 06:54:10 2019-01-21 07:02:19 2019-01-21 06:54:10 2019-01-21 07:02:17 2019-01-21 08:33:12 2019-01-21 08:38:47 2019-01-21 08:33:12 2019-01-21 08:38:46
Root Cause	Transient Condition
CRO and STA Actions	LDAM - Leak Detection System (LDS) Alarm - Flowing Pipeline
LDA Actions	LD - MBS - Leak Alarm
Shutdown Commenced	2019-01-21 06:51:43** **The line was in the process of shutting down when the alarm was generated. The 'Shutdown Commenced' time identifies when the shutdown was initiated.
Shutdown Completed	2019-01-21 07:10:29
Justification for Resumption	CCO investigation identified no leak triggers - Regional and CCO admin approvals granted
Startup Commenced	2019-01-21 08:45:14
Were Procedures Followed	Yes
Post Incident Report	

Pipeline	14
Alarming Event Start Time	2019-04-16 10:35:06
MBS Alarm Received Time **MBS Alarm Assessed Time**	2019-04-16 10:35:06 2019-04-16 10:56:46
MBS Alarm Received Time **MBS Alarm Assessed Time**	2019-04-16 10:35:06 2019-04-16 10:56:49
MBS Alarm Received Time **MBS Alarm Assessed Time**	2019-04-16 10:36:06 2019-04-16 10:56:44
MBS Alarm Received Time **MBS Alarm Assessed Time**	2019-04-16 13:44:14 2019-04-16 13:49:04
MBS Alarm Received Time **MBS Alarm Assessed Time**	2019-04-16 13:44:14 2019-04-16 13:49:06
MBS Alarm Received Time **MBS Alarm Assessed Time**	2019-04-16 13:46:13 2019-04-16 13:49:08
MBS Alarm Received Time **MBS Alarm Assessed Time**	2019-04-16 13:46:13 2019-04-16 13:49:09
MBS Alarm Received Time **MBS Alarm Assessed Time**	2019-04-16 13:48:13 2019-04-16 13:49:21
Root Cause	Field Maintenance
CRO and STA Actions	LDAM - Leak Detection System (LDS) Alarm - Non-Flowing Pipeline
LDA Actions	LD - MBS - Leak Alarm
Shutdown Commenced	Not Applicable - pipeline was already Shutdown and Sectionalized
Shutdown Completed	Not Applicable - pipeline was already Shutdown and Sectionalized
Justification for Resumption	After shutdown, alarm deemed invalid following LDA investigation and CCO investigation identified no leak triggers
Startup Commenced	2019-04-16 14:45:27
Were Procedures Followed	Yes
Post Incident Report	

Pipeline	61
Alarming Event Start Time	2019-03-25 11:00:16
RDS Alarm Received Time **RDS Alarm Assessed Time** **RDS Alarm Received Time** **RDS Alarm Assessed Time** **RDS Alarm Received Time** **RDS Alarm Assessed Time** **RDS Alarm Received Time** **RDS Alarm Assessed Time**	2019-03-25 11:00:16 2019-03-25 12:11:13 2019-03-25 11:00:22 2019-03-25 12:12:52 2019-03-25 11:00:44 2019-03-25 12:12:54 2019-03-25 11:00:50 2019-03-25 12:12:56
Root Cause	SCADA Problem
CRO and STA Actions	Rupture Detection Alarm - Pipeline
LDA Actions	LD - RDS - Rupture Alarm
Shutdown Commenced	Not Applicable - pipeline was already Shutdown and Sectionalized
Shutdown Completed	Not Applicable - pipeline was already Shutdown and Sectionalized
Justification for Resumption	CCO investigation identified no leak triggers - Regional and CCO admin approvals granted
Startup Commenced	2019-03-25 20:25:00
Were Procedures Followed	Yes
Post Incident Report	

Pipeline	65
Alarming Event Start Time	2018-12-06 01:30:46
MBS Alarm Received Time **MBS Alarm Assessed Time**	2018-12-06 01:30:46 2018-12-06 01:47:42
Root Cause	Instrument Error
CRO and STA Actions	LDAM - Leak Detection System (LDS) Alarm - Non-Flowing Pipeline
LDA Actions	LD - MBS - Leak Alarm
Shutdown Commenced	Not Applicable - pipeline was already Shutdown and Sectionalized
Shutdown Completed	Not Applicable - pipeline was already Shutdown and Sectionalized
Justification for Resumption	After shutdown, alarm deemed invalid following LDA investigation and CCO investigation identified no leak triggers
Startup Commenced	2018-12-06 02:31:32
Were Procedures Followed	Yes
Post Incident Report	

Pipeline	67
Alarming Event Start Time	2019-03-25 10:59:39
RDS Alarm Received Time **RDS Alarm Assessed Time** **RDS Alarm Received Time** **RDS Alarm Assessed Time** **RDS Alarm Received Time** **RDS Alarm Assessed Time**	2019-03-25 10:59:39 2019-03-25 11:36:22 2019-03-25 10:59:47 2019-03-25 11:38:01 2019-03-25 10:59:58 2019-03-25 11:46:51
Root Cause	SCADA Problem
CRO and STA Actions	Rupture Detection Alarm - Pipeline
LDA Actions	LD - RDS - Rupture Alarm
Shutdown Commenced	Not Applicable - pipeline was already Shutdown and Sectionalized
Shutdown Completed	Not Applicable - pipeline was already Shutdown and Sectionalized
Justification for Resumption	CCO investigation identified no leak triggers - Regional and CCO admin approvals granted
Startup Commenced	2019-03-25 16:20:00
Were Procedures Followed	Yes
Post Incident Report	

Pipeline	78
Alarming Event Start Time	2019-05-01 08:41:56
MBS Alarm Received Time **MBS Alarm Assessed Time**	2019-05-01 08:41:56 2019-05-01 08:47:36
Root Cause	Column Separation
CRO and STA Actions	LDAM - Leak Detection System (LDS) Alarm - Non-Flowing Pipeline
LDA Actions	LD - MBS - Leak Alarm
Shutdown Commenced	Not Applicable - pipeline was already Shutdown and Sectionalized
Shutdown Completed	Not Applicable - pipeline was already Shutdown and Sectionalized
Justification for Resumption	After shutdown, alarm deemed valid following LDA investigation. Column separation investigated by CCO with no unexplained leak triggers
Startup Commenced	2019-05-01 13:28:00
Were Procedures Followed	Yes
Post Incident Report	

Pipeline	78
Alarming Event Start Time	2019-05-21 06:13:07
MBS Alarm Received Time **MBS Alarm Assessed Time** **MBS Alarm Received Time** **MBS Alarm Assessed Time**	2019-05-21 06:13:07 2019-05-21 08:28:39 2019-05-21 06:18:38 2019-05-21 08:28:37
Root Cause	LDS Error
CRO and STA Actions	LDAM - Leak Detection System (LDS) Alarm - Flowing Pipeline
LDA Actions	LD - MBS - Leak Alarm
Shutdown Commenced	2019-05-21 06:22:43
Shutdown Completed	2019-05-21 06:33:55
Justification for Resumption	After shutdown, alarm deemed invalid following LDA investigation and CCO investigation identified no leak triggers CCO investigation identified no leak triggers - Regional and CCO admin approvals granted
Startup Commenced	2019-05-21 11:00:00
Were Procedures Followed	Yes
Post Incident Report	

3. Weekly List of Alarms (“WLOA”)

The records in this report each contain data that are referenced by the Consent Decree. The terms are explained in the following table.

Table 3a: Description of fields in this Report

Data	Description
Week	ISO 8601 week date label to identify the week in the “weekly” list of alarms.
Pipeline	Name (number) of the pipeline.
Type	Type of alarm (AVB, MBS or RDS): • AVB are 24-hour MBS alarms • MBS are 5-minute, 20-minute, or 2-hour MBS alarms • RDS are Rupture Detection System alarms
Alarming Event Start Time	Start of the Alarming Event that caused the alarm(s) to trigger. It is always the receipt time of the earliest alarm in an Alarming Event.
Alarm Received Time	Time that the alarm was received for each individual alarm within the Alarming Event. Each alarm is simultaneously received by all members of the alarm response team.
Alarm Assessed Time	Time that the alarm was assessed for each individual alarm within the Alarming Event. Each alarm is assessed by each independent member of the alarm response team; an alarm is considered assessed when all members of the alarm response team has assessed.
Alarm Cleared Time	The date and time when the Alarm was cleared. An empty time indicates the Alarm has not yet been cleared as of the printing of this report.
Shutdown Required	Indication of whether this Alarm resulted in a shutdown.

Table 3b: Weekly List of Alarms

2018 Week 47: 1 Alarming Event in total

Pipeline	Alarming Event Start Time	Type	Alarm Received Time	Alarm Assessed Time	Alarm Cleared Time	Shutdown Required
78	2018-11-25 22:45:57	MBS	2018-11-25 22:45:57	2018-11-25 22:50:57	2018-11-25 22:50:57	No
		MBS	2018-11-25 22:47:27	2018-11-25 22:50:55	2018-11-25 22:50:55	
		MBS	2018-11-25 22:48:27	2018-11-25 22:50:52	2018-11-25 22:50:52	

2018 Week 48: 4 Alarming Events in total

Pipeline	Alarming Event Start Time	Type	Alarm Received Time	Alarm Assessed Time	Alarm Cleared Time	Shutdown Required
03	2018-11-29 22:51:25	MBS	2018-11-29 22:51:25	2018-11-29 22:56:45	2018-11-29 22:56:45	No
		MBS	2018-11-29 22:51:25	2018-11-29 22:56:46	2018-11-29 22:56:46	
06A	2018-11-26 13:24:57	MBS	2018-11-26 13:24:57	2018-11-26 13:28:40	2018-11-26 13:28:40	No
		MBS	2018-11-26 13:28:28	2018-11-26 13:28:46	2018-11-26 13:28:46	
10	2018-11-30 12:55:02	MBS	2018-11-30 12:55:02	2018-11-30 13:02:42	2018-11-30 13:02:42	No
14	2018-11-30 02:51:29	MBS	2018-11-30 02:51:29	2018-11-30 02:55:34	2018-11-30 02:55:34	No
		MBS	2018-11-30 02:51:29	2018-11-30 02:55:32	2018-11-30 02:55:32	

2018 Week 49: 17 Alarming Events in total

Pipeline	Alarming Event Start Time	Type	Alarm Received Time	Alarm Assessed Time	Alarm Cleared Time	Shutdown Required
02	2018-12-05 17:26:01	MBS	2018-12-05 17:26:01	2018-12-05 21:22:39	2018-12-05 19:20:48	Yes
03	2018-12-05 08:12:53	MBS	2018-12-05 08:12:53	2018-12-05 08:22:57	2018-12-05 10:20:30	Yes
04	2018-12-06 12:53:30	MBS	2018-12-06 12:53:30	2018-12-06 12:57:36	2018-12-06 12:57:36	No
04	2018-12-07 21:00:56	MBS	2018-12-07 21:00:56	2018-12-07 21:03:43	2018-12-07 21:03:43	No
04	2018-12-08 13:07:14	MBS	2018-12-08 13:07:14	2018-12-08 13:14:39	2018-12-08 13:14:39	No
04	2018-12-08 19:46:28	MBS MBS	2018-12-08 19:46:28 2018-12-08 19:46:59	2018-12-08 19:47:59 2018-12-08 19:48:10	2018-12-08 19:47:59 2018-12-08 19:48:10	No
05	2018-12-05 10:21:19	MBS MBS	2018-12-05 10:21:19 2018-12-05 10:21:49	2018-12-05 10:24:12 2018-12-05 10:24:15	2018-12-05 10:24:12 2018-12-05 10:24:15	No
05	2018-12-05 10:30:20	MBS MBS	2018-12-05 10:30:20 2018-12-05 10:32:20	2018-12-05 11:20:57 2018-12-05 11:46:59	2018-12-06 12:41:01 2018-12-06 12:41:01	Yes
05	2018-12-09 22:14:35	MBS MBS	2018-12-09 22:14:35 2018-12-09 22:17:05	2018-12-09 22:20:16 2018-12-09 22:20:18	2018-12-09 22:20:16 2018-12-09 22:20:18	No
06A	2018-12-05 11:48:24	AVB	2018-12-05 11:48:24	2018-12-05 11:49:03	2018-12-05 11:49:03	No
14	2018-12-03 14:02:30	MBS MBS	2018-12-03 14:02:30 2018-12-03 14:02:30	2018-12-03 14:09:47 2018-12-03 14:09:48	2018-12-03 14:09:47 2018-12-03 14:09:48	No
14	2018-12-06 08:36:36	MBS MBS	2018-12-06 08:36:36 2018-12-06 08:37:06	2018-12-06 08:39:44 2018-12-06 08:39:41	2018-12-06 08:39:44 2018-12-06 08:39:41	No
14	2018-12-07 04:01:34	AVB	2018-12-07 04:01:34	2018-12-07 04:05:40	2018-12-07 04:05:40	No
14	2018-12-07 07:36:10	MBS MBS	2018-12-07 07:36:10 2018-12-07 07:36:10	2018-12-07 07:42:02 2018-12-07 07:42:00	2018-12-07 07:42:02 2018-12-07 07:42:00	No
65	2018-12-05 23:19:44	MBS	2018-12-05 23:19:44	2018-12-05 23:27:26	2018-12-05 23:27:26	No
65	2018-12-06 01:30:46	MBS	2018-12-06 01:30:46	2018-12-06 01:47:42	2018-12-06 02:31:18	Yes

Pipeline	Alarming Event Start Time	Type	Alarm Received Time	Alarm Assessed Time	Alarm Cleared Time	Shutdown Required
78	2018-12-05 12:51:48	MBS	2018-12-05 12:51:48	2018-12-05 12:55:45	2018-12-05 12:55:45	No
		MBS	2018-12-05 12:54:17	2018-12-05 12:55:51	2018-12-05 12:55:51	
		MBS	2018-12-05 12:54:17	2018-12-05 12:55:53	2018-12-05 12:55:53	

2018 Week 50: 4 Alarming Events in total

Pipeline	Alarming Event Start Time	Type	Alarm Received Time	Alarm Assessed Time	Alarm Cleared Time	Shutdown Required
01	2018-12-12 14:38:38	MBS	2018-12-12 14:38:38	2018-12-12 14:44:11	2018-12-12 14:44:11	No
		MBS	2018-12-12 14:42:08	2018-12-12 14:50:05	2018-12-12 14:50:05	
03	2018-12-12 17:32:04	MBS	2018-12-12 17:32:04	2018-12-12 17:38:15	2018-12-12 17:38:15	No
		MBS	2018-12-12 17:32:04	2018-12-12 17:38:17	2018-12-12 17:38:17	
		MBS	2018-12-12 17:33:33	2018-12-12 17:38:19	2018-12-12 17:38:19	
		MBS	2018-12-12 17:33:33	2018-12-12 17:38:21	2018-12-12 17:38:21	
06A	2018-12-14 07:21:23	MBS	2018-12-14 07:21:23	2018-12-14 07:26:51	2018-12-14 07:26:51	No
		MBS	2018-12-14 07:21:23	2018-12-14 07:26:53	2018-12-14 07:26:53	
		MBS	2018-12-14 07:23:53	2018-12-14 07:26:55	2018-12-14 07:26:55	
		MBS	2018-12-14 07:23:53	2018-12-14 07:26:49	2018-12-14 07:26:49	
10	2018-12-15 03:56:01	MBS	2018-12-15 03:56:01	2018-12-15 04:03:26	2018-12-15 04:03:26	No

2018 Week 51: 4 Alarming Events in total

Pipeline	Alarming Event Start Time	Type	Alarm Received Time	Alarm Assessed Time	Alarm Cleared Time	Shutdown Required
10	2018-12-21 09:19:49	MBS	2018-12-21 09:19:49	2018-12-21 09:24:10	2018-12-21 09:24:10	No
14	2018-12-18 06:12:40	MBS	2018-12-18 06:12:40	2018-12-18 06:18:03	2018-12-18 06:18:03	No
		MBS	2018-12-18 06:12:40	2018-12-18 06:18:01	2018-12-18 06:18:01	
14	2018-12-19 22:27:31	MBS	2018-12-19 22:27:31	2018-12-19 22:31:45	2018-12-19 22:31:45	No
		MBS	2018-12-19 22:27:31	2018-12-19 22:31:46	2018-12-19 22:31:46	
14	2018-12-21 17:21:33	MBS	2018-12-21 17:21:33	2018-12-21 17:26:27	2018-12-21 17:26:27	No
		MBS	2018-12-21 17:22:03	2018-12-21 17:26:24	2018-12-21 17:26:24	

2018 Week 52: 2 Alarming Events in total

Pipeline	Alarming Event Start Time	Type	Alarm Received Time	Alarm Assessed Time	Alarm Cleared Time	Shutdown Required
02	2018-12-29 08:07:36	MBS	2018-12-29 08:07:36	2018-12-29 08:13:32	2018-12-29 09:25:00	Yes
02	2018-12-29 10:44:44	MBS	2018-12-29 10:44:44	2018-12-29 10:46:26	2018-12-29 10:46:26	No

2019 Week 01: 2 Alarming Events in total

Pipeline	Alarming Event Start Time	Type	Alarm Received Time	Alarm Assessed Time	Alarm Cleared Time	Shutdown Required
02	2019-01-01 10:16:49	MBS MBS	2019-01-01 10:16:49 2019-01-01 10:17:19	2019-01-01 10:21:25 2019-01-01 10:21:22	2019-01-01 10:21:25 2019-01-01 10:21:22	No
03	2019-01-03 12:41:25	MBS	2019-01-03 12:41:25	2019-01-03 12:48:25	2019-01-03 12:48:25	No

2019 Week 02: 1 Alarming Event in total

Pipeline	Alarming Event Start Time	Type	Alarm Received Time	Alarm Assessed Time	Alarm Cleared Time	Shutdown Required
02	2019-01-08 22:28:24	MBS	2019-01-08 22:28:24	2019-01-08 22:31:33	2019-01-08 22:31:33	No

2019 Week 03: 2 Alarming Events in total

Pipeline	Alarming Event Start Time	Type	Alarm Received Time	Alarm Assessed Time	Alarm Cleared Time	Shutdown Required
02	2019-01-18 16:44:12	MBS	2019-01-18 16:44:12	2019-01-18 16:52:51	2019-01-18 16:52:51	No
03	2019-01-20 23:03:56	MBS	2019-01-20 23:03:56	2019-01-20 23:07:43	2019-01-20 23:07:43	No

2019 Week 04: 5 Alarming Events in total

Pipeline	Alarming Event Start Time	Type	Alarm Received Time	Alarm Assessed Time	Alarm Cleared Time	Shutdown Required
02	2019-01-22 23:21:10	MBS	2019-01-22 23:21:10	2019-01-22 23:27:44	2019-01-22 23:27:44	No
		MBS	2019-01-22 23:21:10	2019-01-22 23:27:42	2019-01-22 23:27:42	
03	2019-01-25 12:27:51	MBS	2019-01-25 12:27:51	2019-01-25 12:34:50	2019-01-25 12:34:50	No
03	2019-01-27 05:01:28	MBS	2019-01-27 05:01:28	2019-01-27 05:10:21	2019-01-27 05:10:21	No
		MBS	2019-01-27 05:01:28	2019-01-27 05:10:22	2019-01-27 05:10:22	
14	2019-01-21 06:54:10	MBS	2019-01-21 06:54:10	2019-01-21 07:02:19	2019-01-21 08:05:48	Yes
		MBS	2019-01-21 06:54:10	2019-01-21 07:02:17	2019-01-21 08:05:48	
		MBS	2019-01-21 08:33:12	2019-01-21 08:38:47	2019-01-21 08:05:48	
		MBS	2019-01-21 08:33:12	2019-01-21 08:38:46	2019-01-21 08:05:48	
14	2019-01-21 09:01:42	AVB	2019-01-21 09:01:42	2019-01-21 09:04:36	2019-01-21 09:04:36	No

2019 Week 05: 7 Alarming Events in total

Pipeline	Alarming Event Start Time	Type	Alarm Received Time	Alarm Assessed Time	Alarm Cleared Time	Shutdown Required
02	2019-01-29 21:59:17	MBS	2019-01-29 21:59:17	2019-01-29 22:06:05	2019-01-29 23:21:54	Yes
		MBS	2019-01-29 21:59:17	2019-01-29 22:06:07	2019-01-29 23:21:54	
02	2019-01-30 05:37:02	MBS	2019-01-30 05:37:02	2019-01-30 05:38:22	2019-01-30 05:38:22	No
06A	2019-02-02 22:01:45	AVB	2019-02-02 22:01:45	2019-02-02 22:04:58	2019-02-02 22:04:58	No
		AVB	2019-02-02 23:01:45	2019-02-02 23:03:41	2019-02-02 23:03:41	
		AVB	2019-02-02 23:23:15	2019-02-02 23:26:00	2019-02-02 23:26:00	
14	2019-01-30 00:49:50	MBS	2019-01-30 00:49:50	2019-01-30 00:56:00	2019-01-30 00:56:00	No
61	2019-02-01 18:06:07	MBS	2019-02-01 18:06:07	2019-02-01 18:09:58	2019-02-01 18:09:58	No
61	2019-02-03 00:28:18	MBS	2019-02-03 00:28:18	2019-02-03 00:31:42	2019-02-03 00:31:42	No
		MBS	2019-02-03 00:28:18	2019-02-03 00:31:40	2019-02-03 00:31:40	
78	2019-01-30 11:54:15	MBS	2019-01-30 11:54:15	2019-01-30 12:02:01	2019-01-30 12:02:01	No
		MBS	2019-01-30 11:54:15	2019-01-30 12:02:03	2019-01-30 12:02:03	

2019 Week 06: 6 Alarming Events in total

Pipeline	Alarming Event Start Time	Type	Alarm Received Time	Alarm Assessed Time	Alarm Cleared Time	Shutdown Required
01	2019-02-04 06:07:03	MBS	2019-02-04 06:07:03	2019-02-04 06:14:04	2019-02-04 06:14:04	No
03	2019-02-04 11:38:59	MBS	2019-02-04 11:38:59	2019-02-04 11:44:01	2019-02-04 11:44:01	No
03	2019-02-08 19:38:05	MBS	2019-02-08 19:38:05	2019-02-08 19:43:00	2019-02-09 11:58:00	Yes
14	2019-02-07 19:32:05	MBS	2019-02-07 19:32:05	2019-02-07 19:37:04	2019-02-07 19:37:04	No
		MBS	2019-02-07 19:32:05	2019-02-07 19:37:06	2019-02-07 19:37:06	
		MBS	2019-02-07 19:32:05	2019-02-07 19:37:07	2019-02-07 19:37:07	
		MBS	2019-02-07 19:32:34	2019-02-07 19:37:09	2019-02-07 19:37:09	
14	2019-02-08 06:27:31	MBS	2019-02-08 06:27:31	2019-02-08 06:35:46	2019-02-08 06:35:46	No
		MBS	2019-02-08 06:28:00	2019-02-08 06:36:13	2019-02-08 06:36:13	
		MBS	2019-02-08 06:33:30	2019-02-08 06:42:53	2019-02-08 06:42:53	
		MBS	2019-02-08 06:36:03	2019-02-08 06:45:39	2019-02-08 06:45:39	
		MBS	2019-02-08 06:41:01	2019-02-08 06:46:07	2019-02-08 06:46:07	
		MBS	2019-02-08 06:46:01	2019-02-08 06:54:40	2019-02-08 06:54:40	
		MBS	2019-02-08 06:51:02	2019-02-08 06:55:12	2019-02-08 06:55:12	
		MBS	2019-02-08 06:55:32	2019-02-08 07:03:36	2019-02-08 07:03:36	
14	2019-02-08 22:19:03	MBS	2019-02-08 22:19:03	2019-02-08 22:25:03	2019-02-08 22:25:03	No
		MBS	2019-02-08 22:19:03	2019-02-08 22:24:50	2019-02-08 22:24:50	
		MBS	2019-02-08 22:19:03	2019-02-08 22:24:45	2019-02-08 22:24:45	

2019 Week 07: 3 Alarming Events in total

Pipeline	Alarming Event Start Time	Type	Alarm Received Time	Alarm Assessed Time	Alarm Cleared Time	Shutdown Required
03	2019-02-17 11:10:07	MBS MBS	2019-02-17 11:10:07 2019-02-17 11:10:07	2019-02-17 11:18:51 2019-02-17 11:18:49	2019-02-17 11:18:51 2019-02-17 11:18:49	No
14	2019-02-12 21:16:47	MBS MBS	2019-02-12 21:16:47 2019-02-12 21:17:18	2019-02-12 21:22:10 2019-02-12 21:22:07	2019-02-12 21:22:10 2019-02-12 21:22:07	No
14	2019-02-14 11:09:30	MBS MBS	2019-02-14 11:09:30 2019-02-14 11:10:00	2019-02-14 11:14:45 2019-02-14 11:14:42	2019-02-14 11:14:45 2019-02-14 11:14:42	No

2019 Week 08: 6 Alarming Events in total

Pipeline	Alarming Event Start Time	Type	Alarm Received Time	Alarm Assessed Time	Alarm Cleared Time	Shutdown Required
03	2019-02-20 19:14:39	MBS MBS	2019-02-20 19:14:39 2019-02-20 19:14:39	2019-02-20 19:19:19 2019-02-20 19:19:17	2019-02-20 19:19:19 2019-02-20 19:19:17	No
04	2019-02-22 16:56:01	MBS MBS	2019-02-22 16:56:01 2019-02-22 16:56:30	2019-02-22 16:59:36 2019-02-22 16:59:38	2019-02-22 16:59:36 2019-02-22 16:59:38	No
05	2019-02-24 21:36:46	MBS	2019-02-24 21:36:46	2019-02-24 21:39:32	2019-02-24 21:39:32	No
06A	2019-02-24 00:24:51	MBS	2019-02-24 00:24:51	2019-02-24 00:29:20	2019-02-24 00:29:20	No
61	2019-02-22 09:49:39	MBS MBS	2019-02-22 09:49:39 2019-02-22 09:51:09	2019-02-22 09:54:17 2019-02-22 09:54:19	2019-02-22 09:54:17 2019-02-22 09:54:19	No
61	2019-02-23 09:30:50	MBS MBS	2019-02-23 09:30:50 2019-02-23 09:32:19	2019-02-23 09:36:10 2019-02-23 09:36:12	2019-02-23 09:36:10 2019-02-23 09:36:12	No

2019 Week 09: 4 Alarming Events in total

Pipeline	Alarming Event Start Time	Type	Alarm Received Time	Alarm Assessed Time	Alarm Cleared Time	Shutdown Required
03	2019-02-25 09:24:45	MBS	2019-02-25 09:24:45	2019-02-25 09:29:31	2019-02-25 09:29:31	No
		MBS	2019-02-25 09:24:45	2019-02-25 09:29:29	2019-02-25 09:29:29	
		MBS	2019-02-25 09:25:15	2019-02-25 09:29:27	2019-02-25 09:29:27	
04	2019-02-27 10:34:48	MBS	2019-02-27 10:34:48	2019-02-27 10:37:02	2019-02-27 10:37:02	No
		MBS	2019-02-27 10:34:48	2019-02-27 10:37:00	2019-02-27 10:37:00	
04	2019-02-28 20:49:27	MBS	2019-02-28 20:49:27	2019-02-28 20:55:48	2019-02-28 20:55:48	No
78	2019-02-25 03:37:34	MBS	2019-02-25 03:37:34	2019-02-25 03:39:41	2019-02-25 03:39:41	No
		MBS	2019-02-25 03:37:34	2019-02-25 03:39:39	2019-02-25 03:39:39	

2019 Week 10: 2 Alarming Events in total

Pipeline	Alarming Event Start Time	Type	Alarm Received Time	Alarm Assessed Time	Alarm Cleared Time	Shutdown Required
04	2019-03-04 17:00:43	MBS	2019-03-04 17:00:43	2019-03-04 17:06:44	2019-03-04 17:06:44	No
		MBS	2019-03-04 17:00:43	2019-03-04 17:06:42	2019-03-04 17:06:42	
67	2019-03-05 14:54:44	MBS	2019-03-05 14:54:44	2019-03-05 15:02:43	2019-03-05 15:02:43	No

2019 Week 11: 1 Alarming Event in total

Pipeline	Alarming Event Start Time	Type	Alarm Received Time	Alarm Assessed Time	Alarm Cleared Time	Shutdown Required
01	2019-03-13 16:59:59	MBS	2019-03-13 16:59:59	2019-03-13 17:16:23	2019-03-13 17:25:00	Yes

2019 Week 12: 2 Alarming Events in total

Pipeline	Alarming Event Start Time	Type	Alarm Received Time	Alarm Assessed Time	Alarm Cleared Time	Shutdown Required
06A	2019-03-18 11:01:23	AVB	2019-03-18 11:01:23	2019-03-18 11:08:10	2019-03-18 11:08:10	No
		AVB	2019-03-18 11:01:23	2019-03-18 11:08:12	2019-03-18 11:08:12	
06A	2019-03-22 00:01:51	AVB	2019-03-22 00:01:51	2019-03-22 00:07:50	2019-03-22 00:07:50	No
		AVB	2019-03-22 01:01:22	2019-03-22 01:04:56	2019-03-22 01:04:56	

2019 Week 13: 18 Alarming Events in total

Pipeline	Alarming Event Start Time	Type	Alarm Received Time	Alarm Assessed Time	Alarm Cleared Time	Shutdown Required
01	2019-03-25 11:00:11	RDS	2019-03-25 11:00:11	2019-03-25 12:07:17	2019-03-25 19:00:00	Yes
01	2019-03-25 20:25:50	MBS	2019-03-25 20:25:50	2019-03-25 20:35:11	2019-03-25 20:35:11	No
		MBS	2019-03-25 20:26:51	2019-03-25 20:35:13	2019-03-25 20:35:13	
		MBS	2019-03-25 20:26:51	2019-03-25 20:35:15	2019-03-25 20:35:15	
		MBS	2019-03-25 20:41:51	2019-03-25 20:43:18	2019-03-25 20:43:18	
01	2019-03-30 19:43:32	MBS	2019-03-30 19:43:32	2019-03-30 19:49:51	2019-03-30 19:49:51	No
04	2019-03-25 10:53:29	MBS	2019-03-25 10:53:29	2019-03-25 11:02:29	2019-03-25 20:05:00	Yes
04	2019-03-25 11:00:04	RDS	2019-03-25 11:00:04	2019-03-25 12:10:07	2019-03-25 20:05:00	Yes
		RDS	2019-03-25 11:00:08	2019-03-25 12:10:09	2019-03-25 20:05:00	
04	2019-03-25 13:02:36	MBS	2019-03-25 13:02:36	2019-03-25 13:07:53	2019-03-25 16:35:19	Yes
		MBS	2019-03-25 15:55:11	2019-03-25 15:58:49	2019-03-25 16:35:19	
04	2019-03-25 19:40:47	MBS	2019-03-25 19:40:47	2019-03-25 19:47:18	2019-03-25 20:05:00	Yes
04	2019-03-25 20:22:49	MBS	2019-03-25 20:22:49	2019-03-25 20:30:11	2019-03-25 20:30:11	No
04	2019-03-29 23:16:52	MBS	2019-03-29 23:16:52	2019-03-29 23:21:40	2019-03-29 23:21:40	No
		MBS	2019-03-29 23:19:50	2019-03-29 23:21:49	2019-03-29 23:21:49	
05	2019-03-28 08:04:06	MBS	2019-03-28 08:04:06	2019-03-28 08:11:00	2019-03-28 08:11:00	No
		MBS	2019-03-28 08:04:37	2019-03-28 08:10:56	2019-03-28 08:10:56	
06A	2019-03-25 11:00:35	RDS	2019-03-25 11:00:35	2019-03-25 12:12:59	2019-03-25 16:27:00	Yes
		RDS	2019-03-25 11:00:38	2019-03-25 12:13:00	2019-03-25 16:27:00	
06A	2019-03-25 15:24:07	MBS	2019-03-25 15:24:07	2019-03-25 15:27:51	2019-03-25 16:29:26	Yes
06A	2019-03-25 17:00:41	MBS	2019-03-25 17:00:41	2019-03-25 17:08:55	2019-03-25 17:08:55	No
		MBS	2019-03-25 17:00:41	2019-03-25 17:08:53	2019-03-25 17:08:53	
		MBS	2019-03-25 17:00:41	2019-03-25 17:08:51	2019-03-25 17:08:51	
		MBS	2019-03-25 17:05:11	2019-03-25 17:13:40	2019-03-25 17:13:40	

Pipeline	Alarming Event Start Time	Type	Alarm Received Time	Alarm Assessed Time	Alarm Cleared Time	Shutdown Required
06A	2019-03-28 04:56:47	MBS	2019-03-28 04:56:47	2019-03-28 05:01:38	2019-03-28 05:01:38	No
		MBS	2019-03-28 04:56:47	2019-03-28 05:01:40	2019-03-28 05:01:40	
		MBS	2019-03-28 04:56:47	2019-03-28 05:01:42	2019-03-28 05:01:42	
		MBS	2019-03-28 04:59:48	2019-03-28 05:01:44	2019-03-28 05:01:44	
		MBS	2019-03-28 04:59:48	2019-03-28 05:01:45	2019-03-28 05:01:45	
		MBS	2019-03-28 04:59:48	2019-03-28 05:01:47	2019-03-28 05:01:47	
06A	2019-03-28 18:21:41	MBS	2019-03-28 18:21:41	2019-03-28 18:29:40	2019-03-28 18:29:40	No
14	2019-03-26 06:43:48	MBS	2019-03-26 06:43:48	2019-03-26 06:49:48	2019-03-26 06:49:48	No
		MBS	2019-03-26 06:43:48	2019-03-26 06:49:45	2019-03-26 06:49:45	
61	2019-03-25 11:00:16	RDS	2019-03-25 11:00:16	2019-03-25 12:11:13	2019-03-25 19:08:00	Yes
		RDS	2019-03-25 11:00:22	2019-03-25 12:12:52	2019-03-25 19:08:00	
		RDS	2019-03-25 11:00:44	2019-03-25 12:12:54	2019-03-25 19:08:00	
		RDS	2019-03-25 11:00:50	2019-03-25 12:12:56	2019-03-25 19:08:00	
67	2019-03-25 10:59:39	RDS	2019-03-25 10:59:39	2019-03-25 11:36:22	2019-03-25 16:00:00	Yes
		RDS	2019-03-25 10:59:47	2019-03-25 11:38:01	2019-03-25 16:00:00	
		RDS	2019-03-25 10:59:58	2019-03-25 11:46:51	2019-03-25 16:00:00	

2019 Week 14: 1 Alarming Event in total

Pipeline	Alarming Event Start Time	Type	Alarm Received Time	Alarm Assessed Time	Alarm Cleared Time	Shutdown Required
78	2019-04-07 10:44:56	MBS	2019-04-07 10:44:56	2019-04-07 10:51:06	2019-04-07 10:51:06	No

2019 Week 15: 8 Alarming Events in total

Pipeline	Alarming Event Start Time	Type	Alarm Received Time	Alarm Assessed Time	Alarm Cleared Time	Shutdown Required
03	2019-04-09 09:39:47	MBS	2019-04-09 09:39:47	2019-04-09 09:47:13	2019-04-09 09:47:13	No
06A	2019-04-10 08:46:15	MBS	2019-04-10 08:46:15	2019-04-10 08:54:08	2019-04-10 08:54:08	No
		MBS	2019-04-10 08:47:16	2019-04-10 08:54:05	2019-04-10 08:54:05	
06A	2019-04-11 12:29:58	MBS	2019-04-11 12:29:58	2019-04-11 14:20:44	2019-04-11 16:31:13	Yes
		MBS	2019-04-11 12:32:29	2019-04-11 14:20:46	2019-04-11 16:31:13	
06A	2019-04-11 13:26:31	MBS	2019-04-11 13:26:31	2019-04-11 13:36:36	2019-04-11 14:57:34	Yes
06A	2019-04-11 18:39:12	MBS	2019-04-11 18:39:12	2019-04-11 18:44:40	2019-04-11 18:44:40	No
		MBS	2019-04-11 18:40:12	2019-04-11 18:44:41	2019-04-11 18:44:41	
		AVB	2019-04-11 20:01:54	2019-04-11 20:03:59	2019-04-11 20:03:59	
		AVB	2019-04-11 20:01:54	2019-04-11 20:03:57	2019-04-11 20:03:57	
		AVB	2019-04-11 22:01:55	2019-04-11 22:04:06	2019-04-11 22:04:06	
		AVB	2019-04-11 22:01:55	2019-04-11 22:04:05	2019-04-11 22:04:05	
14	2019-04-11 00:40:45	MBS	2019-04-11 00:40:45	2019-04-11 00:45:18	2019-04-11 00:45:18	No
		MBS	2019-04-11 00:40:45	2019-04-11 00:45:21	2019-04-11 00:45:21	
		MBS	2019-04-11 00:41:14	2019-04-11 00:45:11	2019-04-11 00:45:11	
67	2019-04-09 20:18:21	MBS	2019-04-09 20:18:21	2019-04-09 20:21:44	2019-04-09 20:21:44	No
78	2019-04-08 07:59:35	MBS	2019-04-08 07:59:35	2019-04-08 08:09:21	2019-04-08 08:09:21	No
		MBS	2019-04-08 08:10:06	2019-04-08 08:12:07	2019-04-08 08:12:07	

2019 Week 16: 8 Alarming Events in total

Pipeline	Alarming Event Start Time	Type	Alarm Received Time	Alarm Assessed Time	Alarm Cleared Time	Shutdown Required
02	2019-04-17 09:00:13	MBS	2019-04-17 09:00:13	2019-04-17 09:07:27	2019-04-17 09:07:27	No
02	2019-04-19 08:38:42	MBS	2019-04-19 08:38:42	2019-04-19 08:43:40	2019-04-19 08:43:40	No
		MBS	2019-04-19 08:38:42	2019-04-19 08:43:38	2019-04-19 08:43:38	
03	2019-04-15 08:06:50	MBS	2019-04-15 08:06:50	2019-04-15 08:10:12	2019-04-15 08:10:12	No
		MBS	2019-04-15 08:06:50	2019-04-15 08:10:09	2019-04-15 08:10:09	
06A	2019-04-16 07:01:30	AVB	2019-04-16 07:01:30	2019-04-16 07:10:18	2019-04-16 07:10:18	No
		AVB	2019-04-16 08:01:33	2019-04-16 08:02:20	2019-04-16 08:02:20	
10	2019-04-17 10:31:03	MBS	2019-04-17 10:31:03	2019-04-17 10:33:57	2019-04-17 10:33:57	No
		MBS	2019-04-17 10:31:03	2019-04-17 10:34:00	2019-04-17 10:34:00	
		MBS	2019-04-17 10:31:03	2019-04-17 10:33:53	2019-04-17 10:33:53	
14	2019-04-16 10:35:06	MBS	2019-04-16 10:35:06	2019-04-16 10:56:46	2019-04-16 11:04:03	Yes
		MBS	2019-04-16 10:35:06	2019-04-16 10:56:49	2019-04-16 11:04:03	
		MBS	2019-04-16 10:36:06	2019-04-16 10:56:44	2019-04-16 11:04:03	
		MBS	2019-04-16 13:44:14	2019-04-16 13:49:04	2019-04-16 11:04:03	
		MBS	2019-04-16 13:44:14	2019-04-16 13:49:06	2019-04-16 11:04:03	
		MBS	2019-04-16 13:46:13	2019-04-16 13:49:08	2019-04-16 11:04:03	
		MBS	2019-04-16 13:46:13	2019-04-16 13:49:09	2019-04-16 11:04:03	
		MBS	2019-04-16 13:48:13	2019-04-16 13:49:21	2019-04-16 11:04:03	
14	2019-04-16 17:15:44	MBS	2019-04-16 17:15:44	2019-04-16 17:21:02	2019-04-16 17:21:02	No
		MBS	2019-04-16 17:15:44	2019-04-16 17:20:48	2019-04-16 17:20:48	
14	2019-04-20 13:36:22	MBS	2019-04-20 13:36:22	2019-04-20 13:41:33	2019-04-20 13:41:33	No
		MBS	2019-04-20 13:36:52	2019-04-20 13:41:31	2019-04-20 13:41:31	
		MBS	2019-04-20 13:37:23	2019-04-20 13:41:28	2019-04-20 13:41:28	

2019 Week 17: 7 Alarming Events in total

Pipeline	Alarming Event Start Time	Type	Alarm Received Time	Alarm Assessed Time	Alarm Cleared Time	Shutdown Required
01	2019-04-23 09:45:07	MBS	2019-04-23 09:45:07	2019-04-23 09:49:32	2019-04-23 09:49:32	No
		MBS	2019-04-23 09:46:07	2019-04-23 09:49:23	2019-04-23 09:49:23	
02	2019-04-24 10:37:57	MBS	2019-04-24 10:37:57	2019-04-24 10:40:57	2019-04-24 10:40:57	No
02	2019-04-24 13:02:00	MBS	2019-04-24 13:02:00	2019-04-24 13:07:28	2019-04-24 13:07:28	No
		MBS	2019-04-24 13:04:30	2019-04-24 13:07:26	2019-04-24 13:07:26	
		MBS	2019-04-24 13:17:01	2019-04-24 13:20:45	2019-04-24 13:20:45	
06A	2019-04-23 17:31:20	MBS	2019-04-23 17:31:20	2019-04-23 17:35:43	2019-04-23 17:59:15	Yes
		MBS	2019-04-23 17:44:50	2019-04-23 17:47:40	2019-04-23 17:59:15	
14	2019-04-23 22:36:33	MBS	2019-04-23 22:36:33	2019-04-23 22:44:54	2019-04-23 22:44:54	No
		MBS	2019-04-23 22:37:34	2019-04-23 22:44:56	2019-04-23 22:44:56	
14	2019-04-24 18:49:42	MBS	2019-04-24 18:49:42	2019-04-24 18:59:38	2019-04-24 18:59:38	No
		MBS	2019-04-24 19:00:42	2019-04-24 19:05:13	2019-04-24 19:05:13	
78	2019-04-23 18:52:34	MBS	2019-04-23 18:52:34	2019-04-23 18:58:40	2019-04-23 18:58:40	No

2019 Week 18: 4 Alarming Events in total

Pipeline	Alarming Event Start Time	Type	Alarm Received Time	Alarm Assessed Time	Alarm Cleared Time	Shutdown Required
02	2019-05-03 21:02:00	MBS	2019-05-03 21:02:00	2019-05-03 21:09:32	2019-05-03 21:09:32	No
02	2019-05-05 11:50:10	MBS	2019-05-05 11:50:10	2019-05-05 11:55:08	2019-05-05 11:55:08	No
04	2019-05-04 17:48:24	MBS	2019-05-04 17:48:24	2019-05-04 17:55:06	2019-05-04 17:55:06	No
78	2019-05-01 08:41:56	MBS	2019-05-01 08:41:56	2019-05-01 08:47:36	2019-05-01 09:45:18	Yes

2019 Week 19: 7 Alarming Events in total

Pipeline	Alarming Event Start Time	Type	Alarm Received Time	Alarm Assessed Time	Alarm Cleared Time	Shutdown Required
02	2019-05-07 04:57:38	MBS	2019-05-07 04:57:38	2019-05-07 05:01:46	2019-05-07 05:01:46	No
02	2019-05-12 18:39:45	MBS	2019-05-12 18:39:45	2019-05-12 18:42:54	2019-05-12 18:42:54	No
03	2019-05-06 10:20:19	MBS	2019-05-06 10:20:19	2019-05-06 10:20:39	2019-05-06 10:20:39	No
		AVB	2019-05-06 10:26:48	2019-05-06 10:27:47	2019-05-06 10:27:47	
		AVB	2019-05-06 10:26:48	2019-05-06 10:28:01	2019-05-06 10:28:01	
05	2019-05-06 15:19:14	MBS	2019-05-06 15:19:14	2019-05-06 15:22:38	2019-05-06 15:22:38	No
		MBS	2019-05-06 15:19:45	2019-05-06 15:22:39	2019-05-06 15:22:39	
06A	2019-05-10 19:14:22	MBS	2019-05-10 19:14:22	2019-05-10 19:19:33	2019-05-10 19:19:33	No
14	2019-05-07 17:58:03	MBS	2019-05-07 17:58:03	2019-05-07 18:03:07	2019-05-07 18:03:07	No
67	2019-05-07 20:27:39	MBS	2019-05-07 20:27:39	2019-05-07 20:33:57	2019-05-07 20:33:57	No
		MBS	2019-05-07 20:28:10	2019-05-07 20:33:59	2019-05-07 20:33:59	
		MBS	2019-05-07 20:29:40	2019-05-07 20:34:00	2019-05-07 20:34:00	

2019 Week 20: 12 Alarming Events in total

Pipeline	Alarming Event Start Time	Type	Alarm Received Time	Alarm Assessed Time	Alarm Cleared Time	Shutdown Required
01	2019-05-16 14:36:49	MBS	2019-05-16 14:36:49	2019-05-16 15:27:32	2019-05-16 15:41:21	Yes
		MBS	2019-05-16 14:38:20	2019-05-16 15:27:34	2019-05-16 15:41:21	
		MBS	2019-05-16 14:39:50	2019-05-16 15:27:35	2019-05-16 15:41:21	
02	2019-05-16 09:42:49	MBS	2019-05-16 09:42:49	2019-05-16 09:49:08	2019-05-16 09:49:08	No
		MBS	2019-05-16 09:43:20	2019-05-16 09:49:07	2019-05-16 09:49:07	
03	2019-05-14 09:04:15	MBS	2019-05-14 09:04:15	2019-05-14 09:07:19	2019-05-14 09:07:19	No
		MBS	2019-05-14 09:04:45	2019-05-14 09:07:35	2019-05-14 09:07:35	
		MBS	2019-05-14 09:05:15	2019-05-14 09:07:54	2019-05-14 09:07:54	
		MBS	2019-05-14 09:06:15	2019-05-14 09:08:11	2019-05-14 09:08:11	
05	2019-05-14 11:24:16	MBS	2019-05-14 11:24:16	2019-05-14 11:25:31	2019-05-14 11:25:31	No
		MBS	2019-05-14 11:32:39	2019-05-14 11:33:47	2019-05-14 11:33:47	
06A	2019-05-14 07:29:36	MBS	2019-05-14 07:29:36	2019-05-14 07:36:57	2019-05-14 07:36:57	No
		MBS	2019-05-14 07:29:36	2019-05-14 07:36:58	2019-05-14 07:36:58	
		MBS	2019-05-14 07:29:36	2019-05-14 07:36:59	2019-05-14 07:36:59	
06A	2019-05-14 13:38:08	MBS	2019-05-14 13:38:08	2019-05-14 13:38:51	2019-05-14 13:38:51	No
		MBS	2019-05-14 13:47:19	2019-05-14 13:47:54	2019-05-14 13:47:54	
14	2019-05-14 07:08:18	MBS	2019-05-14 07:08:18	2019-05-14 07:15:04	2019-05-14 07:15:04	No
		MBS	2019-05-14 07:08:18	2019-05-14 07:15:01	2019-05-14 07:15:01	
14	2019-05-14 12:01:38	MBS	2019-05-14 12:01:38	2019-05-14 12:02:12	2019-05-14 12:02:12	No
		MBS	2019-05-14 12:09:00	2019-05-14 12:09:42	2019-05-14 12:09:42	
61	2019-05-14 09:16:31	MBS	2019-05-14 09:16:31	2019-05-14 09:18:05	2019-05-14 09:18:05	No
		MBS	2019-05-14 09:38:45	2019-05-14 09:40:10	2019-05-14 09:40:10	
61	2019-05-16 11:40:52	MBS	2019-05-16 11:40:52	2019-05-16 11:47:39	2019-05-16 11:47:39	No
78	2019-05-14 14:00:24	MBS	2019-05-14 14:00:24	2019-05-14 14:00:36	2019-05-14 14:00:36	No
		MBS	2019-05-14 14:08:51	2019-05-14 14:09:04	2019-05-14 14:09:04	

Pipeline	Alarming Event Start Time	Type	Alarm Received Time	Alarm Assessed Time	Alarm Cleared Time	Shutdown Required
78	2019-05-19 16:02:03	AVB	2019-05-19 16:02:03	2019-05-19 16:06:06	2019-05-19 16:06:06	No

2019 Week 21: 2 Alarming Events in total

Pipeline	Alarming Event Start Time	Type	Alarm Received Time	Alarm Assessed Time	Alarm Cleared Time	Shutdown Required
14	2019-05-22 09:58:43	MBS	2019-05-22 09:58:43	2019-05-22 10:00:19	2019-05-22 10:00:19	No
		MBS	2019-05-22 10:01:13	2019-05-22 10:01:27	2019-05-22 10:01:27	
78	2019-05-21 06:13:07	MBS	2019-05-21 06:13:07	2019-05-21 08:28:39	2019-05-21 08:52:52	Yes
		MBS	2019-05-21 06:18:38	2019-05-21 08:28:37	2019-05-21 08:52:52	

4. Instrumentation Outage Report

The records in this report each contain data that are referenced by the Consent Decree. The terms are explained in the following table.

Table 4a: Description of fields in this Report

Data	Description
Pipeline	Name (number) of the pipeline on which the instrument is located
Station	Location of the instrument
Outage Start	Date and time when the instrumentation outage began
Outage End	Date and time when the instrumentation outage was resolved
Root Cause	Reason for instrumentation outage (root cause analysis performed by the Leak Detection Analyst)

The records report instances when the outage exceeds time periods set forth in section VII.G.IV.97 of the decree.

Note Enbridge uses root cause descriptions to categorize the outage. The root cause has a finer granularity than the "Reason for Instrumentation Outage" listed in section VII.G.IV.97 of the decree, but is equivalent. The following table maps the fixed set of root causes that result in the "Reason for Instrumentation Outage" listed in section VII.G.IV.97 of the decree as well as their corresponding fixed set of actions to resolve each outage type.

Table 4b: Description of reasons for outage and actions taken to resolve it

Reason for Instrumentation Outage	Time Limit to Restore	Root Cause	Actions Taken to Resolve the Outage
Instrumentation Failure	10 days	Instrumentation Error	Fixed the Instrument
Instrumentation Failure	10 days	Communication Interruption	Restored Communications
Instrumentation Failure	10 days	Power Outage	Restored Power
Scheduled Maintenance or Repairs	4 days	Field Maintenance	Finished the Maintenance

Table 4c: Instrumentation Outage Report

Pipeline	Station	Outage Start	Outage End	Root Cause

Appendix 3 – Lakehead System Pipeline Incident Reporting [112]

Reporting Period: November 23, 2018 to May 22, 2019

ENBRIDGE

Lakehead System Pipeline Incident Reporting						
Incident Description	**Date and Time Notice Received**	**Date and Time Investiga-tion Began**	**Date and time when preliminary Investigation complete**	**Information Provided with Notice**	**Conclusion and Findings of the Investigation**	**Lakehead Lines Affected**
[redacted]	12/11/2018 18:22 MST	12/11/2018 18:32 MST**	12/11/2018 18:30 MST** **Preliminary investigation completed prior to the start of CCO & Regional operation's independent investigations.	[redacted]	[redacted]	Line 5
	12/16/2018 08:42 MST	12/16/2018 08:45 MST	12/16/2018 08:47 MST			Line 61
	12/16/2018 21:53 MST	12/16/2018 21:56 MST	12/16/2018 21:57 MST			Line 78
	12/31/2018 09:33 MST	12/31/2018 09:38 MST	12/31/2018 09:39 MST			Line 5

ENBRIDGE

Lakehead System Pipeline Incident Reporting						
Incident Description	**Date and Time Notice Received**	**Date and Time Investiga-tion Began**	**Date and time when preliminary Investigation complete**	**Information Provided with Notice**	**Conclusion and Findings of the Investigation**	**Lakehead Lines Affected**
[redacted]	12/31/2018 17:39 MST	12/31/2018 17:45 MST	12/31/2018 17:46 MST	[redacted]	[redacted]	Line 5
	01/16/2019 13:15 MST	01/16/2019 13:29 MST**	01/16/2019 13:28 MST** **Preliminary investigation completed prior to the start of CCO & Regional operation's independent investigations.			Line 6A Line 14 Line 78 Line 62
	01/20/2019 08:57 MST	01/20/2019 08:59 MST	01/20/2019 09:01 MST			Line 5

ENBRIDGE

Lakehead System Pipeline Incident Reporting						
Incident Description	**Date and Time Notice Received**	**Date and Time Investiga-tion Began**	**Date and time when preliminary Investigation complete**	**Information Provided with Notice**	**Conclusion and Findings of the Investigation**	**Lakehead Lines Affected**
[redacted]	02/01/2019 17:49 MST	02/01/2019 17:55 MST	02/01/2019 17:55 MST	[redacted]	[redacted]	Line 6A Line 14 Line 61
	02/22/2019 15:33 MST	02/22/2019 15:38 MST	02/22/2019 15:40 MST			Line 78
	02/28/2019 19:31 MST	02/28/2019 19:35 MST	02/28/2019 19:36 MST			Line 1 Line 2B Line 3 Line 4 Line 67
	03/02/2019 09:06 MST	03/02/2019 09:11 MST	03/02/2019 09:20 MST			Line 6A Line 61 Line 78

ENBRIDGE

Lakehead System Pipeline Incident Reporting						
Incident Description	**Date and Time Notice Received**	**Date and Time Investiga-tion Began**	**Date and time when preliminary Investigation complete**	**Information Provided with Notice**	**Conclusion and Findings of the Investigation**	**Lakehead Lines Affected**
[redacted]	04/10/2019 16:40 MST	04/10/2019 16:45 MST	04/10/2019 16:49 MST	[redacted]	[redacted]	Line 06A Line 62 Line 64 Line 78
	04/22/2019 15:57 MST	04/22/2019 16:03 MST	04/22/2019 16:04 MST			Line 78
	04/24/2019 05:57 MST	04/24/2019 05:57 MST	04/24/2019 05:58 MST			Line 6A Line 14 Line 64
	04/25/2019 08:28 MST	04/25/2019 08:31 MST	04/25/2019 08:40 MST			Line 6A Line 14 Line 62 Line 64 Line 78 Line 61

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Lakehead System Pipeline Incident Reporting						
Incident Description	**Date and Time Notice Received**	**Date and Time Investiga-tion Began**	**Date and time when preliminary Investigation complete**	**Information Provided with Notice**	**Conclusion and Findings of the Investigation**	**Lakehead Lines Affected**
[redacted]	04/26/2019 03:45 MST	04/26/2019 03:47 MST**	04/26/2019 03:46 MST** **Preliminary investigation completed prior to the start of CCO & Regional operation's independent investigations.	[redacted]	[redacted]	Line 5
	05/03/2019 16:23 MST	05/03/2019 16:23 MST	05/03/2019 16:28 MST			Line 6A Line 64 Line 78 Line 62

Appendix 4 – Spill Response and Preparedness Additional Information [116]

Reporting Period: November 23, 2018 to May 22, 2019

ENBRIDGE PIPELINES IN MICHIGAN:

Important Pipeline Safety Information

Proudly operating in the Great Lakes State for more than 60 years, Michigan is home to more than 100 Enbridge employees. Our pipelines transport the energy resources we rely on every day to fuel our vehicles, heat our homes and feed our families. The safe and reliable operation of our pipeline system is our top priority.

What are the characteristics and hazards of the products being transported by Enbridge?

Crude oil is naturally occurring, unrefined petroleum. Enbridge transports light, medium and heavy crude oil on its liquids pipeline system. The words light, medium and heavy are often used to describe a crude oil's density and resistance to flow (viscosity). Crude oil's color can range from yellow to black and it has an odor similar to gasoline or diesel fuel. If released, crude oil will flow with the land profile. Flow depends on temperature and viscosity; it can be thick and slow-moving or light and able to move quickly. Crude oil can be flammable and explosive if vapors mix with the atmosphere and an ignition source is present.

Natural Gas Liquids (NGLs) include propane, butane, ethane, and occasionally some other petroleum products like natural gasoline, also known as condensate. NGLs are used by various industries to produce materials such as plastics, refrigerants and tires. NGLs are colorless and will have a steam-like cloud or frost appearance on the ground and have an odor similar to gasoline.

NGLs are liquids when inside the pipeline or storage tank but become gaseous if released into the atmosphere. NGLs are heavier than air and stay close to the ground in low-lying areas.

Crude oil and NGLs can be flammable and vapors may ignite when an ignition source is present. Many compounds in crude oil and NGLs can be harmful if they enter the human body through inhalation, ingestion or skin absorption. Exposure to these compounds may cause skin irritation, dizziness, headache or even loss of consciousness. Suffocation may occur if vapors displace the oxygen in an enclosed area.

How do I know where Enbridge pipelines are located?

Pipeline operators, including Enbridge, are required to submit transmission pipeline maps to the National Pipeline Mapping System. You can access these maps at **npms.phmsa.dot.gov**.

Pipeline markers also indicate the approximate location of pipelines and can be found along the pipeline right-of-way and near road and water crossings. All pipeline markers provide the name of the pipeline operator, product being transported and a telephone number for reporting pipeline emergencies.

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333 S. Kalamazoo Avenue
Marshall, Michigan
USA 49068

What should I do if I suspect a pipeline leak?

If you are in immediate danger, damage the pipeline, or observe or suspect a leak—even if you are uncertain of the severity—take the following steps:

1. If you can do so safely, turn off any mechanized equipment. Move as far away from the leak as possible in an upwind direction, avoiding contact with escaping liquids and gases.
2. Call **911**
3. Call the toll-free, 24-hour Enbridge emergency number for your area: **800-858-5253**
4. Follow instructions provided to you by Enbridge and local emergency responders

You can also report emergencies and other sudden threats to public health, such as oil and/or chemical spills, to the federal government's centralized reporting center, the National Response Center (NRC) at **800-424-8802**. The NRC is staffed 24 hours a day by personnel who will ask you to provide as much information about the incident as possible.

Please include the following:

- Your name, location, organization, and telephone number
- Name and address of the party responsible for the incident; or name of the carrier or vessel, the railcar/truck number, or other identifying information
- Date and time of the incident
- Location of the incident
- Source and cause of the release or spill
- Types of material(s) released or spilled
- Quantity of materials released or spilled
- Medium (e.g. land, water) affected by the release or spill
- Danger or threat posed by the release or spill
- Number and types of injuries or fatalities (if any)
- Weather conditions at the incident location
- Whether an evacuation has occurred
- Other agencies notified or about to be notified
- Any other information that may help emergency personnel respond to the incident

If reporting directly to the NRC is not possible, reports also can be made to the EPA Regional office or the U.S. Coast Guard Marine Safety Office in the area where the incident occurred. In general, EPA should be contacted if the incident involves a release to inland areas or inland waters. The U.S. Coast Guard should be contacted for releases to coastal waters, the Great Lakes, ports and harbors, or the Mississippi River. The EPA or the U.S. Coast Guard will relay release and spill reports to the NRC promptly.*

Michigan is located within EPA Region 5:

U.S. EPA - Region 5
77 W. Jackson Boulevard
Chicago, IL 60604-3590

(312) 353-2000
(800) 621-8431 (in Region 5 only)

* https://www.epa.gov/emergency-response/what-information-needed-when-reporting-oil-spill-or-hazardous-substance-release

What *not* to do in an emergency situation:

- Do not touch any liquid or vapor that may have come from the pipeline
- Do not drive into the area or start your car
- Do not light a match
- Do not turn on or off anything that may create a spark—including cell phones, telephones, light switches, vehicle alarms, vehicle keyless entry and flashlights—until you are in a safe location
- Do not operate pipeline valves
- Do not remain in a building if the smell is stronger inside than outside

How can I obtain information from Enbridge?

During an incident, Enbridge representatives will work diligently to keep the public informed through local news media. We will also post information about the spill on our website and social media channels.

- Website: **Enbridge.com**
- Facebook: **Facebook.com/Enbridge**
- Twitter: **@Enbridge**

You can also visit the EPA website and use the "Cleanups in My Community" tool to find the EPA's current and past emergency response activities in your community.

- **www.epa.gov/emergency-response/emergency-response-my-community**

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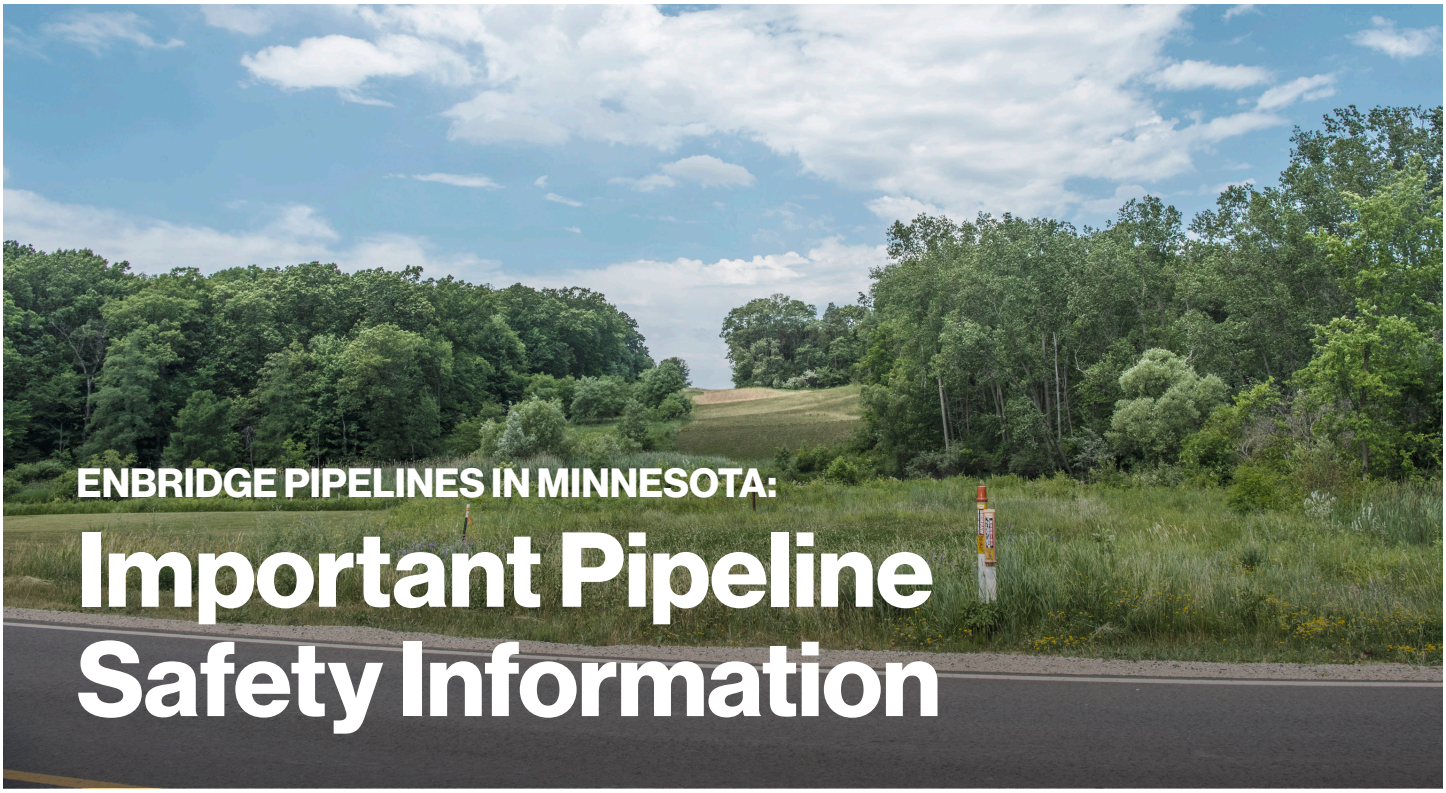

ENBRIDGE PIPELINES IN MINNESOTA:

Important Pipeline Safety Information

Proudly operating in Minnesota since 1949, Minnesota is home to hundreds of Enbridge employees. Our pipelines transport the energy resources we rely on every day to fuel our vehicles, heat our homes and feed our families. The safe and reliable operation of our pipeline system is our top priority.

What are the characteristics and hazards of the products being transported by Enbridge?

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Natural Gas Liquids (NGL) is a liquid when transported inside the pipeline but becomes gaseous if released into the atmosphere. NGL is heavier than air and tends to stay close to the ground in low-lying areas. It is extremely flammable and explosive.

Diluent is a light hydrocarbon that is blended with heavy crude oil to make it thinner and easier to transport by pipeline. Enbridge has a dedicated pipeline to transport diluent that has been recovered from the diluted heavy crude oil. Diluent is very light and fluid. It's liquid when inside the pipeline but quickly evaporates if released into the atmosphere. Like all hydrocarbons transported by Enbridge, diluent is flammable and vapors may ignite if an ignition source is present. The toxicity and potential health effects from exposure to diluent are similar to other petroleum products. During normal operations, the liquid petroleum Enbridge transports is contained with the pipeline system and there are no hazards to those who live and work along the pipelines transporting diluent.

How do I know where Enbridge pipelines are located?

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- Location of the incident
- Source and cause of the release or spill
- Types of material(s) released or spilled
- Quantity of materials released or spilled
- Medium (e.g. land, water) affected by the release or spill
- Danger or threat posed by the release or spill
- Number and types of injuries or fatalities (if any)
- Weather conditions at the incident location
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U.S. EPA - Region 5
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- **www.epa.gov/emergency-response/emergency-response-my-community**

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> For more information, visit **enbridge.com**

Community Outreach Sessions Lessons Learned: Implementation for 2019

From the 2019 Planning Guide

In November of 2018, a team meeting was held that included Enbridge and ERM project principles. The team reviewed the successes and challenges of the 2018 meetings, as well as discussed a plan for 2019 and beyond. The section presented below provides an overview of the discussion that took place and outlines the considerations and changes for implementation in 2019.

1.1 Planning and Process

1. Take a holistic approach to booking event space and include operations staff in the review and decision process. Look to complete this task prior to the first meeting in April.
2. Work ahead with region community engagement specialists to update and compile stakeholder and invitation lists. In addition, work with regional community engagement specialists and government relations staff to identify additional agency-based or private/public sector stakeholders for attendance and participation.
    a. Note: the timing of local elections may influence the accuracy of each stakeholder list. Thus, some updates to stakeholder lists within SIMS may be required prior to exporting the invitation and mailing list.
3. ERM to develop a punch list of planning activities and considerations that must be accomplished for each meeting group
4. Various event supplies ordered/reordered as identified in plan above
    a. Handouts inventory
    b. Let's Connect feedback forms
    c. Banners/Mural
    d. Enbridge branded shirts (non-project specific)
5. Simplify the staff planning guide
6. Enbridge legal only to attend if legal issues have been identified. ERM to coordinate with Lisa Wilson on identifying areas of interest.
7. Hotel blocks are to be reserved only in areas of high population / summer tourism
8. Giveaways and trinkets to be handed out at registration table
9. Include a petroleum prize pack at the "Community" or "Products Info" booth
10. Look for opportunities for team building and engagement when on the road – ex. Tour of energy facility
11. ERM to provide nametag stickers for open house attendees
12. PDFs of county maps printed, laminated and attached to ring – one for each region
13. Inquire with venues regarding rental of screen and projector for NPMS and GeoMap display during open house
14. Work with Edwin Makkinga at Enbridge to rethink booth content for Enbridge in Your Community / Environment table, capturing the "big energy picture", climate change, and sustainability at Enbridge.

1.2 Event Logistics

1. Postcard Invitation Creative:
    a. Simplify the creative and design
    b. Add "You're Invited to a Community Open House" to the top of the postcard
    c. Add a "Dinner Included!" stamp to the front of the postcard
    d. Add "Dinner and refreshments will be served!" to the back
    e. Increase the size font used for the event dates and bold
2. Landowner Letter Invitation:
    a. ERM to produce a landowner letter for each meeting in 2019
    b. In coordination with Enbridge Land Services and the regional community engagement advisor, request and review a mailing list of landowners that should receive an open house written invitation
3. Local official/emergency responder Letter Invitation:
    a. Work with regional community engagement specialists to update content as necessary
4. Grassroots Advertising:
    a. Work with local Enbridge staff on an earned media strategy leading up to the meeting group – invitations to local radio, interviews, etc.
        i. ERM to take an inventory of earned media options for each meeting group and assist with planning and execution
    b. Leverage community Ambassadors and local Operations staff to promote the events during city council meetings
        i. ERM to take an inventory of local government meeting schedules for each meeting group and assist with planning and execution
    c. As noted in the plan previously, develop a "Save the Date" handout for the pre-meeting presentation that community engagement specialists and operations staff can pass out at events and gatherings attended by local public officials and electeds.

1.3 Preparation for 2020

1. Maps:
    a. ERM to produce a map of the 2019 meeting locations and counties involved.
    b. ERM to update a map showing a running total of community open houses held through 2019 by location and note the counties involved.
    c. Review with Enbridge whether a Consent Decree map is necessary that shows the location of all emergency response exercises, table tops, and open houses held through 2019
2. County Inventory:
    a. Work with Jennifer Smith to update and confirm the inventory of counties along the Lakehead system based on the Consent Decree legal requirements.
    b. ERM then to cross-reference the list of counties to identify any gaps and to help formulate the meeting-location strategy heading into 2020.

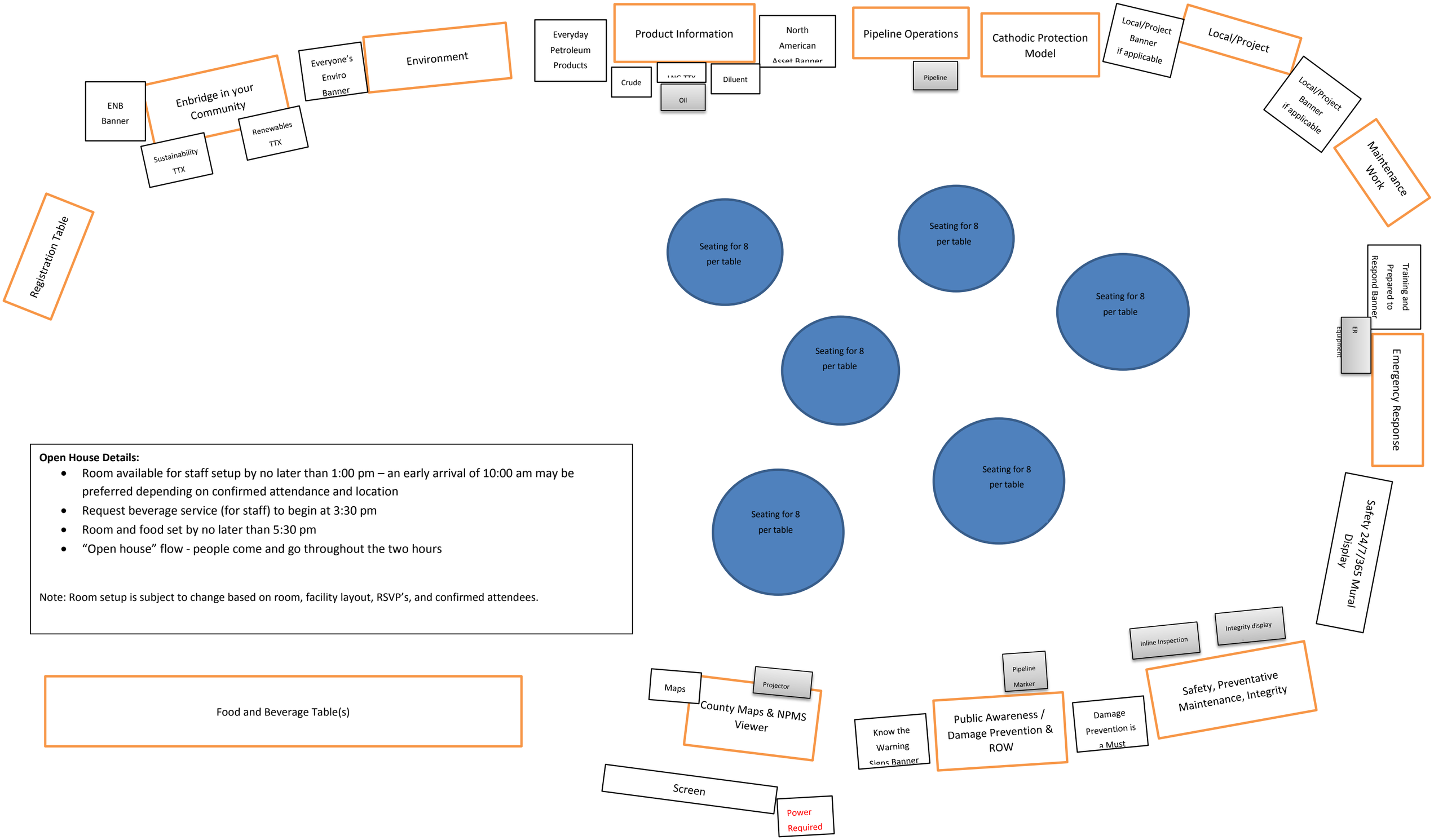
Onsite Table Displays and Print Material Overview

Booth	Topics	Collateral/Materials Available
Registration Table	• Welcome • High level Enbridge messaging	**Collateral:** • Enbridge North American Asset Map Handout • Pipeline Safety Information Handout: "Important Pipeline Safety Information" • DOJ Attendee Feedback Questionnaire: "Let's Connect" **Banners / Display:** • Pipeline Safety Information Meeting – Sign • Pipeline Safety Information Registration – Sign • Community Meeting – Sign • Community Meeting Registration – Sign • Event Parking – Sign **Materials:** • Enbridge Folders (for map/handouts) • Sign in sheet (or computers)
Enbridge in your Community	• Community Investment Program • Safe Community Program • Local Partnerships • Contribution of Enbridge to the State	**Collateral:** • Community Investment handout: "Enbridge Invests in Safe Communities" • Region (Midwest or Great Lakes) Brochure • What's changed since Marshall handout **Display / Banners:** • Enbridge in {STATE} pop-up banner • Sustainability TTX • Corporate Social Responsibility TTX
Environment	• Environmental Protection • Environmental response/restoration in the case of a spill	**Collateral:** • Operating safely along our pipeline routes • Our commitment to the environment • Enbridge's Intelligent Valve Placement handout **Display / Banners:** • Everyone's Environment banner • Environment – Emergency response tasks TTX • Environment – Project work and ongoing operations TTX
Product information	• Oil characteristics (odor, thickness, color etc.) • Grades of oil transported • Hazards of oil on the Lakehead System • Uses of petroleum	**Collateral** • Petroleum: Fueling Our Lives • Fueling Summers: Summertime Petroleum Products (Optional) • Safely Transporting North America's Largest Reserve of Crude Oil (Oil sands brochure) • Safely Transporting North America's Growing Supplies of Light Crude • Diluents: transporting light hydrocarbon resources **Display / Banners:** • Oil characteristic display boards: Crude, Diluent, and LNG TTXs • Everyday petroleum products pop-up banner **Materials:** • Oil samples
Pipeline Operations	• Where pipelines are located • How pipelines are marked • State-specific information • How oil is transported, stored • Facility information (pump stations, terminals, valves)	**Collateral:** • Enbridge pipelines in {STATE} • {STATE} specific asset information (example: Superior Terminal) • Pumps keep oil moving • Crude oil storage terminals **Display / Banners:** • North America assets banner **Materials:** • Pipeline marker
Operations Model	• Cathodic Protection Display • Valve Demonstration • Boom or other	**Collateral:** • N/A **Display / Banners:** • Various region-specific display options **Materials**

		• N/A
Local Project (If Applicable)	• Project information • Video • Other information materials	**Collateral:** • Various project fact sheets **Display / Banners:** • N/A **Materials** • N/A
• **Regional Maintenance Work** • (If Applicable)	• Anchors • Underwater Inspections • Tunnel video w/ TV • Other	**Collateral:** • Various project fact sheets **Display / Banners:** • N/A **Materials** • N/A
Emergency Response	• How the community can obtain information in the event of a spill from Enbridge and government agencies • How the community can report spills to Enbridge/EPA and NRC • Equipment • Training • Exercises	**Collateral:** • Pipeline Safety Information Handout: "Important Pipeline Safety Information" • Optional Brochure : Enbridge's Emergency Response Readiness **Display / Banners:** • Trained and prepared to respond pop-up banner **Materials:** • Response time map • Regional emergency response plans • Emergency response red book • ER materials (booms, absorbent pads, gas monitor, PPE etc.) • Response maps
Safety, Preventative Maintenance, Integrity	• Safety, Preventative Maintenance, Integrity o Construction o Control Center o Aerial Patrols o Cathodic Protection o Integrity Dig Program	**Collateral:** • Integrity 24/7/365 • Maintenance digs • Enbridge Safety Report for the Community **Display / Banners:** • 24/7/365 display mural **Materials:** • Integrity display boards • In-line Inspection tool models
Public Awareness/Damage Prevention	• How pipelines are marked • Leak Recognition and Response • How the community should respond in the event of a spill • 811	**Collateral:** • Pipeline safety and emergency information - Various public awareness brochures **Display / Banners:** • Know the warning signs pop-up banner (see, hear, smell) • Damage prevention is a must pop-up banner **Materials:** • Pipeline marker
County Maps and NPMS Viewer	• **County maps and NPMS Public Viewer**	**Collateral:** • N/A **Display / Banners:** • Laptop set to NPMS Public Viewer and TV and/or screen w/ projector • County maps (laminated) **Materials:** • N/A
Project/Local Specific Table	• Project overview • Project benefits • Other project specific information	**Collateral:** • Various project fact sheets **Display / Banners:** • specific

Key:

Red= DOJ Consent Decree Requirement



Open House Details:

- Room available for staff setup by no later than 1:00 pm – an early arrival of 10:00 am may be preferred depending on confirmed attendance and location
- Request beverage service (for staff) to begin at 3:30 pm
- Room and food set by no later than 5:30 pm
- "Open house" flow - people come and go throughout the two hours

Note: Room setup is subject to change based on room, facility layout, RSVP's, and confirmed attendees.

Food and Beverage Table(s)

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Appendix 5 – PHMSA Reports from Lakehead Discharges [146] and Update on Discharges from a Lakehead System Pipelines [147]

Reporting Period: November 23, 2018 to May 22, 2019

NOTICE: This report is required by 49 CFR Part 195. Failure to report can result in a civil penalty not to exceed $100,000 for each violation for each day that such violation persists except that the maximum civil penalty shall not exceed $1,000,000 as provided in 49 USC 60122.		OMB NO: 2137-0047 EXPIRATION DATE: 8/31/2020
U.S Department of Transportation Pipeline and Hazardous Materials Safety Administration	**Original Report Date:**	04/11/2019
	No.	20190120 - 31940 --- (DOT Use Only)

ACCIDENT REPORT - HAZARDOUS LIQUID PIPELINE SYSTEMS

INSTRUCTIONS

Important: *Please read the separate instructions for completing this form before you begin. They clarify the information requested and provide specific examples. If you do not have a copy of the instructions, you can obtain one from the PHMSA Pipeline Safety Community Web Page at http://www.phmsa.dot.gov/pipeline/library/forms.*

PART A - KEY REPORT INFORMATION

Report Type: *(select all that apply)*	**Original:**	**Supplemental:**	**Final:**
	Yes		**Yes**
Last Revision Date:			

1. Operator's OPS-issued Operator Identification Number (OPID):	11169
2. Name of Operator	ENBRIDGE ENERGY, LIMITED PARTNERSHIP
3. Address of Operator:	
3a. Street Address	5400 WESTHEIMER COURT
3b. City	HOUSTON
3c. State	Texas
3d. Zip Code	77056
4. Local time *(24-hr clock)* and date of the Accident:	03/16/2019 09:49
5. Location of Accident:	
Latitude:	[redacted]
Longitude:	[redacted]
6. National Response Center Report Number (if applicable):	NRC Notification Not Required
7. Local time *(24-hr clock)* and date of initial telephonic report to the National Response Center (if applicable):	
8. Commodity released: *(select only one, based on predominant volume released)*	Crude Oil
- Specify Commodity Subtype:	
- If "Other" Subtype, Describe:	
- If Biofuel/Alternative Fuel and Commodity Subtype is Ethanol Blend, then % Ethanol Blend:	
- If Biofuel/Alternative Fuel and Commodity Subtype is Biodiesel, then Biodiesel Blend e.g. B2, B20, B100	
9. Estimated volume of commodity released unintentionally (Barrels):	1.71
10. Estimated volume of intentional and/or controlled release/blowdown (Barrels):	
11. Estimated volume of commodity recovered (Barrels):	1.71
12. Were there fatalities?	No
- If Yes, specify the number in each category:	
12a. Operator employees	
12b. Contractor employees working for the Operator	
12c. Non-Operator emergency responders	
12d. Workers working on the right-of-way, but NOT associated with this Operator	
12e. General public	
12f. Total fatalities (sum of above)	
13. Were there injuries requiring inpatient hospitalization?	No
- If Yes, specify the number in each category:	
13a. Operator employees	
13b. Contractor employees working for the Operator	
13c. Non-Operator emergency responders	
13d. Workers working on the right-of-way, but NOT associated with this Operator	
13e. General public	

13f. Total injuries (sum of above)	
14. Was the pipeline/facility shut down due to the Accident?	No
- If No, Explain:	Tank line was isolated prior to the release
- If Yes, complete Questions 14a and 14b: *(use local time, 24-hr clock)*	
14a. Local time and date of shutdown:	
14b. Local time pipeline/facility restarted:	
- Still shut down? (* Supplemental Report Required)	
15. Did the commodity ignite?	No
16. Did the commodity explode?	No
17. Number of general public evacuated:	0
18. Time sequence *(use local time, 24-hour clock)*:	
18a. Local time Operator identified Accident - effective 7- 2014 changed to "Local time Operator identified failure":	03/16/2019 09:49
18b. Local time Operator resources arrived on site:	03/16/2019 09:49
PART B - ADDITIONAL LOCATION INFORMATION	
1. Was the origin of the Accident onshore?	Yes
If Yes, Complete Questions (2-12)	
If No, Complete Questions (13-15)	
- If Onshore:	
2. State:	Wisconsin
3. Zip Code:	54880
4. City	Superior
5. County or Parish	Douglas
6. Operator-designated location:	Milepost/Valve Station
Specify:	1098
7. Pipeline/Facility name:	Superior Terminal
8. Segment name/ID:	Tank 21 Header Line
9. Was Accident on Federal land, other than the Outer Continental Shelf (OCS)?	No
10. Location of Accident:	Totally contained on Operator-controlled property
11. Area of Accident (as found):	Underground
Specify:	Under soil
- If Other, Describe:	
Depth-of-Cover (in):	24
12. Did Accident occur in a crossing?	No
- If Yes, specify type below:	
- If Bridge crossing –	
Cased/ Uncased:	
- If Railroad crossing –	
Cased/ Uncased/ Bored/drilled	
- If Road crossing –	
Cased/ Uncased/ Bored/drilled	
- If Water crossing –	
Cased/ Uncased	
- Name of body of water, if commonly known:	
- Approx. water depth (ft) at the point of the Accident:	
- Select:	
- If Offshore:	
13. Approximate water depth (ft) at the point of the Accident:	
14. Origin of Accident:	
- In State waters - Specify:	
- State:	
- Area:	
- Block/Tract #:	
- Nearest County/Parish:	
- On the Outer Continental Shelf (OCS) - Specify:	
- Area:	
- Block #:	
15. Area of Accident:	
PART C - ADDITIONAL FACILITY INFORMATION	
1. Is the pipeline or facility:	Interstate
2. Part of system involved in Accident:	Onshore Terminal/Tank Farm Equipment and Piping
- If Onshore Breakout Tank or Storage Vessel, Including Attached Appurtenances, specify:	
3. Item involved in Accident:	Weld, including heat-affected zone
- If Pipe, specify:	
3a. Nominal diameter of pipe (in):	

3b. Wall thickness (in):	
3c. SMYS (Specified Minimum Yield Strength) of pipe (psi):	
3d. Pipe specification:	
3e. Pipe Seam , specify:	
- If Other, Describe:	
3f. Pipe manufacturer:	
3g. Year of manufacture:	
3h. Pipeline coating type at point of Accident, specify:	
- If Other, Describe:	
- If Weld, including heat-affected zone, specify. If Pipe Girth Weld, 3a through 3h above are required:	Fillet Weld
- If Other, Describe:	
- If Valve, specify:	
- If Mainline, specify:	
- If Other, Describe:	
3i. Manufactured by:	
3j. Year of manufacture:	
- If Tank/Vessel, specify:	
- If Other - Describe:	
- If Other, describe:	
4. Year item involved in Accident was installed:	1975
5. Material involved in Accident:	Carbon Steel
- If Material other than Carbon Steel, specify:	
6. Type of Accident Involved:	Leak
- If Mechanical Puncture – Specify Approx. size:	
in. (axial) by	
in. (circumferential)	
- If Leak - Select Type:	Crack
- If Other, Describe:	
- If Rupture - Select Orientation:	
- If Other, Describe:	
Approx. size: in. (widest opening) by	
in. (length circumferentially or axially)	
- If Other – Describe:	

PART D - ADDITIONAL CONSEQUENCE INFORMATION

1. Wildlife impact:	No
1a. If Yes, specify all that apply:	
- Fish/aquatic	
- Birds	
- Terrestrial	
2. Soil contamination:	Yes
3. Long term impact assessment performed or planned:	No
4. Anticipated remediation:	No
4a. If Yes, specify all that apply:	
- Surface water	
- Groundwater	
- Soil	
- Vegetation	
- Wildlife	
5. Water contamination:	No
5a. If Yes, specify all that apply:	
- Ocean/Seawater	
- Surface	
- Groundwater	
- Drinking water: *(Select one or both)*	
- Private Well	
- Public Water Intake	
5b. Estimated amount released in or reaching water (Barrels):	
5c. Name of body of water, if commonly known:	
6. At the location of this Accident, had the pipeline segment or facility been identified as one that "could affect" a High Consequence Area (HCA) as determined in the Operator's Integrity Management Program?	Yes
7. Did the released commodity reach or occur in one or more High Consequence Area (HCA)?	Yes
7a. If Yes, specify HCA type(s): *(Select all that apply)*	
- Commercially Navigable Waterway:	
Was this HCA identified in the "could affect" determination for this Accident site in the Operator's	

Integrity Management Program?	
- High Population Area:	
Was this HCA identified in the "could affect" determination for this Accident site in the Operator's Integrity Management Program?	
- Other Populated Area	Yes
Was this HCA identified in the "could affect" determination for this Accident site in the Operator's Integrity Management Program?	Yes
- Unusually Sensitive Area (USA) - Drinking Water	Yes
Was this HCA identified in the "could affect" determination for this Accident site in the Operator's Integrity Management Program?	Yes
- Unusually Sensitive Area (USA) - Ecological	
Was this HCA identified in the "could affect" determination for this Accident site in the Operator's Integrity Management Program?	
8. Estimated cost to Operator – effective 12-2012, changed to "Estimated Property Damage":	
8a. Estimated cost of public and non-Operator private property damage paid/reimbursed by the Operator – effective 12-2012, "paid/reimbursed by the Operator" removed	$ [redacted]
8b. Estimated cost of commodity lost	$ [redacted]
8c. Estimated cost of Operator's property damage & repairs	$ [redacted]
8d. Estimated cost of Operator's emergency response	$ [redacted]
8e. Estimated cost of Operator's environmental remediation	$ [redacted]
8f. Estimated other costs	$ [redacted]
Describe:	
8g. Estimated total costs (sum of above) – effective 12-2012, changed to "Total estimated property damage (sum of above)"	$ [redacted]

PART E - ADDITIONAL OPERATING INFORMATION

1. Estimated pressure at the point and time of the Accident (psig):	9.00
2. Maximum Operating Pressure (MOP) at the point and time of the Accident (psig):	275.00
3. Describe the pressure on the system or facility relating to the Accident (psig):	Pressure did not exceed MOP
4. Not including pressure reductions required by PHMSA regulations (such as for repairs and pipe movement), was the system or facility relating to the Accident operating under an established pressure restriction with pressure limits below those normally allowed by the MOP?	No
- If Yes, Complete 4.a and 4.b below:	
4a. Did the pressure exceed this established pressure restriction?	
4b. Was this pressure restriction mandated by PHMSA or the State?	
5. Was "Onshore Pipeline, Including Valve Sites" OR "Offshore Pipeline, Including Riser and Riser Bend" selected in PART C, Question 2?	No
- If Yes - (*Complete 5a. – 5f below)* effective 12-2012, changed to *"(Complete 5.a – 5.e below)"*	
5a. Type of upstream valve used to initially isolate release source:	
5b. Type of downstream valve used to initially isolate release source:	
5c. Length of segment isolated between valves (ft):	
5d. Is the pipeline configured to accommodate internal inspection tools?	
- If No, Which physical features limit tool accommodation? (*select all that apply)*	
- Changes in line pipe diameter	
- Presence of unsuitable mainline valves	
- Tight or mitered pipe bends	
- Other passage restrictions (i.e. unbarred tee's, projecting instrumentation, etc.)	
- Extra thick pipe wall (applicable only for magnetic flux leakage internal inspection tools)	
- Other -	
- If Other, Describe:	
5e. For this pipeline, are there operational factors which significantly complicate the execution of an internal inspection tool run?	
- If Yes, Which operational factors complicate execution? (*select all that apply*)	

- Excessive debris or scale, wax, or other wall buildup	
- Low operating pressure(s)	
- Low flow or absence of flow	
- Incompatible commodity	
- Other -	
- If Other, Describe:	
5f. Function of pipeline system:	> 20% SMYS Regulated Trunkline/Transmission
6. Was a Supervisory Control and Data Acquisition (SCADA)-based system in place on the pipeline or facility involved in the Accident?	Yes
If Yes -	
6a. Was it operating at the time of the Accident?	Yes
6b. Was it fully functional at the time of the Accident?	Yes
6c. Did SCADA-based information (such as alarm(s), alert(s), event(s), and/or volume calculations) assist with the detection of the Accident?	No
6d. Did SCADA-based information (such as alarm(s), alert(s), event(s), and/or volume calculations) assist with the confirmation of the Accident?	No
7. Was a CPM leak detection system in place on the pipeline or facility involved in the Accident?	No
- If Yes:	
7a. Was it operating at the time of the Accident?	
7b. Was it fully functional at the time of the Accident?	
7c. Did CPM leak detection system information (such as alarm(s), alert(s), event(s), and/or volume calculations) assist with the detection of the Accident?	
7d. Did CPM leak detection system information (such as alarm(s), alert(s), event(s), and/or volume calculations) assist with the confirmation of the Accident?	
8. How was the Accident initially identified for the Operator?	Local Operating Personnel, including contractors
- If Other, Specify:	
8a. If "Controller", "Local Operating Personnel", including contractors", "Air Patrol", or "Ground Patrol by Operator or its contractor" is selected in Question 8, specify:	Operator employee
9. Was an investigation initiated into whether or not the controller(s) or control room issues were the cause of or a contributing factor to the Accident?	Yes, specify investigation result(s): (select all that apply)
- If No, the Operator did not find that an investigation of the controller(s) actions or control room issues was necessary due to: *(provide an explanation for why the operator did not investigate)*	
- If Yes, specify investigation result(s): *(select all that apply)*	
- Investigation reviewed work schedule rotations, continuous hours of service (while working for the Operator), and other factors associated with fatigue	
- Investigation did NOT review work schedule rotations, continuous hours of service (while working for the Operator), and other factors associated with fatigue	
Provide an explanation for why not:	
- Investigation identified no control room issues	Yes
- Investigation identified no controller issues	Yes
- Investigation identified incorrect controller action or controller error	
- Investigation identified that fatigue may have affected the controller(s) involved or impacted the involved controller(s) response	
- Investigation identified incorrect procedures	
- Investigation identified incorrect control room equipment operation	
- Investigation identified maintenance activities that affected control room operations, procedures, and/or controller response	
- Investigation identified areas other than those above:	
Describe:	
PART F - DRUG & ALCOHOL TESTING INFORMATION	
1. As a result of this Accident, were any Operator employees tested under the post-accident drug and alcohol testing requirements of DOT's Drug & Alcohol Testing regulations?	No
- If Yes:	
1a. Specify how many were tested:	
1b. Specify how many failed:	

2. As a result of this Accident, were any Operator contractor employees tested under the post-accident drug and alcohol testing requirements of DOT's Drug & Alcohol Testing regulations?	No
- If Yes:	
2a. Specify how many were tested:	
2b. Specify how many failed:	

PART G – APPARENT CAUSE

Select only one box from PART G in shaded column on left representing the APPARENT Cause of the Accident, and answer the questions on the right. Describe secondary, contributing or root causes of the Accident in the narrative (PART H).

Apparent Cause:	G5 - Material Failure of Pipe or Weld

G1 - Corrosion Failure - only one **sub-cause** can be picked from shaded left-hand column

Corrosion Failure – Sub-Cause:	
- If External Corrosion:	
1. Results of visual examination:	
- If Other, Describe:	
2. Type of corrosion: *(select all that apply)*	
- Galvanic	
- Atmospheric	
- Stray Current	
- Microbiological	
- Selective Seam	
- Other:	
- If Other, Describe:	
3. The type(s) of corrosion selected in Question 2 is based on the following: *(select all that apply)*	
- Field examination	
- Determined by metallurgical analysis	
- Other:	
- If Other, Describe:	
4. Was the failed item buried under the ground?	
- If Yes :	
4a. Was failed item considered to be under cathodic protection at the time of the Accident?	
If Yes - Year protection started:	
4b. Was shielding, tenting, or disbonding of coating evident at the point of the Accident?	
4c. Has one or more Cathodic Protection Survey been conducted at the point of the Accident?	
If "Yes, CP Annual Survey" – Most recent year conducted:	
If "Yes, Close Interval Survey" – Most recent year conducted:	
If "Yes, Other CP Survey" – Most recent year conducted:	
- If No:	
4d. Was the failed item externally coated or painted?	
5. Was there observable damage to the coating or paint in the vicinity of the corrosion?	
- If Internal Corrosion:	
6. Results of visual examination:	
- Other:	
7. Type of corrosion *(select all that apply)*: -	
- Corrosive Commodity	
- Water drop-out/Acid	
- Microbiological	
- Erosion	
- Other:	
- If Other, Describe:	
8. The cause(s) of corrosion selected in Question 7 is based on the following *(select all that apply)*: -	
- Field examination	
- Determined by metallurgical analysis	
- Other:	
- If Other, Describe:	
9. Location of corrosion *(select all that apply)*: -	
- Low point in pipe	
- Elbow	
- Other:	
- If Other, Describe:	
10. Was the commodity treated with corrosion inhibitors or biocides?	

11. Was the interior coated or lined with protective coating?	
12. Were cleaning/dewatering pigs (or other operations) routinely utilized?	
13. Were corrosion coupons routinely utilized?	
Complete the following if any Corrosion Failure sub-cause is selected AND the "Item Involved in Accident" (from PART C, Question 3) is Tank/Vessel.	
14. List the year of the most recent inspections:	
14a. API Std 653 Out-of-Service Inspection	
- No Out-of-Service Inspection completed	
14b. API Std 653 In-Service Inspection	
- No In-Service Inspection completed	
Complete the following if any Corrosion Failure sub-cause is selected AND the "Item Involved in Accident" (from PART C, Question 3) is Pipe or Weld.	
15. Has one or more internal inspection tool collected data at the point of the Accident?	
15a. If Yes, for each tool used, select type of internal inspection tool and indicate most recent year run: -	
- Magnetic Flux Leakage Tool	
Most recent year:	
- Ultrasonic	
Most recent year:	
- Geometry	
Most recent year:	
- Caliper	
Most recent year:	
- Crack	
Most recent year:	
- Hard Spot	
Most recent year:	
- Combination Tool	
Most recent year:	
- Transverse Field/Triaxial	
Most recent year:	
- Other	
Most recent year:	
Describe:	
16. Has one or more hydrotest or other pressure test been conducted since original construction at the point of the Accident?	
If Yes -	
Most recent year tested:	
Test pressure:	
17. Has one or more Direct Assessment been conducted on this segment?	
- If Yes, and an investigative dig was conducted at the point of the Accident::	
Most recent year conducted:	
- If Yes, but the point of the Accident was not identified as a dig site:	
Most recent year conducted:	
18. Has one or more non-destructive examination been conducted at the point of the Accident since January 1, 2002?	
18a. If Yes, for each examination conducted since January 1, 2002, select type of non-destructive examination and indicate most recent year the examination was conducted:	
- Radiography	
Most recent year conducted:	
- Guided Wave Ultrasonic	
Most recent year conducted:	
- Handheld Ultrasonic Tool	
Most recent year conducted:	
- Wet Magnetic Particle Test	
Most recent year conducted:	
- Dry Magnetic Particle Test	
Most recent year conducted:	
- Other	
Most recent year conducted:	
Describe:	
G2 - Natural Force Damage - only one **sub-cause** can be picked from shaded left-handed column	
Natural Force Damage – Sub-Cause:	
- If Earth Movement, NOT due to Heavy Rains/Floods:	
1. Specify:	
- If Other, Describe:	
- If Heavy Rains/Floods:	

2. Specify:	
- If Other, Describe:	
- If Lightning:	
3. Specify:	
- If Temperature:	
4. Specify:	
- If Other, Describe:	
- If Other Natural Force Damage:	
5. Describe:	
Complete the following if any Natural Force Damage sub-cause is selected.	
6. Were the natural forces causing the Accident generated in conjunction with an extreme weather event?	
6a. If Yes, specify: *(select all that apply)*	
- Hurricane	
- Tropical Storm	
- Tornado	
- Other	
- If Other, Describe:	
G3 - Excavation Damage - only one **sub-cause** can be picked from shaded left-hand column	
Excavation Damage – Sub-Cause:	
- If Previous Damage due to Excavation Activity: Complete Questions 1-5 ONLY IF the "Item Involved in Accident" (from PART C, Question 3) is Pipe or Weld.	
1. Has one or more internal inspection tool collected data at the point of the Accident?	
1a. If Yes, for each tool used, select type of internal inspection tool and indicate most recent year run: -	
- Magnetic Flux Leakage	
Most recent year conducted:	
- Ultrasonic	
Most recent year conducted:	
- Geometry	
Most recent year conducted:	
- Caliper	
Most recent year conducted:	
- Crack	
Most recent year conducted:	
- Hard Spot	
Most recent year conducted:	
- Combination Tool	
Most recent year conducted:	
- Transverse Field/Triaxial	
Most recent year conducted:	
- Other	
Most recent year conducted:	
Describe:	
2. Do you have reason to believe that the internal inspection was completed BEFORE the damage was sustained?	
3. Has one or more hydrotest or other pressure test been conducted since original construction at the point of the Accident?	
- If Yes:	
Most recent year tested:	
Test pressure (psig):	
4. Has one or more Direct Assessment been conducted on the pipeline segment?	
- If Yes, and an investigative dig was conducted at the point of the Accident:	
Most recent year conducted:	
- If Yes, but the point of the Accident was not identified as a dig site:	
Most recent year conducted:	
5. Has one or more non-destructive examination been conducted at the point of the Accident since January 1, 2002?	
5a. If Yes, for each examination, conducted since January 1, 2002, select type of non-destructive examination and indicate most recent year the examination was conducted:	
- Radiography	
Most recent year conducted:	
- Guided Wave Ultrasonic	
Most recent year conducted:	
- Handheld Ultrasonic Tool	
Most recent year conducted:	

- Wet Magnetic Particle Test	
Most recent year conducted:	
- Dry Magnetic Particle Test	
Most recent year conducted:	
- Other	
Most recent year conducted:	
Describe:	
Complete the following if Excavation Damage by Third Party is selected as the sub-cause.	
6. Did the operator get prior notification of the excavation activity?	
6a. If Yes, Notification received from: *(select all that apply)* -	
- One-Call System	
- Excavator	
- Contractor	
- Landowner	
Complete the following mandatory CGA-DIRT Program questions if any Excavation Damage sub-cause is selected.	
7. Do you want PHMSA to upload the following information to CGA-DIRT (www.cga-dirt.com)?	
8. Right-of-Way where event occurred: *(select all that apply)* -	
- Public	
- If "Public", Specify:	
- Private	
- If "Private", Specify:	
- Pipeline Property/Easement	
- Power/Transmission Line	
- Railroad	
- Dedicated Public Utility Easement	
- Federal Land	
- Data not collected	
- Unknown/Other	
9. Type of excavator:	
10. Type of excavation equipment:	
11. Type of work performed:	
12. Was the One-Call Center notified?	
12a. If Yes, specify ticket number:	
12b. If this is a State where more than a single One-Call Center exists, list the name of the One-Call Center notified:	
13. Type of Locator:	
14. Were facility locate marks visible in the area of excavation?	
15. Were facilities marked correctly?	
16. Did the damage cause an interruption in service?	
16a. If Yes, specify duration of the interruption (hours)	
17. Description of the CGA-DIRT Root Cause *(select only the one predominant first level CGA-DIRT Root Cause and then, where available as a choice, the one predominant second level CGA-DIRT Root Cause as well):*	
Root Cause:	
- If One-Call Notification Practices Not Sufficient, specify:	
- If Locating Practices Not Sufficient, specify:	
- If Excavation Practices Not Sufficient, specify:	
- If Other/None of the Above, explain:	
G4 - Other Outside Force Damage - *only one **sub-cause** can be selected from the shaded left-hand column*	
Other Outside Force Damage – Sub-Cause:	
- If Damage by Car, Truck, or Other Motorized Vehicle/Equipment NOT Engaged in Excavation:	
1. Vehicle/Equipment operated by:	
- If Damage by Boats, Barges, Drilling Rigs, or Other Maritime Equipment or Vessels Set Adrift or Which Have Otherwise Lost Their Mooring:	
2. Select one or more of the following IF an extreme weather event was a factor:	
- Hurricane	
- Tropical Storm	
- Tornado	
- Heavy Rains/Flood	
- Other	
- If Other, Describe:	
- If Previous Mechanical Damage NOT Related to Excavation: Complete Questions 3-7 ONLY IF the "Item Involved in Accident" (from PART C, Question 3) is Pipe or Weld.	
3. Has one or more internal inspection tool collected data at the point of the Accident?	
3a. If Yes, for each tool used, select type of internal inspection tool and indicate most recent year run:	

- Magnetic Flux Leakage	
Most recent year conducted:	
- Ultrasonic	
Most recent year conducted:	
- Geometry	
Most recent year conducted:	
- Caliper	
Most recent year conducted:	
- Crack	
Most recent year conducted:	
- Hard Spot	
Most recent year conducted:	
- Combination Tool	
Most recent year conducted:	
- Transverse Field/Triaxial	
Most recent year conducted:	
- Other	
Most recent year conducted:	
Describe:	
4. Do you have reason to believe that the internal inspection was completed BEFORE the damage was sustained?	
5. Has one or more hydrotest or other pressure test been conducted since original construction at the point of the Accident?	
- If Yes:	
Most recent year tested:	
Test pressure (psig):	
6. Has one or more Direct Assessment been conducted on the pipeline segment?	
- If Yes, and an investigative dig was conducted at the point of the Accident:	
Most recent year conducted:	
- If Yes, but the point of the Accident was not identified as a dig site:	
Most recent year conducted:	
7. Has one or more non-destructive examination been conducted at the point of the Accident since January 1, 2002?	
7a. If Yes, for each examination conducted since January 1, 2002, select type of non-destructive examination and indicate most recent year the examination was conducted:	
- Radiography	
Most recent year conducted:	
- Guided Wave Ultrasonic	
Most recent year conducted:	
- Handheld Ultrasonic Tool	
Most recent year conducted:	
- Wet Magnetic Particle Test	
Most recent year conducted:	
- Dry Magnetic Particle Test	
Most recent year conducted:	
- Other	
Most recent year conducted:	
Describe:	
- If Intentional Damage:	
8. Specify:	
- If Other, Describe:	
- If Other Outside Force Damage:	
9. Describe:	

G5 - Material Failure of Pipe or Weld - only one **sub-cause** can be selected from the shaded left-hand column

Use this section to report material failures ONLY IF the "Item Involved in Accident" (from PART C, Question 3) is "Pipe" or "Weld."

Material Failure of Pipe or Weld – Sub-Cause:	Construction-, Installation-, or Fabrication-related
1. The sub-cause shown above is based on the following: *(select all that apply)*	
- Field Examination	Yes
- Determined by Metallurgical Analysis	
- Other Analysis	
- If "Other Analysis", Describe:	
- Sub-cause is Tentative or Suspected; Still Under Investigation (Supplemental Report required)	
- If Construction, Installation, or Fabrication-related:	
2. List contributing factors: *(select all that apply)*	

- Fatigue or Vibration-related	
Specify:	
- If Other, Describe:	
- Mechanical Stress:	Yes
- Other	
- If Other, Describe:	
- If Environmental Cracking-related:	
3. Specify:	
- If Other - Describe:	
Complete the following if any Material Failure of Pipe or Weld sub-cause is selected.	
4. Additional factors: (*select all that apply*):	
- Dent	
- Gouge	
- Pipe Bend	
- Arc Burn	
- Crack	Yes
- Lack of Fusion	
- Lamination	
- Buckle	
- Wrinkle	
- Misalignment	
- Burnt Steel	
- Other:	
- If Other, Describe:	
5. Has one or more internal inspection tool collected data at the point of the Accident?	No
5a. If Yes, for each tool used, select type of internal inspection tool and indicate most recent year run:	
- Magnetic Flux Leakage	
Most recent year run:	
- Ultrasonic	
Most recent year run:	
- Geometry	
Most recent year run:	
- Caliper	
Most recent year run:	
- Crack	
Most recent year run:	
- Hard Spot	
Most recent year run:	
- Combination Tool	
Most recent year run:	
- Transverse Field/Triaxial	
Most recent year run:	
- Other	
Most recent year run:	
Describe:	
6. Has one or more hydrotest or other pressure test been conducted since original construction at the point of the Accident?	No
- If Yes:	
Most recent year tested:	
Test pressure (psig):	
7. Has one or more Direct Assessment been conducted on the pipeline segment?	No
- If Yes, and an investigative dig was conducted at the point of the Accident -	
Most recent year conducted:	
- If Yes, but the point of the Accident was not identified as a dig site -	
Most recent year conducted:	
8. Has one or more non-destructive examination(s) been conducted at the point of the Accident since January 1, 2002?	No
8a. If Yes, for each examination conducted since January 1, 2002, select type of non-destructive examination and indicate most recent year the examination was conducted: -	
- Radiography	
Most recent year conducted:	
- Guided Wave Ultrasonic	
Most recent year conducted:	
- Handheld Ultrasonic Tool	
Most recent year conducted:	
- Wet Magnetic Particle Test	
Most recent year conducted:	

- Dry Magnetic Particle Test	
Most recent year conducted:	
- Other	
Most recent year conducted:	
Describe:	
G6 – Equipment Failure - only one **sub-cause** can be selected from the shaded left-hand column	
Equipment Failure – Sub-Cause:	
- If Malfunction of Control/Relief Equipment:	
1. Specify: *(select all that apply)* -	
- Control Valve	
- Instrumentation	
- SCADA	
- Communications	
- Block Valve	
- Check Valve	
- Relief Valve	
- Power Failure	
- Stopple/Control Fitting	
- ESD System Failure	
- Other	
- If Other – Describe:	
- If Pump or Pump-related Equipment:	
2. Specify:	
- If Other – Describe:	
- If Threaded Connection/Coupling Failure:	
3. Specify:	
- If Other – Describe:	
- If Non-threaded Connection Failure:	
4. Specify:	
- If Other – Describe:	
- If Other Equipment Failure:	
5. Describe:	
Complete the following if any Equipment Failure sub-cause is selected.	
6. Additional factors that contributed to the equipment failure: *(select all that apply)*	
- Excessive vibration	
- Overpressurization	
- No support or loss of support	
- Manufacturing defect	
- Loss of electricity	
- Improper installation	
- Mismatched items (different manufacturer for tubing and tubing fittings)	
- Dissimilar metals	
- Breakdown of soft goods due to compatibility issues with transported commodity	
- Valve vault or valve can contributed to the release	
- Alarm/status failure	
- Misalignment	
- Thermal stress	
- Other	
- If Other, Describe:	
G7 - Incorrect Operation - only one **sub-cause** can be selected from the shaded left-hand column	
Incorrect Operation – Sub-Cause:	
- If Tank, Vessel, or Sump/Separator Allowed or Caused to Overfill or Overflow	
1. Specify:	
- If Other, Describe:	
- If Other Incorrect Operation	
2. Describe:	
Complete the following if any Incorrect Operation sub-cause is selected.	

3. Was this Accident related to *(select all that apply)*: -	
- Inadequate procedure	
- No procedure established	
- Failure to follow procedure	
- Other:	
- If Other, Describe:	
4. What category type was the activity that caused the Accident?	
5. Was the task(s) that led to the Accident identified as a covered task in your Operator Qualification Program?	
5a. If Yes, were the individuals performing the task(s) qualified for the task(s)?	

G8 - Other Accident Cause - only one **sub-cause** can be selected from the shaded left-hand column

Other Accident Cause – Sub-Cause:	
- If Miscellaneous:	
1. Describe:	
- If Unknown:	
2. Specify:	

PART H - NARRATIVE DESCRIPTION OF THE ACCIDENT

On March 16, 2019 at 9:49 AM CDT, approximately 72 gallons of crude oil was discovered in the Tank 21 Pad Area by field personnel performing routine rounds at the Superior Terminal. The tank line was out of service at the time the release was discovered.

The tank line was excavated and NDE was performed, and a crack was discovered in the upstream weld of the below grade slip on the 48" flange. A pressure containing sleeve was welded over the crack and the line was placed back into service. Approximately 130 cubic yards of contaminated soil was disposed of at an approved site.

PART I - PREPARER AND AUTHORIZED SIGNATURE

Preparer's Name	[redacted]
Preparer's Title	Sr Compliance Analyst
Preparer's Telephone Number	[redacted]
Preparer's E-mail Address	[redacted]
Preparer's Facsimile Number	
Authorized Signer Name	[redacted]
Authorized Signer Title	Supervisor US Pipeline Compliance
Authorized Signer Telephone Number	[redacted]
Authorized Signer Email	[redacted]
Date	04/11/2019

NOTICE: This report is required by 49 CFR Part 195. Failure to report can result in a civil penalty not to exceed $100,000 for each violation for each day that such violation persists except that the maximum civil penalty shall not exceed $1,000,000 as provided in 49 USC 60122.	OMB NO: 2137-0047 EXPIRATION DATE: 8/31/2020

U.S Department of Transportation Pipeline and Hazardous Materials Safety Administration	**Original Report Date:**	05/01/2019
	No.	20190144 - 32056 ---------- (DOT Use Only)

ACCIDENT REPORT - HAZARDOUS LIQUID PIPELINE SYSTEMS

A federal agency may not conduct or sponsor, and a person is not required to respond to, nor shall a person be subject to a penalty for failure to comply with a collection of information subject to the requirements of the Paperwork Reduction Act unless that collection of information displays a current valid OMB Control Number. The OMB Control Number for this information collection is 2137-0047. All responses to the collection of information are mandatory. Send comments regarding this burden or any other aspect of this collection of information, including suggestions for reducing the burden to: Information Collection Clearance Officer, PHMSA, Office of Pipeline Safety (PHP-30) 1200 New Jersey Avenue, SE, Washington, D.C. 20590.

INSTRUCTIONS

Important: *Please read the separate instructions for completing this form before you begin. They clarify the information requested and provide specific examples. If you do not have a copy of the instructions, you can obtain one from the PHMSA Pipeline Safety Community Web Page at http://www.phmsa.dot.gov/pipeline/library/forms.*

PART A - KEY REPORT INFORMATION

Report Type: *(select all that apply)*	**Original:**	**Supplemental:**	**Final:**
	Yes		**Yes**
Last Revision Date:			

1. Operator's OPS-issued Operator Identification Number (OPID):	11169
2. Name of Operator	ENBRIDGE ENERGY, LIMITED PARTNERSHIP
3. Address of Operator:	
3a. Street Address	5400 WESTHEIMER COURT
3b. City	HOUSTON
3c. State	Texas
3d. Zip Code	77056
4. Local time *(24-hr clock)* and date of the Accident:	04/04/2019 10:00
5. Location of Accident:	
Latitude:	[redacted]
Longitude:	[redacted]
6. National Response Center Report Number (if applicable):	1242662
7. Local time *(24-hr clock)* and date of initial telephonic report to the National Response Center (if applicable):	04/13/2019 13:11
8. Commodity released: *(select only one, based on predominant volume released)*	Crude Oil
- Specify Commodity Subtype:	
- If "Other" Subtype, Describe:	
- If Biofuel/Alternative Fuel and Commodity Subtype is Ethanol Blend, then % Ethanol Blend:	
- If Biofuel/Alternative Fuel and Commodity Subtype is Biodiesel, then Biodiesel Blend e.g. B2, B20, B100	
9. Estimated volume of commodity released unintentionally (Barrels):	2.00
10. Estimated volume of intentional and/or controlled release/blowdown (Barrels):	
11. Estimated volume of commodity recovered (Barrels):	2.00
12. Were there fatalities?	No
- If Yes, specify the number in each category:	
12a. Operator employees	
12b. Contractor employees working for the Operator	
12c. Non-Operator emergency responders	
12d. Workers working on the right-of-way, but NOT associated with this Operator	
12e. General public	
12f. Total fatalities (sum of above)	
13. Were there injuries requiring inpatient hospitalization?	No
- If Yes, specify the number in each category:	
13a. Operator employees	
13b. Contractor employees working for the Operator	
13c. Non-Operator emergency responders	
13d. Workers working on the right-of-way, but NOT associated with this Operator	
13e. General public	

13f. Total injuries (sum of above)	
14. Was the pipeline/facility shut down due to the Accident?	No
- If No, Explain:	Area was isolated
- If Yes, complete Questions 14a and 14b: *(use local time, 24-hr clock)*	
14a. Local time and date of shutdown:	
14b. Local time pipeline/facility restarted:	
- Still shut down? (* Supplemental Report Required)	
15. Did the commodity ignite?	No
16. Did the commodity explode?	No
17. Number of general public evacuated:	0
18. Time sequence *(use local time, 24-hour clock)*:	
18a. Local time Operator identified Accident - effective 7- 2014 changed to "Local time Operator identified failure":	04/13/2019 12:15
18b. Local time Operator resources arrived on site:	04/04/2019 10:00
PART B - ADDITIONAL LOCATION INFORMATION	
1. Was the origin of the Accident onshore?	Yes
If Yes, Complete Questions (2-12)	
If No, Complete Questions (13-15)	
- If Onshore:	
2. State:	Wisconsin
3. Zip Code:	54880
4. City	Superior
5. County or Parish	Douglas
6. Operator-designated location:	Milepost/Valve Station
Specify:	1098
7. Pipeline/Facility name:	Superior Terminal
8. Segment name/ID:	Tank 24 Header Line
9. Was Accident on Federal land, other than the Outer Continental Shelf (OCS)?	No
10. Location of Accident:	Totally contained on Operator-controlled property
11. Area of Accident (as found):	Underground
Specify:	Exposed due to excavation
- If Other, Describe:	
Depth-of-Cover (in):	180
12. Did Accident occur in a crossing?	No
- If Yes, specify type below:	
- If Bridge crossing –	
Cased/ Uncased:	
- If Railroad crossing –	
Cased/ Uncased/ Bored/drilled	
- If Road crossing –	
Cased/ Uncased/ Bored/drilled	
- If Water crossing –	
Cased/ Uncased	
- Name of body of water, if commonly known:	
- Approx. water depth (ft) at the point of the Accident:	
- Select:	
- If Offshore:	
13. Approximate water depth (ft) at the point of the Accident:	
14. Origin of Accident:	
- In State waters - Specify:	
- State:	
- Area:	
- Block/Tract #:	
- Nearest County/Parish:	
- On the Outer Continental Shelf (OCS) - Specify:	
- Area:	
- Block #:	
15. Area of Accident:	
PART C - ADDITIONAL FACILITY INFORMATION	
1. Is the pipeline or facility:	Interstate
2. Part of system involved in Accident:	Onshore Terminal/Tank Farm Equipment and Piping
- If Onshore Breakout Tank or Storage Vessel, Including Attached Appurtenances, specify:	
3. Item involved in Accident:	Weld, including heat-affected zone
- If Pipe, specify:	
3a. Nominal diameter of pipe (in):	24

3b. Wall thickness (in):	.375
3c. SMYS (Specified Minimum Yield Strength) of pipe (psi):	35,000
3d. Pipe specification:	API 5L
3e. Pipe Seam , specify:	Longitudinal ERW - Unknown Frequency
- If Other, Describe:	
3f. Pipe manufacturer:	Uknown
3g. Year of manufacture:	Unknown
3h. Pipeline coating type at point of Accident, specify:	Coal Tar
- If Other, Describe:	
- If Weld, including heat-affected zone, specify. If Pipe Girth Weld, 3a through 3h above are required:	Pipe Girth Weld
- If Other, Describe:	
- If Valve, specify:	
- If Mainline, specify:	
- If Other, Describe:	
3i. Manufactured by:	
3j. Year of manufacture:	
- If Tank/Vessel, specify:	
- If Other - Describe:	
- If Other, describe:	
4. Year item involved in Accident was installed:	Unknown
5. Material involved in Accident:	Carbon Steel
- If Material other than Carbon Steel, specify:	
6. Type of Accident Involved:	Leak
- If Mechanical Puncture – Specify Approx. size:	
in. (axial) by	
in. (circumferential)	
- If Leak - Select Type:	Pinhole
- If Other, Describe:	
- If Rupture - Select Orientation:	
- If Other, Describe:	
Approx. size: in. (widest opening) by	
in. (length circumferentially or axially)	
- If Other – Describe:	

PART D - ADDITIONAL CONSEQUENCE INFORMATION

1. Wildlife impact:	No
1a. If Yes, specify all that apply:	
- Fish/aquatic	
- Birds	
- Terrestrial	
2. Soil contamination:	Yes
3. Long term impact assessment performed or planned:	No
4. Anticipated remediation:	Yes
4a. If Yes, specify all that apply:	
- Surface water	
- Groundwater	
- Soil	Yes
- Vegetation	
- Wildlife	
5. Water contamination:	No
5a. If Yes, specify all that apply:	
- Ocean/Seawater	
- Surface	
- Groundwater	
- Drinking water: *(Select one or both)*	
- Private Well	
- Public Water Intake	
5b. Estimated amount released in or reaching water (Barrels):	
5c. Name of body of water, if commonly known:	
6. At the location of this Accident, had the pipeline segment or facility been identified as one that "could affect" a High Consequence Area (HCA) as determined in the Operator's Integrity Management Program?	Yes
7. Did the released commodity reach or occur in one or more High Consequence Area (HCA)?	Yes
7a. If Yes, specify HCA type(s): *(Select all that apply)*	
- Commercially Navigable Waterway:	
Was this HCA identified in the "could affect" determination for this Accident site in the Operator's	

Integrity Management Program?	
- High Population Area:	
Was this HCA identified in the "could affect" determination for this Accident site in the Operator's Integrity Management Program?	
- Other Populated Area	Yes
Was this HCA identified in the "could affect" determination for this Accident site in the Operator's Integrity Management Program?	Yes
- Unusually Sensitive Area (USA) - Drinking Water	Yes
Was this HCA identified in the "could affect" determination for this Accident site in the Operator's Integrity Management Program?	Yes
- Unusually Sensitive Area (USA) - Ecological	
Was this HCA identified in the "could affect" determination for this Accident site in the Operator's Integrity Management Program?	
8. Estimated cost to Operator – effective 12-2012, changed to "Estimated Property Damage":	
8a. Estimated cost of public and non-Operator private property damage paid/reimbursed by the Operator – effective 12-2012, "paid/reimbursed by the Operator" removed	$ [redacted]
8b. Estimated cost of commodity lost	$ [redacted]
8c. Estimated cost of Operator's property damage & repairs	$ [redacted]
8d. Estimated cost of Operator's emergency response	$ [redacted]
8e. Estimated cost of Operator's environmental remediation	$ [redacted]
8f. Estimated other costs	$ [redacted]
Describe:	
8g. Estimated total costs (sum of above) – effective 12-2012, changed to "Total estimated property damage (sum of above)"	$ [redacted]

PART E - ADDITIONAL OPERATING INFORMATION

1. Estimated pressure at the point and time of the Accident (psig):	29.00
2. Maximum Operating Pressure (MOP) at the point and time of the Accident (psig):	275.00
3. Describe the pressure on the system or facility relating to the Accident (psig):	Pressure did not exceed MOP
4. Not including pressure reductions required by PHMSA regulations (such as for repairs and pipe movement), was the system or facility relating to the Accident operating under an established pressure restriction with pressure limits below those normally allowed by the MOP?	No
- If Yes, Complete 4.a and 4.b below:	
4a. Did the pressure exceed this established pressure restriction?	
4b. Was this pressure restriction mandated by PHMSA or the State?	
5. Was "Onshore Pipeline, Including Valve Sites" OR "Offshore Pipeline, Including Riser and Riser Bend" selected in PART C, Question 2?	No
- If Yes - (*Complete 5a. – 5f below)* effective 12-2012, changed to *"(Complete 5.a – 5.e below)"*	
5a. Type of upstream valve used to initially isolate release source:	
5b. Type of downstream valve used to initially isolate release source:	
5c. Length of segment isolated between valves (ft):	
5d. Is the pipeline configured to accommodate internal inspection tools?	
- If No, Which physical features limit tool accommodation? (*select all that apply)*	
- Changes in line pipe diameter	
- Presence of unsuitable mainline valves	
- Tight or mitered pipe bends	
- Other passage restrictions (i.e. unbarred tee's, projecting instrumentation, etc.)	
- Extra thick pipe wall (applicable only for magnetic flux leakage internal inspection tools)	
- Other -	
- If Other, Describe:	
5e. For this pipeline, are there operational factors which significantly complicate the execution of an internal inspection tool run?	
- If Yes, Which operational factors complicate execution? (*select all that apply*)	

- Excessive debris or scale, wax, or other wall buildup	
- Low operating pressure(s)	
- Low flow or absence of flow	
- Incompatible commodity	
- Other -	
- If Other, Describe:	
5f. Function of pipeline system:	> 20% SMYS Regulated Trunkline/Transmission
6. Was a Supervisory Control and Data Acquisition (SCADA)-based system in place on the pipeline or facility involved in the Accident?	Yes
If Yes -	
6a. Was it operating at the time of the Accident?	Yes
6b. Was it fully functional at the time of the Accident?	Yes
6c. Did SCADA-based information (such as alarm(s), alert(s), event(s), and/or volume calculations) assist with the detection of the Accident?	No
6d. Did SCADA-based information (such as alarm(s), alert(s), event(s), and/or volume calculations) assist with the confirmation of the Accident?	No
7. Was a CPM leak detection system in place on the pipeline or facility involved in the Accident?	No
- If Yes:	
7a. Was it operating at the time of the Accident?	
7b. Was it fully functional at the time of the Accident?	
7c. Did CPM leak detection system information (such as alarm(s), alert(s), event(s), and/or volume calculations) assist with the detection of the Accident?	
7d. Did CPM leak detection system information (such as alarm(s), alert(s), event(s), and/or volume calculations) assist with the confirmation of the Accident?	
8. How was the Accident initially identified for the Operator?	Local Operating Personnel, including contractors
- If Other, Specify:	
8a. If "Controller", "Local Operating Personnel", including contractors", "Air Patrol", or "Ground Patrol by Operator or its contractor" is selected in Question 8, specify:	Operator employee
9. Was an investigation initiated into whether or not the controller(s) or control room issues were the cause of or a contributing factor to the Accident?	No, the Operator did not find that an investigation of the controller(s) actions or control room issues was necessary due to: (provide an explanation for why the Operator did not investigate)
- If No, the Operator did not find that an investigation of the controller(s) actions or control room issues was necessary due to: *(provide an explanation for why the operator did not investigate)*	The small amount of volume would not be detected through a tank imbalance as it would not break any thresholds.
- If Yes, specify investigation result(s): *(select all that apply)*	
- Investigation reviewed work schedule rotations, continuous hours of service (while working for the Operator), and other factors associated with fatigue	
- Investigation did NOT review work schedule rotations, continuous hours of service (while working for the Operator), and other factors associated with fatigue	
Provide an explanation for why not:	
- Investigation identified no control room issues	
- Investigation identified no controller issues	
- Investigation identified incorrect controller action or controller error	
- Investigation identified that fatigue may have affected the controller(s) involved or impacted the involved controller(s) response	
- Investigation identified incorrect procedures	
- Investigation identified incorrect control room equipment operation	
- Investigation identified maintenance activities that affected control room operations, procedures, and/or controller response	
- Investigation identified areas other than those above:	
Describe:	

PART F - DRUG & ALCOHOL TESTING INFORMATION

1. As a result of this Accident, were any Operator employees tested under the post-accident drug and alcohol testing requirements of DOT's Drug & Alcohol Testing regulations?	No
- If Yes:	
1a. Specify how many were tested:	

1b. Specify how many failed:	
2. As a result of this Accident, were any Operator contractor employees tested under the post-accident drug and alcohol testing requirements of DOT's Drug & Alcohol Testing regulations?	No
- If Yes:	
2a. Specify how many were tested:	
2b. Specify how many failed:	

PART G – APPARENT CAUSE

Select only one box from PART G in shaded column on left representing the APPARENT Cause of the Accident, and answer the questions on the right. Describe secondary, contributing or root causes of the Accident in the narrative (PART H).

Apparent Cause:	G1 - Corrosion Failure

G1 - Corrosion Failure - only one **sub-cause** can be picked from shaded left-hand column

Corrosion Failure – Sub-Cause:	Internal Corrosion
- If External Corrosion:	
1. Results of visual examination:	
- If Other, Describe:	
2. Type of corrosion: *(select all that apply)*	
- Galvanic	
- Atmospheric	
- Stray Current	
- Microbiological	
- Selective Seam	
- Other:	
- If Other, Describe:	
3. The type(s) of corrosion selected in Question 2 is based on the following: *(select all that apply)*	
- Field examination	
- Determined by metallurgical analysis	
- Other:	
- If Other, Describe:	
4. Was the failed item buried under the ground?	
- If Yes :	
4a. Was failed item considered to be under cathodic protection at the time of the Accident?	
If Yes - Year protection started:	
4b. Was shielding, tenting, or disbonding of coating evident at the point of the Accident?	
4c. Has one or more Cathodic Protection Survey been conducted at the point of the Accident?	
If "Yes, CP Annual Survey" – Most recent year conducted:	
If "Yes, Close Interval Survey" – Most recent year conducted:	
If "Yes, Other CP Survey" – Most recent year conducted:	
- If No:	
4d. Was the failed item externally coated or painted?	
5. Was there observable damage to the coating or paint in the vicinity of the corrosion?	
- If Internal Corrosion:	
6. Results of visual examination:	Not cut open
- Other:	
7. Type of corrosion *(select all that apply)*: -	
- Corrosive Commodity	
- Water drop-out/Acid	Yes
- Microbiological	
- Erosion	
- Other:	
- If Other, Describe:	
8. The cause(s) of corrosion selected in Question 7 is based on the following *(select all that apply)*: -	
- Field examination	Yes
- Determined by metallurgical analysis	
- Other:	
- If Other, Describe:	
9. Location of corrosion *(select all that apply)*: -	
- Low point in pipe	Yes
- Elbow	
- Other:	

- If Other, Describe:	
10. Was the commodity treated with corrosion inhibitors or biocides?	No
11. Was the interior coated or lined with protective coating?	No
12. Were cleaning/dewatering pigs (or other operations) routinely utilized?	Not applicable - Not mainline pipe
13. Were corrosion coupons routinely utilized?	Not applicable - Not mainline pipe
Complete the following if any Corrosion Failure sub-cause is selected AND the "Item Involved in Accident" (from PART C, Question 3) is Tank/Vessel.	
14. List the year of the most recent inspections:	
14a. API Std 653 Out-of-Service Inspection	
- No Out-of-Service Inspection completed	
14b. API Std 653 In-Service Inspection	
- No In-Service Inspection completed	
Complete the following if any Corrosion Failure sub-cause is selected AND the "Item Involved in Accident" (from PART C, Question 3) is Pipe or Weld.	
15. Has one or more internal inspection tool collected data at the point of the Accident?	No
15a. If Yes, for each tool used, select type of internal inspection tool and indicate most recent year run: -	
- Magnetic Flux Leakage Tool	
Most recent year:	
- Ultrasonic	
Most recent year:	
- Geometry	
Most recent year:	
- Caliper	
Most recent year:	
- Crack	
Most recent year:	
- Hard Spot	
Most recent year:	
- Combination Tool	
Most recent year:	
- Transverse Field/Triaxial	
Most recent year:	
- Other	
Most recent year:	
Describe:	
16. Has one or more hydrotest or other pressure test been conducted since original construction at the point of the Accident?	No
If Yes -	
Most recent year tested:	
Test pressure:	
17. Has one or more Direct Assessment been conducted on this segment?	No
- If Yes, and an investigative dig was conducted at the point of the Accident::	
Most recent year conducted:	
- If Yes, but the point of the Accident was not identified as a dig site:	
Most recent year conducted:	
18. Has one or more non-destructive examination been conducted at the point of the Accident since January 1, 2002?	No
18a. If Yes, for each examination conducted since January 1, 2002, select type of non-destructive examination and indicate most recent year the examination was conducted:	
- Radiography	
Most recent year conducted:	
- Guided Wave Ultrasonic	
Most recent year conducted:	
- Handheld Ultrasonic Tool	
Most recent year conducted:	
- Wet Magnetic Particle Test	
Most recent year conducted:	
- Dry Magnetic Particle Test	
Most recent year conducted:	
- Other	
Most recent year conducted:	
Describe:	
G2 - Natural Force Damage - only one **sub-cause** can be picked from shaded left-handed column	
Natural Force Damage – Sub-Cause:	
- If Earth Movement, NOT due to Heavy Rains/Floods:	
1. Specify:	

- If Other, Describe:	
- If Heavy Rains/Floods:	
2. Specify:	
- If Other, Describe:	
- If Lightning:	
3. Specify:	
- If Temperature:	
4. Specify:	
- If Other, Describe:	
- If Other Natural Force Damage:	
5. Describe:	
Complete the following if any Natural Force Damage sub-cause is selected.	
6. Were the natural forces causing the Accident generated in conjunction with an extreme weather event?	
6a. If Yes, specify: *(select all that apply)*	
- Hurricane	
- Tropical Storm	
- Tornado	
- Other	
- If Other, Describe:	
G3 - Excavation Damage - only one **sub-cause** can be picked from shaded left-hand column	
Excavation Damage – Sub-Cause:	
- If Previous Damage due to Excavation Activity: Complete Questions 1-5 ONLY IF the "Item Involved in Accident" (from PART C, Question 3) is Pipe or Weld.	
1. Has one or more internal inspection tool collected data at the point of the Accident?	
1a. If Yes, for each tool used, select type of internal inspection tool and indicate most recent year run: -	
- Magnetic Flux Leakage	
Most recent year conducted:	
- Ultrasonic	
Most recent year conducted:	
- Geometry	
Most recent year conducted:	
- Caliper	
Most recent year conducted:	
- Crack	
Most recent year conducted:	
- Hard Spot	
Most recent year conducted:	
- Combination Tool	
Most recent year conducted:	
- Transverse Field/Triaxial	
Most recent year conducted:	
- Other	
Most recent year conducted:	
Describe:	
2. Do you have reason to believe that the internal inspection was completed BEFORE the damage was sustained?	
3. Has one or more hydrotest or other pressure test been conducted since original construction at the point of the Accident?	
- If Yes:	
Most recent year tested:	
Test pressure (psig):	
4. Has one or more Direct Assessment been conducted on the pipeline segment?	
- If Yes, and an investigative dig was conducted at the point of the Accident:	
Most recent year conducted:	
- If Yes, but the point of the Accident was not identified as a dig site:	
Most recent year conducted:	
5. Has one or more non-destructive examination been conducted at the point of the Accident since January 1, 2002?	
5a. If Yes, for each examination, conducted since January 1, 2002, select type of non-destructive examination and indicate most recent year the examination was conducted:	
- Radiography	
Most recent year conducted:	
- Guided Wave Ultrasonic	
Most recent year conducted:	

- Handheld Ultrasonic Tool	
Most recent year conducted:	
- Wet Magnetic Particle Test	
Most recent year conducted:	
- Dry Magnetic Particle Test	
Most recent year conducted:	
- Other	
Most recent year conducted:	
Describe:	
Complete the following if Excavation Damage by Third Party is selected as the sub-cause.	
6. Did the operator get prior notification of the excavation activity?	
6a. If Yes, Notification received from: *(select all that apply)* -	
- One-Call System	
- Excavator	
- Contractor	
- Landowner	
Complete the following mandatory CGA-DIRT Program questions if any Excavation Damage sub-cause is selected.	
7. Do you want PHMSA to upload the following information to CGA-DIRT (www.cga-dirt.com)?	
8. Right-of-Way where event occurred: *(select all that apply)* -	
- Public	
- If "Public", Specify:	
- Private	
- If "Private", Specify:	
- Pipeline Property/Easement	
- Power/Transmission Line	
- Railroad	
- Dedicated Public Utility Easement	
- Federal Land	
- Data not collected	
- Unknown/Other	
9. Type of excavator:	
10. Type of excavation equipment:	
11. Type of work performed:	
12. Was the One-Call Center notified?	
12a. If Yes, specify ticket number:	
12b. If this is a State where more than a single One-Call Center exists, list the name of the One-Call Center notified:	
13. Type of Locator:	
14. Were facility locate marks visible in the area of excavation?	
15. Were facilities marked correctly?	
16. Did the damage cause an interruption in service?	
16a. If Yes, specify duration of the interruption (hours)	
17. Description of the CGA-DIRT Root Cause *(select only the one predominant first level CGA-DIRT Root Cause and then, where available as a choice, the one predominant second level CGA-DIRT Root Cause as well):*	
Root Cause:	
- If One-Call Notification Practices Not Sufficient, specify:	
- If Locating Practices Not Sufficient, specify:	
- If Excavation Practices Not Sufficient, specify:	
- If Other/None of the Above, explain:	
G4 - Other Outside Force Damage - *only one **sub-cause** can be selected from the shaded left-hand column*	
Other Outside Force Damage – Sub-Cause:	
- If Damage by Car, Truck, or Other Motorized Vehicle/Equipment NOT Engaged in Excavation:	
1. Vehicle/Equipment operated by:	
- If Damage by Boats, Barges, Drilling Rigs, or Other Maritime Equipment or Vessels Set Adrift or Which Have Otherwise Lost Their Mooring:	
2. Select one or more of the following IF an extreme weather event was a factor:	
- Hurricane	
- Tropical Storm	
- Tornado	
- Heavy Rains/Flood	
- Other	
- If Other, Describe:	
- If Previous Mechanical Damage NOT Related to Excavation: Complete Questions 3-7 ONLY IF the "Item Involved in Accident" (from PART C, Question 3) is Pipe or Weld.	
3. Has one or more internal inspection tool collected data at the point of	

the Accident?	
3a. If Yes, for each tool used, select type of internal inspection tool and indicate most recent year run:	
- Magnetic Flux Leakage	
Most recent year conducted:	
- Ultrasonic	
Most recent year conducted:	
- Geometry	
Most recent year conducted:	
- Caliper	
Most recent year conducted:	
- Crack	
Most recent year conducted:	
- Hard Spot	
Most recent year conducted:	
- Combination Tool	
Most recent year conducted:	
- Transverse Field/Triaxial	
Most recent year conducted:	
- Other	
Most recent year conducted:	
Describe:	
4. Do you have reason to believe that the internal inspection was completed BEFORE the damage was sustained?	
5. Has one or more hydrotest or other pressure test been conducted since original construction at the point of the Accident?	
- If Yes:	
Most recent year tested:	
Test pressure (psig):	
6. Has one or more Direct Assessment been conducted on the pipeline segment?	
- If Yes, and an investigative dig was conducted at the point of the Accident:	
Most recent year conducted:	
- If Yes, but the point of the Accident was not identified as a dig site:	
Most recent year conducted:	
7. Has one or more non-destructive examination been conducted at the point of the Accident since January 1, 2002?	
7a. If Yes, for each examination conducted since January 1, 2002, select type of non-destructive examination and indicate most recent year the examination was conducted:	
- Radiography	
Most recent year conducted:	
- Guided Wave Ultrasonic	
Most recent year conducted:	
- Handheld Ultrasonic Tool	
Most recent year conducted:	
- Wet Magnetic Particle Test	
Most recent year conducted:	
- Dry Magnetic Particle Test	
Most recent year conducted:	
- Other	
Most recent year conducted:	
Describe:	
- If Intentional Damage:	
8. Specify:	
- If Other, Describe:	
- If Other Outside Force Damage:	
9. Describe:	
G5 - Material Failure of Pipe or Weld - only one **sub-cause** can be selected from the shaded left-hand column	
Use this section to report material failures ONLY IF the "Item Involved in Accident" (from PART C, Question 3) is "Pipe" or "Weld."	
Material Failure of Pipe or Weld – Sub-Cause:	
1. The sub-cause shown above is based on the following: *(select all that apply)*	
- Field Examination	
- Determined by Metallurgical Analysis	
- Other Analysis	
- If "Other Analysis", Describe:	
- Sub-cause is Tentative or Suspected; Still Under Investigation (Supplemental Report required)	

- If Construction, Installation, or Fabrication-related:	
2. List contributing factors: *(select all that apply)*	
- Fatigue or Vibration-related	
Specify:	
- If Other, Describe:	
- Mechanical Stress:	
- Other	
- If Other, Describe:	
- If Environmental Cracking-related:	
3. Specify:	
- If Other - Describe:	
Complete the following if any Material Failure of Pipe or Weld sub-cause is selected.	
4. Additional factors: (*select all that apply*):	
- Dent	
- Gouge	
- Pipe Bend	
- Arc Burn	
- Crack	
- Lack of Fusion	
- Lamination	
- Buckle	
- Wrinkle	
- Misalignment	
- Burnt Steel	
- Other:	
- If Other, Describe:	
5. Has one or more internal inspection tool collected data at the point of the Accident?	
5a. If Yes, for each tool used, select type of internal inspection tool and indicate most recent year run:	
- Magnetic Flux Leakage	
Most recent year run:	
- Ultrasonic	
Most recent year run:	
- Geometry	
Most recent year run:	
- Caliper	
Most recent year run:	
- Crack	
Most recent year run:	
- Hard Spot	
Most recent year run:	
- Combination Tool	
Most recent year run:	
- Transverse Field/Triaxial	
Most recent year run:	
- Other	
Most recent year run:	
Describe:	
6. Has one or more hydrotest or other pressure test been conducted since original construction at the point of the Accident?	
- If Yes:	
Most recent year tested:	
Test pressure (psig):	
7. Has one or more Direct Assessment been conducted on the pipeline segment?	
- If Yes, and an investigative dig was conducted at the point of the Accident -	
Most recent year conducted:	
- If Yes, but the point of the Accident was not identified as a dig site -	
Most recent year conducted:	
8. Has one or more non-destructive examination(s) been conducted at the point of the Accident since January 1, 2002?	
8a. If Yes, for each examination conducted since January 1, 2002, select type of non-destructive examination and indicate most recent year the examination was conducted: -	
- Radiography	
Most recent year conducted:	
- Guided Wave Ultrasonic	
Most recent year conducted:	
- Handheld Ultrasonic Tool	
Most recent year conducted:	

- Wet Magnetic Particle Test	
Most recent year conducted:	
- Dry Magnetic Particle Test	
Most recent year conducted:	
- Other	
Most recent year conducted:	
Describe:	
G6 – Equipment Failure - only one **sub-cause** can be selected from the shaded left-hand column	
Equipment Failure – Sub-Cause:	
- If Malfunction of Control/Relief Equipment:	
1. Specify: *(select all that apply)* -	
- Control Valve	
- Instrumentation	
- SCADA	
- Communications	
- Block Valve	
- Check Valve	
- Relief Valve	
- Power Failure	
- Stopple/Control Fitting	
- ESD System Failure	
- Other	
- If Other – Describe:	
- If Pump or Pump-related Equipment:	
2. Specify:	
- If Other – Describe:	
- If Threaded Connection/Coupling Failure:	
3. Specify:	
- If Other – Describe:	
- If Non-threaded Connection Failure:	
4. Specify:	
- If Other – Describe:	
- If Other Equipment Failure:	
5. Describe:	
Complete the following if any Equipment Failure sub-cause is selected.	
6. Additional factors that contributed to the equipment failure: *(select all that apply)*	
- Excessive vibration	
- Overpressurization	
- No support or loss of support	
- Manufacturing defect	
- Loss of electricity	
- Improper installation	
- Mismatched items (different manufacturer for tubing and tubing fittings)	
- Dissimilar metals	
- Breakdown of soft goods due to compatibility issues with transported commodity	
- Valve vault or valve can contributed to the release	
- Alarm/status failure	
- Misalignment	
- Thermal stress	
- Other	
- If Other, Describe:	
G7 - Incorrect Operation - only one **sub-cause** can be selected from the shaded left-hand column	
Incorrect Operation – Sub-Cause:	
- If Tank, Vessel, or Sump/Separator Allowed or Caused to Overfill or Overflow	
1. Specify:	
- If Other, Describe:	
- If Other Incorrect Operation	

2. Describe:	
Complete the following if any Incorrect Operation sub-cause is selected.	
3. Was this Accident related to *(select all that apply)*: -	
- Inadequate procedure	
- No procedure established	
- Failure to follow procedure	
- Other:	
- If Other, Describe:	
4. What category type was the activity that caused the Accident?	
5. Was the task(s) that led to the Accident identified as a covered task in your Operator Qualification Program?	
5a. If Yes, were the individuals performing the task(s) qualified for the task(s)?	

G8 - Other Accident Cause - only one **sub-cause** can be selected from the shaded left-hand column

Other Accident Cause – **Sub-Cause:**	
- If Miscellaneous:	
1. Describe:	
- If Unknown:	
2. Specify:	

PART H - NARRATIVE DESCRIPTION OF THE ACCIDENT

On April 4, 2019 at approximately 10:00 AM CDT crude oil was discovered in an excavation near valve 221-V-2406 within the Superior Terminal (this excavation was unrelated to this incident). The location of the discovered product was in an area of a historical release site, therefore operations personnel monitored the area and installed three potholes in an effort to determine if the crude oil was from a current or historical release. On April 6, 2019 an oil/water mixture was discovered in the potholes, the Control Center was contacted and the area of concern was isolated and Pipeline Maintenance personnel began excavating to investigate the source of the release. While onsite to observe a delivery into Tank 24 on April 13, 2019 at approximately 12:15 PM CDT, field personnel observed a pinhole leak at the 6:00 position of the girth weld on a 45 degree elbow that was on the short piece of 24" piping that connected Line 6 with the Tank 24 Header Line. The NRC was notified on April 13, 2019 at 1:11 PM CDT (Report #1242662). The 48-hour NRC notification was made on April 15, 2019 at 9:16 AM CDT (Report #1242765).

After further investigation it was determined that internal corrosion caused the pinhole which led to the release of two barrels of crude oil. A leak clamp was installed over the failure. Tank 24 is currently out of service for an API 653 Inspection. This short piece of dead leg piping will be removed from the system prior to Tank 24 going back into service.

Approximately 350 cubic yards of contaminated soil will be disposed of at an approved landfill.

PART I - PREPARER AND AUTHORIZED SIGNATURE

Preparer's Name	[redacted]
Preparer's Title	Sr Compliance Analyst
Preparer's Telephone Number	[redacted]
Preparer's E-mail Address	[redacted]
Preparer's Facsimile Number	
Authorized Signer Name	[redacted]
Authorized Signer Title	Supervisor US Pipeline Compliance
Authorized Signer Telephone Number	[redacted]
Authorized Signer Email	[redacted]
Date	05/01/2019