

Crack ILI Program Summary Document

Line 05 ENO-EMA 2018 NDT UCc

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1.0 Purpose

This document serves as a checklist and summary of Crack ILI assessment results, with provisions for commentary.

2.0 Scope

This record applies to the ILI reports indicated on the front page of this document. This document will reference Pipeline Integrity (PI) procedures as part of the Fitness for Service (FfS) process defined further in Integrated Management System. Information found elsewhere within PI documentation is not to be duplicated herein.

3.0 Basic Inspection Remarks

This inspection is the third circumferential crack inspection for this section of pipeline. The most recent prior inspection was conducted in April 2017 with NDT UCc.

The minimum detection threshold for this inspection is:

- 30 mm long by 2.0 mm deep at weld
- 30 mm long by 1.0 mm deep in base metal

Tool depth tolerances are:

- ± 1.0 mm depth at 80% confidence at weld
- ± 1.0 mm depth at 80% confidence in base metal

Link to Vendor Final ILI Report

Is this a Lakehead regulated line segment?

☒ Yes
☐ No

4.0 Priority Notification for Imperative Condition

Were there any features reported meeting imperative condition?

☐ Yes
☒ No

5.0 Inspection Report Review (PI-36) and Remarks

Complete steps in PI-36, adding explanatory notes below for any data quality issues, corrective actions (if applicable), and why inspection results meet expectations.	☒ Complete

Pipeline name	Line 5
Construction year	1953
Launcher – receiver	North Straits East – Mackinaw
Length of pipeline section	4.10 mi.
Length of recorded pipeline section	21694.15 ft.
Outer diameter	20"
Minimum bend radius	5D/90°
Wall thickness range	0.500 in. – 0.812 in., predominant: 0.812 in.
Weld type	Seamless
Steel grades	API 5L X30, API 5L X52, API 5L X60, API 5L X65

During the inspection, data was recorded by all channels, covering the complete circumference and length of the pipeline. Based on the statistics and results of the data quality assessment it can be concluded that the quality of the recorded data is good, complete and has consistent amplitudes over the total inspection distance. No coupling loss was identified. The tool speed was within acceptable limits. The stated performance specifications can be achieved over the entire pipeline length and circumference.

The number of reported features between the 2017 and 2018 UCc inspections is listed below:

East Straits	2017 UCc	2018 UCc
Notch-like features	13	0
Crack-like features	0	2

As can be seen, there is a discrepancy in the number of reported features, especially in notch-like features. After investigation with NDT:

In 2018 all notch-like features have a calculated depth < 39 mils and are therefore below the reporting threshold and not reported.

The 13 notch-like features in 2017 were also below the reporting threshold. They were nevertheless reported because they were reported as crack-like features in 2014. NDT has been updating their feature classifications based on field verification results and newest knowledge in UCc data analysis.

In regards to the 2 CL features reported in 2018, there are indications in the 2017 raw data, however, it was not classified as crack-like and reported at that time. Based on newest UCc data analysis, they are now classified as crack-like features and meet reporting criteria.

DQA Issues:
NDT has stated: *"Please be aware that the UCc tool is not the best tool to detect geometric features. It has also to be mentioned that detection, discrimination and sizing of linear anomalies at geometric features is limited due to lift off of the sensor carrier"* and *"several features with a length below the reporting threshold were entered into the listing. The specified confidence level is not applicable to features with dimensions below the performance specifications and may therefore be reduced."*

Based on these statements, NDT does not have the confidence to reliably classify features located within geometric features, especially with features that are below the stated reporting threshold. NDT has reviewed their feature classifications below detection threshold and within geometric features with additional considerations for field verification results. Based on this review, NDT has issued an updated report with revised feature comment on a geometric anomaly feature (FID 8966). The comment was revised to: *verified: geometric anomaly with minor scrapes (<10% NWT)*.

6.0 ILI Fitness-for-Service Evaluation (PI-37) and Remarks

The Fitness for Service Evaluation checklist is as follows:

WI-32 Threat Integration is complete and interacting crack features are addressed in Detailed Feature Review ☒ Complete

Is this a circumferential crack ILI tool assessment? ☒ Yes ☐ No

If yes, complete steps in WI-54/PI-54, delete the rest of the template below, and describe the FfS results, mitigation selection, and conclusions below.

Only 2 unmitigated CL features were reported in this inspection.

Neither of the CL features were located within strain sites or interacting with other features.

The most severe SF is 4.35 and the shortest fatigue life is in excess of 200 years.

Based on this assessment, no features meet Consent Decree or Enbridge excavation criteria.

No pressure restrictions are required.

7.0 Excavation Selection (PI-38) and PI Listing Approval

Select features for mitigation based on PI-38 and WI-38.

Complete steps in PI-38 Mitigation Selection and PI Listing Approval, including steps of WI-38 Mitigation Selection, Crack, In-Line Inspection ☒ Complete

Ensure comments columns in the Crack ILI Assessment Sheet have appropriate entries for features to be mitigated. ☒ Complete

Any additional features meriting a detailed review due to mitigation selection process have been assessed in the Detailed Feature review document. ☒ Complete

The Crack ILI Assessment tool has generated the before and after mitigation program Fitness for Purpose graphs and they have been checked for accuracy and completeness ☒ Complete

Pressure restrictions and safe excavation pressures have been ☒ Complete

determined and entered. If required, a pressure restriction study has been completed.

The Crack ILI Assessment tool has created a Dig Selection Summary Table and has been checked for accuracy and completeness	☒ Complete
Priority Dig Total: 0 Phase 1 Dig Total: 0 Phase 2 Dig Total: ___	
Consult Crack SME if special circumstances or deviations from standard analysis methods are employed. This will usually involve writing an Engineering Assessment per PI-150, with crack SME approval.	☒ Complete
WI-15 Below Grade Appurtenances steps are followed.	☒ Complete
A crack program summary stakeholder meeting (Crack SME, PI Planning Supervisor, Dig Program and Safety Case engineers) has been held and any action items addressed. Invite crack SME to review this document.	☒ Complete

SME Approval Box: Reviewed and Approved?	☒ Yes ☐ No

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