PIPELINE INTEGRITY
CIRCUMFERENTIAL CRACK PROGRAM SUMMARY
LINE 5 WNO-WMA 2014 NDT UCC ILI

Last Update: March 1, 2016

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This report addresses all aspects related to the completion of this tool run. Contents include but are not limited to:

- A summary of the inspection details
- Immediate reported features and actions taken
- Preliminary reporting results (if available)
- Final results including final report review details and dig selection
- Summary of field results and trending
- Worst remaining feature and bias

This document is a working file that tracks learnings and status. As such, concerns that arise with quality, and changes to selection process are included in the pertinent sections and dated to provide a clear summary of the learnings and resultant actions.

ENBDNR0006324

1. INSPECTION SUMMARY

1.1. BASIC INSPECTION PROPERTIES

This inspection is the baseline comprehensive circumferential crack inspection for this section of pipe.

The minimum detection threshold for this is inspection is:

- 0.040" x 1.18" (in the base metal)
- 0.080" x 1.18" (in the weld)

2. INSPECTION RESULTS AND DIG SELECTION

2.1. IMMEDIATE REPORTED FEATURES

Were there immediate reported features? ☐ Yes ☒ No

2.2. FINAL REPORT

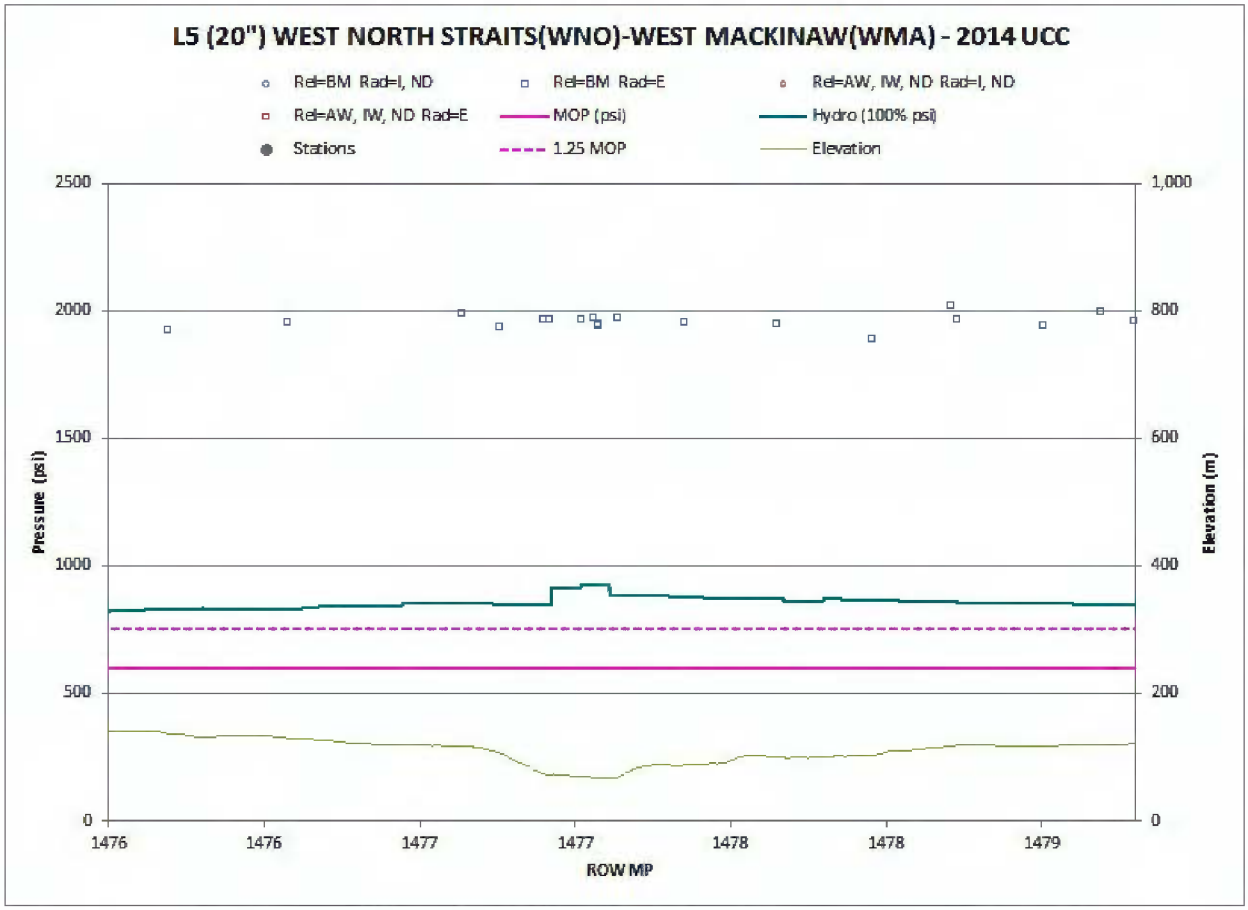


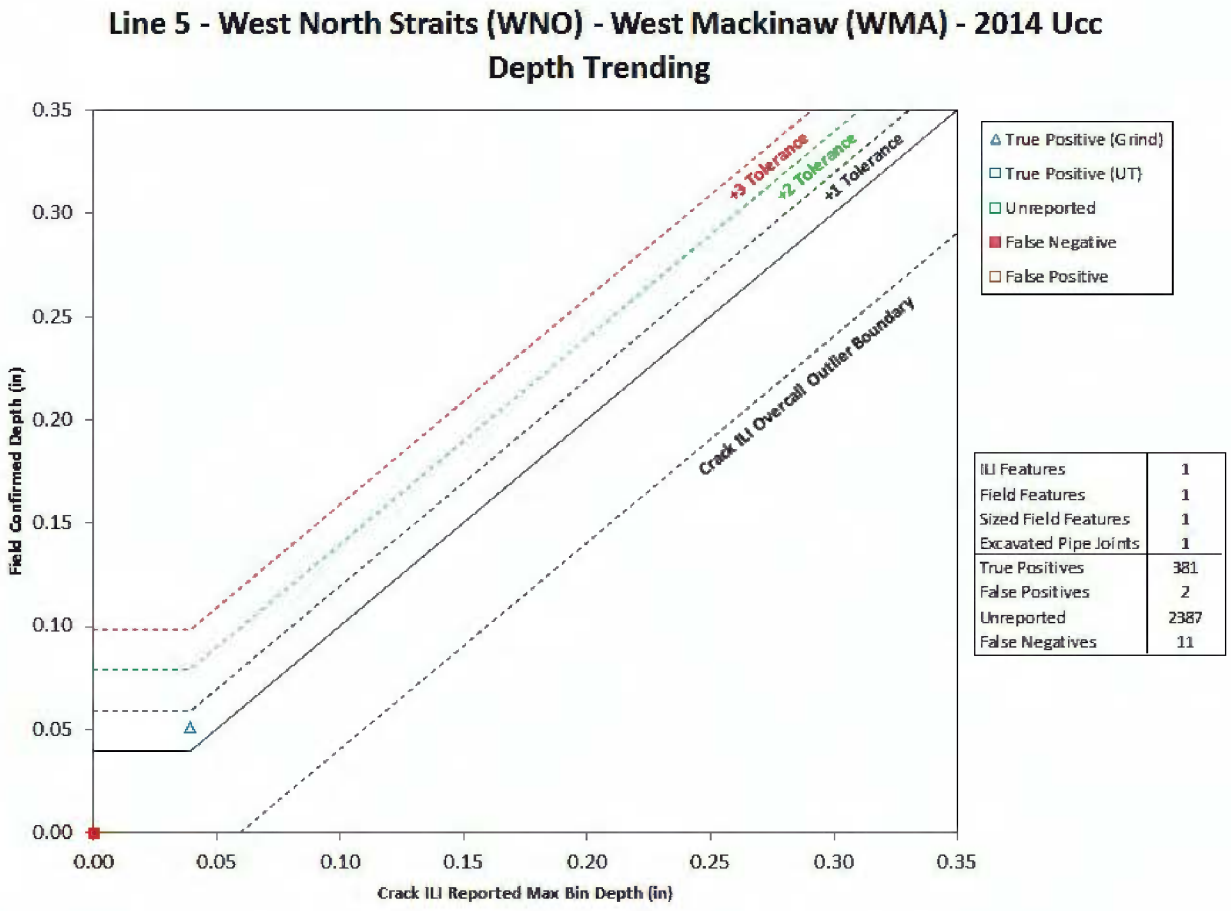
Figure 2.4.a Fitness-for-Purpose, as Reported, Under Sleeve Excluded

- 21 CL features were reported
- 1 feature on one joint issued for excavation; feature was found to be multiple circumferential tool scrapes from the machine that lowered the pipe into the ground (trending plot not provided)

Table 2.4.a Dig Selection Summary – Based on Completed and Scheduled Digs – February 29, 2016

Program Component	Applicable	Selection Criteria	Selection Code	Number of Features Selected												Inf
				CL Depth (in)				CF Depth (in)				NL Depth (in)				
				<0.040	0.040-0.080	0.080-0.120	>0.120	<0.040	0.040-0.080	0.080-0.120	>0.120	<0.040	0.040-0.080	0.080-0.120	>0.120	0
Core Program	CL,CF,NL	Depth associated with a saturated response	3.0.a	0				0				0				0
Select all that meet criteria	CL,CF,NL	P_f < MOP	3.0.b.1	0	0	0	0	0	0	0	0	0	0	0	0	0
		P_f < 1.25 MOP	3.0.b.2	0	0	0	0	0	0	0	0	0	0	0	0	0
		P_f (depth + bias) < MOP	3.0.b.3	0	0	0	0	0	0	0	0	0	0	0	0	0
		P_f (depth + bias) < 1.25 MOP	3.0.b.4	0	0	0	0	0	0	0	0	0	0	0	0	0
	CF	CF with LI >3*	3.0.c	0	0	0	0	0	0	0	0	0	0	0	0	0
Reinspection Interval Consideration	CL,CF,NL	all with fatigue life <2* reinspection interval	3.1.a	0	0	0	0	0	0	0	0	0	0	0	0	0
		all with fatigue life <10 years	3.1.b	0	0	0	0	0	0	0	0	0	0	0	0	0
Risk Mitigation Consideration	CL, CF located within 10% of pump stn dsc	within 3* of long seam and length > leak rupture boundary	3.2.a	0	0	0	0	0	0	0	0	0	0	0	0	0
		within pipe body and length > leak rupture boundary	3.2.b	0	0	0	0	0	0	0	0	0	0	0	0	0
		within 3* of long seam and length <= leak rupture boundary	3.2.c	0	0	0	0	0	0	0	0	0	0	0	0	0
		within pipe body and length <= leak rupture boundary	3.2.d	0	0	0	0	0	0	0	0	0	0	0	0	0
Selection considers results from Mainline Risk Assessment	CL,CF,NL	Radial position of feature not-determinable	3.2.e.1	0	0	0	0	0	0	0	0	0	0	0	0	0
		Internal / External Feature Indication	3.2.e.2	0	0	0	0	0	0	0	0	0	0	0	0	0
	CL,NL	High Density of Crack Features (on the Joint)	3.2.f.1	0	0	0	0	0	0	0	0	0	0	0	0	0
	CL,CF,NL	High Density of Crack Features (per mile)	3.2.f.2	0	0	0	0	0	0	0	0	0	0	0	0	0
		Unique Crack Features	3.2.g	0	0	0	0	0	0	0	0	0	0	0	0	0
		No Reported Depth	3.2.h	0				0				0				0
Threat Integration	CL,CF,NL	Dent with Cracking	3.1.a	0	0	0	0	0	0	0	0	0	0	0	0	0
	CL,CF,NL	Dent with Metal Loss	3.1.b	0	0	0	0	0	0	0	0	0	0	0	0	0
ILI Validation	CL,CF,NL, ML, IL, ND	Associated with secondary characteristics to the feature	3.3.a	0	0	0	0	0	0	0	0	0	0	0	0	0
		Additional Features on Target Joint	3.3.b	0	0	0	0	0	0	0	0	0	0	0	0	0
ILI Validation	CL,CF,NL, ML, IL, ND	Other crack Features of Interest	3.9	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Feature Population Selected				0	0	0	0	0	0	0	0	0	0	0	0	0
Total Feature Mitigated (as of February 29, 2016)				0												
Tool Performance Validation	CL, CF, NL	Target number of features to achieve 80% confidence level		0												
		Achieved confidence level (as of Date) (%)		<80%												

3. TRENDING


Line 5 - West North Straits (WNO) - West Mackinaw (WMA) - 2014 Ucc
Depth Trending
Field Confirmed Depth (in)
Crack ILI Reported Max Bin Depth (in)
0.00
0.05
0.10
0.15
0.20
0.25
0.30
0.35
+3 Tolerance
+2 Tolerance
+1 Tolerance
Crack ILI Overcall Outlier Boundary
True Positive (Grind)
True Positive (UT)
Unreported
False Negative
False Positive
ILI Features 1
Field Features 1
Sized Field Features 1
Excavated Pipe Joints 1
True Positives 381
False Positives 2
Unreported 2387
False Negatives 11

		ILI Feature Type							
		CL	NL	CF	ML	GEO	IL	LAM	False Negative
Field NDE Reported Flaw	SCC	0	0	0	0	0	0	0	0
	Crack	0	0	0	0	0	0	0	0
	Hook Crack	0	0	0	0	0	0	0	0
	Stacked Features	0	0	0	0	0	0	0	0
	Dent	0	0	0	0	0	0	0	0
	Inclusion	0	0	0	0	0	0	0	0
	Metal loss	0	0	0	0	0	0	0	0
	Geometric Reflector	1	0	0	0	0	0	0	0
	False Positive	0	0	0	0	0	0	0	0
	Total	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
	POD (All)	100%	--%	--%	N/A	N/A	N/A	N/A	
		100%							
	POI	0%	--%	--%	--%				
	POS-Unity	0%	--%	--%					
	POS - Tool Tolerance	100%	--%	--%					

	CL	NL	CF	ML	GEO	IL	ND
False Positive	0	0	0	0	0	0	0
False Positive Rate (All)	0%						
False Positive Rate	0%	--%	--%	--%	--%	--%	--%

The information below was used to generate the re-assessment interval.

Depth Bin	Measurement Tolerance	Largest Outlier	**Measurement Error Selected**
<0.040"	0.040"	N/A	**0.040"**
0.040-0.080"	0.040"	N/A	**0.040"**
0.080-0.120"	0.040"	N/A	**0.040"**
>0.120"	N/A	N/A	**N/A**
False Negative	N/A	N/A	**N/A**
Unreported	N/A	N/A	**N/A**

Based on the field trending results a Phase 2 program was not required nor issued. The UCc tool will be re-run in 4 years (2018) to align with the MFL and Geometry tool runs.