

Record

Geometric ILI Summary Document

Line 5 WNO-WMA 2017 GEMINICAL

Effective Date: <5/24/2017>

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1.0 Purpose

This document will provide a summary of all aspects associated with the deformation program. Contents of this summary may include but it is not limited to:

- ILI QA/QC results and remarks
- Summary of preliminary results, as well as learnings from previous excavation program
- Summary of preliminary field results and trending (if available)
- Back to back ILI inspection comparison
- Summary of priority notification features
- Summary of pressure restrictions associated with geometric features reported by the Inspection
- Summary of geometric features meeting “Code Criteria” as per Table 3 of PI-43
- Summary of geometric features meeting “Investigative Criteria” as per Table 4 of PI-43
- Summary of geometric features identified through threat integration
- List of geometric feature selected for detail feature review
- Risk mitigation assessment data.

It is important to consider that this document is a working file that tracks learnings and/or status of the deformation program. Therefore, all changes to the selection process should be included in the corresponding sections and a clear summary of the learnings and resultant actions should be documented within this document.

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 (Offs) process defined further in Integrated Management System IMS-09.

3.0 Basic Inspection Remarks

Please indicate in this section important information regarding the inspection; contents of this sections are but not limited to:

- This is the fifth geometry inspection on the West Straits
- The last two geometric inspections were in 2016 and previously 2013; as per the PIPES ACT, the Straits will have annual corrosion and geometry inspections starting in 2016

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Table 1 Inspection Parameters

ILI inspection Parameter	Absolute units (in/mm)	Alternative
Sizing accuracy	± 0.1	± 0.5 % OD
Orientation accuracy	NG	NG
Reporting Threshold	± 0.1	± 0.5 % OD
Minimum deformation detection threshold	#.##	0.5 % OD
Circumferential sensor/arm spacing	1.26	50 sensors

- This inspection is considered to be a high resolution inspection level # (please note high resolution inspection level 1 is a circumferential spacing less than 25.4 mm (1 in), level 2 greater than or equal to 25.4 mm (1 in) and less than 50.8 mm (2 in), and level 3 greater than or equal to 76.2 mm (3 in))[1]

4.0 Inspection Report Review (PI-47) and Remarks

Complete the review of the ILI report as per guidelines of PI-47

1. Was this a degraded inspection?

☒ No
☐ Yes

If yes, summarize what caused the inspection to be degraded and identify additional actions taken to ensure a successful program.

2. Are there features meeting immediate reporting requirements not previously reported?

☒ No
☐ Yes

If yes, confirm that these features were identified and appropriate mitigation was initiated.

3. Is reported feature density what was expected?

☒ Yes

[1] Please note that the resolution levels defined is this document does not correspond to any industrial standard classification and have been defined for Enbridge internal use only.

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☐ No

If no, summarize additional actions, if required, taken to ensure a successful program

4. Do reported features align with known existing features?

☒ Yes
☐ No

If no, summarize additional actions, if required, taken to ensure a successful program

5. Based on Report Review, is the inspection acceptable for further analysis?

☒ Yes
☐ No

If no, summarize additional actions taken to ensure a successful program.

5.0 Priority Notification for Imperative Condition

Were there any features reported meeting imperative condition?

☐ Yes
☒ No

If yes, provide feature metrics and dig selection similar to Section 6.1

Were there any features not reported as imperative condition that meet the imperative condition criteria?

☐ Yes
☒ No

If yes, provide feature metrics and dig selection similar to Section 6.1

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6.0 Back to Back Inspection Comparison

No dents were reported in the 2017 or 2016 geopig inspections.

7.0 Summary of Feature Selection

7.1 SUMMARY OF FEATURES MEETING CODE CRITERIA (PI-43)

Table 2 summarizes all features meeting the code criteria as defined by PI-43.

Table 2 Features meeting code criteria

Category	Sub-Category d = depth D = Diameter	Number of Features Reported	Number of Features Issued for Excavation
Topside Dent Features	d > 6%	0	0
	D < 12", d > 0.250" D ≥ 12", 6% ≥ d ≥ 3%	0	0
	D < 12", d = 0.250" D ≥ 12", 3% > d ≥ 2%	0	0
	Associated with metal loss, cracking, or stress concentrator	0	0
Bottom Side Dent Features	Bottom of pipe dent, d > 6%	0	0
	Associated with metal loss, cracking, or stress concentrator	0	0
Dents Affecting Pipe Curvature at a Weld	D < 12", d > 0.250" D ≥ 12", d ≥ 2% Associated with girth weld	0	0
	D < 12", d > 0.250" D ≥ 12", d ≥ 2% Associated with long seam weld	0	0
Totals		0	0

7.2 SUMMARY OF FEATURES MEETING INVESTIGATIVE CRITERIA (PI-43)

Table 3 summarizes all features meeting the investigative criteria as defined by PI-43.

Table 3 Features meeting investigative criteria (PI-43)

Category	Sub-Category/Comments	Number of Features Reported	Number of Features Issued for Excavation
Other Features of Interest	Top of pipe geometric anomalies in close proximity (within 10' axial and 60° radial positions)	0	0
	Bottom of pipe dents or geometric anomalies in Close Proximity (within 5' axial and 60° radial positions)	0	0
	Multiple Apex Dent	0	0
	Other dent/geometry features of interest including buckles, wrinkles and ovalities (Ovalities excavation selection based on Minimum Allowable ID as per OMM Book 3 05-03-03)	0	0
Interacting Features Identified Through Threat Integration Processes	Dent with possible stress concentrator	0	0
Totals		0	0

7.3 TOTAL DIG SELECTION SUMMARY

Table 4 Total number of digs selected based on Code Criteria and Investigative Criteria

Criteria	Number of Features Reported	Number of Features Issued for Excavation
Code	0	0
Investigative	0	0
Totals	0	0

8.0 Features Identified Through Data Integration (PI-32)

Please include in Table 5 all features that have been identified as potential associated with secondary feature. Also, indicate which features require detail feature review. It is important to note that all features identified as requiring detail feature review should be included in the detail feature review document.

No features reported and thus none associated with secondary features.

9.0 Graphical Representation of the Integrity Status of the Line

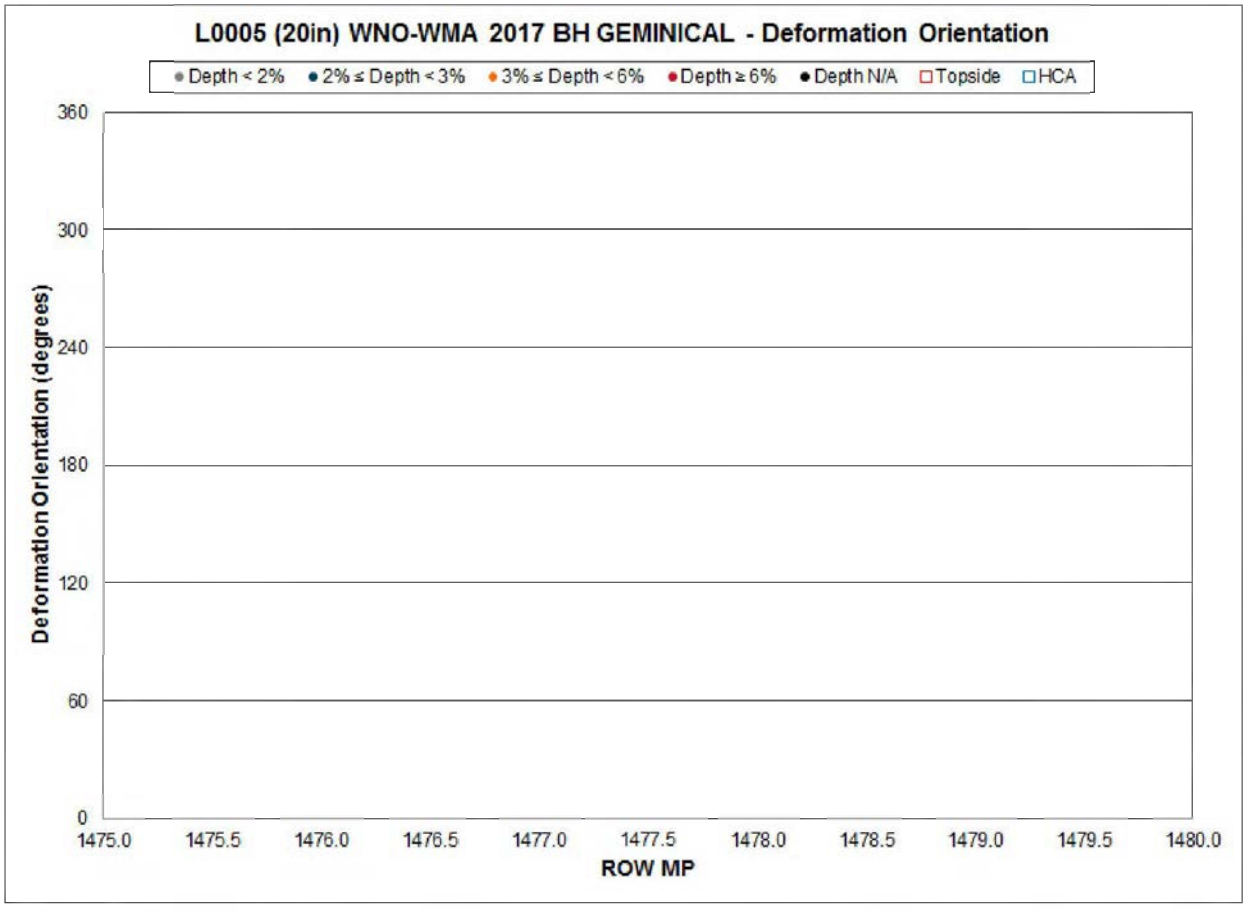


Figure 1 Orientation of all unmitigated features remaining in the pipeline system after completing the excavation program.

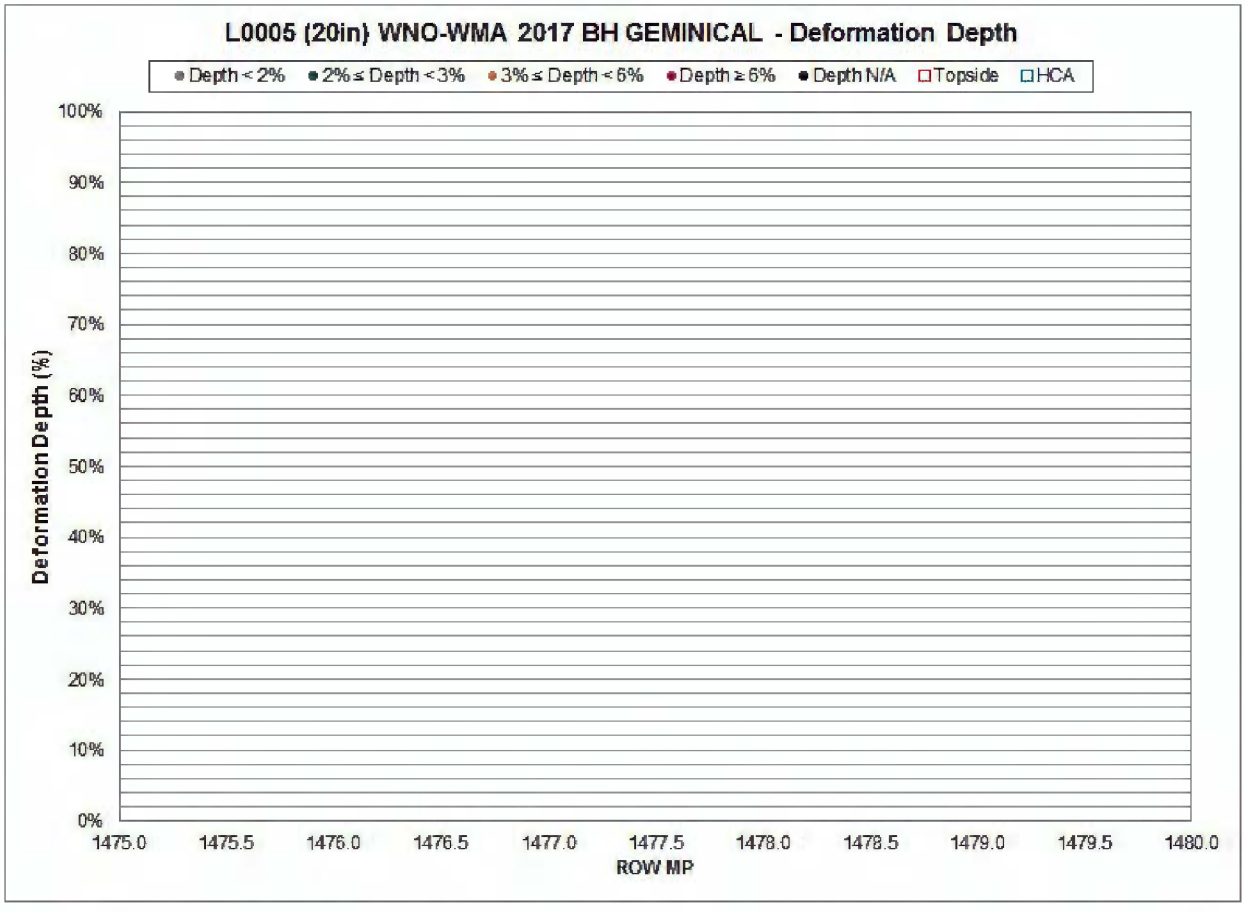


Figure 2 Depth of all unmitigated deformation features remaining in the pipeline system after completing the excavation program.

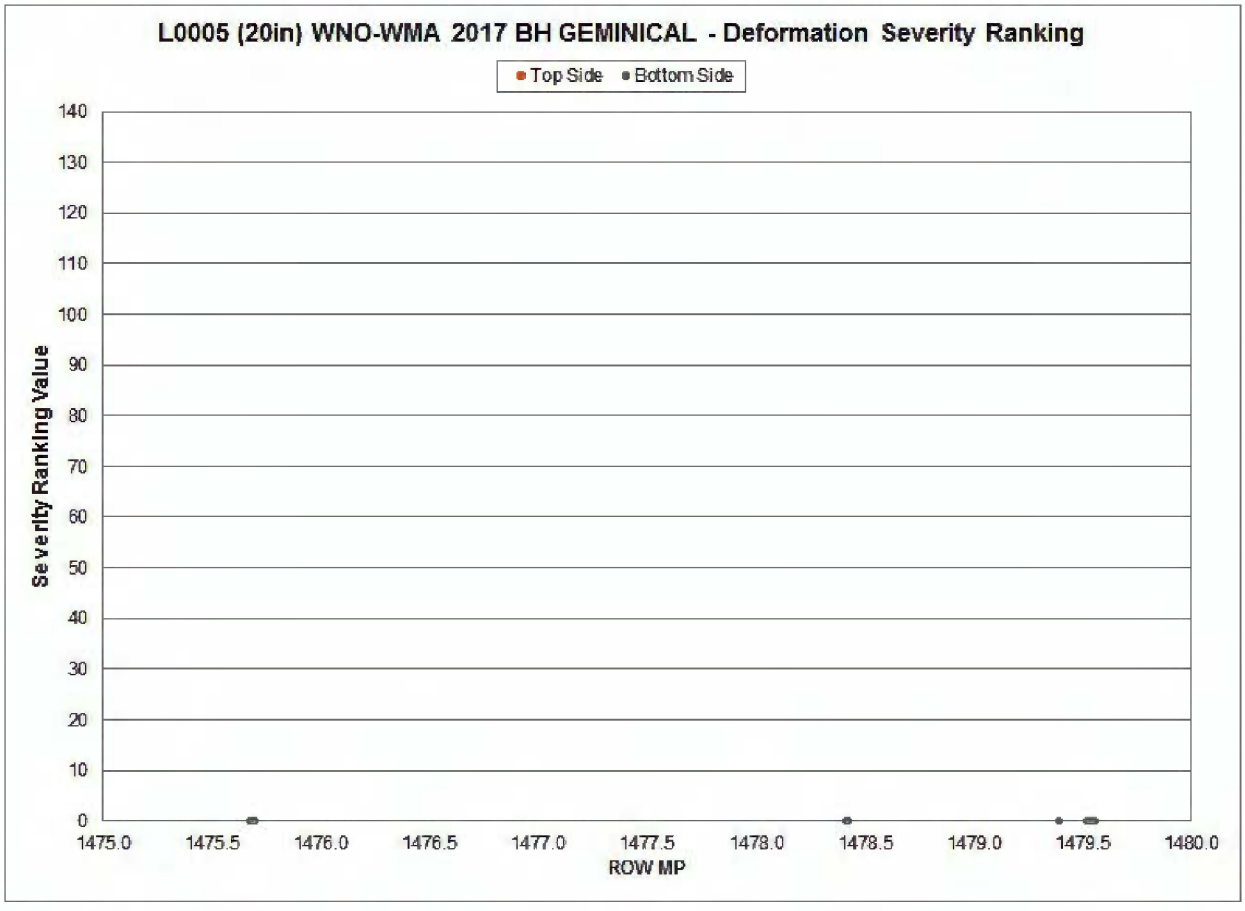


Figure 3 Severity ranking of all unmitigated deformation features remaining in the pipeline system after completing the excavation program.

Summary:

No dents reported. Two ovalities reported (GW 6080 & 6100), 7.94% and 5.64% OD respectively. Both were inspected by divers in 2014 and no ovalitites were found. See the email report from Ballard: U:\Edm\PipeInt\Excavation and Repair Records\NDT REPORTS\Line 5\06 - Straits of Mackinac (West Leg)

Both ovalities have ID's below minimum ID of 17.9" as specified in Table 2 of PI-43. The ID's are 17.445" and 17.815" respectively. However, their RSFs are above 0.9, at 1.27 and 1.60, respectively, and as such are not an issue from a FfP perspective. Both of these ovalitites are associated with IDRs and these IDRs are below the ID limits. These specific ovalities were reported in both the 2016 and 2013 BH Geopig reports.

One other IDR was reported (on bend with heavy wall, GW 8190), but the location had an inner diameter just above the acceptable ovalization limit (455.7 versus 454.7). As this IDR is not associated with any other features it does not pose an integrity threat; the IDRs are provided by the ILI vendor for operability reasons. This IDR was reported in the 2016 and 2013 Geopig inspections with minimum ID's above the minimum IDR standard. No interacting features based on TI.

No digs are recommeded based on this inspection.

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