

Kelly Well Main Line Valve Coating Assessment Report

Document No. BGS-RP-A-0012 Rev 0A

File Path: G:\Work\APA\23.3_BGS_Below Ground Station Pipework Recoating\20. Coating Defect Analysis\Kelly Well\BGS-RP-A-0012 Kelly Well MLV coating assessment Rev 0A.docx

Author	Adam Nuske <i>Adam Nuske</i>			
Report Checked by				
Report Approved by				
Changes to be approved by				
Version control	Date	Version	Nature of Change	Approved (Name) by
	14/07/2013	0A	Final	<i>Stephen Hughes</i>

Contents

1	Introduction	1
2	Method	1
3	Results.....	1
3.1	DCVG	1
3.2	Coating Inspection	2
3.3	Metal loss	2
3.4	LRUT	2
4	Discussion.....	3
5	Recommendation	4
6	Conclusion.....	4
Appendix 1	MLV Layout.	5
Appendix 2	Coating Damage Assessment Forms	6
Appendix 3	Photo Log	7
Appendix 4	LRUT.....	0



1 Introduction

Direct Current Voltage Gradient (DCVG) surveys have been conducted at each scraper station along the Amadeus Gas Pipeline (AGP) to give an indication of the condition of the coating at each site. However, the accuracy of these DCVG surveys at the scraper stations is uncertain due to the possibilities of Cathodic Protection (CP) shielding and interactions between different pipe sections.

To correlate the DCVG results to actual defects, 5 scraper stations, 4 Main Line Valves (MLVs) and 9 anchor blocks have been selected to be excavated and to undergo coating assessment. The results of these excavations and coating assessments will help determine the expected condition of the remaining stations and MLV's, and provide key information into the decision to excavate them or not.

Kelly Well is the third of the MLV sites to be excavated and assessed. This report compares the DCVG results for Kelly Well to the results of the coating assessment following excavation including Long Range Ultrasonic Testing (LRUT).

After coating assessments had been conducted, the station pipework was cleaned by abrasive blasting and recoated with Luxepoxy, a high build 2 part epoxy coating.

2 Method

In April 2012 a DCVG survey was conducted on the Kelly Well MLV. These results have been included in this report for comparison to determine if there is a correlation between the DCVG survey data and actual coating defects around the MLV.

The Kelly Well MLV has been excavated and assessed, see Appendix 1. For major defects a coating defect assessment has been conducted, completed coating defect assessment forms are in Appendix 2. Appendix 3 contains any referenced photos and the photo log.

The results of the DCVG survey and the coating defects assessments have been compared to determine if there is a correlation between the DCVG survey and actual coating defects in Section 4 Discussion.

Finally, the LRUT survey results from GL Noble are examined to determine whether there is any metal loss on the pipe within concrete anchor blocks or support blocks.

3 Results

3.1 DCVG

There was one recorded DCVG result at Kelly Well MLV. The defect is summarised in Table 1 below. As there is only the single result a plan and elevation drawing is shown in Appendix 1.

Table 1: DCVG Detected Defects

DCVG Defect Number	Section	IR
1	Kelly Well MLV	5.6 %

Dig up of the Kelly Well MLV reported the following coating defects of Table 2.

Table 2: Coating Defects Within Vicinity of DCVG Detected Defects

DCVG Defect Number	Defect ID#	Section	Photo Log / Notes
-	17	South canusa sleeve from MLV	Appendix 3, Photos 1690, 2082, 2107, 2108
MLV 9& IR	18	Yellowjacket split north of MLV	Appendix 3, Photos 0074, 2083, 2102
MLV 9% IR	19	Yellowjacket split south of MLV	Appendix 3, Photos 1690, 2085, 2105

3.2 Coating Inspection

There were coating defects found to the south canusa sleeve of the MLV and two yellowjacket splits to the north and south of the MLV. The canusa sleeve defect was found to contain moisture as a result, and corrosion was also found underneath the sleeve. The two areas of yellowjacket splitting did not show signs of moisture underneath the coating however CP product build-up was noted in the areas, therefore the DCVG likely detected these defects. Coating Damage Assessment reports were prepared to document the coating defects for each of the yellowjacket splits and the MLV coating defects, refer to Appendix 2.

The CTE coating the MLV had many blistering coating defects not reported in the coating defect assessment forms, however photos 0069, 2046, 2048, 2053 and 2054 indicate the CTE coating is failing in many areas where it has been applied.

3.3 Metal loss

Metal loss was reported underneath one area of canusa sleeve to the south of the MLV, and a significant number of areas of corrosion were found underneath tape wrapping north of the MLV. Pitting corrosion was detected in all cases, with a maximum penetration depth of 1.91mm underneath the tape wrap. The area of corrosion was probably not detected by DCVG survey which suggests that the corrosion is due to the shielding effect of the tape wrap. Coating Damage Assessment reports were prepared for each area of metal loss found, refer to Appendix 2.

3.4 LRUT

LRUT was conducted at Kelly Well MLV from January 23, 2013. Extracts from the LRUT report are presented in Appendix 4. The diagram in Appendix 4 shows the setup and location of the LRUT probe when undertaking the test. Two LRUT 'shots' were conducted from the south (Test Point 1, TP1) and north (Test Point 2, TP2) in order to examine the condition of the pipe wall underneath the MLV support blocks.

Test Point 1

Test Point 1 is the forward LRUT shot at Kelly Well MLV. The concrete support block begins 1.4m from the sensor head as shown in the schematic drawing. As shown in the results of Appendix 4, a coating interface anomaly due to a pipe clamp is detected at 1.7m, tee-piece welds are detected at



2.09m and 2.65m, the concrete block interface is detected at 3.09m and the valve body detected at 3.48m. Refer to photos 2085 and 2105, and the schematic drawing of TP1 in Appendix 4 for cross references of these LRUT results.

Test Point 2

Test Point 2 is a backward shot at Kelly Well MLV, looking south, at the north support block. The concrete support block begins 1.4m from the sensor head as shown in the results of Appendix 4 at a range of 1.52m, the T-piece welds were detected at 2.13m and 2.75m and the MLV was correctly detected at a range of 3.5m which agrees with the schematic drawing of Appendix 4 for TP2. There was no reported coating defect or corrosion evident during blasting, refer to photo 2102 for cross-reference of the detected welds and valve.

4 Discussion

Comparing the results of DCVG to the areas of dig up, it is possible to compare the results and correlate the DCVG data to areas of coating defects and corrosion. Due to the limited area of pipe which was dug up there are only few results to report.

DCVG and Coating Defects

There were three significant coating defect found at Kelly Well MLV, two were cracks in the yellowjacket, and a canusa sleeve that had failed. Traces of CP product build-up within the yellowjacket coating defects suggest that this is the likely cause of the DCVG reading at Kelly well MLV.

DCVG and Metal Loss Defects

Detected DCVG in the area of the Kelly Well MLV is likely to have resulted from the yellowjacket cracks to the north and south of the MLV. Metal loss due to shielding corrosion was found underneath the canusa sleeve south of the MLV, and tape wrap north of the MLV which was removed for the purpose of LRUT testing. DCVG measurements are not attributed to the corrosion at Kelly Well MLV, as in both cases the corrosion is identified as due to CP shielding from the coating, and the yellowjacket defects are the probable cause of DCVG readings in the area.

Coating Condition

As can be seen in photos the yellowjacket pipe coating appeared to be in poor condition. The CTE coating on the MLV has reported to have several small defects and photos indicate some signs of blistering, though not as severe as other sites.

LRUT

No anomalies were detected at the Kelly Well MLV.



5 Recommendation

LRUT reported that corrosion was not detected within the support blocks at Kelly Well MLV, however removal of the canusa sleeves and sections of tape wrap coating uncovered areas of significant pitting corrosion both north and south of the MLV concrete support blocks. The condition of the yellowjacket coating to the north and south was poor due to cracks which likely resulted in the DCVG detection in the area.

The coating was removed, the exposed area of the pipe was blasted and recoated with Luxepoxy, a high build 2 part epoxy coating. No further recommendation is therefore made.

6 Conclusion

Due to the limited area of excavation at the site, conclusions on the effectiveness of the DCVG survey cannot be drawn on the basis of this survey alone. The DCVG did however successfully detect the appearance of crack defects in the yellowjacket coating around the MLV.

No anomalies were detected using LRUT and no metal loss was detected within the concrete support blocks. The condition of the CTE coating on the MLV was poor with a number of blistering defects reported.

Appendix 1 MLV Layout.

Appendix 2 Coating Damage Assessment Forms

#1

KP:

Work Order No:

Form created by Ben Parkin Apr 09
Approved by Henry Dupal

COATING DAMAGE ASSESSMENT

Page 1

Location

Pipeline: _____
 Section: _____
 Kilometre Point: Kiloby Wile MLV
 Zone: _____
 Easting: _____
 Northing: _____

Excavation Date: 22/1/2013
 Digup Reason: CONTING REPAIR
 DCVG Measurement: NIL
 Defect Length from survey (m): _____
 CMMS Work Order No: 144 305

Surrounding Description: _____
 (Buildings, drains, etc)

Photos

☒ Has the camera date and time been set correctly?

Please remember to take both close up (no closer than 500mm) and wide photos.

Description	Time(s) photo taken or viewfinder number
Surrounding landscape	
Site facing increasing chainage	
Site facing decreasing chainage	
Pipe with coating	<u>1695</u>
Pipe with coating removed	<u>2059, 2065, 2066, 2067, 2068</u>
Pipe cleaned	<u>2092, 2093, 2094, 2095, 2096</u>
Pipe repaired	

Soil and CP

Soil Description (tick one or more from each column):

<input type="checkbox"/> Sand	<input type="checkbox"/> Fine	<input type="checkbox"/> Dusty
<input checked="" type="checkbox"/> Loam	<input type="checkbox"/> Coarse	<input type="checkbox"/> Dry
<input type="checkbox"/> Clay	<input type="checkbox"/> Gravel	<input checked="" type="checkbox"/> Damp
<input type="checkbox"/> Black	<input type="checkbox"/> Rocky	<input type="checkbox"/> Wet
<input checked="" type="checkbox"/> Red Dirt		

Pipeline Soil Cover Depth (m): 1.2

Soil pH: 5-6

Pipe To Soil Potential (V): -1.208

Soil Resistivity (Ohms): _____

Pin Spacing 1.5m

Coating

Coating Description:

- ☐ Yellow Jacket
☐ Sleeve
☒ Wrapping
☐ FBE
☐ Paint

Is there a coating defect (Y/N)?

N

Any white buildup from cathodic protection (Y/N)?

N

Any evidence of termite damage (Y/N)?

N

Any moisture inside the coating (Y/N)?

N

Any stress corrosion cracking (Y/N)? If yes, complete APA pipeline damage report

N/A

Has the coating lifted away from the pipe (Y/N)?

N

If yes, how far around the pipe has it lifted (mm)?

Sketch of coating / corrosion damage completed (Y/N)?

Coating Defect Length (mm): NIL

Coating Defect Width (mm): NIL

Coating Defect Comments:

COATING WAS IN GOOD CONDITION

#1

KP:

Work Order No:

Page 2

Metal LossIs there any deformation of the pipe
(dent, gouge or not round) (Y/N)?

✓

If Yes, Engineering must be contacted IMMEDIATELY.

Is there any metal loss (Y/N)?

✓

If there is any metal loss, complete the remaining
section of this form and contact Engineering
IMMEDIATELY.*The following measurements should indicate whether defects INTERACT*

Interaction Rules:

1. Consider each defect as a rectangular box.
2. Draw a larger box around each defect, extending length and width as per Figure 1.
3. IF BOTH larger boxes intersect with the original defect boxes, the defects interact.
4. The dimensions reported on this form are the dimensions of the defect after interaction - dimensions A and B as shown in Figure 1.

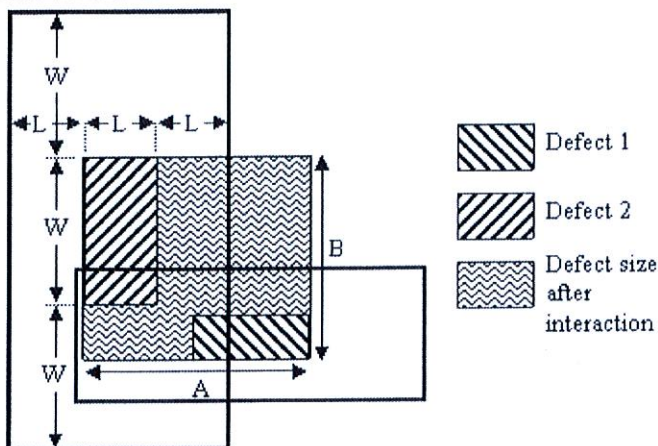


Figure 1

Maximum Depth (mm):

1.02

Wall thickness (mm):

5.9

Longitudinal dimension (A) (mm):

98 13

Circumferential dimension (B) (mm):

27

Clock Position (looking in direction of flow):

9:0

Distance from longitudinal weld (mm):

180

Distance from nearest girth weld (mm):
(if no girth weld has been found, do not excavate further)

98

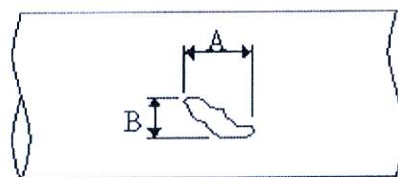


Figure 2

Repair 280 TDC

Length of Pipe Wrapped (mm): PIPE WAS PAINTED WITH LUXAROX UHPB

Other Repair Information:

#1

OLD CORROSION AREA, FIRST ASSESSED 2/5/98
DEFECT # 1

Dig Up Comments:

RIED DAMP SOIL.

Operator:

Wayne Duff

Signature:

[Signature]

Date:

20/2/2013

KP:

Work Order No:

Form created by Ben Parkin Apr 09
Approved by Henry Dupal**COATING DAMAGE ASSESSMENT**

Page 1

Location

Pipeline: _____ Excavation Date: 22/1/2013
 Section: _____ Digup Reason: COATING REPAIR
 Kilometre Point: Kelly Inlet MCV DCVG Measurement: NIL
 Zone: _____ Defect Length from survey (m): _____
 Easting: _____ CMMS Work Order No: 144305
 Northing: _____

Surrounding Description: _____

(Buildings, drains, etc)

Photos

☒ Has the camera date and time been set correctly?

Please remember to take both close up (no closer than 500mm) and wide photos.

Description	Time(s) photo taken or viewfinder number
Surrounding landscape	
Site facing increasing chainage	
Site facing decreasing chainage	
Pipe with coating	<u>1695</u>
Pipe with coating removed	<u>2059, 2065, 2066, 2067, 2068</u>
Pipe cleaned	<u>2092, 2093, 2094, 2095, 2096</u>
Pipe repaired	

Soil and CP

Soil Description (tick one or more from each column):

<input type="checkbox"/> Sand	<input type="checkbox"/> Fine	<input type="checkbox"/> Dusty
<input checked="" type="checkbox"/> Loam	<input type="checkbox"/> Coarse	<input type="checkbox"/> Dry
<input type="checkbox"/> Clay	<input type="checkbox"/> Gravel	<input checked="" type="checkbox"/> Damp
<input type="checkbox"/> Black	<input type="checkbox"/> Rocky	<input type="checkbox"/> Wet
<input checked="" type="checkbox"/> Red Dirt		

Pipeline Soil Cover Depth (m): 1.2Soil pH: 5-6Pipe To Soil Potential (V): -1.208

Soil Resistivity (Ohms): _____ Pin Spacing 1.5m

Coating

Coating Description: _____ Is there a coating defect (Y/N)? N
☐ Yellow Jacket Any white buildup from cathodic protection (Y/N)? N
☐ Sleeve Any evidence of termite damage (Y/N)? N
☒ Wrapping Any moisture inside the coating (Y/N)? N
☐ FBE Any stress corrosion cracking (Y/N)? If yes, complete APA pipeline damage report N/A
☐ Paint Has the coating lifted away from the pipe (Y/N)? N
 If yes, how far around the pipe has it lifted (mm)? _____
 Sketch of coating / corrosion damage completed (Y/N)? _____

Coating Defect Length (mm): NILCoating Defect Width (mm): NIL

Coating Defect Comments:

COATING IN AS IN GOOD ORDER.

KP:

Work Order No:

Page 2

Metal Loss

Is there any deformation of the pipe (dent, gouge or not round) (Y/N)?

N

If Yes, Engineering must be contacted IMMEDIATELY.

Is there any metal loss (Y/N)?

Y

If there is any metal loss, complete the remaining section of this form and contact Engineering IMMEDIATELY.

The following measurements should indicate whether defects INTERACT

Interaction Rules:

1. Consider each defect as a rectangular box.
2. Draw a larger box around each defect, extending length and width as per Figure 1.
3. IF BOTH larger boxes intersect with the original defect boxes, the defects interact.
4. The dimensions reported on this form are the dimensions of the defect after interaction - dimensions A and B as shown in Figure 1.

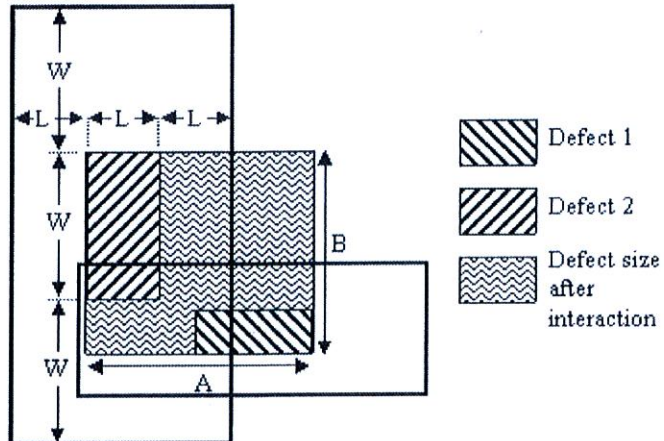


Figure 1

Maximum Depth (mm):

0.89

Wall thickness (mm):

5.9

Longitudinal dimension (A) (mm):

16

Circumferential dimension (B) (mm):

23

Clock Position (looking in direction of flow):

8:30

Distance from longitudinal weld (mm):

228

Distance from nearest girth weld (mm):
(if no girth weld has been found, do not excavate further)

343

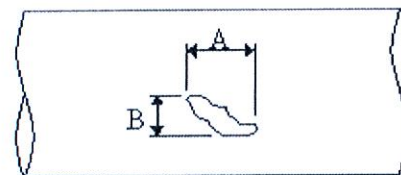


Figure 2

Repair #2 340 TOC

Length of Pipe Wrapped (mm): PIPE PAINTED WITH LUXAPOXY UHB.

Other Repair Information:

OLD CORROSION AREA, FIRST ASSESSED 2/5/98
DEFECT # 2

Dig Up Comments:

RED DAMP SOIL.

Operator:

Wayne Duff

Signature:

Duff

Date:

20/2/2013

#3

KP:

Work Order No:

Form created by Ben Parkin Apr 09
Approved by Henry Dupal

COATING DAMAGE ASSESSMENT

Page 1

Location

Pipeline: _____
 Section: _____
 Kilometre Point: K12.5/12.5 MLV
 Zone: _____
 Easting: _____
 Northing: _____

Excavation Date: 22/1/2013
 Digup Reason: COATING REPAIR
 DCVG Measurement: NIL
 Defect Length from survey (m): _____
 CMMS Work Order No: 144 305

Surrounding Description: _____
 (Buildings, drains, etc)

Photos

☒ Has the camera date and time been set correctly?

Please remember to take both close up (no closer than 500mm) and wide photos.

Description	Time(s) photo taken or viewfinder number
Surrounding landscape	
Site facing increasing chainage	
Site facing decreasing chainage	
Pipe with coating	<u>1695</u>
Pipe with coating removed	<u>2059, 2065, 2066, 2067, 2068</u>
Pipe cleaned	<u>2092, 2093, 2094, 2095, 2096</u>
Pipe repaired	

Soil and CP

Soil Description (tick one or more from each column):

<input type="checkbox"/> Sand	<input type="checkbox"/> Fine	<input type="checkbox"/> Dusty
<input checked="" type="checkbox"/> Loam	<input type="checkbox"/> Coarse	<input type="checkbox"/> Dry
<input type="checkbox"/> Clay	<input type="checkbox"/> Gravel	<input checked="" type="checkbox"/> Damp
<input type="checkbox"/> Black	<input type="checkbox"/> Rocky	<input type="checkbox"/> Wet
<input checked="" type="checkbox"/> Red Dirt		

Pipeline Soil Cover Depth (m): 1.2 Soil pH: 5-6
 Pipe To Soil Potential (V): -1.208 Soil Resistivity (Ohms): _____ Pin Spacing 1.5m

Coating

Is there a coating defect (Y/N)? N
 Coating Description: Any white buildup from cathodic protection (Y/N)? N
☐ Yellow Jacket Any evidence of termite damage (Y/N)? N
☐ Sleeve Any moisture inside the coating (Y/N)? N
☒ Wrapping Any stress corrosion cracking (Y/N)? N/A If yes, complete APA pipeline damage report
☐ FBE Has the coating lifted away from the pipe (Y/N)? N
☐ Paint If yes, how far around the pipe has it lifted (mm)? _____
 Sketch of coating / corrosion damage completed (Y/N)? _____

Coating Defect Length (mm): NIL Coating Defect Width (mm): NIL

Coating Defect Comments:

COATING WAS IN GOOD CONDITION

#3

KP:

Work Order No:

Page 2

Metal Loss

Is there any deformation of the pipe
(dent, gouge or not round) (Y/N)?

1/

If Yes, Engineering must be contacted IMMEDIATELY.

Is there any metal loss (Y/N)?

✓

If there is any metal loss, complete the remaining
section of this form and contact Engineering
IMMEDIATELY.

The following measurements should indicate whether defects INTERACT

Interaction Rules:

1. Consider each defect as a rectangular box.
2. Draw a larger box around each defect, extending length and width as per Figure 1.
3. IF BOTH larger boxes intersect with the original defect boxes, the defects interact.
4. The dimensions reported on this form are the dimensions of the defect after interaction - dimensions A and B as shown in Figure 1.

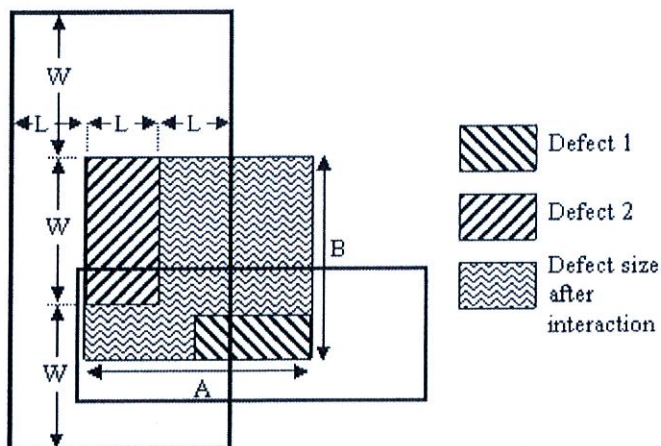


Figure 1

Maximum Depth (mm):

1.55

Wall thickness (mm):

5.9

Longitudinal dimension (A) (mm):

28

Circumferential dimension (B) (mm):

27

Clock Position (looking in direction of flow):

7:30

Distance from longitudinal weld (mm):

305

Distance from nearest girth weld (mm):
(if no girth weld has been found, do not excavate further)

123

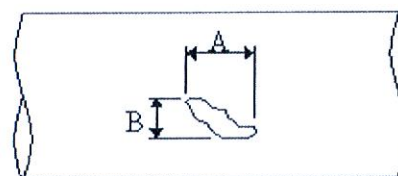


Figure 2

Repair #3 425 TDC

Length of Pipe Wrapped (mm): PIPE WAS PAINTED WITH LUXAPOXY UH13

Other Repair Information:

OLD CORROSION AREA, FIRST ASSESSED 2/5/98
DEFECT # 3.

Dig Up Comments:

RED DAMP SOIL

Operator:

Wayne Duff

Signature:

[Signature]

Date:

20/4/2013

KP:

Work Order No:

Form created by Ben Parkin Apr 09
Approved by Henry Dupal**COATING DAMAGE ASSESSMENT**

Page 1

Location

Pipeline: _____
 Section: _____
 Kilometre Point: Kelly Well MLV
 Zone: _____
 Easting: _____
 Northing: _____

Excavation Date: 22/1/2017
 Digup Reason: COATING REPAIR
 DCVG Measurement: NIL
 Defect Length from survey (m): _____
 CMMS Work Order No: 144 305

Surrounding Description: _____
 (Buildings, drains, etc)

Photos

☒ Has the camera date and time been set correctly?

Please remember to take both close up (no closer than 500mm) and wide photos.

Description	Time(s) photo taken or viewfinder number
Surrounding landscape	
Site facing increasing chainage	
Site facing decreasing chainage	
Pipe with coating	<u>1695</u>
Pipe with coating removed	<u>2099, 2065, 2066, 2067, 2068</u>
Pipe cleaned	<u>2092, 2093, 2094, 2095, 2096</u>
Pipe repaired	

Soil and CP

Soil Description (tick one or more from each column):

<input type="checkbox"/> Sand	<input type="checkbox"/> Fine	<input type="checkbox"/> Dusty
<input checked="" type="checkbox"/> Loam	<input type="checkbox"/> Coarse	<input type="checkbox"/> Dry
<input type="checkbox"/> Clay	<input type="checkbox"/> Gravel	<input checked="" type="checkbox"/> Damp
<input type="checkbox"/> Black	<input type="checkbox"/> Rocky	<input type="checkbox"/> Wet
<input checked="" type="checkbox"/> Red Dirt		

Pipeline Soil Cover Depth (m): 1.2

Soil pH: 5.6

Pipe To Soil Potential (V): -1.208

Soil Resistivity (Ohms): _____ Pin Spacing 1.5m

Coating

Coating Description:

- ☐ Yellow Jacket
☐ Sleeve
☒ Wrapping
☐ FBE
☐ Paint

Is there a coating defect (Y/N)?

N

Any white buildup from cathodic protection (Y/N)?

N

Any evidence of termite damage (Y/N)?

N

Any moisture inside the coating (Y/N)?

N

Any stress corrosion cracking (Y/N)? If yes, complete APA pipeline damage report

N/A

Has the coating lifted away from the pipe (Y/N)?

N

If yes, how far around the pipe has it lifted (mm)?

Sketch of coating / corrosion damage completed (Y/N)?

Coating Defect Length (mm): NIL

Coating Defect Width (mm): NIL

Coating Defect Comments:

COATING WAS IN GOOD CONDITION

KP:

Work Order No:

Page 2

Metal Loss

Is there any deformation of the pipe
(dent, gouge or not round) (Y/N)?

N

If Yes, Engineering must be contacted IMMEDIATELY.

Is there any metal loss (Y/N)?

Y

If there is any metal loss, complete the remaining
section of this form and contact Engineering
IMMEDIATELY.

The following measurements should indicate whether defects INTERACT

Interaction Rules:

1. Consider each defect as a rectangular box.
2. Draw a larger box around each defect, extending length and width as per Figure 1.
3. IF BOTH larger boxes intersect with the original defect boxes, the defects interact.
4. The dimensions reported on this form are the dimensions of the defect after interaction - dimensions A and B as shown in Figure 1.

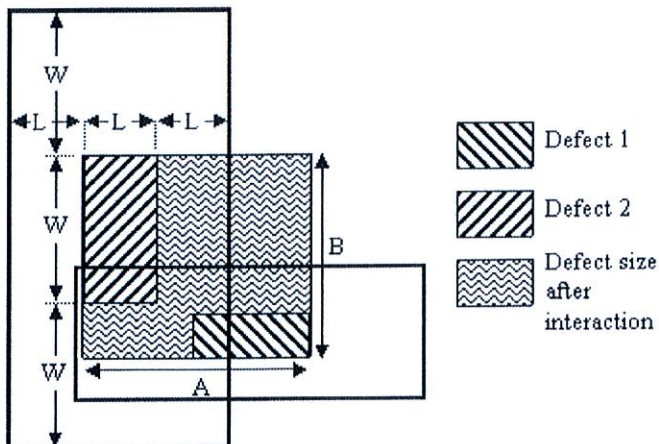


Figure 1

Maximum Depth (mm):

1.05

Wall thickness (mm):

5.9

Longitudinal dimension (A) (mm):

93

Circumferential dimension (B) (mm):

27

Clock Position (looking in direction of flow):

7:0

Distance from longitudinal weld (mm):

365

Distance from nearest girth weld (mm):

280

(if no girth weld has been found, do not excavate further)

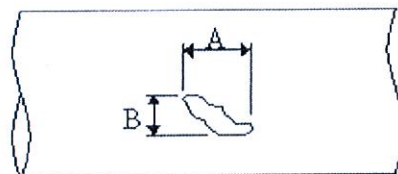


Figure 2

Repair #4 477 TDC

Length of Pipe Wrapped (mm): PIPE WAS PAINTED WITH LUXAPOXY UHB.

Other Repair Information:

OLD CORROSION AREA, FIRST ASSESSED 2/5/98.
DEFECT # 4

Dig Up Comments:

RED DAMP SOIL.

Operator:

Wayne Duff

Signature:

[Signature]

Date:

20/2/2013

#5

KP:

Work Order No:

Form created by Ben Parkin Apr 09
Approved by Henry Dupal**COATING DAMAGE ASSESSMENT**

Page 1

Location

Pipeline: _____ Excavation Date: 22/1/2013
 Section: _____ Digup Reason: COATING REPAIR
 Kilometre Point: Kelly Inlet MLV DCVG Measurement: NIL
 Zone: _____ Defect Length from survey (m): _____
 Easting: _____ CMMS Work Order No: 144 305
 Northing: _____
 Surrounding Description: _____
 (Buildings, drains, etc) _____

Photos

☒ Has the camera date and time been set correctly?

Please remember to take both close up (no closer than 500mm) and wide photos.

Description	Time(s) photo taken or viewfinder number
Surrounding landscape	
Site facing increasing chainage	
Site facing decreasing chainage	
Pipe with coating	<u>1695</u>
Pipe with coating removed	<u>2059, 2065, 2066, 2067, 2068</u>
Pipe cleaned	<u>2092, 2093, 2094, 2095, 2096</u>
Pipe repaired	

Soil and CP

Soil Description (tick one or more from each column):

<input type="checkbox"/> Sand	<input type="checkbox"/> Fine	<input type="checkbox"/> Dusty
<input checked="" type="checkbox"/> Loam	<input type="checkbox"/> Coarse	<input type="checkbox"/> Dry
<input type="checkbox"/> Clay	<input type="checkbox"/> Gravel	<input checked="" type="checkbox"/> Damp
<input type="checkbox"/> Black	<input type="checkbox"/> Rocky	<input type="checkbox"/> Wet
<input checked="" type="checkbox"/> Red Dirt		

Pipeline Soil Cover Depth (m): 1.2 Soil pH: 5-6
 Pipe To Soil Potential (V): -1.208 Soil Resistivity (Ohms): _____ Pin Spacing 1.5m

Coating

Coating Description:	Is there a coating defect (Y/N)?	<u>N</u>
<input type="checkbox"/> Yellow Jacket	Any white buildup from cathodic protection (Y/N)?	<u>N</u>
<input type="checkbox"/> Sleeve	Any evidence of termite damage (Y/N)?	<u>N</u>
<input checked="" type="checkbox"/> Wrapping	Any moisture inside the coating (Y/N)?	<u>N</u>
<input type="checkbox"/> FBE	Any stress corrosion cracking (Y/N)? If yes, complete APA pipeline damage report	<u>N/A</u>
<input type="checkbox"/> Paint	Has the coating lifted away from the pipe (Y/N)?	<u>N</u>
	If yes, how far around the pipe has it lifted (mm)?	_____
	Sketch of coating / corrosion damage completed (Y/N)?	_____

Coating Defect Length (mm): NIL Coating Defect Width (mm): NIL

Coating Defect Comments:

COATING WAS IN GOOD CONDITION

KP:

Work Order No:

Page 2

Metal Loss

Is there any deformation of the pipe (dent, gouge or not round) (Y/N)?

N

If Yes, Engineering must be contacted IMMEDIATELY.

Is there any metal loss (Y/N)?

Y

If there is any metal loss, complete the remaining section of this form and contact Engineering IMMEDIATELY.

The following measurements should indicate whether defects INTERACT

Interaction Rules:

1. Consider each defect as a rectangular box.
2. Draw a larger box around each defect, extending length and width as per Figure 1.
3. IF BOTH larger boxes intersect with the original defect boxes, the defects interact.
4. The dimensions reported on this form are the dimensions of the defect after interaction - dimensions A and B as shown in Figure 1.

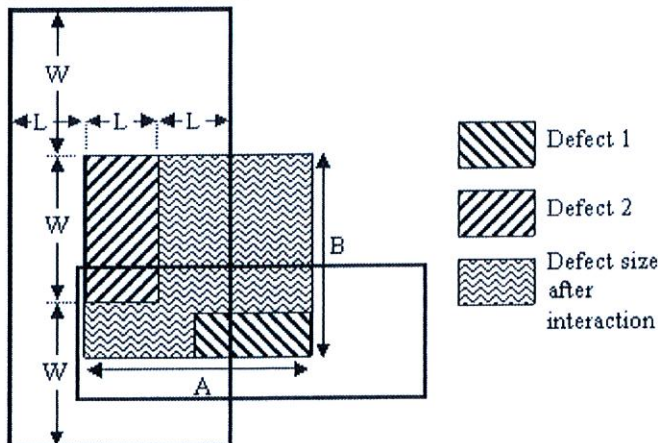


Figure 1

Maximum Depth (mm):

0.66

Wall thickness (mm):

5.9

Longitudinal dimension (A) (mm):

19

Circumferential dimension (B) (mm):

18

Clock Position (looking in direction of flow):

7:0

Distance from longitudinal weld (mm):

360

Distance from nearest girth weld (mm):
(if no girth weld has been found, do not excavate further)

170

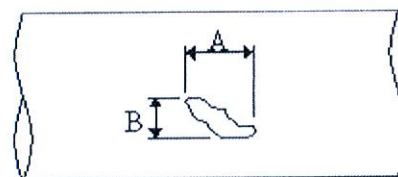


Figure 2

Repair #5 476 TDC

Length of Pipe Wrapped (mm): *PIPE WAS PAINTED WITH LUXAPOXY UHB.*

Other Repair Information:

OLD CORROSION AREA, FIRST ASSESSED 2/5/98
DEFECT # 5

Dig Up Comments:

RED DAMP SOIL.

Operator:

Wayne Duff

Signature:

[Signature]

Date:

20/2/2013

KP:

Work Order No:

Form created by Ben Parkin Apr 09
Approved by Henry Dupal**COATING DAMAGE ASSESSMENT**

Page 1

Location

Pipeline: _____ Excavation Date: 22/1/2013
 Section: _____ Digup Reason: COATING REPAIR.
 Kilometre Point: KILLY WALK MLV DCVG Measurement: NIL
 Zone: _____ Defect Length from survey (m): _____
 Easting: _____ CMMS Work Order No: 144 305
 Northing: _____

Surrounding Description:

(Buildings, drains, etc)

Photos

☐ Has the camera date and time been set correctly?

Please remember to take both close up (no closer than 500mm) and wide photos.

Description	Time(s) photo taken or viewfinder number
Surrounding landscape	
Site facing increasing chainage	
Site facing decreasing chainage	
Pipe with coating	<u>1695</u>
Pipe with coating removed	<u>2059, 2065, 2066, 2067, 2068</u>
Pipe cleaned	<u>2092, 2093, 2094, 2095, 2096</u>
Pipe repaired	

Soil and CP

Soil Description (tick one or more from each column):

<input type="checkbox"/> Sand	<input type="checkbox"/> Fine	<input type="checkbox"/> Dusty
<input checked="" type="checkbox"/> Loam	<input type="checkbox"/> Coarse	<input type="checkbox"/> Dry
<input type="checkbox"/> Clay	<input type="checkbox"/> Gravel	<input checked="" type="checkbox"/> Damp
<input type="checkbox"/> Black	<input type="checkbox"/> Rocky	<input type="checkbox"/> Wet
<input checked="" type="checkbox"/> Red Dirt		

Pipeline Soil Cover Depth (m): 1.2Soil pH: 5-6Pipe To Soil Potential (V): -1.208

Soil Resistivity (Ohms): _____ Pin Spacing 1.5m

Coating

Coating Description:

- ☐ Yellow Jacket
☐ Sleeve
☒ Wrapping
☐ FBE
☐ Paint

Is there a coating defect (Y/N)?

✓

Any white buildup from cathodic protection (Y/N)?

✓

Any evidence of termite damage (Y/N)?

✓

Any moisture inside the coating (Y/N)?

✓

Any stress corrosion cracking (Y/N)? If yes, complete APA pipeline damage report

N/A

Has the coating lifted away from the pipe (Y/N)?

✓

If yes, how far around the pipe has it lifted (mm)?

Sketch of coating / corrosion damage completed (Y/N)?

Coating Defect Length (mm): NILCoating Defect Width (mm): NIL

Coating Defect Comments:

COATING IN GOOD ORDER.

KP:

Work Order No:

Page 2

Metal LossIs there any deformation of the pipe
(dent, gouge or not round) (Y/N)?

✓

If Yes, Engineering must be contacted IMMEDIATELY.

Is there any metal loss (Y/N)?

✓

If there is any metal loss, complete the remaining
section of this form and contact Engineering
IMMEDIATELY.*The following measurements should indicate whether defects INTERACT*

Interaction Rules:

1. Consider each defect as a rectangular box.
2. Draw a larger box around each defect, extending length and width as per Figure 1.
3. IF BOTH larger boxes intersect with the original defect boxes, the defects interact.
4. The dimensions reported on this form are the dimensions of the defect after interaction - dimensions A and B as shown in Figure 1.

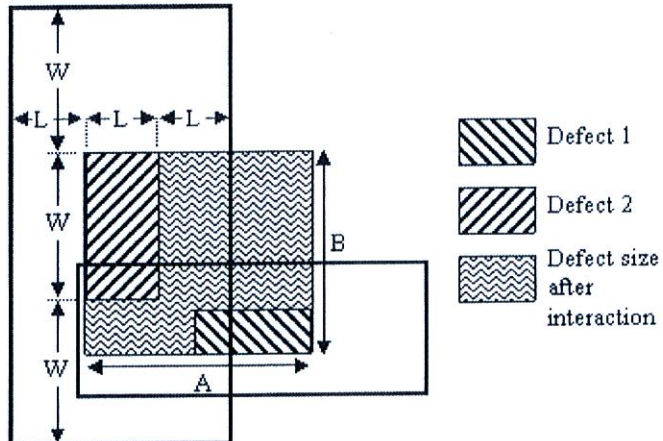


Figure 1

Maximum Depth (mm):

1.91

Wall thickness (mm):

5.9

Longitudinal dimension (A) (mm):

27

Circumferential dimension (B) (mm):

27

Clock Position (looking in direction of flow):

6:30

Distance from longitudinal weld (mm):

380

Distance from nearest girth weld (mm):
(if no girth weld has been found, do not excavate further)

94

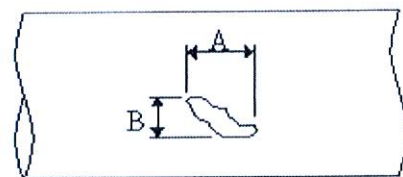


Figure 2

Repair #6 480 TOC

Length of Pipe Wrapped (mm): PIPE PAINTED WITH LUXABOX UHB

Other Repair Information:

OLD CORROSION, FIRST ASSESSED 2/5/98
DEFECT #6

Dig Up Comments:

RED DAMP SOIL.

Operator:

Wayne Duff

Signature:

[Signature]

Date: 20/2/2013

KP:

Work Order No:

Form created by Ben Parkin Apr 09
Approved by Henry Dupal**COATING DAMAGE ASSESSMENT**

Page 1

Location

Pipeline: _____
 Section: _____
 Kilometre Point: Kelly Well MLV
 Zone: _____
 Easting: _____
 Northing: _____

Excavation Date: 22/1/2013
 Digup Reason: COATING REPAIR.
 DCVG Measurement: NIL.
 Defect Length from survey (m): _____
 CMMS Work Order No: 144 305.

Surrounding Description: _____
 (Buildings, drains, etc)

Photos

☒ Has the camera date and time been set correctly?

Please remember to take both close up (no closer than 500mm) and wide photos.

Description	Time(s) photo taken or viewfinder number
Surrounding landscape	
Site facing increasing chainage	
Site facing decreasing chainage	
Pipe with coating	<u>1695.</u>
Pipe with coating removed	<u>2059, 2065, 2066, 2067, 2068</u>
Pipe cleaned	<u>2092, 2093, 2094, 2095, 2096</u>
Pipe repaired	

Soil and CP

Soil Description (tick one or more from each column):

<input type="checkbox"/> Sand	<input type="checkbox"/> Fine	<input type="checkbox"/> Dusty
<input checked="" type="checkbox"/> Loam	<input type="checkbox"/> Coarse	<input type="checkbox"/> Dry
<input type="checkbox"/> Clay	<input type="checkbox"/> Gravel	<input checked="" type="checkbox"/> Damp
<input type="checkbox"/> Black	<input type="checkbox"/> Rocky	<input type="checkbox"/> Wet
<input checked="" type="checkbox"/> Red Dirt		

Pipeline Soil Cover Depth (m): 1.2

Soil pH: 5-6

Pipe To Soil Potential (V): -1.208

Soil Resistivity (Ohms): _____ Pin Spacing 1.5m

Coating

Coating Description:

- ☐ Yellow Jacket
☐ Sleeve
☒ Wrapping
☐ FBE
☐ Paint

Is there a coating defect (Y/N)?

N

Any white buildup from cathodic protection (Y/N)?

N

Any evidence of termite damage (Y/N)?

N

Any moisture inside the coating (Y/N)?

N

Any stress corrosion cracking (Y/N)? If yes, complete APA pipeline damage report

N/A

Has the coating lifted away from the pipe (Y/N)?

N

If yes, how far around the pipe has it lifted (mm)?

Sketch of coating / corrosion damage completed (Y/N)?

Coating Defect Length (mm): NIL

Coating Defect Width (mm): NIL

Coating Defect Comments:

COATING WAS IN GOOD CONDITION. REMOVED FOR L&UT

#7

KP:

Work Order No:

Page 2

Metal Loss

Is there any deformation of the pipe
(dent, gouge or not round) (Y/N)?

N

If Yes, Engineering must be contacted IMMEDIATELY.

Is there any metal loss (Y/N)?

Y

If there is any metal loss, complete the remaining
section of this form and contact Engineering
IMMEDIATELY.

The following measurements should indicate whether defects INTERACT

Interaction Rules:

1. Consider each defect as a rectangular box.
2. Draw a larger box around each defect, extending length and width as per Figure 1.
3. IF BOTH larger boxes intersect with the original defect boxes, the defects interact.
4. The dimensions reported on this form are the dimensions of the defect after interaction - dimensions A and B as shown in Figure 1.

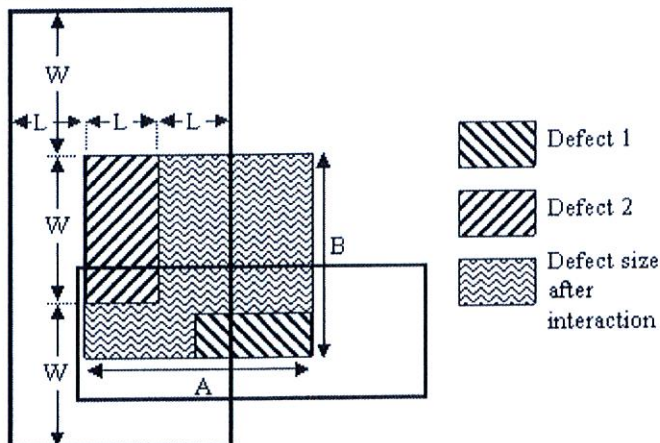


Figure 1

Maximum Depth (mm):

1.68

Wall thickness (mm):

5.9

Longitudinal dimension (A) (mm):

68

Circumferential dimension (B) (mm):

45

Clock Position (looking in direction of flow):

6:0

Distance from longitudinal weld (mm):

443

Distance from nearest girth weld (mm):
(if no girth weld has been found, do not excavate further)

227

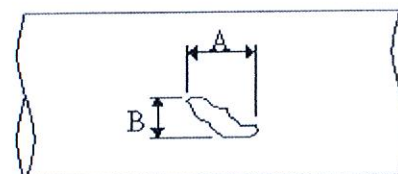


Figure 2

Repair # 7 673 TDC

Length of Pipe Wrapped (mm): PIPE PAINTED WITH LUXAPOXY UHB.

Other Repair Information:

OLD CORROSION AREA, FIRST ASSESSED 2/5/98.
DEFECT # 7

Dig Up Comments:

RED DAMP SOIL.

Operator:

Wayne Duffy

Signature:

[Signature]

Date:

20/2/2013.

KP:

Work Order No:

Form created by Ben Parkin Apr 09
Approved by Henry Dupal**COATING DAMAGE ASSESSMENT**

Page 1

Location

Pipeline: _____
 Section: _____
 Kilometre Point: Kelly Well MLV
 Zone: _____
 Easting: _____
 Northing: _____

Excavation Date: 22/1/2013
 Digup Reason: COATING REPAIR
 DCVG Measurement: NIL
 Defect Length from survey (m): _____
 CMMS Work Order No: 144 305

Surrounding Description: _____
 (Buildings, drains, etc)

Photos

☒ Has the camera date and time been set correctly?

Please remember to take both close up (no closer than 500mm) and wide photos.

Description	Time(s) photo taken or viewfinder number
Surrounding landscape	
Site facing increasing chainage	
Site facing decreasing chainage	
Pipe with coating	<u>1695</u>
Pipe with coating removed	<u>2059, 2065, 2066, 2067, 2068</u>
Pipe cleaned	<u>2092, 2093, 2094, 2095, 2096</u>
Pipe repaired	

Soil and CP

Soil Description (tick one or more from each column):

<input type="checkbox"/> Sand	<input type="checkbox"/> Fine	<input type="checkbox"/> Dusty
<input checked="" type="checkbox"/> Loam	<input type="checkbox"/> Coarse	<input type="checkbox"/> Dry
<input type="checkbox"/> Clay	<input type="checkbox"/> Gravel	<input checked="" type="checkbox"/> Damp
<input type="checkbox"/> Black	<input type="checkbox"/> Rocky	<input type="checkbox"/> Wet
<input checked="" type="checkbox"/> Red Dirt		

Pipeline Soil Cover Depth (m): 1.2

Soil pH: 5-6

Pipe To Soil Potential (V): -1.208

Soil Resistivity (Ohms): _____ Pin Spacing 1.5m

Coating

Coating Description:

- ☐ Yellow Jacket
☐ Sleeve
☒ Wrapping
☐ FBE
☐ Paint

Is there a coating defect (Y/N)?

N

Any white buildup from cathodic protection (Y/N)?

N

Any evidence of termite damage (Y/N)?

N

Any moisture inside the coating (Y/N)?

N

Any stress corrosion cracking (Y/N)? If yes, complete APA pipeline damage report

N/A

Has the coating lifted away from the pipe (Y/N)?

N

If yes, how far around the pipe has it lifted (mm)?

Sketch of coating / corrosion damage completed (Y/N)?

Coating Defect Length (mm): NIL

Coating Defect Width (mm): NIL

Coating Defect Comments:

COATING IN AS IN GOOD CONDITION

KP:

Work Order No:

Page 2

Metal Loss

Is there any deformation of the pipe
(dent, gouge or not round) (Y/N)?

✓

If Yes, Engineering must be contacted IMMEDIATELY.

Is there any metal loss (Y/N)?

✓

If there is any metal loss, complete the remaining
section of this form and contact Engineering
IMMEDIATELY.

The following measurements should indicate whether defects INTERACT

Interaction Rules:

1. Consider each defect as a rectangular box.
2. Draw a larger box around each defect, extending length and width as per Figure 1.
3. IF BOTH larger boxes intersect with the original defect boxes, the defects interact.
4. The dimensions reported on this form are the dimensions of the defect after interaction - dimensions A and B as shown in Figure 1.

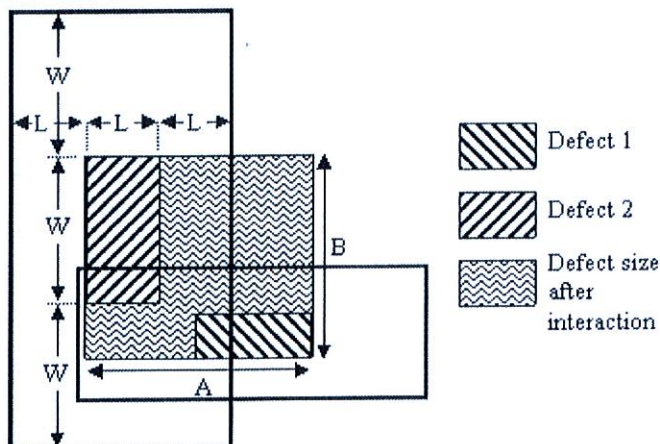


Figure 1

Maximum Depth (mm):

1.27

Wall thickness (mm):

5.9

Longitudinal dimension (A) (mm):

40

Circumferential dimension (B) (mm):

32

Clock Position (looking in direction of flow):

6:0

Distance from longitudinal weld (mm):

443

Distance from nearest girth weld (mm):
(if no girth weld has been found, do not excavate further)

307

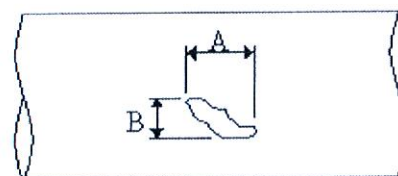


Figure 2

Repair #8 673 TDC

Length of Pipe Wrapped (mm): PIPE PAINTED WITH LUXAPOXY UHB.

Other Repair Information:

OLD CORROSION AREA, FIRST ASSESSED 2/5/98
DEFECT # 8

Dig Up Comments:

RED DAMP SOIL.

Operator:

Wayne Diffy

Signature:

Wayne Diffy

Date: 20/2/2013.

KP:

Work Order No:

Form created by Ben Parkin Apr 09
Approved by Henry Dupal**COATING DAMAGE ASSESSMENT**

Page 1

Location

Pipeline: _____ Excavation Date: 22/1/2013
 Section: _____ Digup Reason: COATING REPAIR
 Kilometre Point: Kelly Well MLV DCVG Measurement: NIL
 Zone: _____ Defect Length from survey (m): _____
 Easting: _____ CMMS Work Order No: 144 305
 Northing: _____
 Surrounding Description: _____
 (Buildings, drains, etc)

Photos

☒ Has the camera date and time been set correctly?

Please remember to take both close up (no closer than 500mm) and wide photos.

Description	Time(s) photo taken or viewfinder number
Surrounding landscape	
Site facing increasing chainage	
Site facing decreasing chainage	
Pipe with coating	<u>1695</u>
Pipe with coating removed	<u>2059, 2065, 2066, 2067, 2068</u>
Pipe cleaned	<u>2092, 2093, 2094, 2095, 2096</u>
Pipe repaired	

Soil and CP

Soil Description (tick one or more from each column):

<input checked="" type="checkbox"/> Sand	<input type="checkbox"/> Fine	<input type="checkbox"/> Dusty
<input checked="" type="checkbox"/> Loam	<input type="checkbox"/> Coarse	<input type="checkbox"/> Dry
<input type="checkbox"/> Clay	<input type="checkbox"/> Gravel	<input checked="" type="checkbox"/> Damp
<input type="checkbox"/> Black	<input type="checkbox"/> Rocky	<input type="checkbox"/> Wet
<input checked="" type="checkbox"/> Red Dirt		

Pipeline Soil Cover Depth (m): 1.2 Soil pH: 5-6
 Pipe To Soil Potential (V): -1.208 Soil Resistivity (Ohms): _____ Pin Spacing 1.5m

Coating

Is there a coating defect (Y/N)? N
 Coating Description: Any white buildup from cathodic protection (Y/N)? N
☐ Yellow Jacket Any evidence of termite damage (Y/N)? N
☐ Sleeve Any moisture inside the coating (Y/N)? N
☒ Wrapping Any stress corrosion cracking (Y/N)? N/A If yes, complete APA pipeline damage report
☐ FBE Has the coating lifted away from the pipe (Y/N)? N
☐ Paint If yes, how far around the pipe has it lifted (mm)? _____
 Sketch of coating / corrosion damage completed (Y/N)? _____

Coating Defect Length (mm): NIL Coating Defect Width (mm): NIL

Coating Defect Comments:

COATING WAS IN GOOD CONDITION.

KP:

Work Order No:

Page 2

Metal LossIs there any deformation of the pipe
(dent, gouge or not round) (Y/N)?

N

If Yes, Engineering must be contacted IMMEDIATELY.

Is there any metal loss (Y/N)?

Y

If there is any metal loss, complete the remaining
section of this form and contact Engineering
IMMEDIATELY.

The following measurements should indicate whether defects INTERACT

Interaction Rules:

1. Consider each defect as a rectangular box.
2. Draw a larger box around each defect, extending length and width as per Figure 1.
3. IF BOTH larger boxes intersect with the original defect boxes, the defects interact.
4. The dimensions reported on this form are the dimensions of the defect after interaction - dimensions A and B as shown in Figure 1.

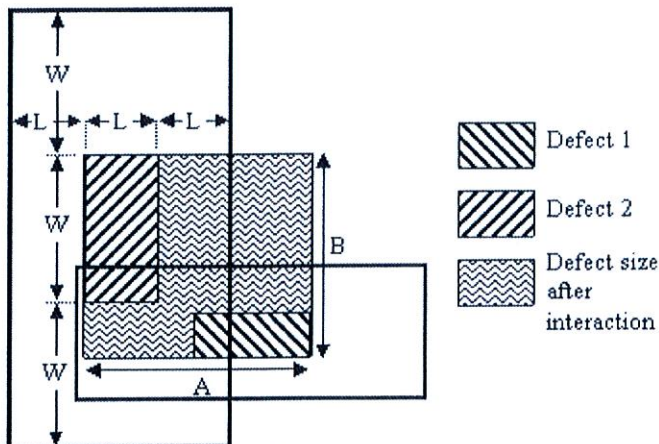


Figure 1

Maximum Depth (mm):

0.50

Wall thickness (mm):

5.9

Longitudinal dimension (A) (mm):

23

Circumferential dimension (B) (mm):

25

Clock Position (looking in direction of flow):

5:30

Distance from longitudinal weld (mm):

465

Distance from nearest girth weld (mm):

397

(if no girth weld has been found, do not excavate further)

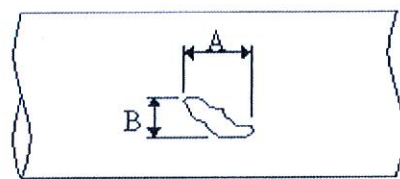


Figure 2

Repair #9 690 FDC

Length of Pipe Wrapped (mm): PIPE COATED WITH LUXAPOXY UHB.

Other Repair Information:

OLD CORROSION AREA, FIRST ASSESSED 2/5/98
DEFECT #9

Dig Up Comments:

RED DAMP SOIL.

Operator:

Wayne Duff

Signature:

[Signature]

Date:

20/2/2013.

KP:

Work Order No:

Form created by Ben Parkin Apr 09
Approved by Henry Dupal**COATING DAMAGE ASSESSMENT**

Page 1

Location

Pipeline: _____
 Section: _____
 Kilometre Point: Kelly Hill MLV
 Zone: _____
 Easting: _____
 Northing: _____

Excavation Date: 22/1/2013
 Digup Reason: COATING REPAIR
 DCVG Measurement: NIL
 Defect Length from survey (m): _____
 CMMS Work Order No: 144 305

Surrounding Description: _____
 (Buildings, drains, etc)

Photos

☒ Has the camera date and time been set correctly?

Please remember to take both close up (no closer than 500mm) and wide photos.

Description	Time(s) photo taken or viewfinder number
Surrounding landscape	
Site facing increasing chainage	
Site facing decreasing chainage	
Pipe with coating	<u>1695</u>
Pipe with coating removed	<u>2059, 2065, 2066, 2067, 2068</u>
Pipe cleaned	<u>2093, 2093, 2094, 2095, 2096</u>
Pipe repaired	

Soil and CP

Soil Description (tick one or more from each column):

<input type="checkbox"/> Sand	<input type="checkbox"/> Fine	<input type="checkbox"/> Dusty
<input checked="" type="checkbox"/> Loam	<input type="checkbox"/> Coarse	<input type="checkbox"/> Dry
<input type="checkbox"/> Clay	<input type="checkbox"/> Gravel	<input checked="" type="checkbox"/> Damp
<input type="checkbox"/> Black	<input type="checkbox"/> Rocky	<input type="checkbox"/> Wet
<input checked="" type="checkbox"/> Red Dirt		

Pipeline Soil Cover Depth (m): 1-2

Soil pH: 5-6

Pipe To Soil Potential (V): 1.208

Soil Resistivity (Ohms): _____

Pin Spacing 1.5m

Coating

Coating Description:

- ☐ Yellow Jacket
☐ Sleeve
☒ Wrapping
☐ FBE
☐ Paint

Is there a coating defect (Y/N)?

N

Any white buildup from cathodic protection (Y/N)?

N

Any evidence of termite damage (Y/N)?

N

Any moisture inside the coating (Y/N)?

N

Any stress corrosion cracking (Y/N)? If yes, complete APA pipeline damage report

N/A

Has the coating lifted away from the pipe (Y/N)?

N

If yes, how far around the pipe has it lifted (mm)?

Sketch of coating / corrosion damage completed (Y/N)?

Coating Defect Length (mm): NIL

Coating Defect Width (mm): NIL

Coating Defect Comments:

COATING WAS IN GOOD CONDITION

KP:

Work Order No:

Page 2

Metal LossIs there any deformation of the pipe
(dent, gouge or not round) (Y/N)?

N

If Yes, Engineering must be contacted IMMEDIATELY.

Is there any metal loss (Y/N)?

Y

If there is any metal loss, complete the remaining
section of this form and contact Engineering
IMMEDIATELY.

The following measurements should indicate whether defects INTERACT

Interaction Rules:

1. Consider each defect as a rectangular box.
2. Draw a larger box around each defect, extending length and width as per Figure 1.
3. IF BOTH larger boxes intersect with the original defect boxes, the defects interact.
4. The dimensions reported on this form are the dimensions of the defect after interaction - dimensions A and B as shown in Figure 1.

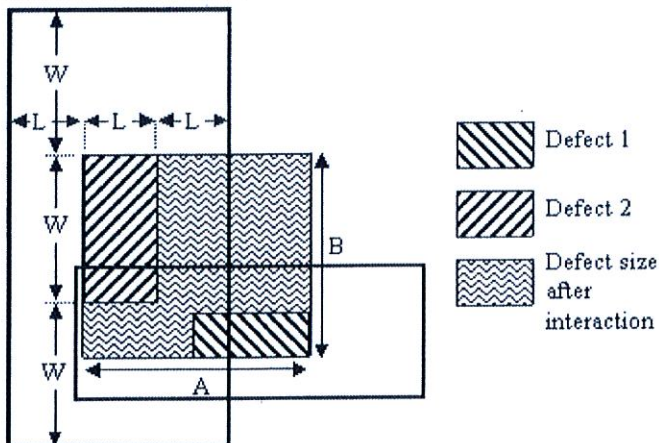


Figure 1

Maximum Depth (mm):

1.03

Wall thickness (mm):

5.9.

Longitudinal dimension (A) (mm):

63

Circumferential dimension (B) (mm):

58

Clock Position (looking in direction of flow):

5:00

Distance from longitudinal weld (mm):

625

Distance from nearest girth weld (mm):

315

(if no girth weld has been found, do not excavate further)

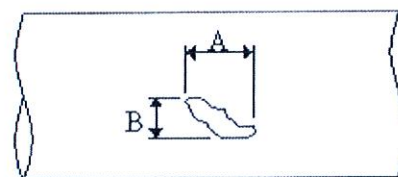


Figure 2

Repair #10 505 TDC

Length of Pipe Wrapped (mm):

PIPE WAS PAINTED WITH LUXAPOXY UHB

Other Repair Information:

OLD CORROSION AREA, FIRST ASSESSED 2/5/98.
DEFECT # 10

Dig Up Comments:

RED DAMP SOIL.

Operator:

Wayne Duffy

Signature:

[Signature]

Date:

20/2/2013

KP:

Work Order No:

Form created by Ben Parkin Apr 09
Approved by Henry Dupal**COATING DAMAGE ASSESSMENT**

Page 1

Location

Pipeline: _____
 Section: _____
 Kilometre Point: Kelly Well MLV
 Zone: _____
 Easting: _____
 Northing: _____

Excavation Date: 22/1/2013
 Digup Reason: COATING REPAIR.
 DCVG Measurement: NIL
 Defect Length from survey (m): _____
 CMMS Work Order No: 144 305

Surrounding Description: _____
 (Buildings, drains, etc)

Photos

☒ Has the camera date and time been set correctly?

Please remember to take both close up (no closer than 500mm) and wide photos.

Description	Time(s) photo taken or viewfinder number
Surrounding landscape	
Site facing increasing chainage	
Site facing decreasing chainage	
Pipe with coating	<u>1695.</u>
Pipe with coating removed	<u>2059, 2065, 2066, 2067, 2068</u>
Pipe cleaned	<u>2092, 2093, 2094, 2095, 2096</u>
Pipe repaired	

Soil and CP

Soil Description (tick one or more from each column):

<input type="checkbox"/> Sand	<input type="checkbox"/> Fine	<input type="checkbox"/> Dusty
<input checked="" type="checkbox"/> Loam	<input type="checkbox"/> Coarse	<input type="checkbox"/> Dry
<input type="checkbox"/> Clay	<input type="checkbox"/> Gravel	<input checked="" type="checkbox"/> Damp
<input type="checkbox"/> Black	<input type="checkbox"/> Rocky	<input type="checkbox"/> Wet
<input checked="" type="checkbox"/> Red Dirt		

Pipeline Soil Cover Depth (m): 1.2.

Soil pH: 5-6

Pipe To Soil Potential (V): -1208

Soil Resistivity (Ohms): _____

Pin Spacing 1.5m

Coating

	Is there a coating defect (Y/N)?	<u>N</u>
Coating Description:	Any white buildup from cathodic protection (Y/N)?	<u>N</u>
<input type="checkbox"/> Yellow Jacket	Any evidence of termite damage (Y/N)?	<u>N</u>
<input type="checkbox"/> Sleeve	Any moisture inside the coating (Y/N)?	<u>N</u>
<input checked="" type="checkbox"/> Wrapping	Any stress corrosion cracking (Y/N)? If yes, complete APA pipeline damage report	<u>N/A</u>
<input type="checkbox"/> FBE	Has the coating lifted away from the pipe (Y/N)?	<u>N</u>
<input type="checkbox"/> Paint	If yes, how far around the pipe has it lifted (mm)?	_____
	Sketch of coating / corrosion damage completed (Y/N)?	_____

Coating Defect Length (mm): NIL.

Coating Defect Width (mm): NIL

Coating Defect Comments:

COATING WAS IN GOOD CONDITION.

KP:

Work Order No:

Page 2

Metal LossIs there any deformation of the pipe
(dent, gouge or not round) (Y/N)?

N

If Yes, Engineering must be contacted IMMEDIATELY.

Is there any metal loss (Y/N)?

Y

If there is any metal loss, complete the remaining
section of this form and contact Engineering
IMMEDIATELY.

The following measurements should indicate whether defects INTERACT

Interaction Rules:

1. Consider each defect as a rectangular box.
2. Draw a larger box around each defect, extending length and width as per Figure 1.
3. IF BOTH larger boxes intersect with the original defect boxes, the defects interact.
4. The dimensions reported on this form are the dimensions of the defect after interaction - dimensions A and B as shown in Figure 1.

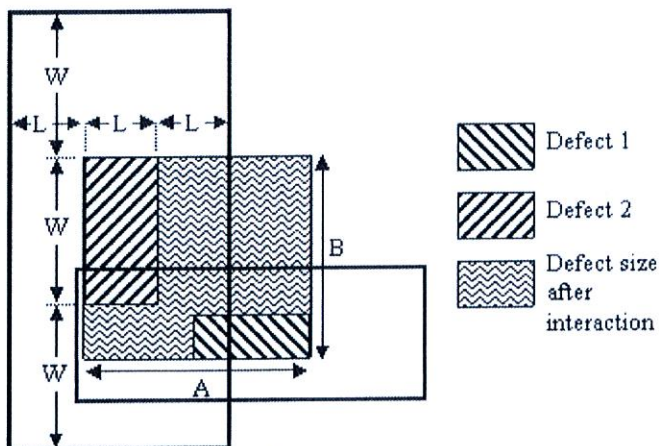


Figure 1

Maximum Depth (mm):

1.81

Wall thickness (mm):

5.9

Longitudinal dimension (A) (mm):

23

Circumferential dimension (B) (mm):

28

Clock Position (looking in direction of flow):

5:00

Distance from longitudinal weld (mm):

625

Distance from nearest girth weld (mm):
(if no girth weld has been found, do not excavate further)

92

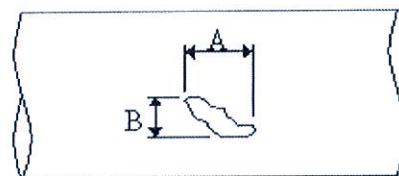


Figure 2

Repair #11 505 TDC

Length of Pipe Wrapped (mm): PIPE PAINTED WITH LUXAPOXY UHB.

Other Repair Information:

OLD CORROSION AREA, FIRST ASSESSED 2/5/98
DEFECT # 11

Dig Up Comments:

RED DAMP SOIL.

Operator:

Wayne Doff

Signature:

[Signature]

Date:

20/2/2013

KP:

Work Order No:

Form created by Ben Parkin Apr 09
Approved by Henry Dupal

COATING DAMAGE ASSESSMENT

Page 1

Location

Pipeline: _____ Excavation Date: 22/1/2013
 Section: _____ Digup Reason: COATING REPAIR
 Kilometre Point: Kiloby Whizz MLV DCVG Measurement: NIL
 Zone: _____ Defect Length from survey (m): _____
 Easting: _____ CMMS Work Order No: 144 305
 Northing: _____
 Surrounding Description: _____
 (Buildings, drains, etc)

Photos

☒ Has the camera date and time been set correctly?

Please remember to take both close up (no closer than 500mm) and wide photos.

Description	Time(s) photo taken or viewfinder number
Surrounding landscape	
Site facing increasing chainage	
Site facing decreasing chainage	
Pipe with coating	<u>1695</u>
Pipe with coating removed	<u>2059, 2065, 2066, 2067, 2068</u>
Pipe cleaned	<u>2092, 2093, 2094, 2095, 2096</u>
Pipe repaired	

Soil and CP

Soil Description (tick one or more from each column):

<input type="checkbox"/> Sand	<input type="checkbox"/> Fine	<input type="checkbox"/> Dusty
<input checked="" type="checkbox"/> Loam	<input type="checkbox"/> Coarse	<input type="checkbox"/> Dry
<input type="checkbox"/> Clay	<input type="checkbox"/> Gravel	<input checked="" type="checkbox"/> Damp
<input type="checkbox"/> Black	<input type="checkbox"/> Rocky	<input type="checkbox"/> Wet
<input checked="" type="checkbox"/> Red Dirt		

Pipeline Soil Cover Depth (m): 1.2 Soil pH: 5-6
 Pipe To Soil Potential (V): 1.208 Soil Resistivity (Ohms): _____ Pin Spacing 1.5m

Coating

Is there a coating defect (Y/N)? N
 Coating Description: Any white buildup from cathodic protection (Y/N)? N
☐ Yellow Jacket Any evidence of termite damage (Y/N)? N
☐ Sleeve Any moisture inside the coating (Y/N)? N
☒ Wrapping Any stress corrosion cracking (Y/N)? N/A If yes, complete APA pipeline damage report
☐ FBE Has the coating lifted away from the pipe (Y/N)? N
☐ Paint If yes, how far around the pipe has it lifted (mm)? _____
 Sketch of coating / corrosion damage completed (Y/N)? _____
 Coating Defect Length (mm): NIL Coating Defect Width (mm): NIL
 Coating Defect Comments:
COATING WAS IN GOOD ORDER.

KP:

Work Order No:

Page 2

Metal LossIs there any deformation of the pipe
(dent, gouge or not round) (Y/N)?

N

If Yes, Engineering must be contacted IMMEDIATELY.

Is there any metal loss (Y/N)?

Y

If there is any metal loss, complete the remaining
section of this form and contact Engineering
IMMEDIATELY.*The following measurements should indicate whether defects INTERACT*

Interaction Rules:

1. Consider each defect as a rectangular box.
2. Draw a larger box around each defect, extending length and width as per Figure 1.
3. IF BOTH larger boxes intersect with the original defect boxes, the defects interact.
4. The dimensions reported on this form are the dimensions of the defect after interaction - dimensions A and B as shown in Figure 1.

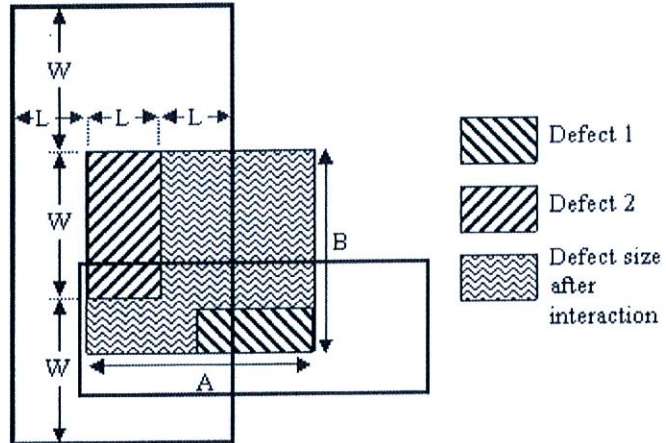


Figure 1

Maximum Depth (mm):

1.28

Wall thickness (mm):

5.9

Longitudinal dimension (A) (mm):

24

Circumferential dimension (B) (mm):

22

Clock Position (looking in direction of flow):

5:30

Distance from longitudinal weld (mm):

600

Distance from nearest girth weld (mm):
(if no girth weld has been found, do not excavate further)

97

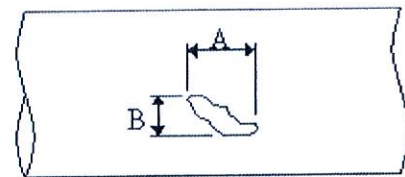


Figure 2

Repair # 12 490TDCLength of Pipe Wrapped (mm): PIPE PAINTED WITH LUXABOND UHB.

Other Repair Information:

OLD CORROSION AREA, FIRST ASSESSED 2/5/98.
DEFECT # 12.

Dig Up Comments:

RED DAMP SOIL.

Operator:

Wayne Duff

Signature:

[Signature]

Date:

20/2/2013

KP:

Work Order No:

Form created by Ben Parkin Apr 09
Approved by Henry Dupal**COATING DAMAGE ASSESSMENT**

Page 1

Location

Pipeline: _____ Excavation Date: 22/1/2013.
 Section: _____ Digup Reason: COATING REPAIR.
 Kilometre Point: Kelly Hill MLV. DCVG Measurement: NIL.
 Zone: _____ Defect Length from survey (m): _____
 Easting: _____ CMMS Work Order No: 144305.
 Northing: _____
 Surrounding Description: _____
 (Buildings, drains, etc) _____

Photos

☒ Has the camera date and time been set correctly?

Please remember to take both close up (no closer than 500mm) and wide photos.

Description	Time(s) photo taken or viewfinder number
Surrounding landscape	
Site facing increasing chainage	
Site facing decreasing chainage	
Pipe with coating	<u>1695</u>
Pipe with coating removed	<u>2059, 2065, 2066, 2067, 2068</u>
Pipe cleaned	<u>2092, 2093, 2094, 2095, 2096</u>
Pipe repaired	

Soil and CP

Soil Description (tick one or more from each column):

<input type="checkbox"/> Sand	<input type="checkbox"/> Fine	<input type="checkbox"/> Dusty
<input checked="" type="checkbox"/> Loam	<input type="checkbox"/> Coarse	<input type="checkbox"/> Dry
<input type="checkbox"/> Clay	<input type="checkbox"/> Gravel	<input checked="" type="checkbox"/> Damp
<input type="checkbox"/> Black	<input type="checkbox"/> Rocky	<input type="checkbox"/> Wet
<input checked="" type="checkbox"/> Red Dirt		

Pipeline Soil Cover Depth (m): 1.2 Soil pH: 5-6
 Pipe To Soil Potential (V): 1209 Soil Resistivity (Ohms): _____ Pin Spacing 1.5m

Coating

Is there a coating defect (Y/N)? N
 Coating Description: Any white buildup from cathodic protection (Y/N)? N
☐ Yellow Jacket Any evidence of termite damage (Y/N)? N
☐ Sleeve Any moisture inside the coating (Y/N)? N
☒ Wrapping Any stress corrosion cracking (Y/N)? N/A If yes, complete APA pipeline damage report
☐ FBE Has the coating lifted away from the pipe (Y/N)? N
☐ Paint If yes, how far around the pipe has it lifted (mm)? _____
 Sketch of coating / corrosion damage completed (Y/N)? _____
 Coating Defect Length (mm): NIL. Coating Defect Width (mm): NIL
 Coating Defect Comments:
COATING WAS IN GOOD CONDITION.

KP:

Work Order No:

Page 2

Metal Loss

Is there any deformation of the pipe
(dent, gouge or not round) (Y/N)?

N

If Yes, Engineering must be contacted IMMEDIATELY.

Is there any metal loss (Y/N)?

Y

If there is any metal loss, complete the remaining
section of this form and contact Engineering
IMMEDIATELY.

The following measurements should indicate whether defects INTERACT

Interaction Rules:

1. Consider each defect as a rectangular box.
2. Draw a larger box around each defect, extending length and width as per Figure 1.
3. IF BOTH larger boxes intersect with the original defect boxes, the defects interact.
4. The dimensions reported on this form are the dimensions of the defect after interaction - dimensions A and B as shown in Figure 1.

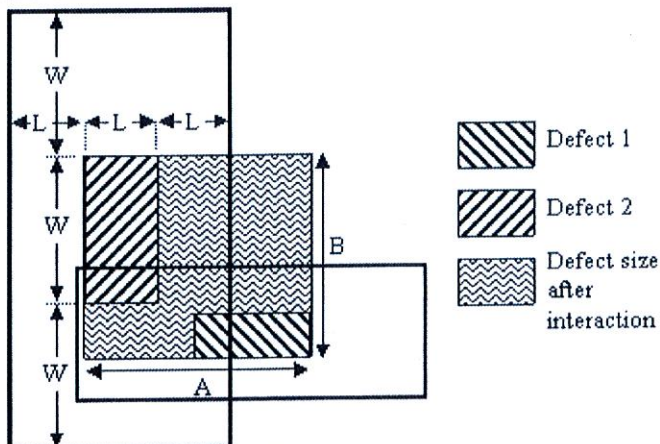


Figure 1

Maximum Depth (mm):

1.23

Wall thickness (mm):

5.9

Longitudinal dimension (A) (mm):

90

Circumferential dimension (B) (mm):

28

Clock Position (looking in direction of flow):

4:00

Distance from longitudinal weld (mm):

566

Distance from nearest girth weld (mm):
(if no girth weld has been found, do not excavate further)

153

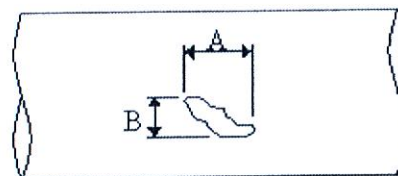


Figure 2

Repair #13 456 TDC

Length of Pipe Wrapped (mm): PIPE PAINTED WITH LUXAROX JHB.

Other Repair Information:

OLD CORROSION AREA, FIRST ASSESSED 2/5/98.
DEFECT # 13

Dig Up Comments:

RED DAMP SOIL.

Operator:

Wayne Duffy

Signature:

[Signature]

Date:

20/2/2013

KP:

Work Order No:

Form created by Ben Parkin Apr 09
Approved by Henry Dupal**COATING DAMAGE ASSESSMENT**

Page 1

Location

Pipeline: _____ Excavation Date: 22/1/2013
 Section: _____ Digup Reason: COATING REPAIR
 Kilometre Point: Kelly Hill MCV DCVG Measurement: NIL
 Zone: _____ Defect Length from survey (m): _____
 Easting: _____ CMMS Work Order No: 144 305
 Northing: _____
 Surrounding Description: _____
 (Buildings, drains, etc)

Photos

☐ Has the camera date and time been set correctly?

Please remember to take both close up (no closer than 500mm) and wide photos.

Description	Time(s) photo taken or viewfinder number
Surrounding landscape	
Site facing increasing chainage	
Site facing decreasing chainage	
Pipe with coating	<u>1695</u>
Pipe with coating removed	<u>2059, 2065, 2066, 2067, 2068</u>
Pipe cleaned	<u>2092, 2093, 2094, 2095, 2096</u>
Pipe repaired	

Soil and CP

Soil Description (tick one or more from each column):

<input type="checkbox"/> Sand	<input type="checkbox"/> Fine	<input type="checkbox"/> Dusty
<input checked="" type="checkbox"/> Loam	<input type="checkbox"/> Coarse	<input type="checkbox"/> Dry
<input type="checkbox"/> Clay	<input type="checkbox"/> Gravel	<input checked="" type="checkbox"/> Damp
<input type="checkbox"/> Black	<input type="checkbox"/> Rocky	<input type="checkbox"/> Wet
<input checked="" type="checkbox"/> Red Dirt		

Pipeline Soil Cover Depth (m): 1-2 Soil pH: 5-6
 Pipe To Soil Potential (V): 1-208 Soil Resistivity (Ohms): _____ Pin Spacing 1.5m

Coating

Coating Description: _____ Is there a coating defect (Y/N)? N
☐ Yellow Jacket Any white buildup from cathodic protection (Y/N)? N
☐ Sleeve Any evidence of termite damage (Y/N)? N
☒ Wrapping Any moisture inside the coating (Y/N)? N
☐ FBE Any stress corrosion cracking (Y/N)? If yes, complete APA pipeline damage report N/A
☐ Paint Has the coating lifted away from the pipe (Y/N)? N
 If yes, how far around the pipe has it lifted (mm)? _____
 Sketch of coating / corrosion damage completed (Y/N)? _____

Coating Defect Length (mm): NIL Coating Defect Width (mm): NIL

Coating Defect Comments:

COATING IN GOOD ORDER.

KP:

Work Order No:

Page 2

Metal Loss

Is there any deformation of the pipe
(dent, gouge or not round) (Y/N)?

✓

If Yes, Engineering must be contacted IMMEDIATELY.

Is there any metal loss (Y/N)?

✓

If there is any metal loss, complete the remaining
section of this form and contact Engineering
IMMEDIATELY.

The following measurements should indicate whether defects INTERACT

Interaction Rules:

1. Consider each defect as a rectangular box.
2. Draw a larger box around each defect, extending length and width as per Figure 1.
3. IF BOTH larger boxes intersect with the original defect boxes, the defects interact.
4. The dimensions reported on this form are the dimensions of the defect after interaction - dimensions A and B as shown in Figure 1.

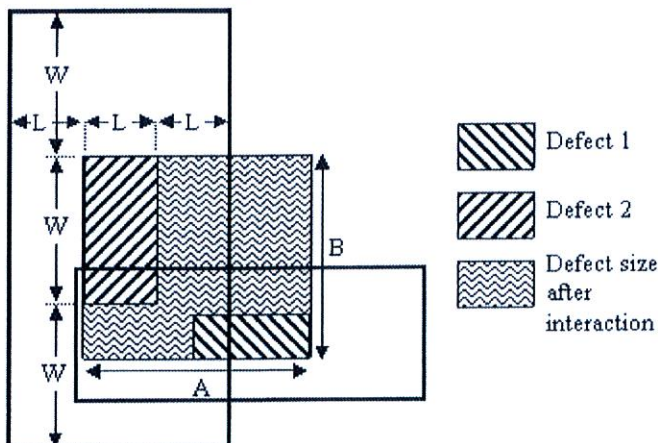


Figure 1

Maximum Depth (mm):

1.41

Wall thickness (mm):

5.9

Longitudinal dimension (A) (mm):

35

Circumferential dimension (B) (mm):

55

Clock Position (looking in direction of flow):

3:30

Distance from longitudinal weld (mm):

485

Distance from nearest girth weld (mm):
(if no girth weld has been found, do not excavate further)

335

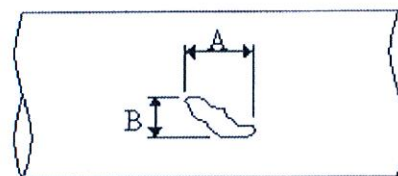


Figure 2

Repair #14 375 TOC

Length of Pipe Wrapped (mm): PIPE PAINTED WITH LUXAPOXY UHB.

Other Repair Information:

OLD CORROSION AREA, FIRST ASSESSED 2/5/98.
DEFECT #14

Dig Up Comments:

RED DAMP SOIL.

Operator:

Wayne Duffy

Signature:

[Signature]

Date:

20/2/2013.

KP:

Work Order No:

Form created by Ben Parkin Apr 09
Approved by Henry Dupal**COATING DAMAGE ASSESSMENT**

Page 1

Location

Pipeline: _____ Excavation Date: 22/1/2013
 Section: _____ Digup Reason: COATING REPAIR
 Kilometre Point: KELLY WALL MLV DCVG Measurement: NIL
 Zone: _____ Defect Length from survey (m): _____
 Easting: _____ CMMS Work Order No: 144 305
 Northing: _____

Surrounding Description:

(Buildings, drains, etc)

Photos

☐ Has the camera date and time been set correctly?

Please remember to take both close up (no closer than 500mm) and wide photos.

Description	Time(s) photo taken or viewfinder number
Surrounding landscape	
Site facing increasing chainage	
Site facing decreasing chainage	
Pipe with coating	<u>1695</u>
Pipe with coating removed	<u>2059, 2065, 2066, 2067, 2068.</u>
Pipe cleaned	<u>2092, 2093, 2094, 2095, 2096.</u>
Pipe repaired	

Soil and CP

Soil Description (tick one or more from each column):

<input type="checkbox"/> Sand	<input type="checkbox"/> Fine	<input type="checkbox"/> Dusty
<input checked="" type="checkbox"/> Loam	<input type="checkbox"/> Coarse	<input type="checkbox"/> Dry
<input type="checkbox"/> Clay	<input type="checkbox"/> Gravel	<input checked="" type="checkbox"/> Damp
<input type="checkbox"/> Black	<input type="checkbox"/> Rocky	<input type="checkbox"/> Wet
<input checked="" type="checkbox"/> Red Dirt		

Pipeline Soil Cover Depth (m): 1.2 Soil pH: 5-6Pipe To Soil Potential (V): -1.208 Soil Resistivity (Ohms): _____ Pin Spacing 1.5m**Coating**

Coating Description:

- ☐ Yellow Jacket
☐ Sleeve
☒ Wrapping
☐ FBE
☐ Paint

Is there a coating defect (Y/N)? N
 Any white buildup from cathodic protection (Y/N)? N
 Any evidence of termite damage (Y/N)? N
 Any moisture inside the coating (Y/N)? N
 Any stress corrosion cracking (Y/N)? N/A If yes, complete APA pipeline damage report
 Has the coating lifted away from the pipe (Y/N)? N
 If yes, how far around the pipe has it lifted (mm)? _____
 Sketch of coating / corrosion damage completed (Y/N)? _____

Coating Defect Length (mm): NIL Coating Defect Width (mm): NIL

Coating Defect Comments:

#15 142mm FROM TDC C&W
COATING IN GOOD ORDER.

KP:

Work Order No:

Page 2

Metal LossIs there any deformation of the pipe
(dent, gouge or not round) (Y/N)?

N

If Yes, Engineering must be contacted IMMEDIATELY.

Is there any metal loss (Y/N)?

Y

If there is any metal loss, complete the remaining
section of this form and contact Engineering
IMMEDIATELY.

The following measurements should indicate whether defects INTERACT

Interaction Rules:

1. Consider each defect as a rectangular box.
2. Draw a larger box around each defect, extending length and width as per Figure 1.
3. IF BOTH larger boxes intersect with the original defect boxes, the defects interact.
4. The dimensions reported on this form are the dimensions of the defect after interaction - dimensions A and B as shown in Figure 1.

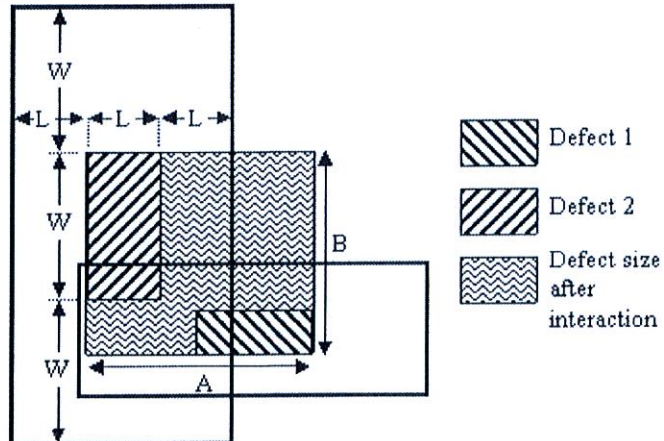


Figure 1

Maximum Depth (mm):

0.23

Wall thickness (mm):

5.9.

Longitudinal dimension (A) (mm):

11

Circumferential dimension (B) (mm):

12.

Clock Position (looking in direction of flow):

1030

Distance from longitudinal weld (mm):

30

Distance from nearest girth weld (mm):
(if no girth weld has been found, do not excavate further)

340

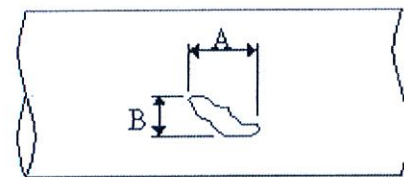


Figure 2

Repair #15

Length of Pipe Wrapped (mm): PIPE PAINTED WITH LUXAPOXY UHB.

Other Repair Information:

OLD CORROSION FIRST ASSESSED 2/5/98
DEFECT # 15

Dig Up Comments:

RED DAMP SOIL.

Operator: Wayne Duff

Signature:

Date: 20/2/2013

KP:

Work Order No:

Form created by Ben Parkin Apr 09
Approved by Henry Dupal**COATING DAMAGE ASSESSMENT**

Page 1

Location

Pipeline: _____ Excavation Date: 22/1/2013.
 Section: _____ Digup Reason: COATING REPAIR.
 Kilometre Point: Kelly Well MLV. DCVG Measurement: NIL.
 Zone: _____ Defect Length from survey (m): NIL.
 Easting: _____ CMMS Work Order No: 144305.
 Northing: _____

Surrounding Description: _____

(Buildings, drains, etc)

Photos

☒ Has the camera date and time been set correctly?

Please remember to take both close up (no closer than 500mm) and wide photos.

Description	Time(s) photo taken or viewfinder number
Surrounding landscape	
Site facing increasing chainage	
Site facing decreasing chainage	
Pipe with coating	<u>1695.</u>
Pipe with coating removed	<u>2059, 2065, 2066, 2067, 2068.</u>
Pipe cleaned	<u>2092, 2093, 2094, 2095, 2096.</u>
Pipe repaired	

Soil and CP

Soil Description (tick one or more from each column):

<input type="checkbox"/> Sand	<input type="checkbox"/> Fine	<input type="checkbox"/> Dusty
<input checked="" type="checkbox"/> Loam	<input type="checkbox"/> Coarse	<input type="checkbox"/> Dry
<input type="checkbox"/> Clay	<input type="checkbox"/> Gravel	<input checked="" type="checkbox"/> Damp
<input type="checkbox"/> Black	<input type="checkbox"/> Rocky	<input type="checkbox"/> Wet
<input checked="" type="checkbox"/> Red Dirt		

Pipeline Soil Cover Depth (m): 1.2. Soil pH: 5-6Pipe To Soil Potential (V): -1.208 Soil Resistivity (Ohms): _____ Pin Spacing 1.5m**Coating**

Is there a coating defect (Y/N)? N
 Coating Description: Any white buildup from cathodic protection (Y/N)? N
☐ Yellow Jacket Any evidence of termite damage (Y/N)? N
☐ Sleeve Any moisture inside the coating (Y/N)? N
☒ Wrapping Any stress corrosion cracking (Y/N)? N/A If yes, complete APA pipeline damage report
☐ FBE Has the coating lifted away from the pipe (Y/N)? N
☐ Paint If yes, how far around the pipe has it lifted (mm)? _____
 Sketch of coating / corrosion damage completed (Y/N)? _____

Coating Defect Length (mm): NIL Coating Defect Width (mm): NIL.

Coating Defect Comments:

COATING WAS IN GOOD ORDER.

KP:

Work Order No:

Page 2

Metal LossIs there any deformation of the pipe
(dent, gouge or not round) (Y/N)?

N

If Yes, Engineering must be contacted IMMEDIATELY.

Is there any metal loss (Y/N)?

Y

If there is any metal loss, complete the remaining
section of this form and contact Engineering
IMMEDIATELY.*The following measurements should indicate whether defects INTERACT*

Interaction Rules:

1. Consider each defect as a rectangular box.
2. Draw a larger box around each defect, extending length and width as per Figure 1.
3. IF BOTH larger boxes intersect with the original defect boxes, the defects interact.
4. The dimensions reported on this form are the dimensions of the defect after interaction - dimensions A and B as shown in Figure 1.

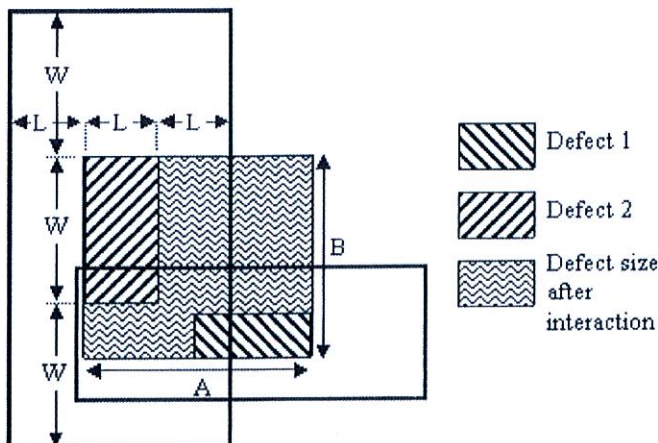


Figure 1

Maximum Depth (mm):

0.43

Wall thickness (mm):

5.9

Longitudinal dimension (A) (mm):

7

Circumferential dimension (B) (mm):

10

Clock Position (looking in direction of flow):

1:30

Distance from longitudinal weld (mm):

213

Distance from nearest girth weld (mm):
(if no girth weld has been found, do not excavate further)

300

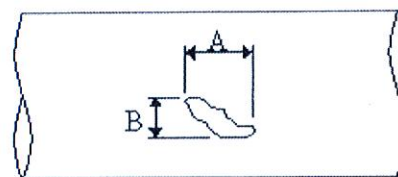


Figure 2

Repair #16 103 TDCLength of Pipe Wrapped (mm): PIPE PAINTED WITH LUXALOX UHB

Other Repair Information:

OLD CORROSION, FIRST ASSESSED 2/5/98.
DEFECT #16

Dig Up Comments:

RED DAMP SOIL.Operator: Wayne Duffly

Signature:

Date: 20/2/2013.

KP:

Work Order No:

Form created by Ben Parkin Apr 09
Approved by Henry Dupal**COATING DAMAGE ASSESSMENT**

Page 1

Location

Pipeline: _____ Excavation Date: 22/1/2013
 Section: _____ Digup Reason: COATING REPAIR
 Kilometre Point: KILLY KILL MLV DCVG Measurement: NIL
 Zone: _____ Defect Length from survey (m): _____
 Easting: _____ CMMS Work Order No: 144 305
 Northing: _____
 Surrounding Description: _____
 (Buildings, drains, etc) _____

Photos

☒ Has the camera date and time been set correctly?

Please remember to take both close up (no closer than 500mm) and wide photos.

Description	Time(s) photo taken or viewfinder number
Surrounding landscape	
Site facing increasing chainage	
Site facing decreasing chainage	
Pipe with coating	<u>1690</u>
Pipe with coating removed	<u>2081, 2082</u>
Pipe cleaned	<u>2108, 2107</u>
Pipe repaired	

Soil and CP

Soil Description (tick one or more from each column):

<input type="checkbox"/> Sand	<input type="checkbox"/> Fine	<input type="checkbox"/> Dusty
<input checked="" type="checkbox"/> Loam	<input type="checkbox"/> Coarse	<input type="checkbox"/> Dry
<input type="checkbox"/> Clay	<input type="checkbox"/> Gravel	<input checked="" type="checkbox"/> Damp
<input type="checkbox"/> Black	<input type="checkbox"/> Rocky	<input type="checkbox"/> Wet
<input checked="" type="checkbox"/> Red Dirt		

Pipeline Soil Cover Depth (m): 1.2 Soil pH: 5-6
 Pipe To Soil Potential (V): -1.208 Soil Resistivity (Ohms): _____ Pin Spacing 1.5m

Coating

Coating Description:

- ☐ Yellow Jacket
☐ Sleeve
☐ Wrapping
☐ FBE
☐ Paint

Is there a coating defect (Y/N)?

Any white buildup from cathodic protection (Y/N)?

Any evidence of termite damage (Y/N)?

Any moisture inside the coating (Y/N)?

Any stress corrosion cracking (Y/N)? If yes, complete APA pipeline damage report

Has the coating lifted away from the pipe (Y/N)?

If yes, how far around the pipe has it lifted (mm)?

Sketch of coating / corrosion damage completed (Y/N)?

Coating Defect Length (mm): 200Coating Defect Width (mm): 310

Coating Defect Comments:

REMOVED CANUSA SLEEVE 5M SOUTH OF MLV AND FOUND CORROSION ON THE BOTTOM OF PIPE.

KP:

Work Order No:

Page 2

Metal LossIs there any deformation of the pipe
(dent, gouge or not round) (Y/N)?N

If Yes, Engineering must be contacted IMMEDIATELY.

Is there any metal loss (Y/N)?

YIf there is any metal loss, complete the remaining
section of this form and contact Engineering
IMMEDIATELY.*The following measurements should indicate whether defects INTERACT*

Interaction Rules:

1. Consider each defect as a rectangular box.
2. Draw a larger box around each defect, extending length and width as per Figure 1.
3. IF BOTH larger boxes intersect with the original defect boxes, the defects interact.
4. The dimensions reported on this form are the dimensions of the defect after interaction - dimensions A and B as shown in Figure 1.

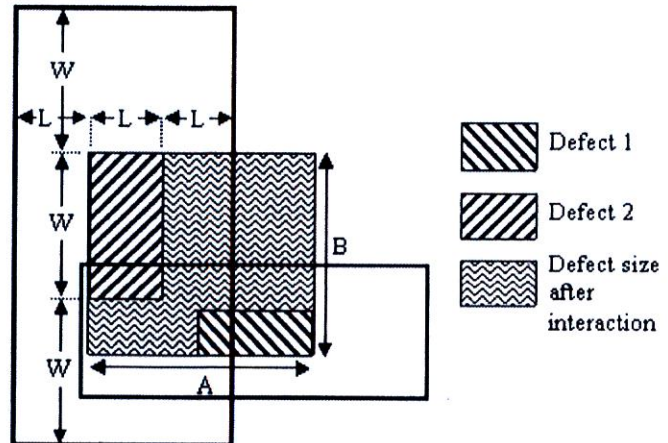


Figure 1

Maximum Depth (mm):

0.74

Wall thickness (mm):

8.74

Longitudinal dimension (A) (mm):

3.0

Circumferential dimension (B) (mm):

2.0

Clock Position (looking in direction of flow):

6:30

Distance from longitudinal weld (mm):

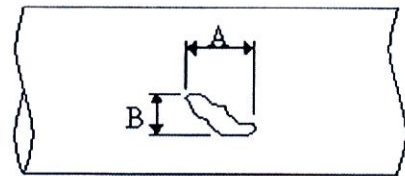
430Distance from nearest girth weld (mm):
(if no girth weld has been found, do not excavate further)50mm NORTH OF GIRTH WELD

Figure 2

RepairLength of Pipe ^{PAINTED M} ~~Wrapped~~ (mm): 6M OF PIPE SOUTH OF MLV PAINTED

Other Repair Information:

CORROSION UNDER CANUSA SLIEVIE ON BOTTOM OF PIPE
CD # 1 SOUTH OF MLV.
BUTT WELD IS 5.0 M SOUTH OF MLV

Dig Up Comments:

SOIL RIED AND DAMP, SOME STONIE.

Operator:

Wayne Duffy

Signature:

[Signature]

Date:

4/3/2013

KP:

Work Order No:

Form created by Ben Parkin Apr 09
Approved by Henry Dupal**COATING DAMAGE ASSESSMENT**

Page 1

Location

Pipeline: _____ Excavation Date: 22/1/2013
 Section: _____ Digup Reason: COATING REPAIR
 Kilometre Point: KIELLY WELL MLV DCVG Measurement: NIL
 Zone: _____ Defect Length from survey (m): _____
 Easting: _____ CMMS Work Order No: 144305
 Northing: _____

Surrounding Description: _____

(Buildings, drains, etc)

Photos

☒ Has the camera date and time been set correctly?

Please remember to take both close up (no closer than 500mm) and wide photos.

Description	Time(s) photo taken or viewfinder number
Surrounding landscape	
Site facing increasing chainage	
Site facing decreasing chainage	
Pipe with coating	<u>0074</u>
Pipe with coating removed	<u>2083</u>
Pipe cleaned	<u>2102</u>
Pipe repaired	

Soil and CP

Soil Description (tick one or more from each column):

<input type="checkbox"/> Sand	<input type="checkbox"/> Fine	<input type="checkbox"/> Dusty
<input type="checkbox"/> Loam	<input type="checkbox"/> Coarse	<input type="checkbox"/> Dry
<input type="checkbox"/> Clay	<input type="checkbox"/> Gravel	<input checked="" type="checkbox"/> Damp
<input type="checkbox"/> Black	<input type="checkbox"/> Rocky	<input type="checkbox"/> Wet
<input checked="" type="checkbox"/> Red Dirt		

Pipeline Soil Cover Depth (m): 1.2 Soil pH: 5.6Pipe To Soil Potential (V): 1.208 Soil Resistivity (Ohms): _____ Pin Spacing 1.5m**Coating**

Is there a coating defect (Y/N)? Y
 Coating Description: Any white buildup from cathodic protection (Y/N)? Y
☒ Yellow Jacket Any evidence of termite damage (Y/N)? N
☐ Sleeve Any moisture inside the coating (Y/N)? N
☐ Wrapping Any stress corrosion cracking (Y/N)? N/A If yes, complete APA pipeline damage report
☐ FBE Has the coating lifted away from the pipe (Y/N)? N
☐ Paint If yes, how far around the pipe has it lifted (mm)? _____
 Sketch of coating / corrosion damage completed (Y/N)? _____

Coating Defect Length (mm): 900 Coating Defect Width (mm): 5

Coating Defect Comments:

COATING DEFECT (SPLIT YELLOW JACKET) ON OUTSIDE EDGE OF CONCRETE SUPPORT BLOCK, NORTH OF MLV

KP:

Work Order No:

Page 2

Metal Loss

Is there any deformation of the pipe
(dent, gouge or not round) (Y/N)?

N

If Yes, Engineering must be contacted IMMEDIATELY.

Is there any metal loss (Y/N)?

N

If there is any metal loss, complete the remaining
section of this form and contact Engineering
IMMEDIATELY.

The following measurements should indicate whether defects INTERACT

Interaction Rules:

1. Consider each defect as a rectangular box.
2. Draw a larger box around each defect, extending length and width as per Figure 1.
3. IF BOTH larger boxes intersect with the original defect boxes, the defects interact.
4. The dimensions reported on this form are the dimensions of the defect after interaction - dimensions A and B as shown in Figure 1.

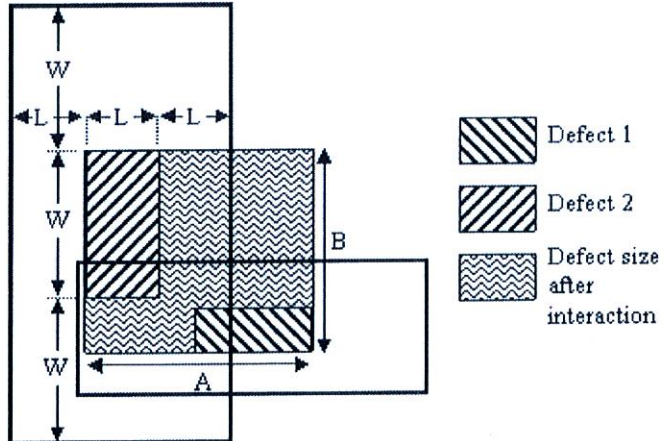


Figure 1

Maximum Depth (mm):

Wall thickness (mm):

Longitudinal dimension (A) (mm):

Circumferential dimension (B) (mm):

Clock Position (looking in direction of flow):

Distance from longitudinal weld (mm):

Distance from nearest girth weld (mm):
(if no girth weld has been found, do not excavate further)

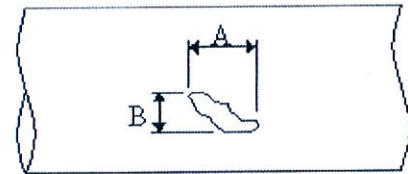


Figure 2

Repair

Length of Pipe Wrapped (mm):

Other Repair Information:

MLV ABRASIVE BLASTED & PAINTED WITH DULUX LUXAPOXY UM13

Dig Up Comments:

SOIL WAS DAMP & FREE OF STONE

Operator: *Wayne Duff* Signature:

Wayne Duff

Date: 20/2/2013

KP:

Work Order No:

Form created by Ben Parkin Apr 09
Approved by Henry Dupal**COATING DAMAGE ASSESSMENT**

Page 1

Location

Pipeline: _____ Excavation Date: 22/1/2013
 Section: _____ Digup Reason: COATING REPAIR.
 Kilometre Point: TRILLY WHEEL MLV DCVG Measurement: NIL
 Zone: _____ Defect Length from survey (m): _____
 Easting: _____ CMMS Work Order No: 144305
 Northing: _____

Surrounding Description: _____

(Buildings, drains, etc)

Photos

☒ Has the camera date and time been set correctly?

Please remember to take both close up (no closer than 500mm) and wide photos.

Description	Time(s) photo taken or viewfinder number
Surrounding landscape	
Site facing increasing chainage	
Site facing decreasing chainage	
Pipe with coating	<u>1690</u>
Pipe with coating removed	<u>2085</u>
Pipe cleaned	<u>2105</u>
Pipe repaired	

Soil and CP

Soil Description (tick one or more from each column):

<input type="checkbox"/> Sand	<input type="checkbox"/> Fine	<input type="checkbox"/> Dusty
<input type="checkbox"/> Loam	<input type="checkbox"/> Coarse	<input type="checkbox"/> Dry
<input type="checkbox"/> Clay	<input type="checkbox"/> Gravel	<input checked="" type="checkbox"/> Damp
<input type="checkbox"/> Black	<input type="checkbox"/> Rocky	<input type="checkbox"/> Wet
<input checked="" type="checkbox"/> Red Dirt		

Pipeline Soil Cover Depth (m): 1.2 Soil pH: 5-6Pipe To Soil Potential (V): 1.208 Soil Resistivity (Ohms): _____ Pin Spacing 1.5m**Coating**

Coating Description:

- ☒ Yellow Jacket
☐ Sleeve
☐ Wrapping
☐ FBE
☐ Paint

Is there a coating defect (Y/N)? YAny white buildup from cathodic protection (Y/N)? YAny evidence of termite damage (Y/N)? NAny moisture inside the coating (Y/N)? NAny stress corrosion cracking (Y/N)? N/A If yes, complete APA pipeline damage reportHas the coating lifted away from the pipe (Y/N)? N

If yes, how far around the pipe has it lifted (mm)? _____

Sketch of coating / corrosion damage completed (Y/N)? _____

Coating Defect Length (mm): 1.2 Coating Defect Width (mm): 5

Coating Defect Comments:

YELLOW JACKET HAD SPLIT FROM UNDER SADDLE FOR 1.2m
NO CORROSION.
THIS COATING DEFECT WAS SOUTH OF MLV.

KP:

Work Order No:

Page 2

Metal Loss

Is there any deformation of the pipe
(dent, gouge or not round) (Y/N)?

N

If Yes, Engineering must be contacted IMMEDIATELY.

Is there any metal loss (Y/N)?

N

If there is any metal loss, complete the remaining
section of this form and contact Engineering
IMMEDIATELY.

The following measurements should indicate whether defects INTERACT

Interaction Rules:

1. Consider each defect as a rectangular box.
2. Draw a larger box around each defect, extending length and width as per Figure 1.
3. IF BOTH larger boxes intersect with the original defect boxes, the defects interact.
4. The dimensions reported on this form are the dimensions of the defect after interaction - dimensions A and B as shown in Figure 1.

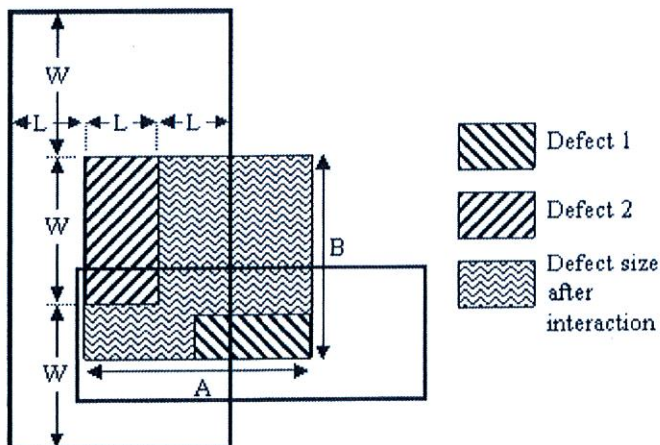


Figure 1

Maximum Depth (mm):

Wall thickness (mm):

Longitudinal dimension (A) (mm):

Circumferential dimension (B) (mm):

Clock Position (looking in direction of flow):

Distance from longitudinal weld (mm):

Distance from nearest girth weld (mm):
(if no girth weld has been found, do not excavate further)

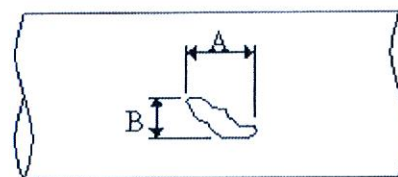


Figure 2

Repair

Length of Pipe Wrapped (mm):

Other Repair Information:

ENTIRE SECTION COATED WITH DULUX LUXAPOXY UHB.

Dig Up Comments:

SOIL MOIST AND FREE OF STONES.

Operator:

Wayne Duff

Signature:

Duff

Date:

20/2/2013



Appendix 3 Photo Log

Photos:

0069

0074

1690

1690

2046

2048

2053

2054

2082

2083

2085

2102

2105

2107

2108



Appendix 4 LRUT

INSPECTION REPORTS

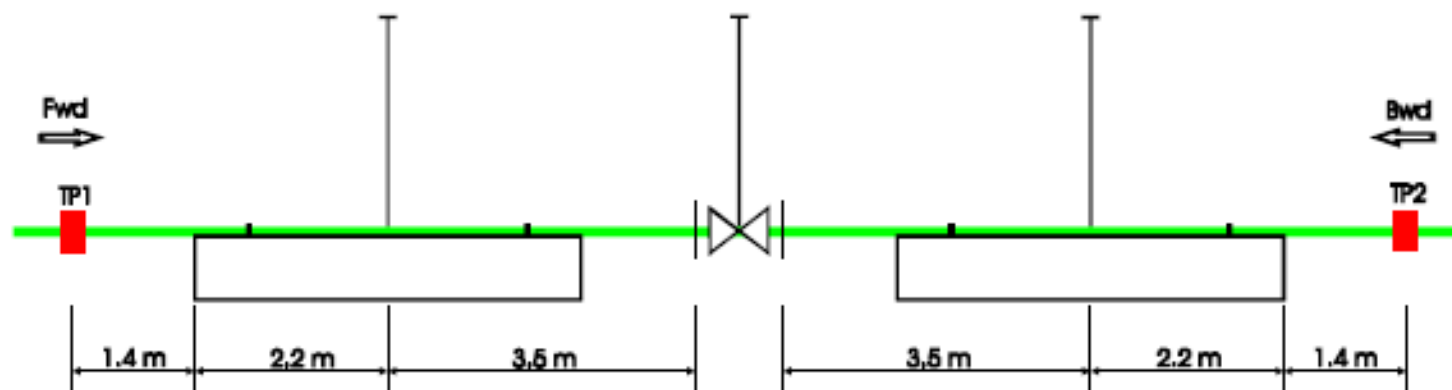
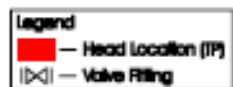
A comprehensive *LRUT* Inspection on the 10 and 14inch to concrete anchor block gas line at Kelly well MLV and Warrego scrapper station in Northern Territory Australia, has been conducted and the following is the summary of findings:

	Date of Insp.	Thickness measured at Head Location (mm)		LRUT Coverage Distance (m)			Anomaly categories			Inspection Findings / Comments / Remarks
		Min	Max	AG	UG	R/C	1	2	3	
Line ID: 14" Kelly well MLV (Forward only)										
TP 1	23.1.2013	8.8	8.9	-	3.48	-				No significant findings noted along test length during testing.
Line ID: 14" Kelly well MLV (Forward only)										
TP 2	23.1.2013	8.8	9.0	-	3.5	-				No significant findings noted along test length during testing.
Line ID: 14" Warrego Scrapper Station (Forward only)										
TP 1	23.1.2013	8.8	9.0	-	1.71	-				No significant findings noted along test length during testing.
Line ID: 14" Warrego Scrapper Station (Backward only)										
TP2	23.1.2013	8.8	8.9	-	2.11	-				No significant findings noted along test length during testing.
Line ID: 14" Warrego Scrapper Station (Forward only)										
TP3	23.1.2013	8.7	9.2	-	1.68	-				No significant findings noted along test length during testing.
Line ID: 14" Warrego Scrapper Station (Forward only)										
TP 4	23.1.2013	8.8	8.9	-	3.42	-				No significant findings noted along test length during testing.

Legend: Underground (UG), Aboveground (AG), Road Crossing (RC), NRWT – Net Remaining Wall Thickness

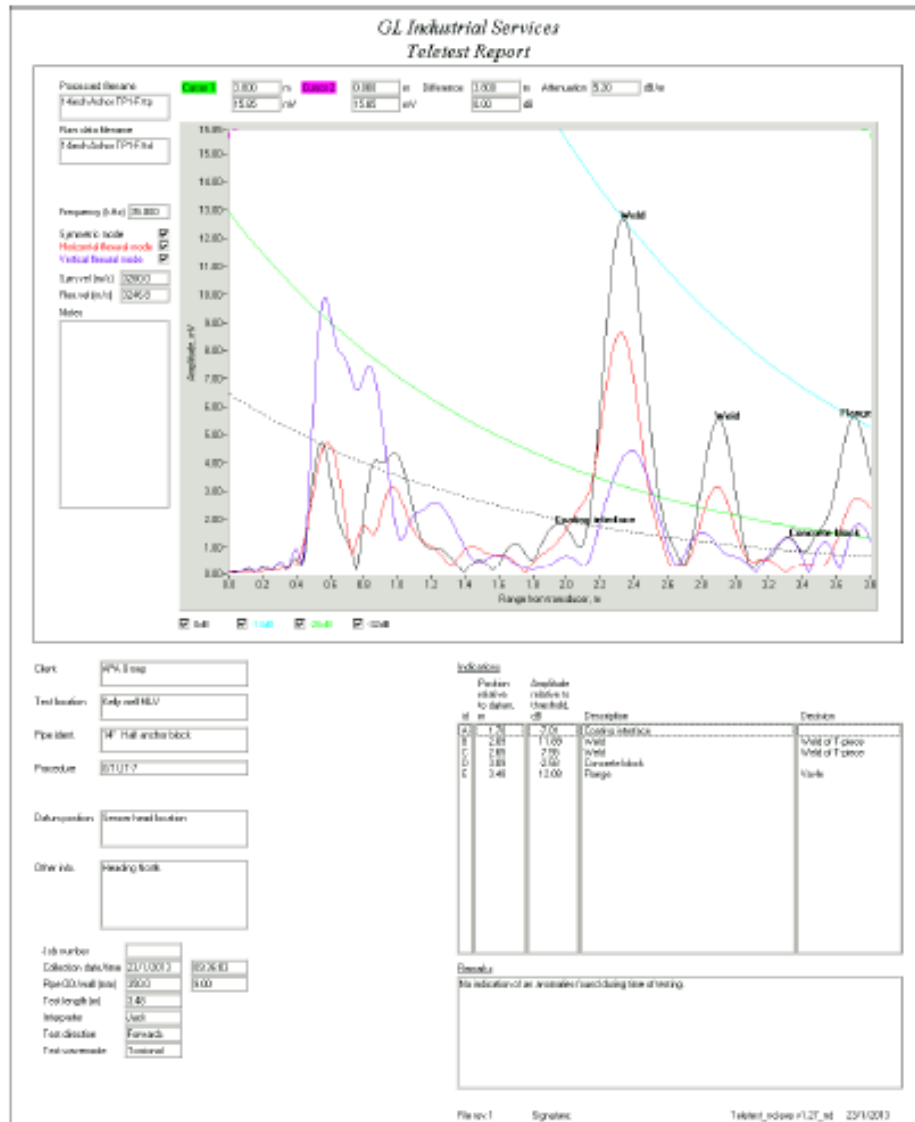
PIPELINE SCHEMATIC DRAWINGS

Line Identification: 14" Kelly Well MLV (Half Concrete Block)



Test Point 1 Line ID: 14" Kelly Well MLV

(Forward Shot only)



Test Point 2 Line ID: 14" Kelly Well MLV

(Backward Shot only)

