5-7 Alexandra Road
Hemel Hempstead
Herts HP2 5BS. UK

Tel: 44 (0)1442 242200
Fax: 44 (0)1442 214077
business@bpa.co.uk
www.bpa.co.uk

COPEX 2014

Pipeline Inspection and Repair – Dents

Richard Price

BPA, Operations Integrity Engineer

Oil and gas pipeline objectives

- Introduction, BPA and our Network
- BPA Integrity Management System
- Case Study – 14” Pipeline Dents
- Summary

Integrated
Pipeline
Solutions

BPA and Our Network

Title

Integrated
Pipeline
Solutions

BPA Integrity Management System – Pipeline Integrity

BPA operate several concurrent programmes to manage pipeline integrity, including:

- In-Line Inspection All transmission lines inspected on an agreed programme
  - Potential defects, evaluated, repaired or removed and recorded
  - Fitness for Purpose (FFP) analysis completed

- Corrosion Protection
  - Pipelines are wrapped and have CP systems
  - Routine monitoring of pipeline potentials (including remote monitoring)
  - CIPS/DCVG surveys completed on an agreed programme

- Management of Third Party Risks
  - Collaborative programmes (Linesearch and Linewatch)
  - Field surveys and regular liaison discussions
  - Contravention management and supervision

Case Study UKOP Thames – Mersey Pipeline

Investigation and findings on features identified on 14” pipeline following last in-line inspection

Pipeline Details

• Size:	14” NB
• Material:	API 5L X52
• Wall t:	7.14mm
• Operating Pressure:	MOP = 90barg (ANSI #600)
• Date to Service:	1968
• Service:	Gasoline, Jet/Kerosene, Diesel
• Internal Inspection History:	1992
	1997
	2002
	2011

Case Study – 14” Pipeline Dents

In-Line Inspection and FFP

- 2011 ILI survey – Baker Hughes MFL with Inertial Navigation system
- FFP looked at results, previous 2002 (Tuboscope/NDT) run and CIPS/DCVG survey in 2004

- Findings:

Inspection	Dents (>3% ID)	Metal Loss (>10% Wt)
2002	6	235
2011	10	295

- Review of reports indicated change due to differences in report analysis (15%WT compared to more accurate 10%WT now) and so 2011 ILI found all the 2002 features and found “new” minor ones

Case Study – 14” Pipeline Dents

Dent 1

- 1.8% dent/metal loss and shorted sleeve
- Previously reported in 2002 ILI as not a dent but a touching casing
- Pipeline sleeve had crushed spacer and pipe resting on casing
- Dent/metal loss within length covered by sleeve
- Repair works identified to ensure pipeline integrity
- Major road near London

Case Study – 14” Pipeline Dents

Dent 1

- Wrap master repair on dent
- Casing cut-back and re-aligned
- New link seals installed

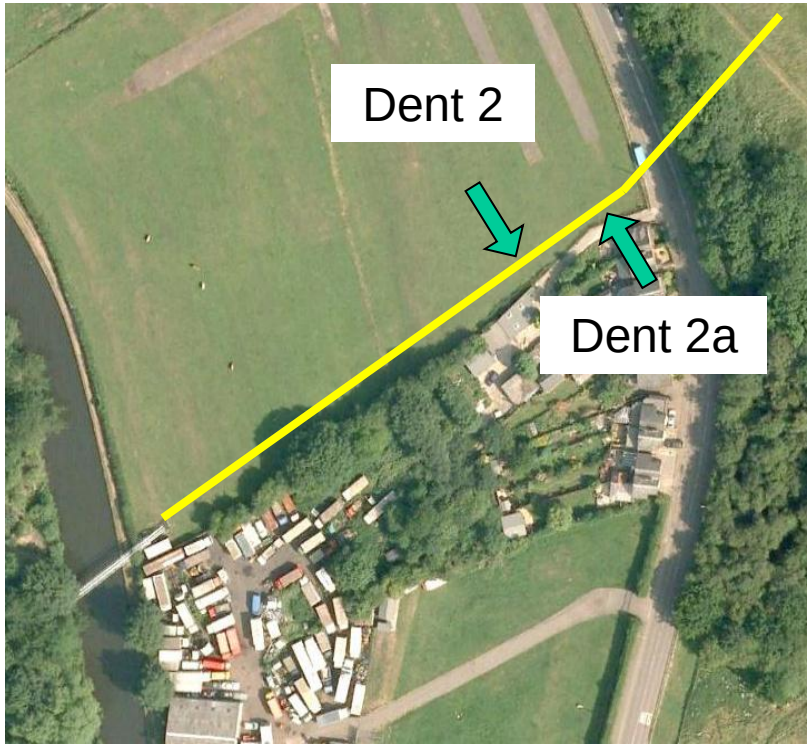
Failure Causes

- Natural ground movement around pipeline

Case Study – 14” Pipeline Dents

Dents 2 and 2a

- Dent 2: 6% dent with associated metal loss
- Dent 2a: adjacent to Dent 2a
- Previously reported in 2002 as exaggerated reaction of sensors to girth weld and no metal loss
- Dents excavated and repair strategy developed
- Pipeline Clamps installed as temporary measure
- Local land use issues also had to be taken into account



Case Study – 14” Pipeline Dents

Dents 2 and 2a

- Cut out and replace repair strategy
- Pipeline nitrogen cleared
- Pup pieces installed
- 2a pup piece had to be formed

Failure Cause

- Construction/installation damage
- Believed to have been there 45 years

Dent 2

Case Study – Dents 2 and 2a

Installation of formed pup-piece

Removed Dent

Summary

- Integrity management programmes comprise multiple activities to help improve confidence in the condition of the pipeline
- Must be confident that these barriers to failure are working
- Pipeline condition will change over time, as a pipeline ages you expect to find features from inspections
- Newer tools are more accurate – you will find more, including features you may not have been identified on previous inspections
- More accurate tools/processes help us improve our level of confidence
- Information helps us to act and ensure integrity

Questions

- Any questions?