

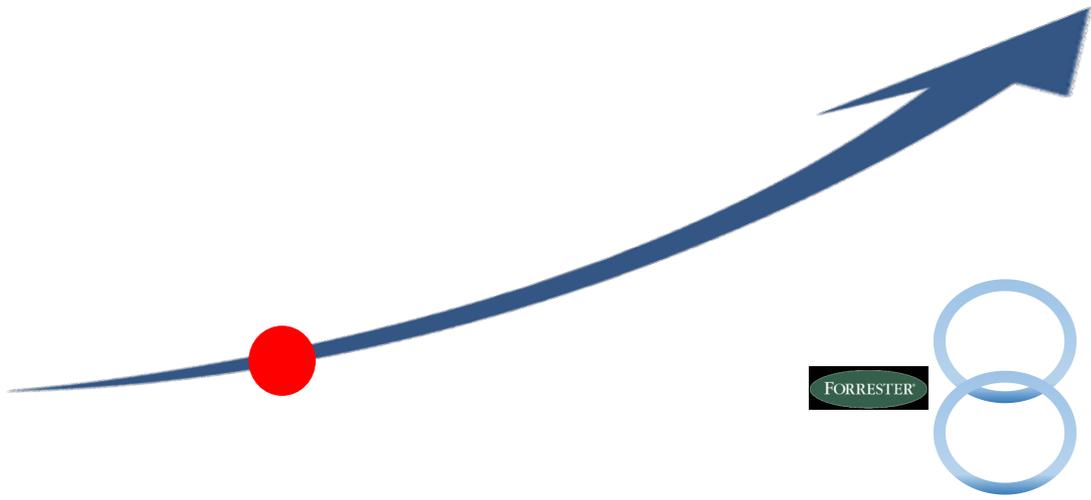
The Safety Data Transformation

Dr. Sherry S. Borener
Senior Research Advisor

Pipeline and Hazardous Materials Safety
Administration
(PHMSA)



Data is what fuels safety transformation



San Bruno

IMPORTANCE:

- PHMSA oversees the safety 2.8 Million miles of pipeline
 - Risk management
 - Cost management
 - Infrastructure maintenance



BENEFITS of DATA FUSION and AI

- Combing information resources will create a more accurate picture of what is going on in the community (especially in better understanding the origin of rare events).
- Possession of complete and accurate data leads to deeper analysis and system safety enhancements that benefit the entire industry.
- Fused data equals shared analysis. Collaborative analysis by a broad-based community of experts has consistently provided superior risk reduction.
- AI allows us to capture data and convert it to actionable information.



DATA VOLUME and VARIETY

PHMSA holds hundreds of thousands of data points:

- *134,241 Event Records* that describe some aspect of pipeline operational risk

Explorer Content Analytics

Explorer Content Analytics

Specify search terms

134241

1

Documents

Facets

Time Series

Deviations

Results 1-10 of 134241

1 2 3 4 5 ... 10

Sort by: [Relevance]

[jdbc://jdbc:oracle:thin:@phmhqndb015:1521:HIPP/](#)

Dec 5, 2018, 3:23:40 PM

00327.0689114046.1284.91137.87Natural Gas3TOTAL1FLOYD0993202564COL EST00.5278.068911441.40000006560SOUTHERN NATURAL GAS CO1851626 System 1704 - KM_Gas_SNG_North_MainNatural Gas11362GATLANTA OPER ALABAMA-GEORGIA STATE LINE (MILE POST 11.670, NORTH OF US-78) TO I-24/I-75 SPLIT). GEORGIA TENNESSEE STATE LINE IS AT MILE POST 113.7 FROM EAST OF TUNNEL HILL, GEORGIA TO SOUTHEAST OF CLEVELAND, 8.413 EAST TENNESSEE LATERAL LINE - FROM...

[jdbc://jdbc:oracle:thin:@phmhqndb015:1521:HIPP/](#)

Dec 5, 2018, 3:23:41 PM

0 0 328.7637254 0 0 0 0 Crude Oil 6 TOTAL 0 TIPTO 0 4828 1 32147 MARATHC 2016 00:00:00 EDT 0 0 .5 168.7637254 160 0 0 .3 1 0 0 19154 MARATHON PIPE HIGH .3 A A 23040 0 SO System 3790 - Marathon_Capline MARATHON'S MID-S RECORDS LOCATED AT NESBIT, MS OFFICE. Crude Oil 15 1682 T SINGLE LI



DATA VOLUME and VARIETY

Non-destructive Evaluation (NDE)

The use of robotic systems “pigs” that crawl through the pipeline to identify anomalies that may be predictors of pipeline failures.



top short of 30L closure.

26" Trap Inlet/Outlet Valve assembly

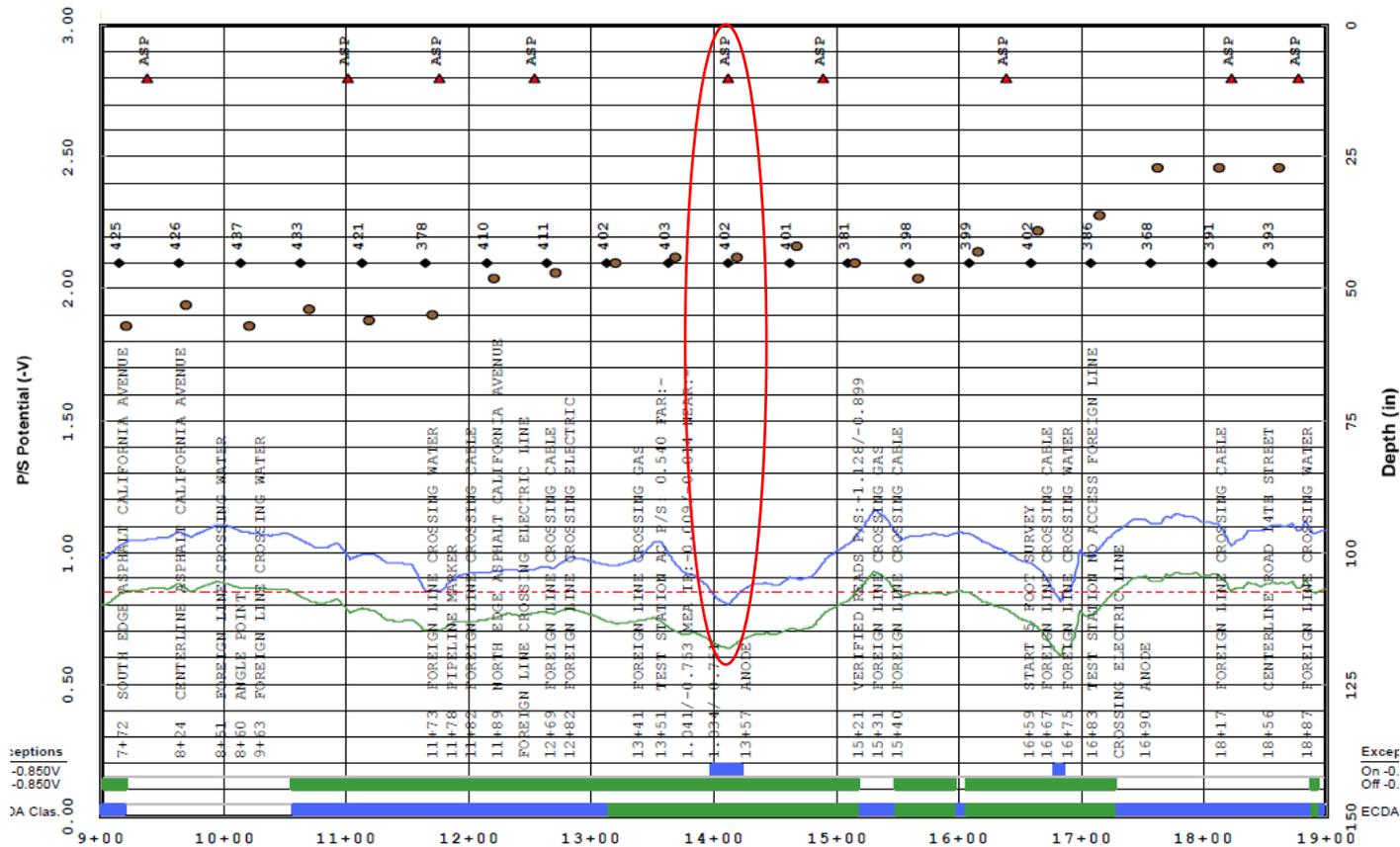


mesh removed from gate cavity

Residual heavy-oil containing mesh



The Goal - Enhanced Threat Detection



... and accident prevention



BENEFITS of AI to NDE

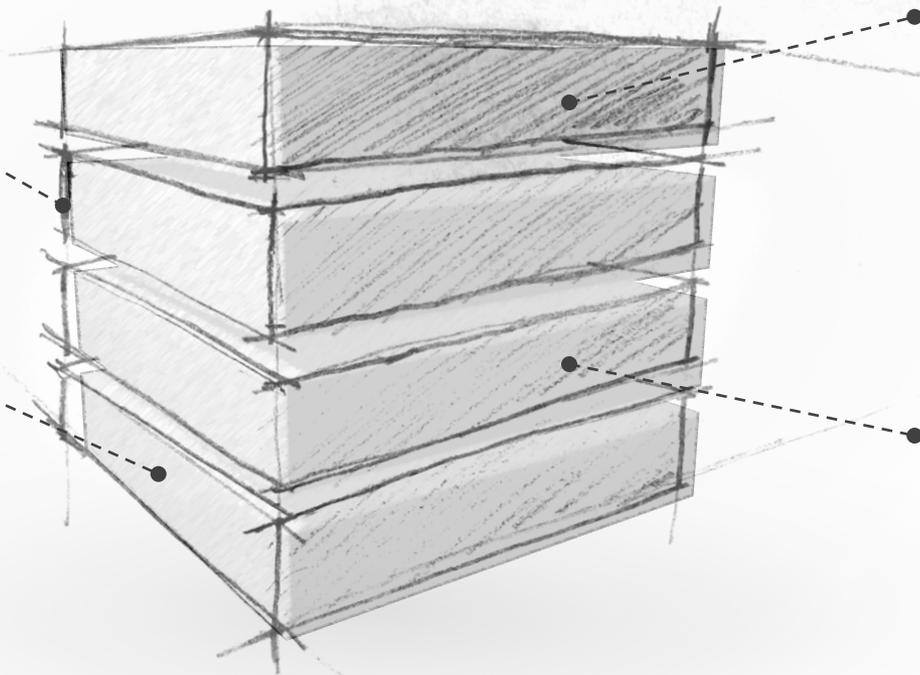
- Allow us to identify a digital signature for potential failures and reduce the time it takes to act
- Reduce false positives and the associated costs
- ‘Allow Operators to compare significant anomalies identified/mile and assess impact of quality or process of NDE techniques vs. effectiveness.
- Ultimately – improve safety



A FUTURE AI CONCEPT

Level 3
Expert judgement
and historical data
combined

Level 1
Lessons
learned reports
and multi-
operator
historical
experience



Level 4
AI
applications
running
based upon
multi-
operator,
multi-year
experience

Level 2
Multiple field
data sources
compared
based upon
similar
location,
design,
historical or
performance
factors

