

SENSOR[®]
NETWORKS, INC

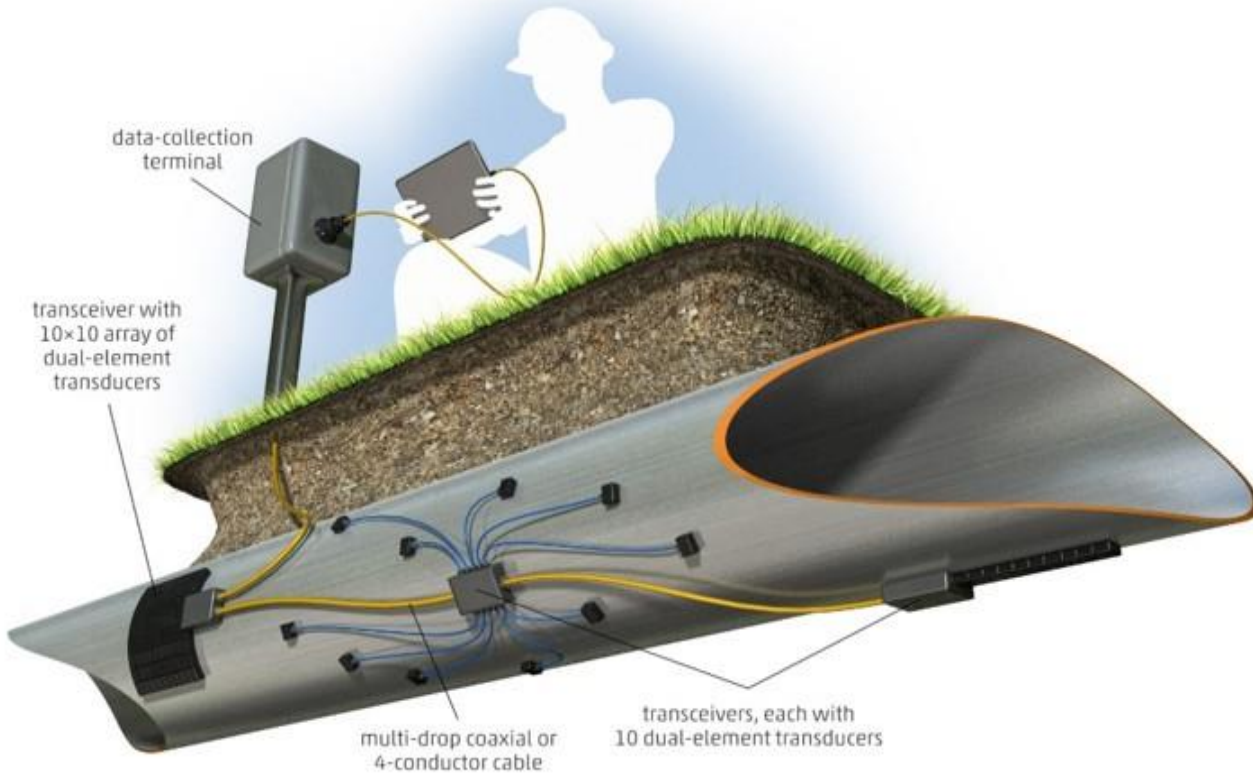
Inspection, Testing & Asset-Integrity Solutions



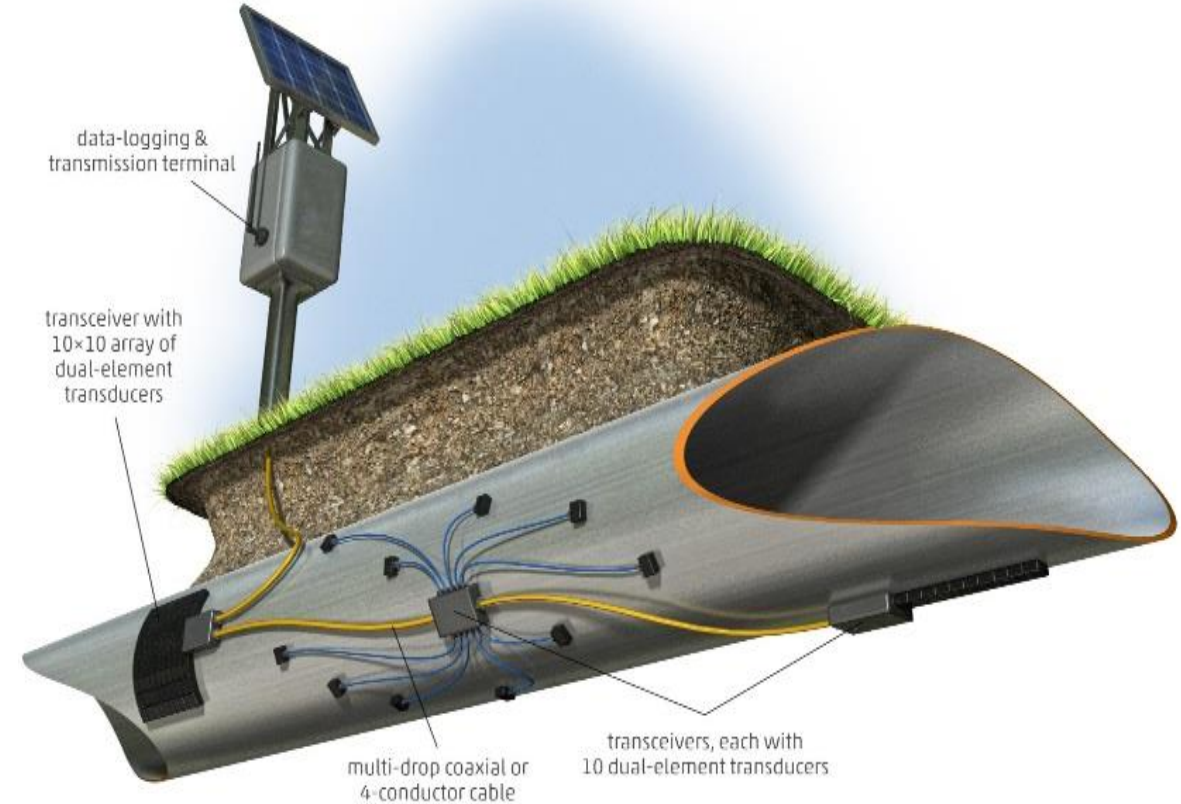
Midstream

Asset Integrity & Corrosion Monitoring Using
Installed Ultrasonic Sensors

Manual or Automated Internal UT Thickness Data Collection



Manual Collection



Wireless Collection (Cellular)

Internal Corrosion Monitoring for New or Vintage (Buried or Above Ground) Assets

matPIMS – Area Monitoring

- New construction for potential low collection areas
- Spots which have previously failed
- Locations which have been fixed, sleeved, or repaired



smartPIMS – Point Monitoring

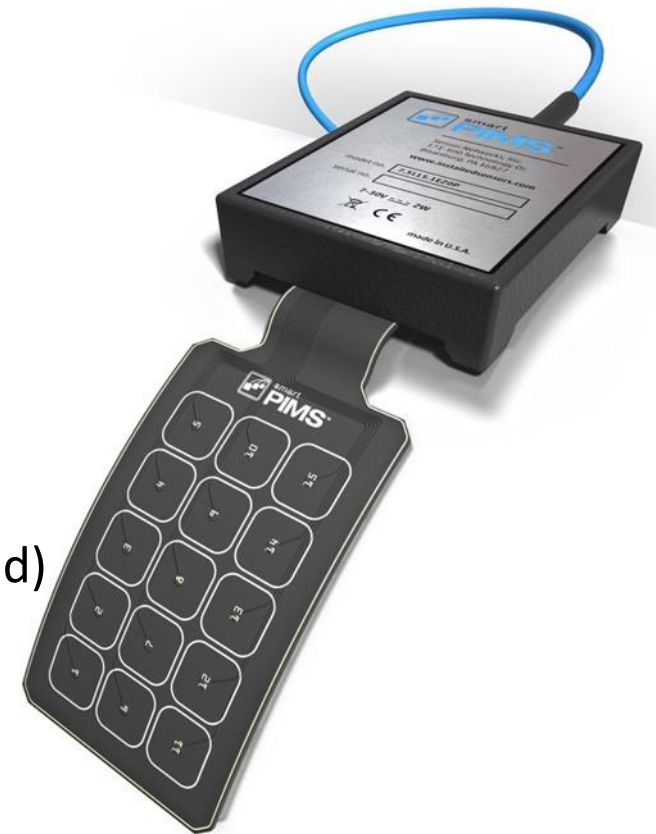
- Pits or “low spots” which have been identified by ILI
- Used to track status of ‘anomalies’ to measure if they are active (growing) or inactive
- For remediation tactics (verify inhibitor or cleaning effectiveness)



matPIMS – Area Monitoring



- **Standard sizes:** 1x15 or 3x5 array
- **Custom sizes:** Available up to 32 elements and 100 inches in length
- **Temperature Range:** -30 to 150F
- **Thickness Range:** 0.1”(2.5mm) – 2”(50mm)
- **Accuracy:** +/- .001” (.025mm)
- **Installation:** Permanent (above or below ground)
- Epoxy acts as couplant and adhesive
- Wired communication (RS-485) for tablet collection or integration with SCADA/PLC/DCS, etc.



matPIMS – Installation Applications

New Construction: During topography review, potential low spots are identified which could be problematic in the future (examples: valleys, when construction must go below existing lines, etc.)

Pipe Replacement: Sensors are installed on areas that have previously failed or had to be fixed, sleeved, or repaired (if it failed at this location once, chances are it could happen again)



matPIMS – Installation Applications



1. Measure, draw, and surface prep the area on the pipe where the sensors will be epoxied to the bare pipe



2. Once area has been prepped to bare metal, use alcohol wipe to sterilize area where sensors will be epoxied



3. Head shell is attached using quick dry Rectorseal and epoxy is applied to each sensor of the matPIMS

matPIMS – Installation Applications



4. Once epoxied mat is placed on the pipe, magnet bands are placed on the top of each sensor until epoxy has dried (6-24 hours depending on pipe temperature)



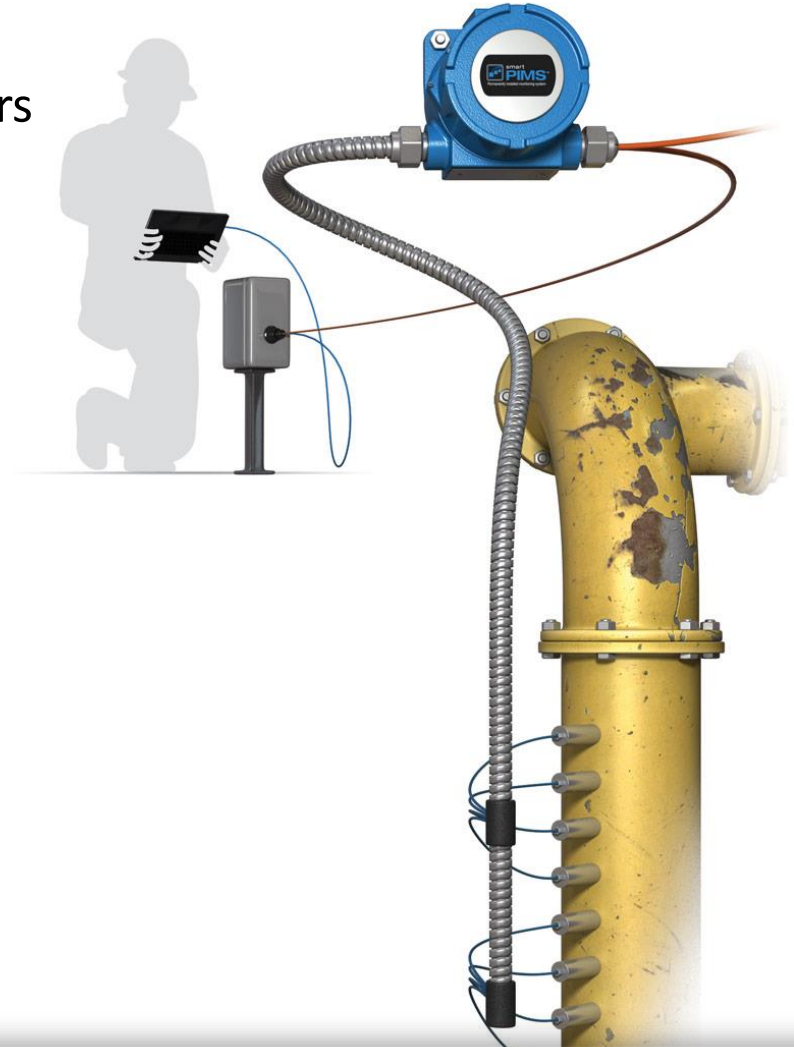
5. After epoxy has dried, magnets can be removed and matPIMS is ready for overwrap and burial



6. Cover the sensors and Stopaq putty and Stopaq wrap with cable coming to surface. Ensure proper coatings are used per procedure

smartPIMS – Multi-Point Monitoring

- **Sensors**: Up to 8 dual element sensors per system
- **Temperature Range**: -30 to 300F
- **Thickness Range**: 0.04”(1mm) – 4”(152mm)
- **Installation**: Permanent or Temporary
- **Accuracy**: +/- .001” (.025mm)
- Cellular, Datalogger, or Modbus (RS-485 to tablet or integrated to SCADA)
- Epoxy acts as couplant and adhesive
- UL/CSA, CID2, A-D, T4



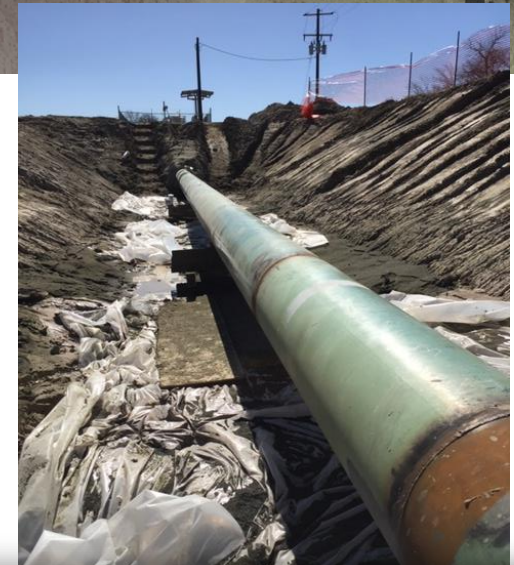
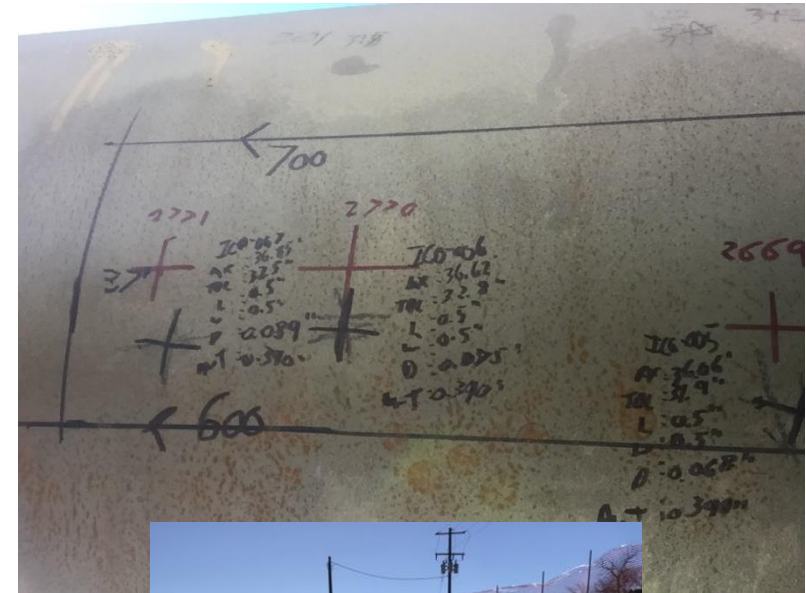
smartPIMS – Installation Examples



Post ILI Inspection: Placing discrete sensors on 'pits', 'low spots' or 'anomalies' to monitor if they are active/in-active without having to excavate the pipe or perform a tool run

Quantifying Remediation Strategies: Placing discrete sensors in select areas and collecting wall thickness data using different cleaning tools or inhibitors

Regulation: DOT and PHMSA regulations for 49 CFR 192 and 195 calling for pipeline MONITORING between inspections



smartPIMS – Installation Steps



1. Surface prep (remove coatings), use alcohol wipe to decontaminate probe and area, and epoxy probe to pipe

2. After epoxy has cured, cover the sensor like an igloo in Stopaq putty and wrap so that probe is fully sealed and ready for over coating

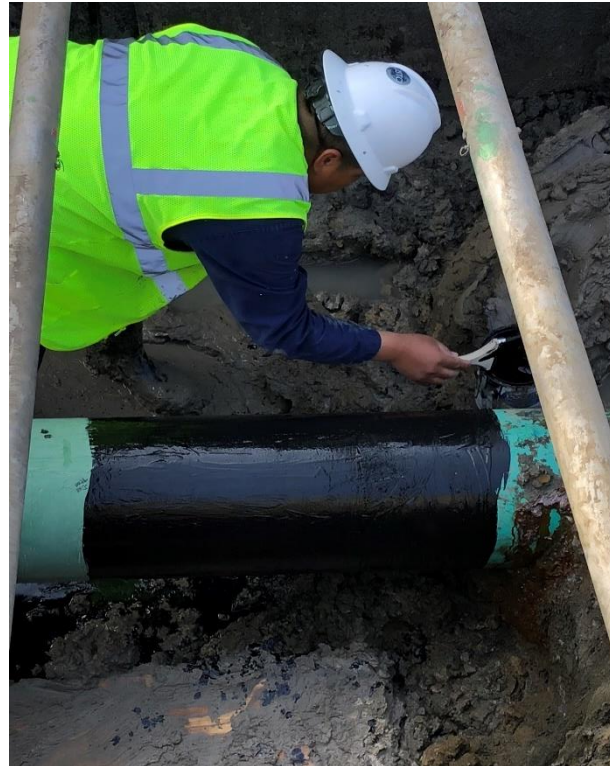
smartPIMS – Post Installation Sealing



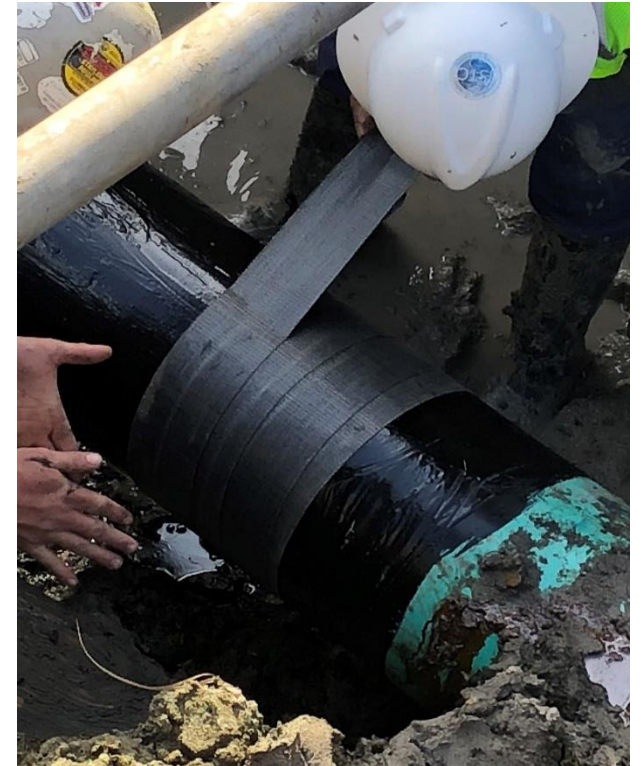
Probes readings are taken for baseline data



Pipe can be coated in Denso or other approved coating



Primer is then applied over the Denso coating



Pipe is then wrapped in RD-6 or other approved material

smartPIMS – Backfill & Ready for Data Collection



Backfill should be done **carefully** at least 24 hours after installation



smartPIMS or matPIMS collection point resides inside box for periodic data collection



webPIMS – Data Management

SNI: Access Points | smart | x

www.smartpims.com/ultrasensecloud/organizations/7/summary

Jim Barshinger

Executive Summary

Companies > SNI

Asset Health

In tolerance:	8
Warnings:	0
Alarms:	1

Name	SNI
Description	
Address	171 Technology Drive Boalsburg, PA 16827 USA
Phone	814-466-7207

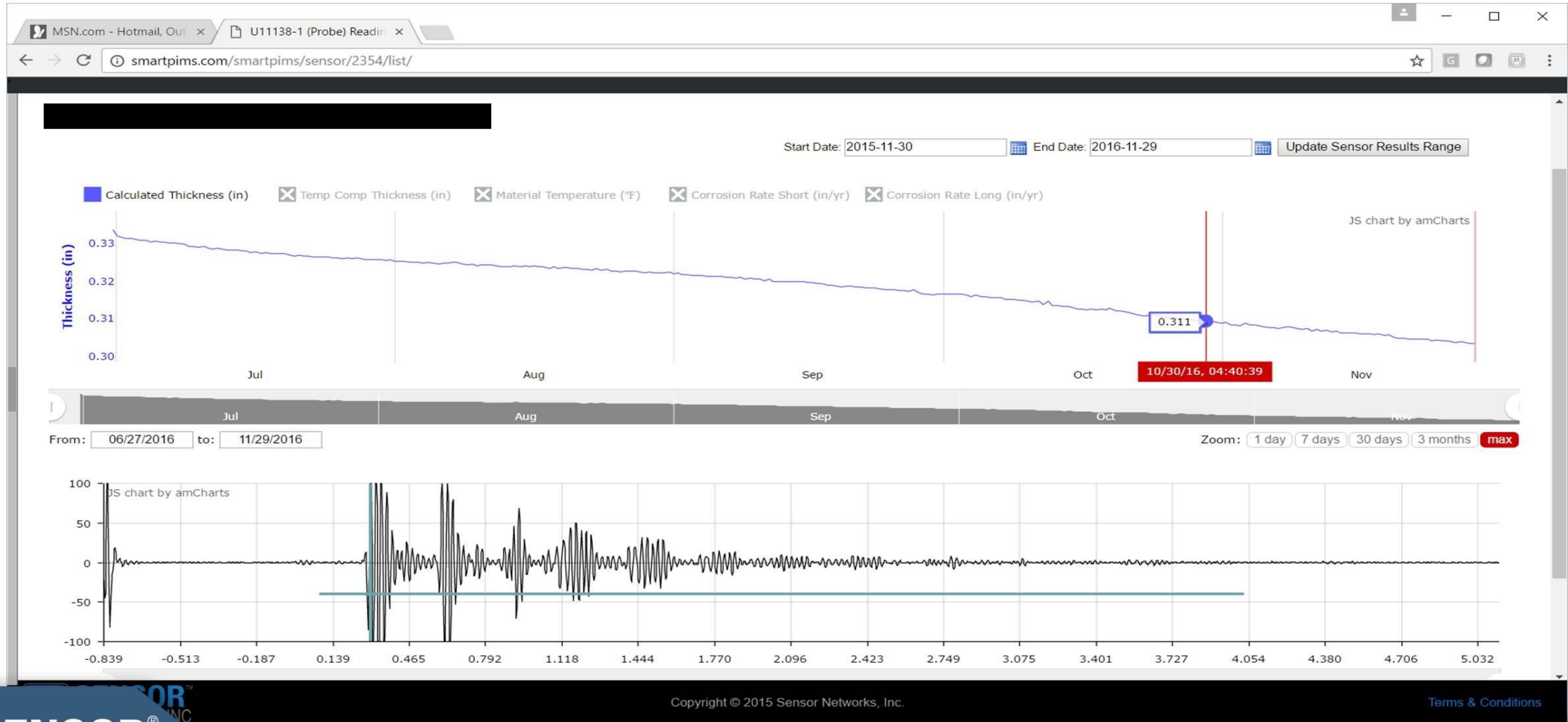
Alarms

Alarms Only | Warnings and Alarms | All TMLs

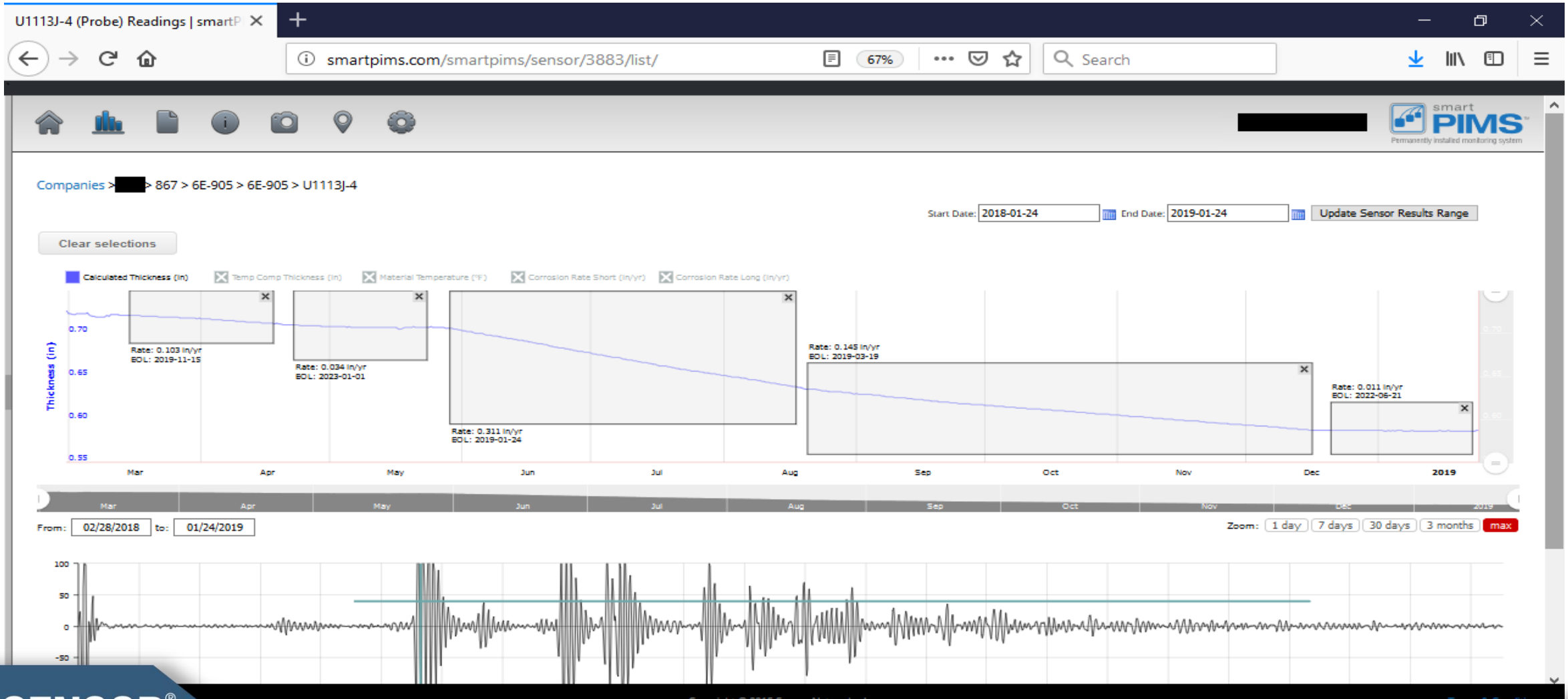
Measurement Timestamp	Asset	Measurement Location	Calculated Thickness (mm)	Temp Comp Thickness (mm)	Warning Thickness Threshold (mm)	Minimum Thickness Threshold (mm)	Corrosion Rate Short (mm/yr)	Corrosion Rate Long (mm/yr)	Warning Corrosion Rate Threshold (mm/yr)	Maximum Corrosion Rate Threshold (mm/yr)
Nov. 17, 2015, 4:30 p.m.	Steve Demo	#123456-2	0.000	N/A	7.000	3.000	N/A	N/A	N/A	N/A
Nov. 17, 2015, 4:29 p.m.	Steve Demo	#123456-1	13.121	N/A	7.000	3.000	N/A	N/A	N/A	N/A
Sept. 17, 2015, 2:50 p.m.	Asia Demo	#DSI-0002-1	6.950	N/A	0.000	5.500	N/A	N/A	N/A	N/A
Sept. 14, 2015, 9:03 a.m.	Demo	#DSI-0002-1	12.464	N/A	0.000	5.500	N/A	N/A	N/A	N/A
Feb. 8, 2015, noon	Unit 12 Piping	#PI-DSI0041-1	9.539	N/A	0.000	7.190	N/A	N/A	N/A	N/A
Jan. 1, 2015, midnight	Unit 12 Piping	#PI-DSI0041-1	9.550	N/A	0.000	7.190	N/A	N/A	N/A	N/A
Dec. 31, 2013, noon	Unit 12 Piping	#PI-DSI0041-1	9.882	N/A	0.000	7.190	N/A	N/A	N/A	N/A
Dec. 31, 2013, noon	Unit 12 Piping	#PI-DSI0041-1	9.427	N/A	0.000	7.190	N/A	N/A	N/A	N/A
Dec. 31, 2013, noon	Unit 12 Piping	#PI-DSI0041-1	9882.486	N/A	0.000	7.190	N/A	N/A	N/A	N/A

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webPIMS – Data Analytics, Trending, & Reporting



Time Gated Corrosion Rate Mgmt.



Data Integration

Historians Integration: Pull data from webPIMS and push into historians

Excel Reporting: Export data from webPIMS and archive locally, report, trending, etc.

IDMS Management: Input data from selected dates in webPIMS

