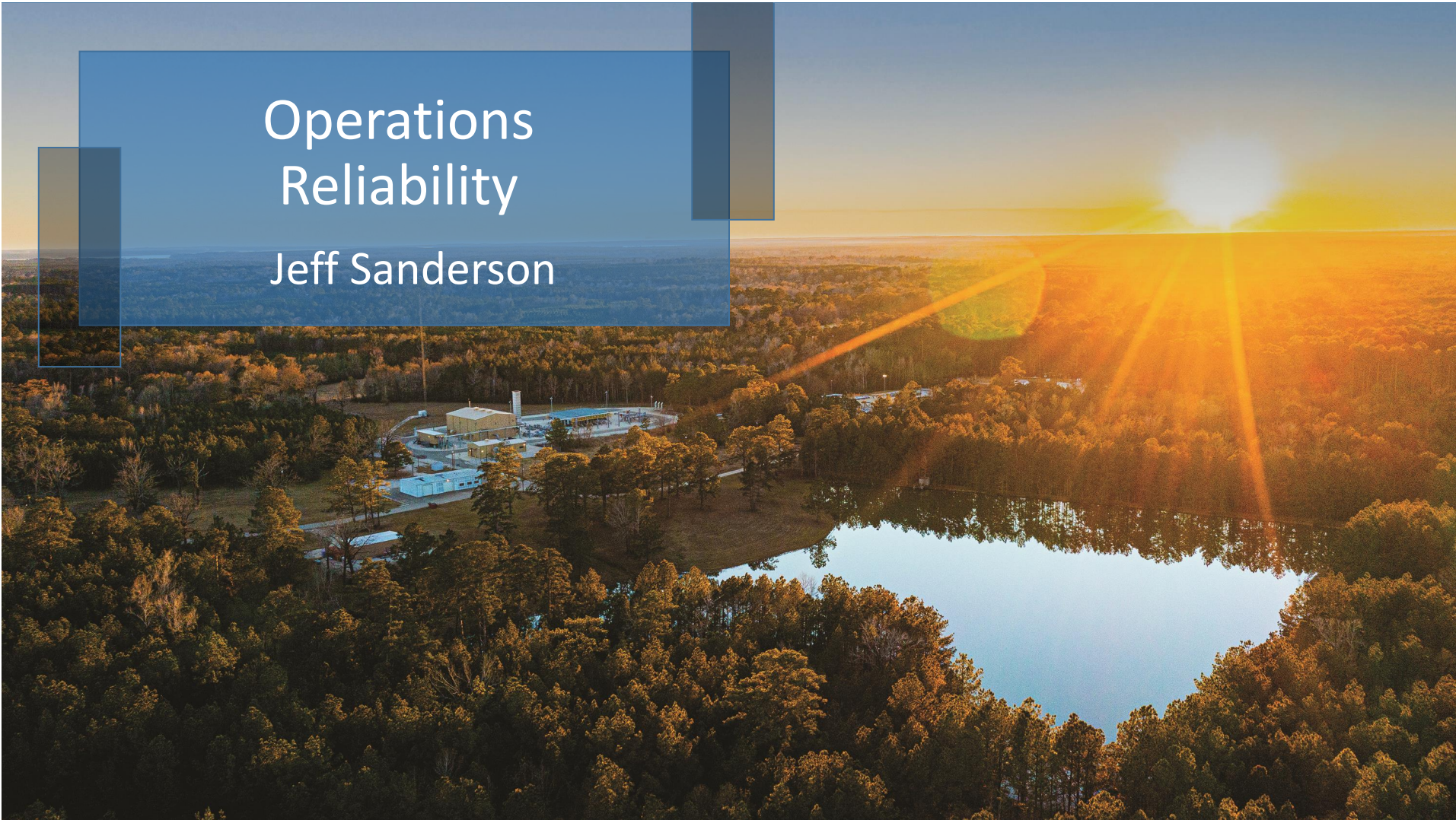




Boardwalk's Customer Meeting

April 5, 2023



Operations Reliability

Jeff Sanderson



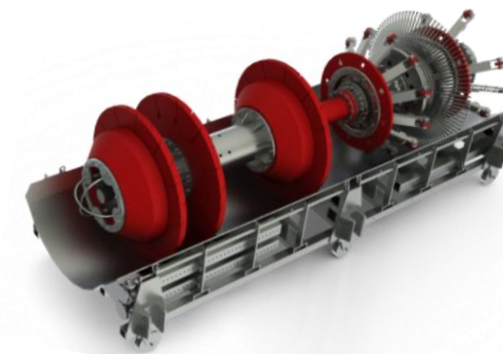
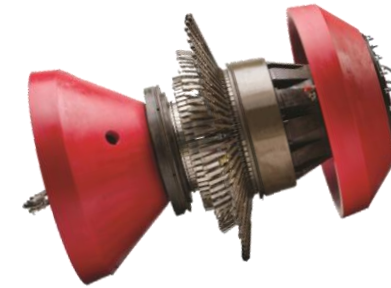
Operations Commitment

- To be a leading provider of energy services with a commitment to deliver safe and **reliable** infrastructure.
- To create value for our stakeholders through superior customer service and a commitment to **operational excellence**.

Pipeline Reliability

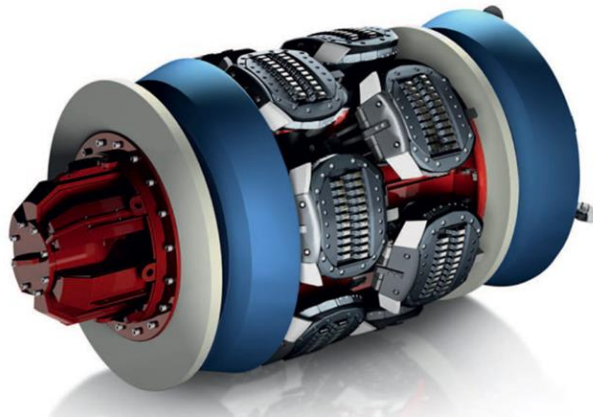
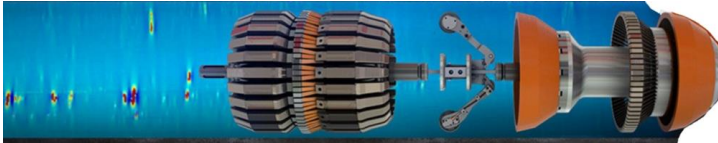
ILI Program Totals for 2022

- 71 In-line Inspections Completed or 2046 miles of pipe
 - 43 Magnetic Flux Leakage/Deformation/Mapping (MFL-A Combo Tool)
 - 6 Circumferential Magnetic Flux Leakage (MFL-C)
 - 7 Electro-Magnetic Acoustic Transducer (EMAT)
 - 15 New Construction Caliper Inspections
- 236 Anomaly investigations have been issued to date; Continue to evaluate and issue more investigations as necessary



ILI Technology & Analytics

In-Line Inspection Tools



■ Magnetic Flux Leakage (MFL):

- Widely used in the industry for metal loss detection and sizing
- Has been used since the 60s and is routinely updated with more sensors, capabilities and accuracy advancements
- Used in finding internal and external corrosion, manufacturing anomalies, welding anomalies, equipment anomalies and third-party damage

■ Deformation:

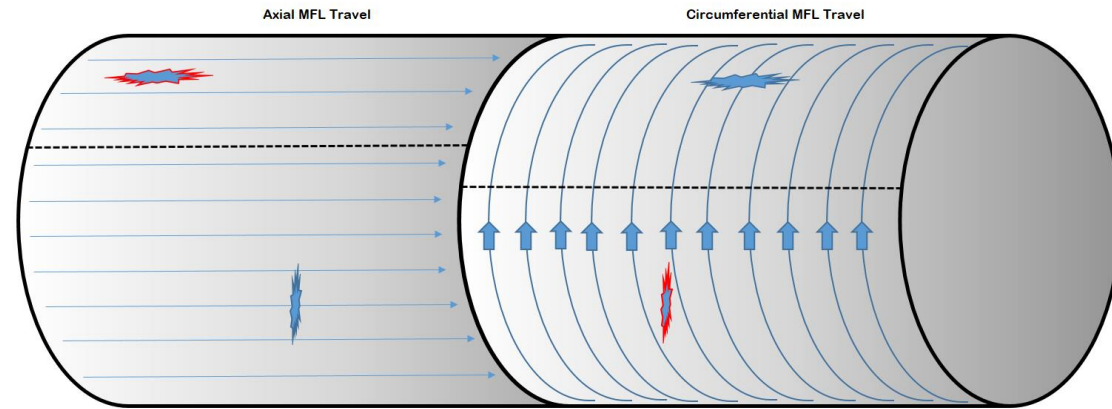
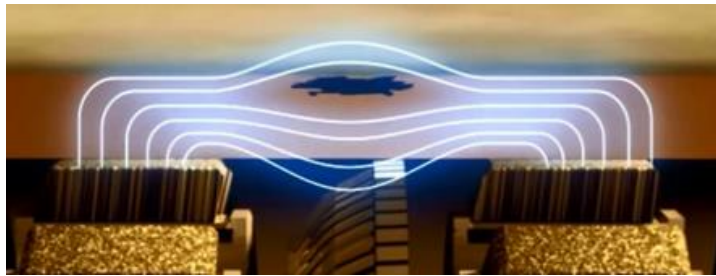
- Deformation tools are used to find geometric anomalies within the pipeline such as dents, buckles, ovalities and expansions.
- Sizing is normally accurate down to 1% of the pipe diameter.
- Additionally, deformation tools can locate known features such as taps, tees, valve and bends. These are also known as caliper tools.

■ Combination Tools (Combo):

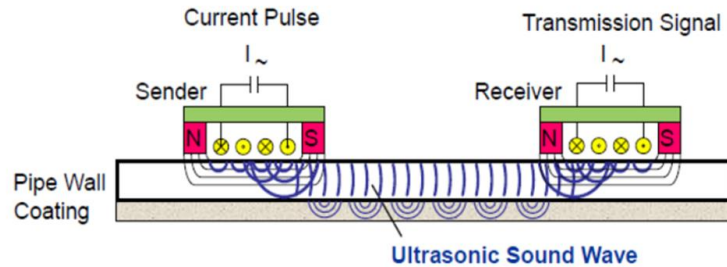
- Combo tools are inspection tools that have multiple technologies on board to maximize efficiency and data collection.
- The most-used combo tool utilizes the technologies above and is a significant portion of Boardwalk's ILI program.

ILI Technology & Analytics

In-Line Inspection Tools



- **Standard Axial MFL** (normally referred to as MFL) and **Circumferential MFL** (normally referred to as CMFL) utilize the same technology. The difference comes in when the sensors are turned 90 degrees in order to get a different view of the anomaly.
- For this reason, it is important to alternate technology when possible. Alternating technology allows you to view the pipeline at a different angle, allowing for additional verification of features throughout the inspection area.



■ Electro-Magnetic Acoustic Transducer (EMAT):

- Uses ultrasonic detection designed for natural gas environments
- Detection and sizing for cracking or crack-like features in the pipeline
- Usage is available instead of hydrotesting
 - Data is available vs. pass/fail from hydrotest
- Developed for pipelines in the early 2000s and is widely used today

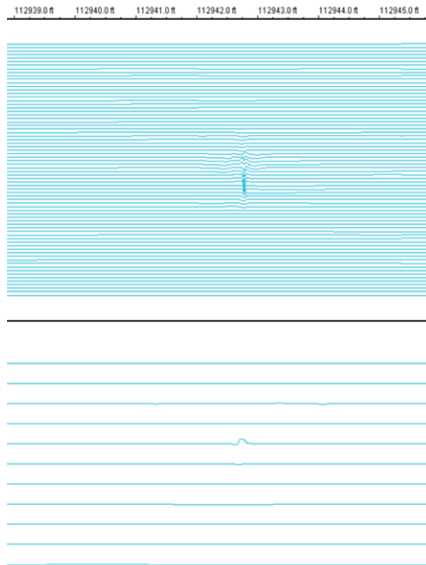


ILI Technology & Analytics

Data Comparisons and Dig Selection

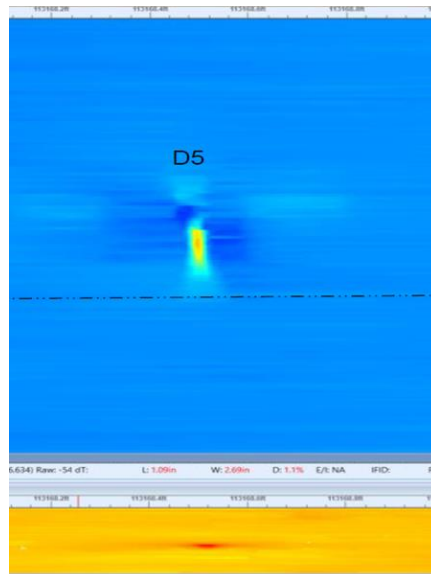
2016 ILI

- Manufacturing defect called
- Non-injurious (monitor)



2021 ILI

- Dent with Metal loss called
- Immediate condition



In-Ditch Findings

- Repaired upon excavation
- Differences in reporting are attributed to advances in technology and grading capabilities



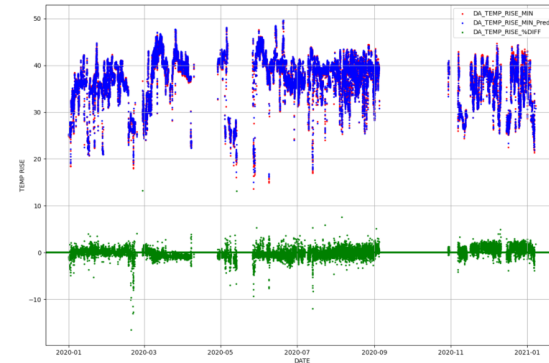
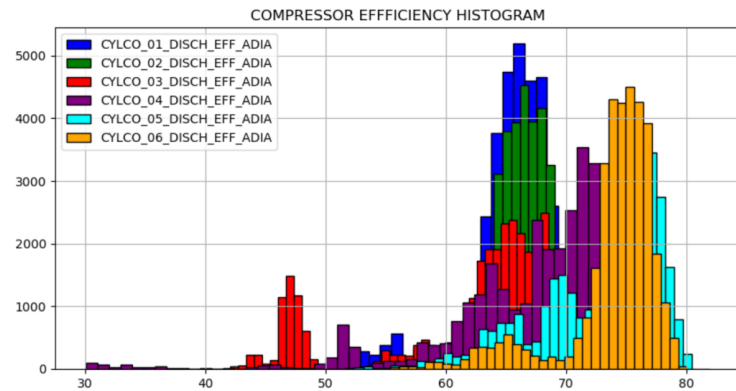
Asset Reliability

Predictive Measures

- Solar InSight (OEM):
 - Remote monitoring and diagnostics
 - Condition Assessments (4,000 hours or annual)
 - Two dedicated Solar Fleet Managers & one Fleet Engineer
- Reciprocating Engine and Compressor Analysis (2150 hours)
- Routine and Advanced Oil analysis
- Glycol analysis (jacket water, boilers and dehy)
- Data Historian/Trending/Events (Canary Labs)
- 3rd party vibration and infrared analysis

Predictive Measures

- Artificial Intelligence/Machine Learning
 - In-house and 3rd Party solutions are utilized
 - Real-time prediction of asset parameters for comparing to actual values
 - Allows for early detection of “hidden” asset defects
 - Identify asset performance degradation/inefficiencies



Maintenance – Exchanges/Overhauls

- Solar Turbines – engine exchange intervals extended based on borescope inspections and operating data (i.e., vibration, performance, etc.)
- Recip Overhauls – based on hours, oil analysis, engine analysis

	2022 Completed	2023 Planned
Turbine Exchanges	7	10
Engine Overhauls	13	18

Outage Coordination

- Pipeline and Horsepower maintenance outages are coordinated across the organization and entered into our Gas Control Service Request (GCSR) system.
 - Project Managers work closely with Operations, Gas Control and Commercial to minimize customer impacts.
 - Changes to planned outages are updated in GCSR to ensure all stakeholders are aware of potential impacts.

Inclement Weather and Reliability

- Control Value Insulated Boxes
 - Valve priority list identified
 - Insulated boxes both maintain heat and protect from freezing rain
 - Flaps allow for maintenance
 - Straps allow for removal
 - Projects ongoing

- Turbine Fuel Run Weather Covers
 - Covers for complete turbine fuel runs will keep the summer sun and the winter weather off these components
 - Projects ongoing



Inclement Weather and Reliability

- Critical Station Turbine Control Upgrades
 - Three active capital projects for obsolescence mitigation regarding Solar controls for improved reliability.
- Compressed Air System Reviews
 - Scheduled air dryer replacements
 - Evaluating heat tracing and piping arrangements
 - Enclosure upgrade evaluations
- Critical Equipment Enclosure Review
 - Evaluating building heat and weather enclosure upgrades for legacy horsepower
- Compressor Station Design Standards
 - Working with OEMs to ensure equipment is specified to handle temperature ranges.
 - Changing OEM equipment specs to include new controls and hardware to mitigate cold temperatures.
 - Findings from all assessments will be used to modify BWP standards. They are living documents that adapt to lessons learned.

Inclement Weather and Reliability

- Third Party Station Assessments:
 - To ensure BWP is taking a complete view of potential risks associated with our assets and overall reliability strategy, a third-party contractor will be conducting assessments of ten compressor stations in 2023 used as an additional reference. They will assess reliability with an emphasis on cold weather operation and provide a supplemental review of tasks such as:
 - Analysis Programs
 - Winter Operation
 - Operational Modes
 - Preventative Maintenance Programs
 - Spares
 - Auxiliary Equipment
 - Safety Systems
 - Gas Conditioning
 - Risks and Major Exposure Assessments
- The findings and action items will be carried over to our other stations and will result in capital projects.



Methane Emissions Reductions

