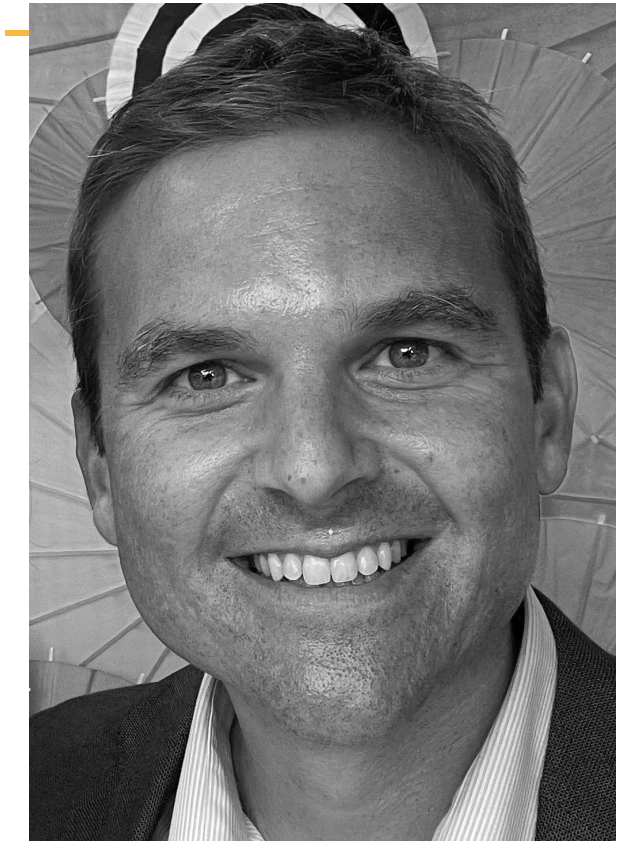
NOVEMBER 16, 2022

Vistra Corp – Kosse Mine Digital Transformation Journey

Presented by: Michael Hull, Jessica Ewy, Peter Liu



MICHAEL HULL

Senior Technology Leader

VISTRA CORP

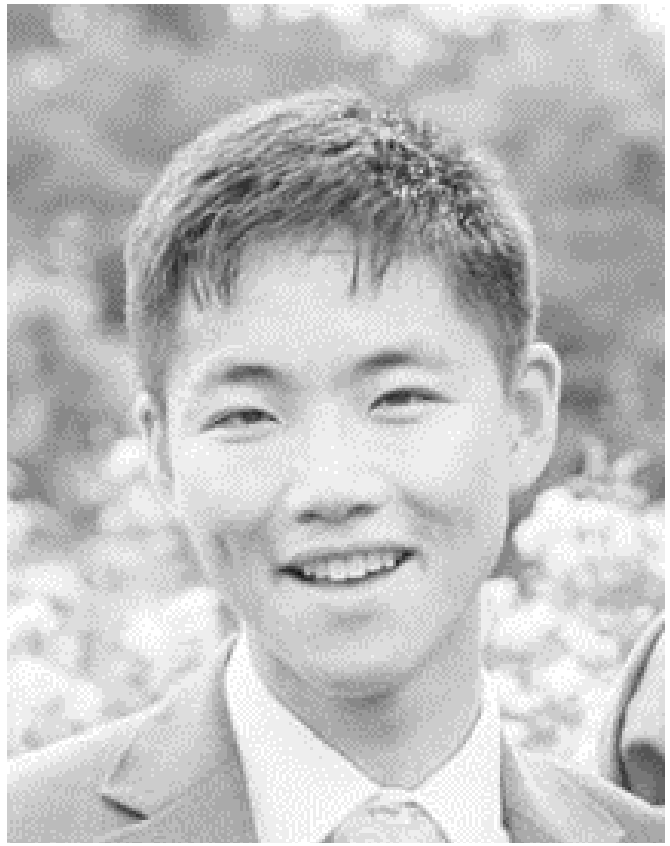
MICHAEL.HULL@LUMINANT.COM

JESSICA EWY

Technical Program Manager

CASNE ENGINEERING

JESSICA.EWY@CASNE.COM



PETER LIU

Systems Engineer II

CASNE ENGINEERING

PETER.LIU@CASNE.COM

AVEVA

CASNE

- Operating globally from Bellevue, WA USA. Established in 1979
- Full-service engineering, systems integration, and technology services.
- AVEVA Endorsed Systems Integrator (AVEVA PI systems) since 2006
- Partnership with Vistra Corp since 2014

- **OIL AND GAS**
- **WATER/WASTEWATER**
- **MANUFACTURING**
- **POWER GENERATION**
- **T&D**
- **DATA CENTERS**
- **CRITICAL FACILITIES**
- **TRANSPORTATION**
- **MINING**

6 INFRASTRUCTURE Oilsoft Accredited

5 INSTALLATION Oilsoft Accredited

CASNE CLOUDSTREAM

AVEVA ENDORSED OPERATIONS System Integrator

AVEVA

America’s leading integrated energy company

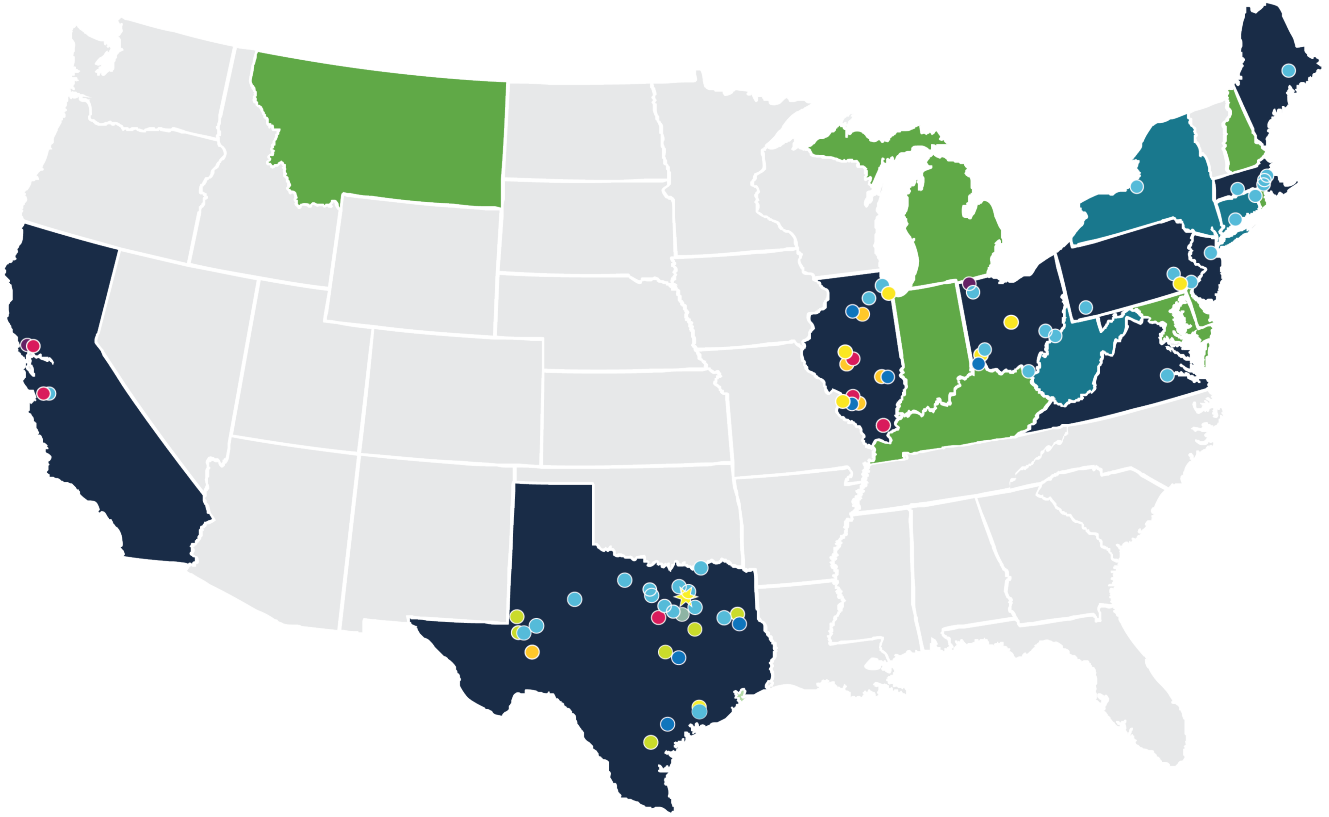
Vistra (NYSE: VST) is a leading Fortune 500 integrated retail electricity and power generation company based in Irving, Texas, providing essential resources for customers, commerce, and communities. Vistra combines an innovative, customer-centric approach to retail with safe, reliable, diverse, and efficient power generation. The company brings its products and services to market in 20 states and the District of Columbia, including six of the seven competitive wholesale markets in the U.S.. Serving approximately 4 million residential, commercial, and industrial retail customers with electricity and natural gas, Vistra is one of the largest competitive electricity providers in the country and offers over 50 renewable energy plans. The company is also the largest competitive power generator in the U.S. with a capacity of approximately 39,000 megawatts powered by a diverse portfolio, including natural gas, nuclear, solar, and battery energy storage facilities. In addition, Vistra is a large purchaser of wind power. The company owns and operates the 750-MW/3,000-MWh battery energy storage system in Moss Landing, California, the largest of its kind in the world. Vistra is guided by four core principles: we do business the right way, we work as a team, we compete to win, and we care about our stakeholders, including our customers, our communities where we work and live, our employees, and our investors.

Power Plants*
- Natural Gas
- Coal
- Other

*Note: Does not include plants previously announced to be retired.

Vistra Zero
- Nuclear
- Solar / Batteries
- Solar (under development)
- Batteries (under development)

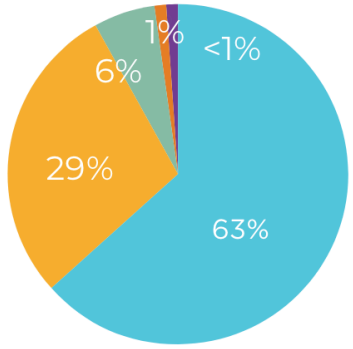
Operations
- Retail Operations
- Plant Operations
- Retail and Plant Operations
- Regional Office
- Company Headquarters



~39 GWs
Capacity

~174 TWh
Generated

Generation by Capacity



Gas Coal Nuclear Renewables Other

Problem Statement

Vistra's Kosse Mine site partnered with Casne in late 2021 to kickstart their digital transformation journey.

Over the years many investments had been made to implement independent Dragline and mobile fleet monitoring systems.

Now they lacked proper overall metrics with data from across the various systems and a unified, single version of the truth to aid in better decision-making mid-shift.

CHALLENGE

Siloed data and lagged reporting

Limited visibility into critical asset performance to make fact-based real-time decisions

Manual reporting processes with no single version of the truth

Every change to existing reporting tools required hiring a developer

SOLUTION

CASNE and Vistra SMEs worked as a team to build out critical use cases for each challenge

Data integration to AVEVA PI System for single-pane-of-glass

AF, Analytics, Notifications, and PI Vision enabled the solution

BENEFITS

Real-time insights to critical assets for proactive response

Optimization of operations using fact-based decisions

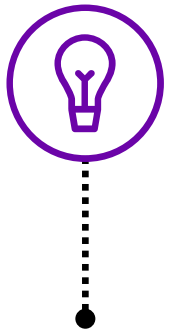
Automated and traceable production KPI reporting for single version of truth

Reduction of manual input activities

Tools that local PI administrators can build upon

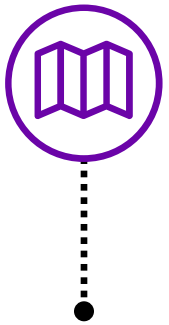
Solution Approach

Kosse mine's goal was to implement a centralized data warehouse to monitor critical assets in real-time



Vision and foundation

The goal was a unified source of truth which could allow the team to **monitor critical assets in real-time**.

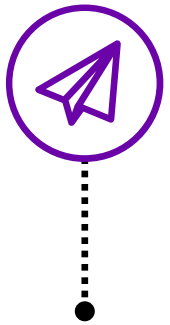


Single pane of glass

Integrate all data to a **centralized data historian** for a single-pane-of-glass view of operations

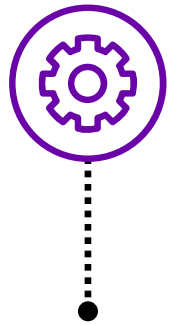
Model and Analyze

Build **critical asset monitoring** around several use cases identified by the site as high priority



Build and Optimize

Work with local SMEs to build out monitoring tools to enable **proactive response** and **optimize production** operations



Enhance and Automate

Automate reporting processes for **production KPIs**, reduce manual input processes, and enhance monitoring of critical assets

Critical Use Cases

The site identified several initial use cases to develop analytics and reports around:

- Loader and shovel wait time
- Dragline RSL's
- Dozer utilization
- Coal Quality
- Operational productivity
- Maintenance and reliability
- Production reporting
- Optimization
- Training

CHALLENGE

Siloed data and lagged reporting

Limited visibility into critical asset performance to make fact-based real-time decisions

Manual reporting processes with no single version of the truth

Every change to existing reporting tools required hiring a developer

SOLUTION

CASNE and Vistra SMEs worked as a team to build out critical use cases for each challenge

Data integration to AVEVA PI System for single-pane-of-glass

AF, Analytics, Notifications, and PI Vision enabled the solution

BENEFITS

Real-time insights to critical assets for proactive response

Optimization of operations using fact-based decisions

Automated and traceable production KPI reporting for single version of truth

Reduction of manual input activities

Tools that local PI administrators can build upon

Data Integrations to PI

COAL BARN

OPC DA SERVER

DOZER, LOADER, SHOVEL

SPEED AND STATUS

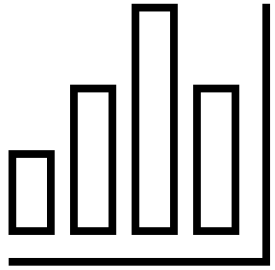
WENCO SQL SERVER

DRAGLINE STATISTICS

MINEWARE SQL SERVER

TRAIN TRACKING

GEOTAB WEB API



MANUAL ENTRY DATA

ADMINISTRATIVE PROJECTION

Solution #1 Goal

- Enable in-shift fact-based decision making from central dispatch office
- Centralized single-pane-of-glass view of all real-time data from across all operations
- Customized, machine-specific PI development to monitor critical equipment

Solution #1

LOADER AND SHOVEL WAIT TIME

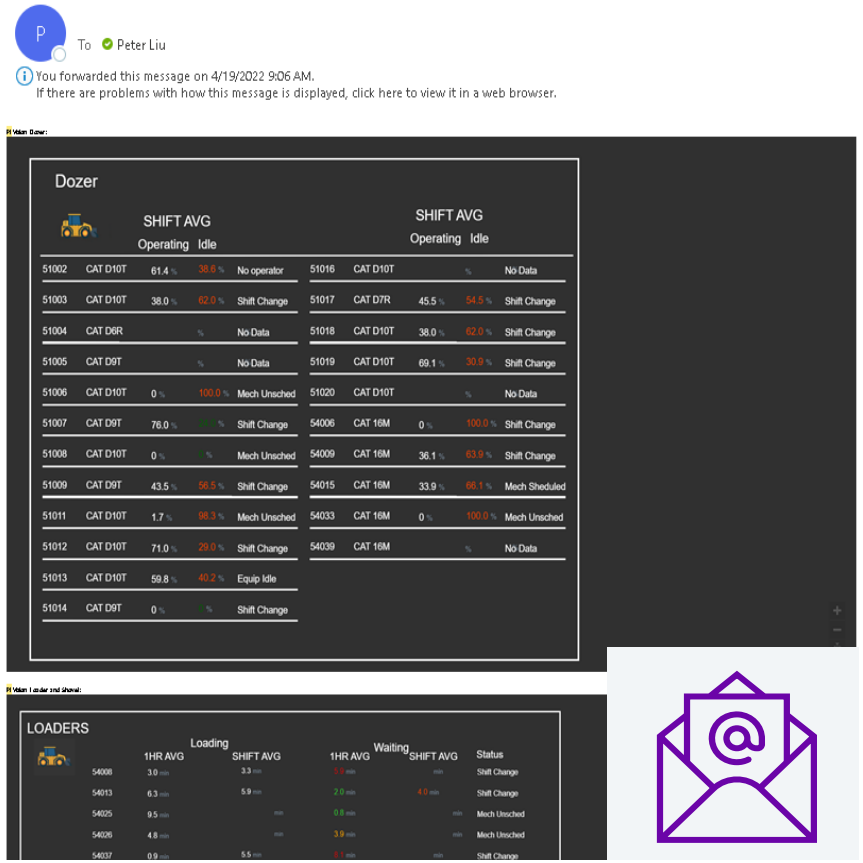
- AF templates, Analytics, PI Vision + multi-states
- Visualize wait time for critical equipment
- Scheduled AM/PM notification for summary of wait time

LOADERS

	Loading		Waiting			
	1HR AVG	SHIFT AVG	1HR AVG	SHIFT AVG	Timestamp	Status
54008	1.0 min	3.8 min	8.0 min	min	5/10/2022 12:41:29 PM	Waiting
54013	0.3 min	4.2 min	0.6 min	1.3 min	5/10/2022 2:21:10 PM	Waiting
54025	2.3 min	2.9 min	7.8 min	min	5/10/2022 2:18:43 PM	Waiting
54026	4.8 min	min	3.9 min	min	4/2/2022 1:43:56 AM	Mech Sheduled
54037	2.5 min	4.6 min	6.4 min	min	5/10/2022 2:18:58 PM	Waiting
54041	0.2 min	5.1 min	4.8 min	min	5/10/2022 2:06:44 PM	Waiting

SHOVELS

	Loading		Waiting			
	1HR AVG	SHIFT AVG	1HR AVG	SHIFT AVG	Timestamp	Status
56006	4.6 min	Set to Bad min	2.0 min	min	5/9/2022 6:18:11 AM	Mech Sheduled
56110	3.9 min	4.1 min	2.0 min	4.4 min	5/10/2022 1:39:16 PM	LU Loading



Solution #1

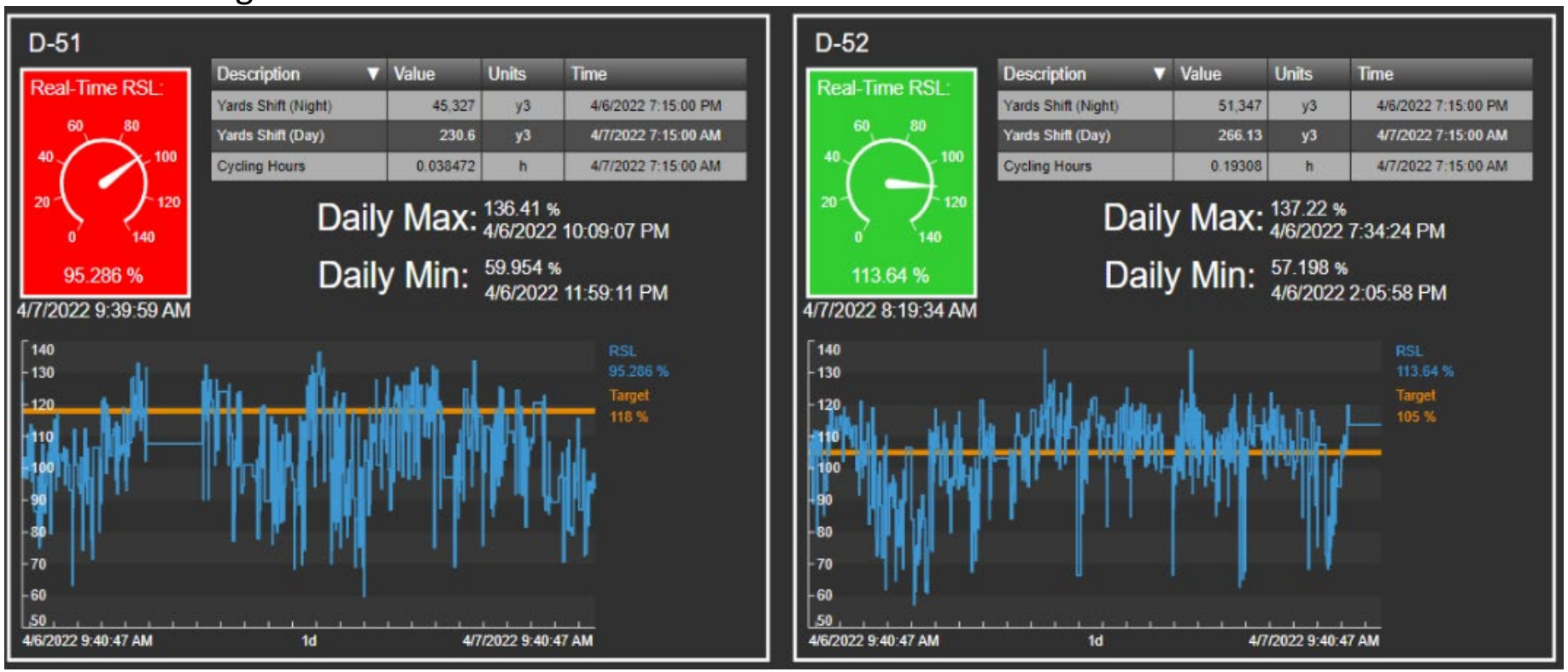
DOZER WAIT TIME

- AF templates, Analytics, PI Vision + multi-states
- Visualize wait time for critical equipment
- Scheduled AM/PM notification for summary of wait time

Solution #1

DRAGLINE RSL

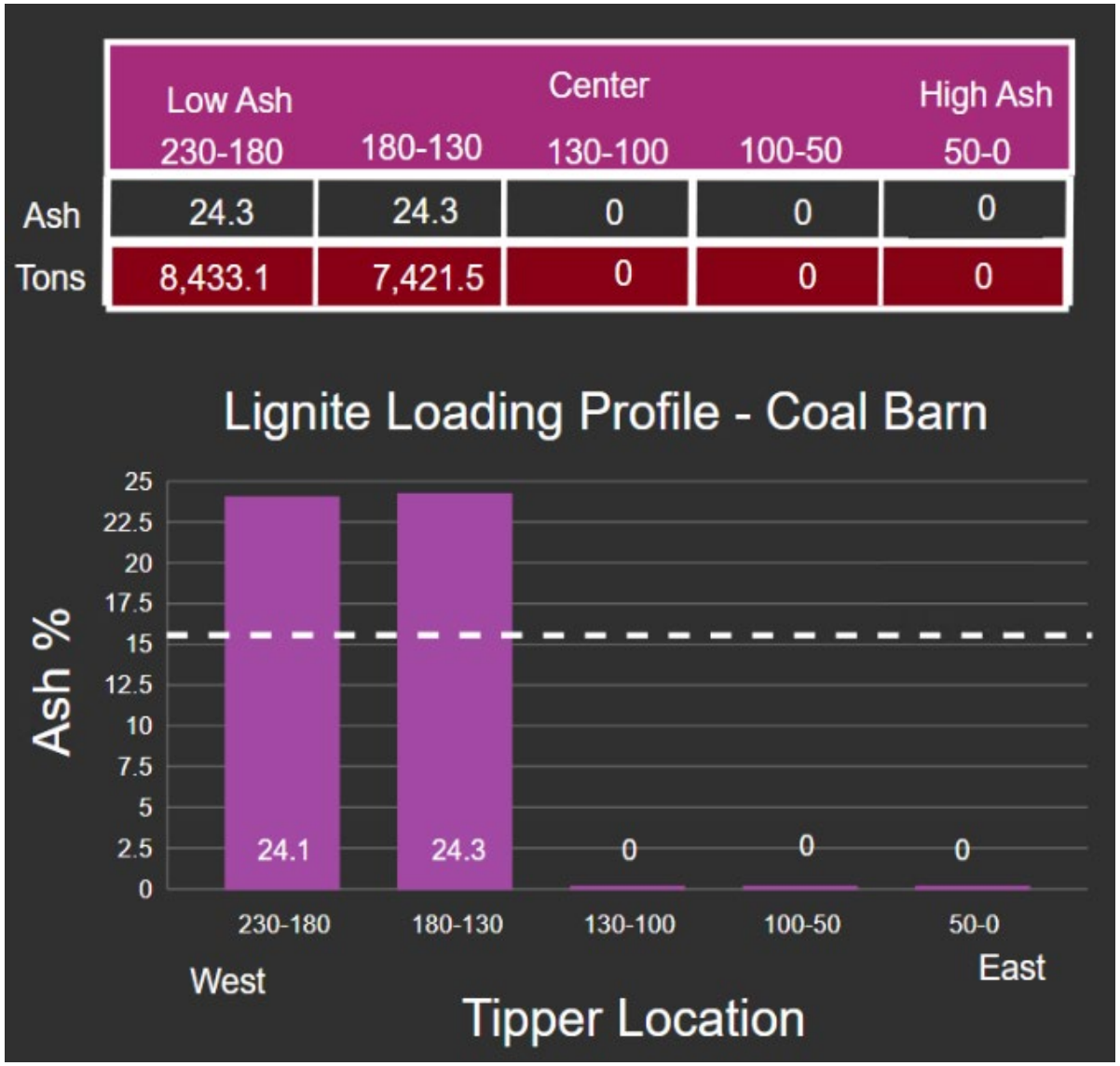
- Dragline real-time yardage for day and night shift
- Allows real-time alert of stressors (such as RSL) on equipment to prevent unplanned downtime and improve daily operations
- Machine-specific metrics and multi-stating



Solution #1

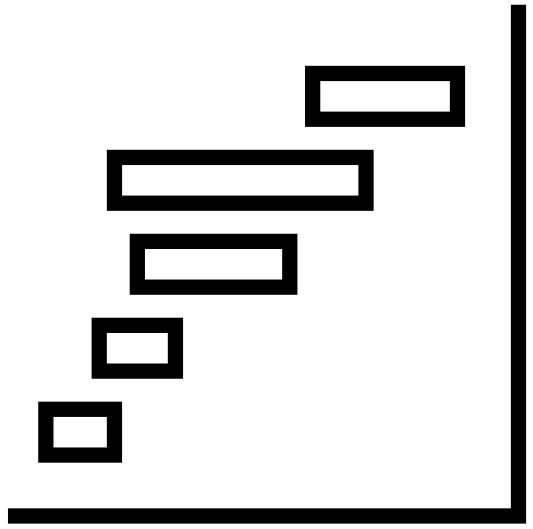
COAL QUALITY

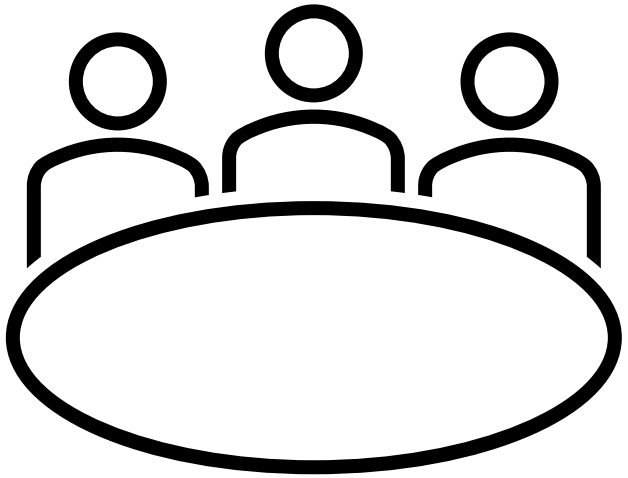
- Shows real-time tonnage and ash %
- Production reporting and quality monitoring for direct downstream Vistra power plant
- Improved accuracy of estimated tonnage calculation to within ~1.5% of actual tonnage from Kanawha weigh scales
  - *Old method +25% actual tonnage*



Solution #2 Goal

- Traceability down to shift level for long-term (MTD/YTD) reporting
- Validated, single version of truth for reporting with ability to true-up survey data
- Easy to view graphics for operators and directors with detailed smart links to detailed trends

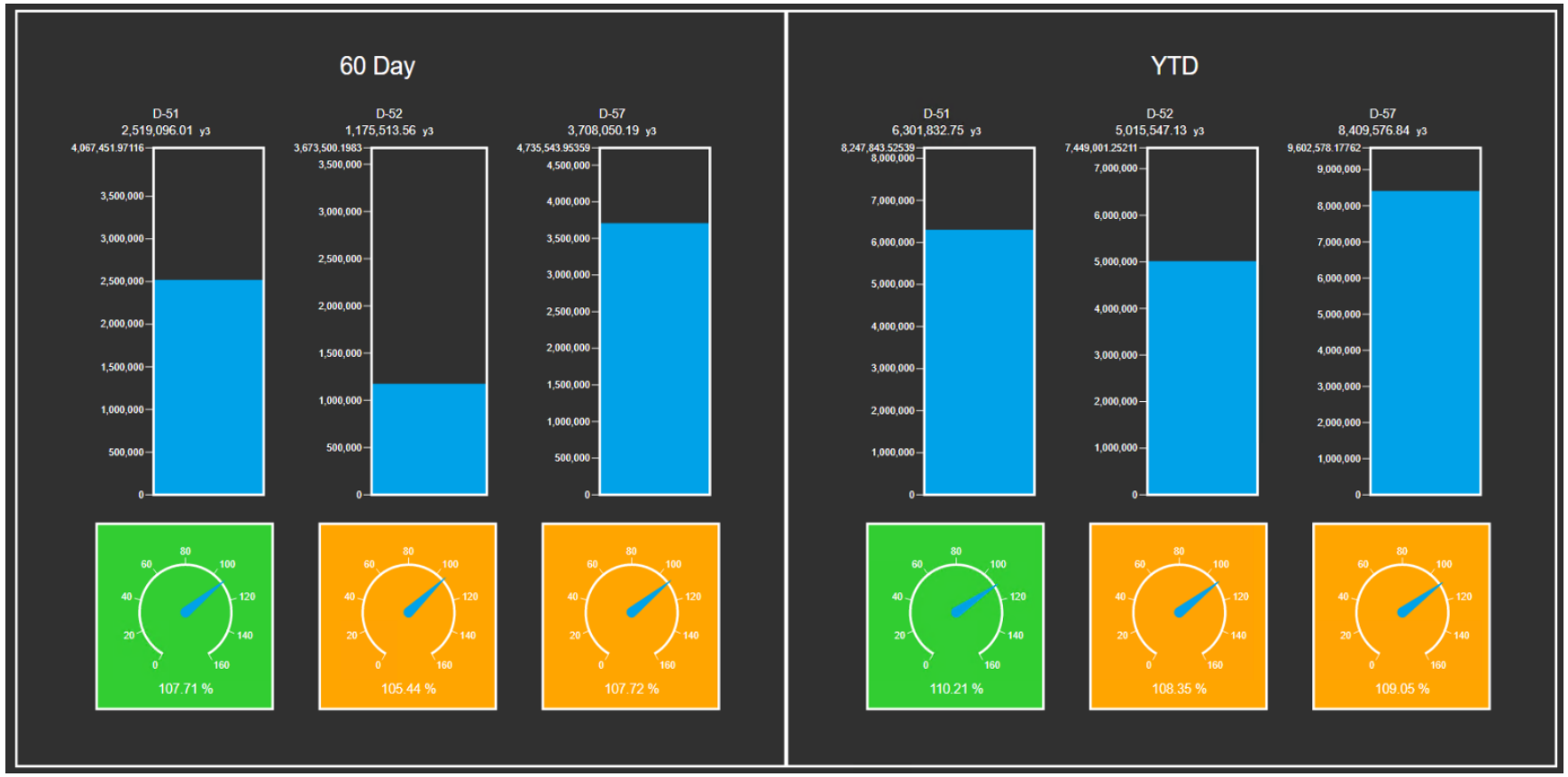




Solution #2

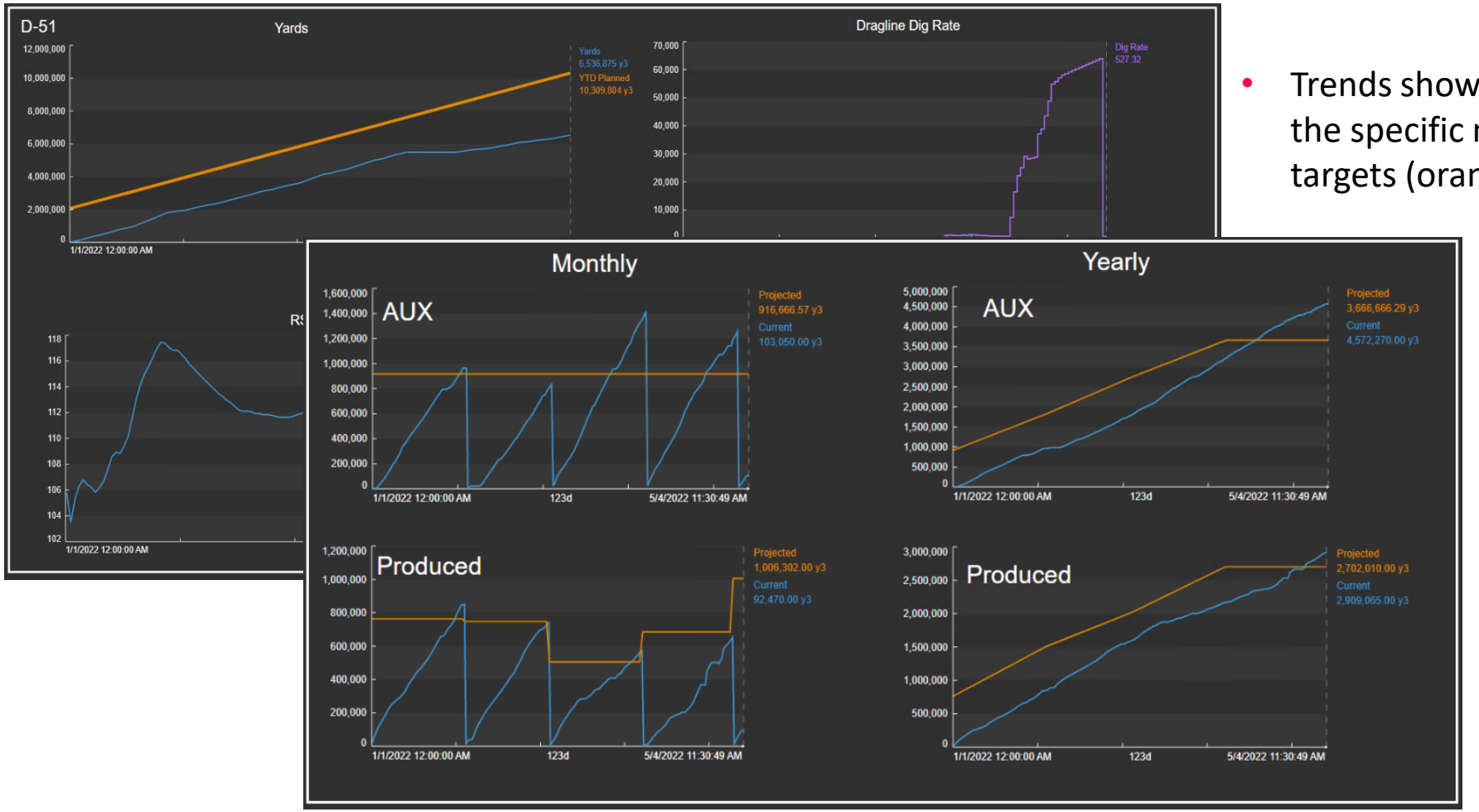
OPERATIONAL PRODUCTIVITY

- 60 day and MTD production reporting for each machine
- Bar charts dynamically scale the targets based on the date
- Design allows true-up survey data at end of each month
- Multi-stated gauges specific for each machine to monitor current production
- Dynamic smart links for drill-in analysis



Solution #2

OPERATIONAL PRODUCTIVITY



- Dynamic smart links for drill-in analysis
- Trends show historic values (blue) for the specific machine versus production targets (orange)

CHALLENGE

Siloed data and lagged reporting

Limited visibility into critical asset performance to make fact-based real-time decisions

Manual reporting processes with no single version of the truth

Every change to existing reporting tools required hiring a developer

SOLUTION

CASNE and Vistra SMEs worked as a team to build out critical use cases for each challenge

Data integration to AVEVA PI System for single-pane-of-glass

AF, Analytics, Notifications, and PI Vision enabled the solution

BENEFITS

Real-time insights to critical assets for proactive response

Optimization of operations using fact-based decisions

Automated and traceable production KPI reporting for single version of truth

Reduction of manual input activities

Tools that local PI administrators can build upon

What's Next?

Build on existing development to analyze additional KPIs and production metrics

1 Additional KPI Analytics

Automate monthly production reporting to improve planning

2 Production Planning

Integrate data from mobile assets and monitor reliability and performance

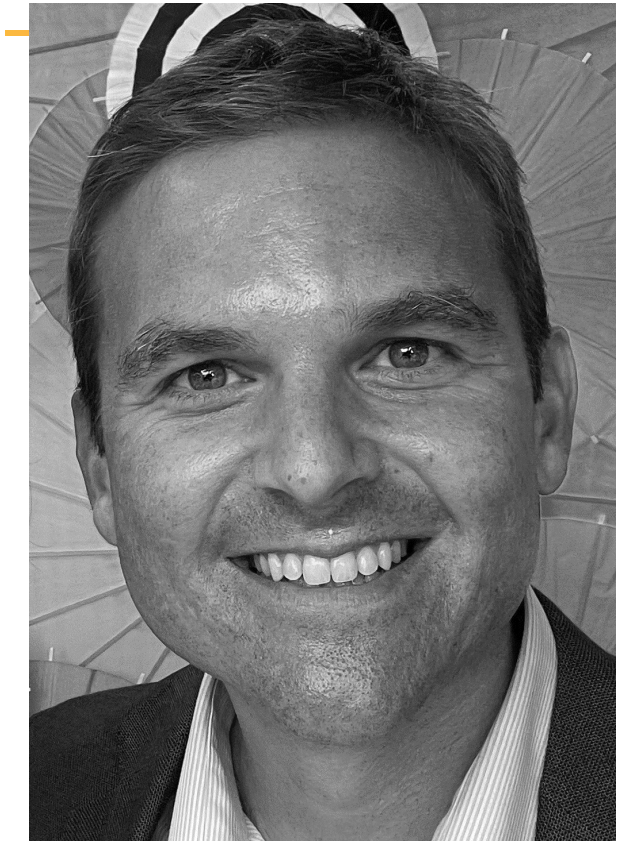
3 Mobile Asset Data Integration

Analyze reliability metrics to improve fleet uptime

4 Reliability Analytics

Monitor critical assets and alert proactively for maintenance needs

5 Condition Based Maintenance Alerts



MICHAEL HULL

Senior Technology Leader

VISTRA CORP

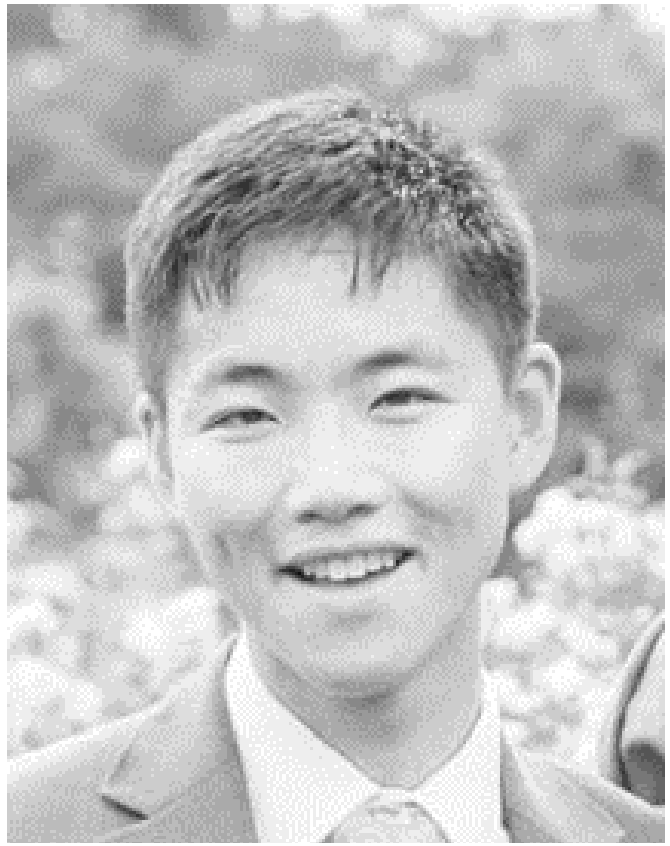
MICHAEL.HULL@LUMINANT.COM

JESSICA EWY

Technical Program Manager

CASNE ENGINEERING

JESSICA.EWY@CASNE.COM



PETER LIU

Systems Engineer II

CASNE ENGINEERING

PETER.LIU@CASNE.COM

AVEVA

Questions?

Please wait for the microphone.

State your name and company.

Please remember to…

Navigate to this session in the mobile app to complete the survey.

Thank you!

AVEVA

This presentation may include predictions, estimates, intentions, beliefs and other statements that are or may be construed as being forward-looking. While these forward-looking statements represent our current judgment on what the future holds, they are subject to risks and uncertainties that could result in actual outcomes differing materially from those projected in these statements. No statement contained herein constitutes a commitment by AVEVA to perform any particular action or to deliver any particular product or product features. Readers are cautioned not to place undue reliance on these forward-looking statements, which reflect our opinions only as of the date of this presentation.

The Company shall not be obliged to disclose any revision to these forward-looking statements to reflect events or circumstances occurring after the date on which they are made or to reflect the occurrence of future events.

linkedin.com/company/aveva

@avevagroup

ABOUT AVEVA

AVEVA is a global leader in industrial software, sparking ingenuity to drive responsible use of the world's resources. The company's secure industrial cloud platform and applications enable businesses to harness the power of their information and improve collaboration with customers, suppliers and partners.

Over 20,000 enterprises in over 100 countries rely on AVEVA to help them deliver life's essentials: safe and reliable energy, food, medicines, infrastructure and more. By connecting people with trusted information and AI-enriched insights, AVEVA enables teams to engineer efficiently and optimize operations, driving growth and sustainability.

Named as one of the world's most innovative companies, AVEVA supports customers with open solutions and the expertise of more than 6,400 employees, 5,000 partners and 5,700 certified developers. With operations around the globe, we are headquartered in Cambridge, UK and listed on the London Stock Exchange's FTSE 100.

Learn more at www.aveva.com

AVEVA