
AVEVAWORLD

TAS Online

(Pty.) Ltd.

Pump Monitoring & Consultancy

How a South African Mining company uses CONNECT to enhance operational efficiency and reduce energy

AVEVA World 2025

Presenters

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Gold Mine Use Case

- **Use case customer:**
  - **South African mining company** operating several gold mines (SAMC)
- **Customer challenges:**
  - Struggled with data silos and wanted to modernize IT
  - Needed to enable their people with more real-time and more holistic insights
  - That includes a more real-time collaboration with external SME companies
- **Action taken:**
  - Together with TAS Online, SAMC embarked on a **lighthouse project** with AVEVA

Optimise SAMC's Pumping in Real Time

LIGHTHOUSE SOLUTION ARCHITECTURE (high level)

SAMC Mines (levels)

PUMPS

PUMPS

PUMPS

Agent

Agent

Agent

Raw Data →

Calculated Data →

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CONNECT Data Services

TAS PumpMonitor

Digital Twin – Simulation Model

CONNECT Visualization

Self-Service

Pre-defined

CONNECT Data Services

AVEVA Advanced Analytics

AI

CONNECT

Desktop Browser

Roles

Operations

Maintenance

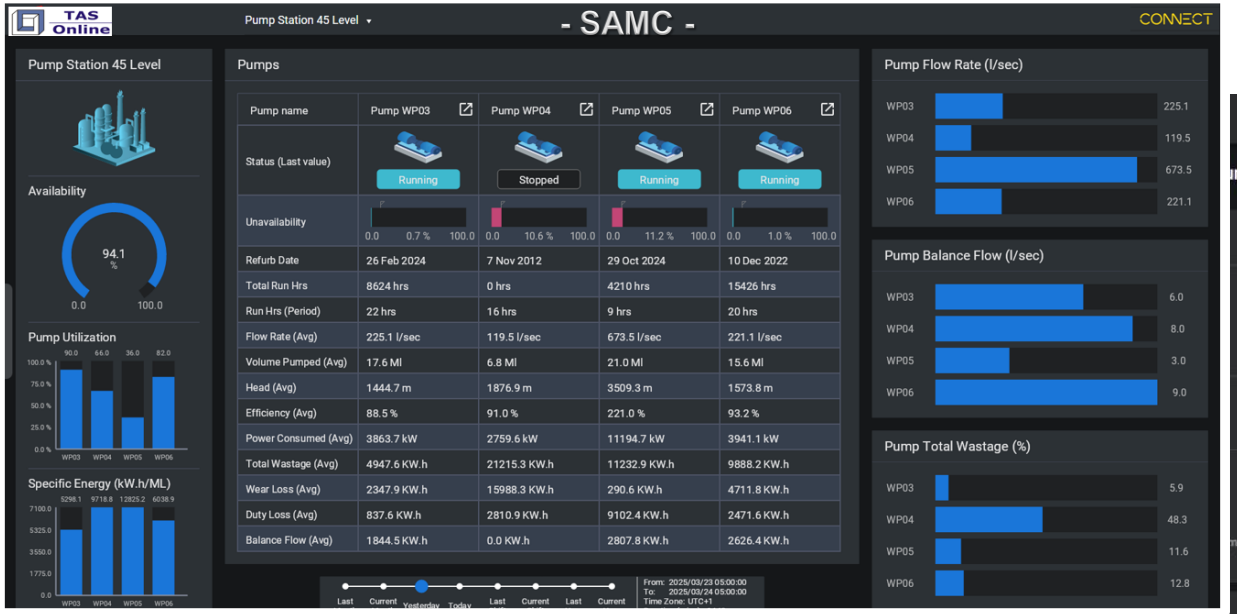
Management

CONNECT

TAS Online

Optimise SAMC's Pumping in Real Time

Better Information at people's fingertips



CONNECT

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Why CONNECT?

SAMC PERSPECTIVE

- One system of reference for all SAMC mines ‘OT’ data, including 3rd party insights
- Data sharing standardized - securely, reliably and available in real-time
- Holistic insights in a one stop shop – all mines & related information at our fingertips
- Platform approach provides a great base layer to enable new use cases & applications

The value of real-time data sharing cannot be overstated, as it allows for more accurate control, optimisation, and reporting.

“Having Data in the CONNECT cloud means SAMC and our partners can now access complete data history and near real-time updates securely without impacting SCADA or PLC infrastructure. Teams can access the data from anywhere”

Why TAS Online?

Pump selection software since 1990's

- Major pump manufacturers around the world use our software
- Experts in generating pump performance curves
- Developed software for pump test facilities

Pumping systems specialists

- Provided expert pump training programs around the world with UNIDO
- On site pump system assessments using portable instrumentation

Developed proprietary software, TAS PumpMonitor

- Introduced remote monitoring of pumps & supporting consultancy in 2004
- Accredited by NBI PSEE, NCPC, World Bank, Eskom, UNIDO recognized international pump expert

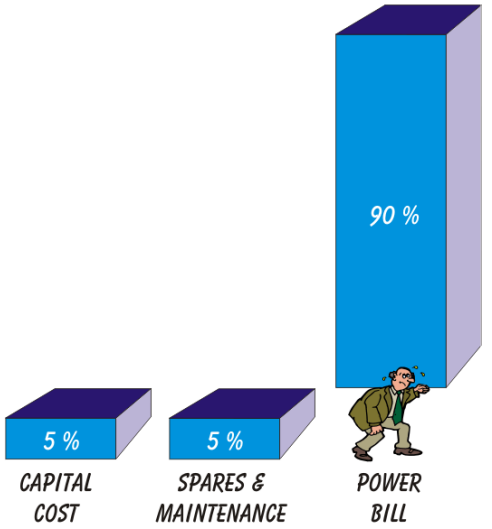
Major Clients

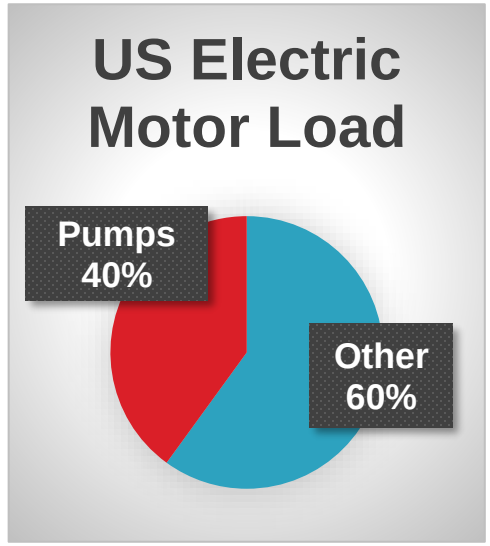
- The majority of deep level mines in SA
- Mining process plants, refineries, bulk water supply, metal industry

Why Pumps?

Cost of Pumping Systems

- Power costs up to 90% of the Life Cycle Cost of a typical water pump
- Pumping systems use 40% of electric motor consumption (USA)
- Average energy wastage in pumping systems 15-40%.
- UNIDO pump system audits demonstrated 10-20% savings
- Improves pump reliability, wear life and overall system performance





Energy efficiency is the cleanest energy possible

Costs 2-10 times less than conventional energy

REDUCED COSTS = INCREASED PROFITS

TRADITIONAL APPROACH TO DATA ANALYSIS

Condition-based monitoring instrumentation

- Vibration
- Bearing temperatures
- Suction and discharge pressure

Picks up a problem, user has time to repair pump before failure occurs

Energy monitoring instrumentation

- Power meter (or volts, amps, power factor, motor eff)
- Total flow (one meter for column or mine)
- ESCO provides monthly energy report

Only shows total energy consumed in a month?

Not – Actual energy wasted

Not – Individual pump performance

Not – **How to fix the problem?**

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SAMC Case Study

NEW APPROACH –SETUP DIGITAL TWIN

Raw Data

- Instrumentation available
- Suction & discharge pressure
- Amps

Digital Twin

Simulation Model

Remote model setup for each pump in TAS PumpMonitor

Performance curve from OEM uploaded when new

Update performance after pump test

Raw Data Tags / Streams

WP03_PIT001	Pump Suction Pressure
WP03_PIT002	Pump Delivery Pressure
WP03_IT001	Motor Current

Calculated Values

- Virtual flow meter
- Head, Power, Pump Efficiency
- Specific energy (kW.h/Ml)
- Flow as percent of BEP (Qbep)
- Wear and Duty Losses
- Energy wastage (kW.h, USD)

Calculated Data Tags / Streams

WP03_TAS_PM_Q	Pump flow rate
WP03_TAS_PM_Q1	Balance flow rate
WP03_TAS_PM_H	Pump Head
WP03_TAS_PM_EFF	Pump Efficiency
WP03_TAS_PM_KW	Power absorbed
WP03_TAS_PM_QBEP	Qbep
WP03_TAS_PM_WL, DL, VL	Wear, Duty, Volumetric loss
WP03_TAS_PM_ML	Volume Pumped
WP03_TAS_PM_KWH_ML	Specific energy kW.h/ML

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SAMC Case Study - PumpMonitor and CONNECT

PUMP STATION SCREEN – LIVE DATA

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INDIVIDIUAL PUMP SCREEN – LIVE DATA

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UNDERSTANDING WHAT THE PROBLEM IS - PUMP PERFORMANCE CURVE

View Duty Point on Curve

- How far from BEP
- What is actual pump efficiency

High Wear Loss

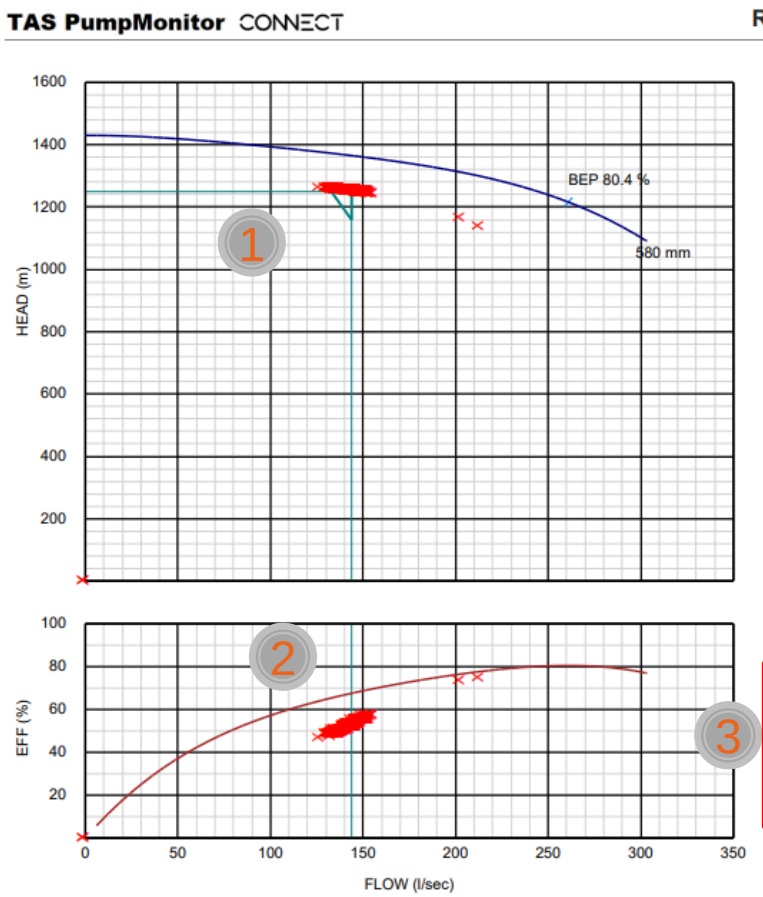
- Refurbish pump
- Replace impeller
- Apply pump coatings

High Duty Loss

- Trim impeller
- Change pump speed / VSD
- Install different pump
- Check system (valves, pipes)

High Volumetric Loss

- Replace balance disk



Asset Details	
Tag No	AMM.045_PMP01_WP05
Reference No	MPN4505
Pump model	GSB 250 12
Pump station	Mponeng 45 Level

Pump Duty		Pump On Time	52.33 hrs
Flow	143.8 l/sec	Balance flow	5 l/sec
Head	1250 m	Utilisation	90 %
Power Absorbed	3514 kW	Volume pumped	27.1 ML
Efficiency	52.61 %	Total energy	183,874 kW.h
Ideal/Calc Eff	55.98 %	Total cost	239,037 R
Q Bep	37.33 %	Specific energy	6785 kW.h/M

Energy wastage			Monthly wastage	
	%	kW	kWh	R
Total	39.37	1,383.46	902,281	1,172,965
Wear	5.981	210.17	137,072	178,194
Duty	31.83	1,118.51	729,480	948,323
Throttling	-1.18	-41.47	-27,043	-35,156
Balance flow	2.735	96.11	62,681	81,485

Notes

TAS

Date: 3/19/2025
GSB 250*Undefined
SCG_PM_Multi_8_1_1.aspx/7.44.5.36

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SAMC Case Study - PumpMonitor and CONNECT

MEASURE SUCCESS OF THE PROJECT USING M&V

Energy Savings / Month

633 320 kW.h

$ 50,730 savings US average

$ 125,400 savings California

Refurb cost $175,000

Simple payback 3.5 months

Cost of Power USD

- US Average 8.0 c/kW.h
- California 19.8 c/k|W.h

1. Baseline Period 1-29 October 2024, 1390 Ml of water pumped

No	Pump Average Values				Energy Consumed			Energy Wasted	
	Flow	Head	Eff	Power	Spec. Energy	Power	Cost	Power	Cost
	l/s	m	%	kW	kW.h/ ML	KW.h	USD	KW.h	USD
3	202	1264	78.3	3 398	4 655	2 149 667	172 188	60 649	4 858
4	149	1188	62.0	3 012	5 645	1 804 035	144 503	448 715	35 942
5	129	1147	46.9	3 255	6 146	1 634 237	130 902	667 457	53 463
6	179	1259	73.4	3 148	4 844	1 834 840	146 971	142 388	11 405
	572	**1 214**	**65.1**	**12 813**	**5 323**	**8 193 691**	**$656 315**	**1 456 219**	**$116 643**

2. After Changes 10 Nov – 8 Dec 2024, 1584 Ml of water pumped

No	Pump Average Values				Energy Consumed			Energy Wasted	
	Flow	Head	Eff	Power	Spec. Energy	Power	Cost	Power	Cost
	l/s	m	%	kW	kW.h/ ML	KW.h	USD	KW.h	USD
3	208	1313	81.2	3 499	4 686	2 297 370	184 019	64 915	5 200
4	120	1249	63.4	2 519	5 913	1 527 521	122 354	410 994	32 921
5	240	1277	78.6	4 042	4 658	2 114 576	169 378	116 493	9 331
6	183	1314	76.3	3 226	4 926	1 857 922	148 820	153 075	12 261
	652	**1 288**	**74.9**	**13 287**	**5 046**	**8 607 207**	**$689 437**	**822 900**	**$65 914**

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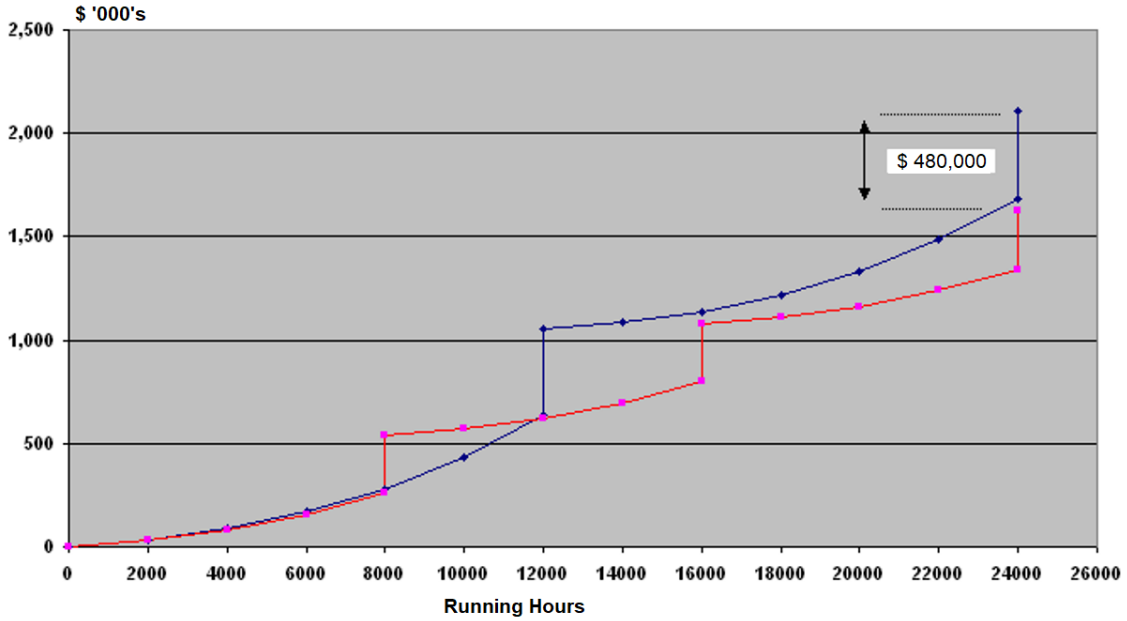
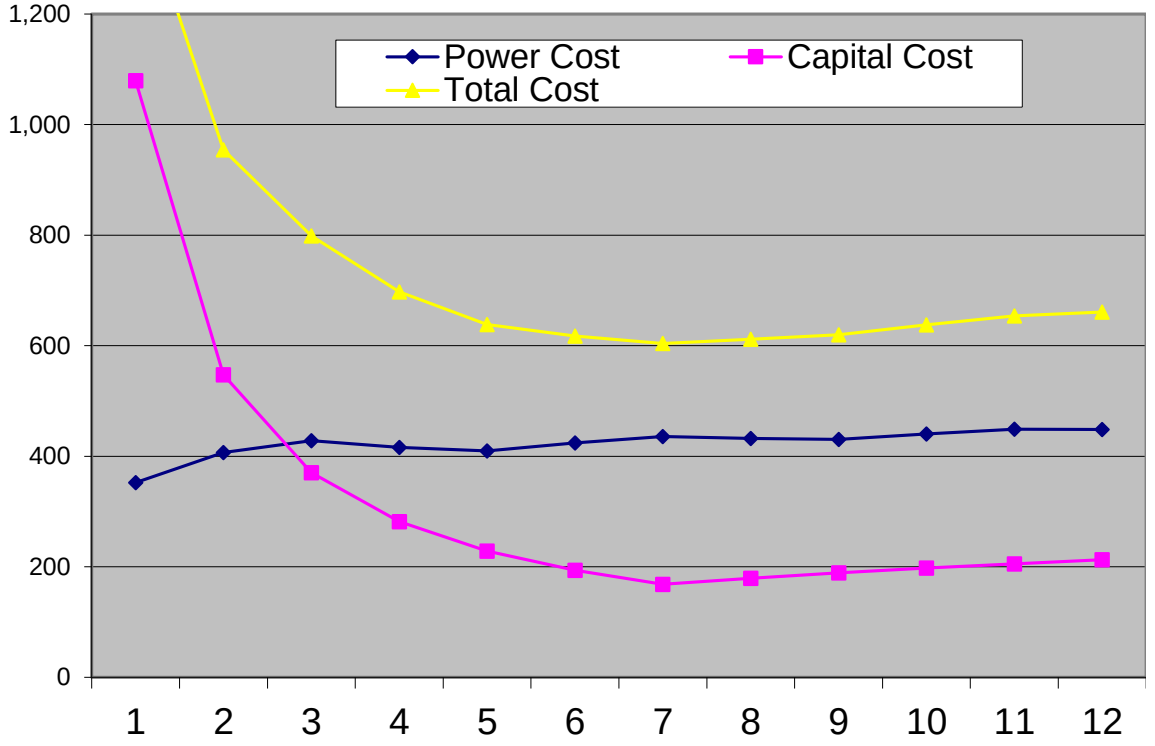
Optimised Maintenance

Pump Maintenance Strategy

- Failure based
- Time based
- Operating hours
- Flow drops off





Calculate Optimal Time for each Pump

- Cost to refurbish vs Increased energy cost

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TAS Online PumpMonitor – CONNECT

HOLISTIC APPROACH

Quantify

- Pump Station screen
- Monthly energy reports

Understand

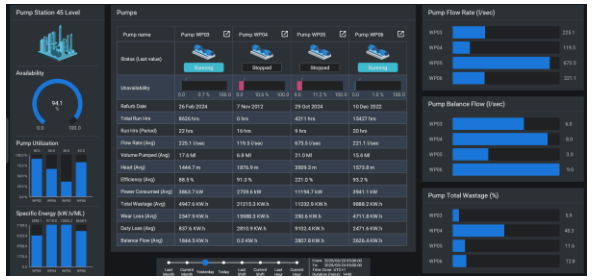
- Pump screen
- PM Report with curve
- ML, anomaly score

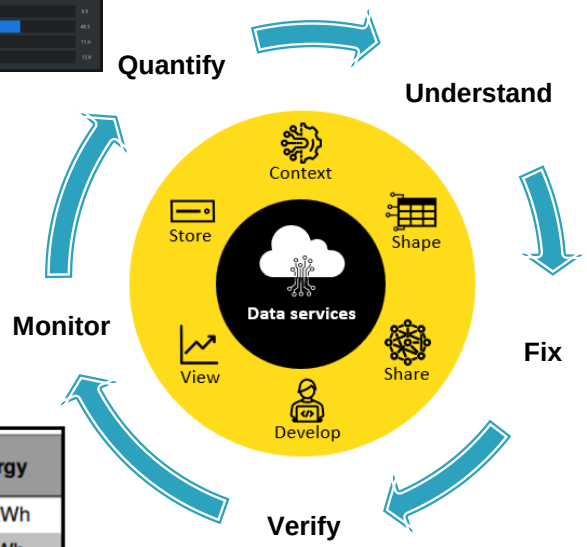
Fix Problems

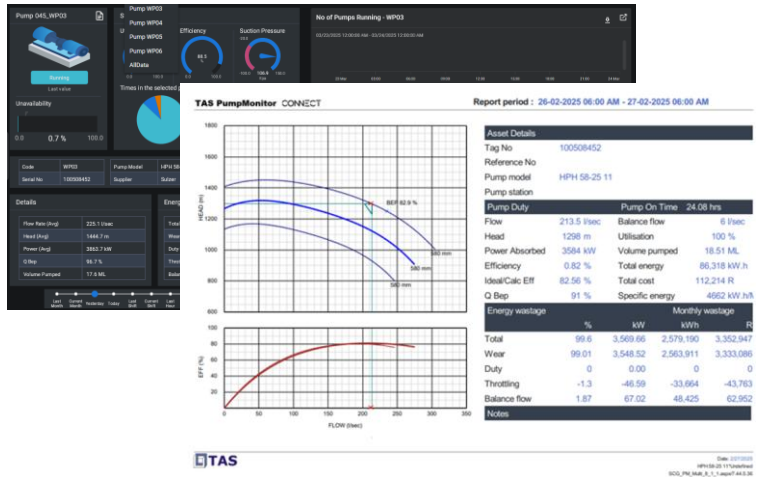
- Refurbish pump
- Replace balance disk
- Optimise pump operation
- Improve availability

Verify

- Mine level screen
- Monthly energy reports







System	Budget energy
Mine	52 300 816 kWh
Fans	5 488 680 kWh
Pumping	14 833 033 kWh
Winders	2 468 824 kWh
Refrigeration	10 363 781 kWh
Compressors	6 745 255 kWh
Underground Load	12 098 702 kWh
Surface Load	302 592 kWh

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MINING | EMEA (SOUTH AFRICA)

A South African Mining Company harnesses the power of data-sharing to improve sustainability and cost-effectiveness of its deep-level mining activities

Challenge

- Struggled with data silos and wanted to modernize IT
- Needed to enable its people with more real-time and more holistic insights, specifically improved visibility on its underground equipment, with a view to reduce operating costs
- Needed real-time collaboration capability with external SME companies

Solution

- Deployed CONNECT as the secure, centralized data exchange for real time monitoring of equipment (pumps, fans, compressors and fridge plants), without compromising data security. This solution allowed the mining company to work seamlessly with TAS Online, a third party specialising in pumping systems

Results

- **Improved data sharing between the mine and TAS Online, enriched data sets with predictive insights, and better visualisation experiences**
- **Improved asset performance, reduced energy wastage, and lower operational costs**
- **Allowed the mine to move away from time or hours based maintenance to condition based maintenance**

"Standardizing on CONNECT has enhanced data access from our customers, including sharing back results, making it easier, faster, and more secure. This enables us to deliver our expertise in real-time, accessible from anywhere - helping our customers optimize economic and environmental impact of mining operations.

We are excited about CONNECT and the opportunities it unlocks, most certainly the way to go for our future."

- Harry Rosen, TAS Online

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