Pollution Prevention & Netzero Carbon

Vale’s Digital Journey to achieve sustainable goals

Luciane Moreira
Thayse Rodrigues
Yan Freitas Marques
Luciane Moreira  
Technology Analyst  
- Vale  
- luciane.moreira@vale.com

Thayse Rodrigues  
IT Consultant  
- Ihm Stefanini  
- thayse.rodrigues@ihm.com.br

Yan Freitas Marques  
Digital Consultant & IIoT Architect  
- Ihm Stefanini  
- yan.freitas@ihm.com.br
- We exist to improve life and transform the future Together.
- A global mining company.
- A company with strategic assets.
- One of the world’s largest producers of iron ore, pellets and nickel.

Mining is the basis of a chain that contributes to the development of society. It is present in products that are essential to people’s well-being.

- Take children to school
- Bring energy to your home
- Exercise your body and mind
- Help develop medical devices
- Relieve the summer heat
- Keep us connected and entertained
- Exercise your body and mind
Our presence in operations

- +20 Open-cast mines
- +15 Underground mines
- 13 Pelletizing plants
- 2 Railroads
- 6 Ports of operation

- Iron
- Nickel
- Manganese
- Copper
- Coal
AVEVA PI SYSTEM SCENARIO IN VALE

+80 OPERATIONAL UNITS

Carajás Ferrosos
Carajás MB
Canadá
Itabira
Malásia
Omã
Vitória
Stefanini at a Glance

**Industries**
- Banking, Financial Services, and Insurance
- Payments
- Energy and Utilities
- Life Sciences and Health Care
- Communication
- Media and Technology
- Consumer Goods
- Manufacturing and Automotive
- Retail

**Area of Expertise**
- Digital Transformation
- Next Gen Applications
- Artificial Intelligence
- Automation Everywhere
- Analytics
- Cloud Enablement
- Digital Workplace and Infrastructure
- Digital Marketing
- Cyber Security
- Hybrid Infrastructure
- Smart Enterprise

**Employees Around the World**

**Delivery Models**
- Agile Teams / Squads
- Projects on Demand
- Shared Teams
- Dedicated Teams
- Onshore, Offshores, and Nearshore

**KEY STATS**

- **U$ 1.5 Bi Revenue 2023**
- **1,260 Active Clients**
- **50% Global / Regional Clients**
- **Client Profile: 70% Multinational**
- **66% Revenue above U$ 1 Bi**
- **12.1 years Client Relationship avg.**
- **Global NPS : 65**
- **97% Client Satisfaction**

**Recognition**
- Recognized in 95 reports by:
  - AVEVA
  - Gartner
  - ISG
  - Direct Group

**Locations**
- HQs: Michigan – US, Brussels – Belgium, São Paulo – Brazil and Mexico City – MX.
- 1,260 Active Clients
- 50% Global / Regional Clients
- Client Profile: 70% Multinational
- 66% Revenue above U$ 1 Bi

**Profitable and growing YoY since our inception in 1987**

104 Countries Delivering Solutions

41 Present in Countries

32k Employees

44 Languages

2.7k Cities

3.2k Employees Around the World
Business Challenge and Impact

Challenge, Solution and Benefit
To comply with agreements signed with the community and regulatory agencies, Vale SA invests in accelerating the digital transformation of the S11D Environmental Control Center with the aim of increasing pollution prevention, Netzero Carbon and employee safety and health.
Pollution Prevention & NetZero

Pollution Prevention

With the aim of preserving the Environment and meeting legal conditions, the Environmental Control Center monitors the following themes:

- **Air Quality (4 Stations)**
  - Measurement of suspended particles arising from ore transportation.

- **Water Quality (15 Stations)**
  - To measure the water condition of rivers, streams and natural lakes.

- **Hydrology (12 Stations)**
  - Hydro Balance to identify potential water savings.

- **Weather (13 stations)**
  - Used to complement Air and Water condition analysis.

- **Forest Fire Detection (3 Stations)**
  - Preventing the destruction of fauna and flora;
  - Reduction of carbon emissions into the atmosphere from forest fires;
  - Preservation of the carbon capture element.
Pollution Prevention & NetZero

NetZero

Energy Efficiency is a key factor in optimizing costs and at the same time ensuring reductions in greenhouse gas emissions

Vehicle Fuel
- Fossil Fuel and ethanol consumed by Vale's operational vehicles

Electricity
- Electrical energy consumed by process plant

Emulsion
- Product used in mine blast

Vale has committed to voluntarily protecting and recovering another 500,000 hectares of forest in Brazil by 2030. Of this total, 100,000 hectares will be recovered and another 400,000 will focus on protection.
Vale’s Digital Journey to achieve Pollution Prevention & Netzero Carbon

**Challenge**
- Decrease or eliminate environmental negative impacts
- Decrease or eliminate environmental fines and operational stoppages
- Reduce employee risk exposure

**Solution**
- Centralize all 35 environmental monitoring stations’ data in real-time into PI System, designed simple and readable dashboard at PI Vision, reports using PI Datalink, PI Analyses to calculate alarms and alerts to prevent negative impact.

**Results**
- **Mitigated risk of fine**
- **Operator field trips decreased to 27% per month**
  - reducing the exposure of operators to field risks
  - reducing vehicle carbon emission
  - increasing effective operator work time
- **Automated report and Alarms**
  - reducing failure response time
  - Improving data traceability
  - Enhancing information consistency
- **Created a data-driven and innovation culture**
Solution

Development of instrumentation and use of AVEVA PI System
AVEVA PI AF and Analyses

Structure and enhance the data

• AVEVA PI AF:
  • **Environmental Operational Efficiency**: Using the hierarchical structuring of data in PI AF, operations staff have instant access to all information in PI Vision enabling operational readiness and reducing failure response time.

• AVEVA PI Analyses:
  • **Reduction of Environmental Impacts**: Applying calculation in PI Analyses made it possible to make quick decisions, based on current and historical data to control environmental conditions.
AVEVA PI Vision

- Interoperability
- Easy access
- Easy visualization
- Position, Theme, Alerts
- Quick decision making
- 27 Screens
- 20 users
- 600 tags
• Quick view of stations with the same theme
• Shows the main information
• Shows alerts
• All measurements
• General information
• Alarm detail
• Custom graphics
• Trend
AVEVA PI Vision

Estação de Hidrologia ETA Usina

Informações
- Local: ETA Usina
- Responsável: Melquisedecio C.
- Tensão da Bateria: 12.90 V
- Temperatura do Datalogger: 23.07 °C

Alares
- Alarme Temp. Datalogger: OK
- Alarme Tensão da Bateria: OK
- Alarme Consumo Diário: OK
- Alarme Consumo Mensal: OK
- Alarme Consumo Anual: OK
- Alarme Comunicação: OK

Vazão Instantânea: 30.95 m³/h

Estação de Meteorologia CCP

Informações
- Local: CCP
- Responsável: Melquisedecio C.
- Tensão da Bateria: 13.50 V
- Temperatura do Datalogger: 40.03 °C

Alares
- Alarme Temp. Datalogger: OK
- Alarme Bateria: OK
- Alarme Raio de Vento: OK
- Alarme Taus de Chuva: OK
- Alarme Comunicação: OK

Temperatura do Ar: 30.19 °C
- Unidade: 61.70%
- Velocidade do Vento: 2.39 m/s
- Direção do Vento: 15.20

Pluviometria Diária: 0.00 mm
Pluviometria Mensal: 21.233 mm
Pluviometria Anual: 314.36 mm
Radiação Solar: 513.90 W/m²

Histórico
- Umidade Relativa: 61.7%
- Temperatura do Ar: 30.19 °C
- Raio de Vento: 2.39 m/s
- Pressão Atmosférica: 863.04 mb
- Radiação Solar: 513.9 W/m²
- Pluviometria: 0 mm

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AVEVA PI Vision

• Easily compare information

• Analyze data from different stations in seconds

• Show real and historical data

• Identify trends
• Calculate and Store data on Carbon Emissions

• Monitoring of Carbon Emissions

• Shows all variables involved in the calculation
- Governmental Regulations
- Standardization
- Consistency
- Quick and simple
- 6 reports
Impact and Results
Impact and Results

• Prevent government fines due to unmonitored environmental impacts.

Before the Project

• **600km**: Average distance traveled monthly for manual collections.

• **5h20m**: Average time spent collecting and reporting Air Quality data (4 stations).

• **5 Screens**: Number of systems that should be consulted to acquire data.

• **7 days**: Average time required to update all data through manual collection.

• **1 month**: Average time to implement communication infrastructure and integrate station into monitoring platform.

After the Project

• **200km**: Average distance traveled monthly for preventive maintenance.

• **2 min**: Average time taken to generate Air Quality reports (4 stations).

• **1 Screen**: All data is concentrated on a single synoptic global monitoring screen.

• **5 min**: Stations transmit data every 5 min (battery and data savings).

• **3 day**: Simple and Easy to rollout the solution into other Vale’s sites.
Conclusion
Conclusion

Vale Purpose

- We believe mining is essential to the world’s development and we only serve society when we generate prosperity for all and take care of the planet.

AVEVA PI System

- With deeper operational insight, faster analysis of critical data, and expanded visibility of remote assets and IIoT sensors, AVEVA PI System helps you operate more efficiently and sustainably.

Ihm Stefanini

- To be a strategic partner providing innovative solutions in search of a more efficient and sustainable industry.

Working together, it was possible to obtain real-time and historical environmental data analysis to ensure sustainability and efficiency gains in the environmental operation routines.
Luciane Moreira
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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.

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AVEVA is a world leader in industrial software, providing engineering and operational solutions across multiple industries, including oil and gas, chemical, pharmaceutical, power and utilities, marine, renewables, and food and beverage. Our agnostic and open architecture helps organizations design, build, operate, maintain and optimize the complete lifecycle of complex industrial assets, from production plants and offshore platforms to manufactured consumer goods.

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. The company is headquartered in Cambridge, UK.

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