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Quebec Iron Ore improves reliability of critical assets and enhance traceability from pit to port advancing on their digital roadmap

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AVEVA

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Quebec Iron Ore

Champion Iron Limited, through its subsidiary Quebec Iron Ore Inc., owns and operates the Bloom Lake Mining Complex, located on the south end of the Labrador Trough, approximately 13 km north of Fermont, Québec.

Bloom Lake is an open-pit operation with two concentrators that primarily source energy from renewable hydroelectric power.

The Bloom Lake Phase I and Phase II plants have a combined nameplate capacity of 15 Mtpa and produce a low contaminant high-grade 66.2% Fe iron ore concentrate with a proven ability to produce a 67.5% Fe direct reduction quality concentrate.

Business Challenges

Main challenge: Improve reliability of critical assets, inventory and traceability from pit to port

- Reliability of critical equipment needs to be improved to support expansion
- Increase throughput to full nameplate capacity by debottlenecking production
- Lack of pit to port inventory tracking and traceability of ore
- Produce highest-grade with lowest emission iron ore, whilst tracking and reporting of energy and emissions
- Allow systems across the whole company to make decisions automatically on live operational data (Industry 4.0).
- Need to find a robust and efficient way to transfer data across OT and IT multiple times per day.

Roadmap (Recap)

Main challenge: Reducing reaction time from event to resolution

Reliable HMI/SCADA

AVEVA™ Operations Control

Solid Temporal & Structured Data Architecture

AVEVA™ PI System™

Process and Asset Performance Visibility

AVEVA™ Predictive Analytics
&
AVEVA™ Production Management*

Sharing data across IT and OT ecosystem

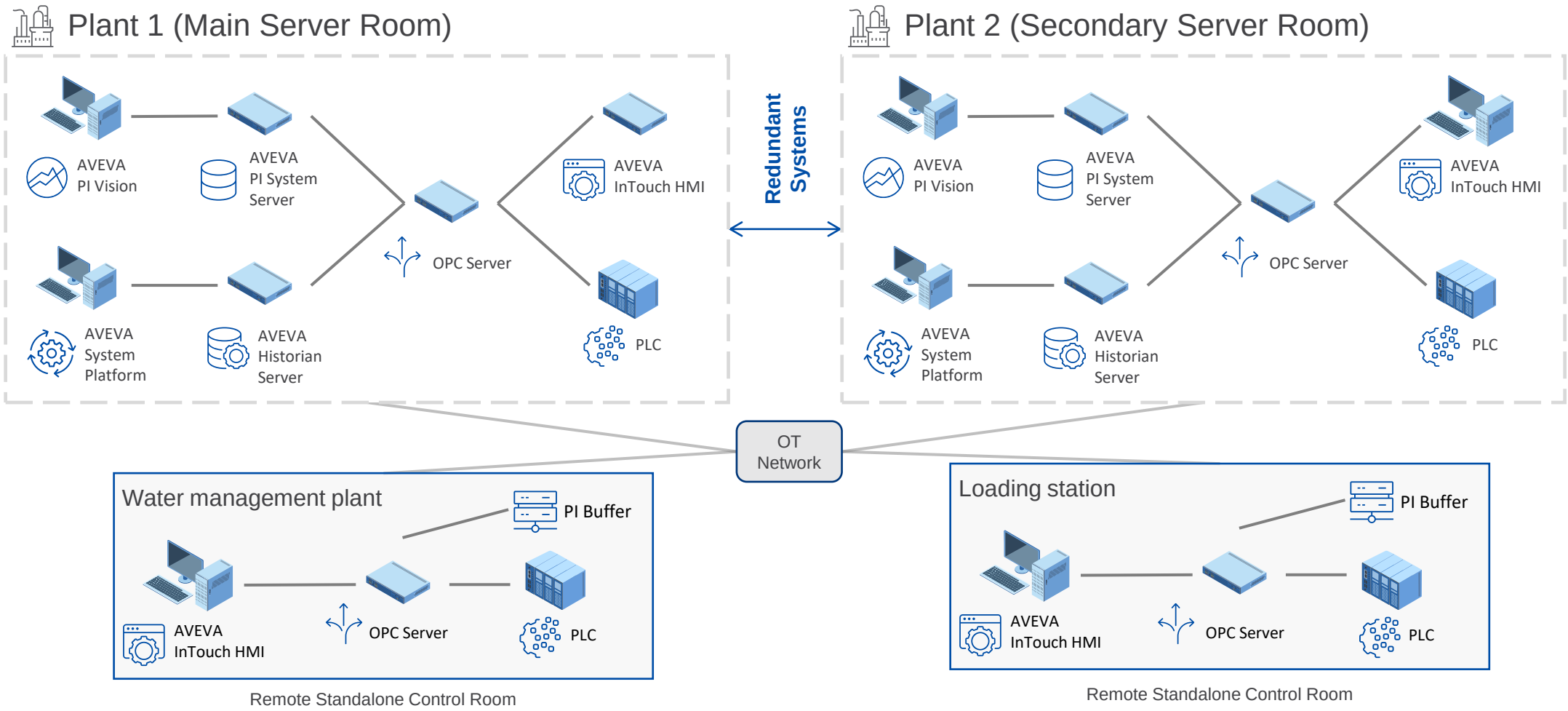
AVEVA™ Data Hub

** Potential implementations*

Reliable HMI/SCADA

AVEVA Operations Control

Control Rooms (AVEVA Operations Control + PI System)



Remote Standalone Control Room

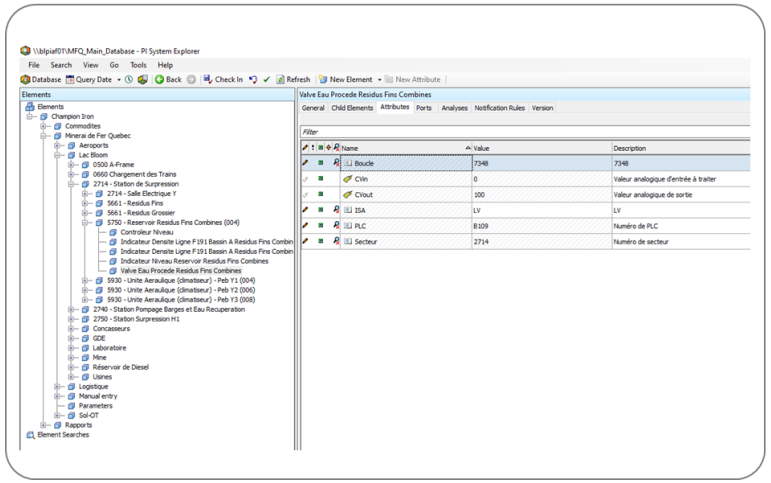
Remote Standalone Control Room

Operational Data Foundation (PI System)

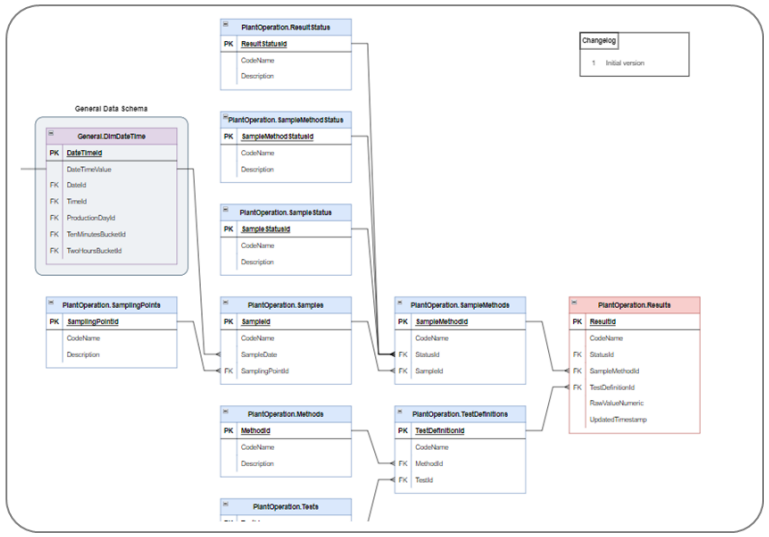
Solid Temporal & Structured Data Architecture

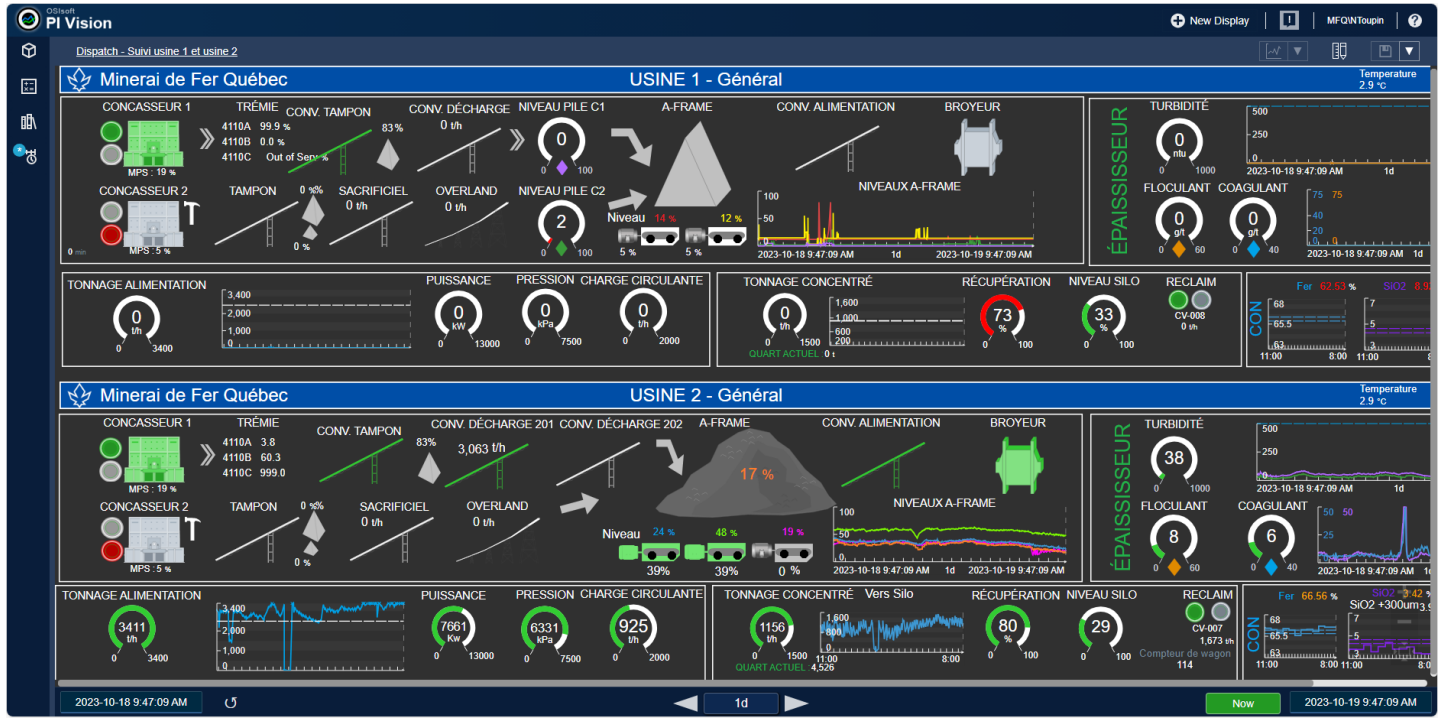
AVEVA PI System

Temporal Data



Structured Data

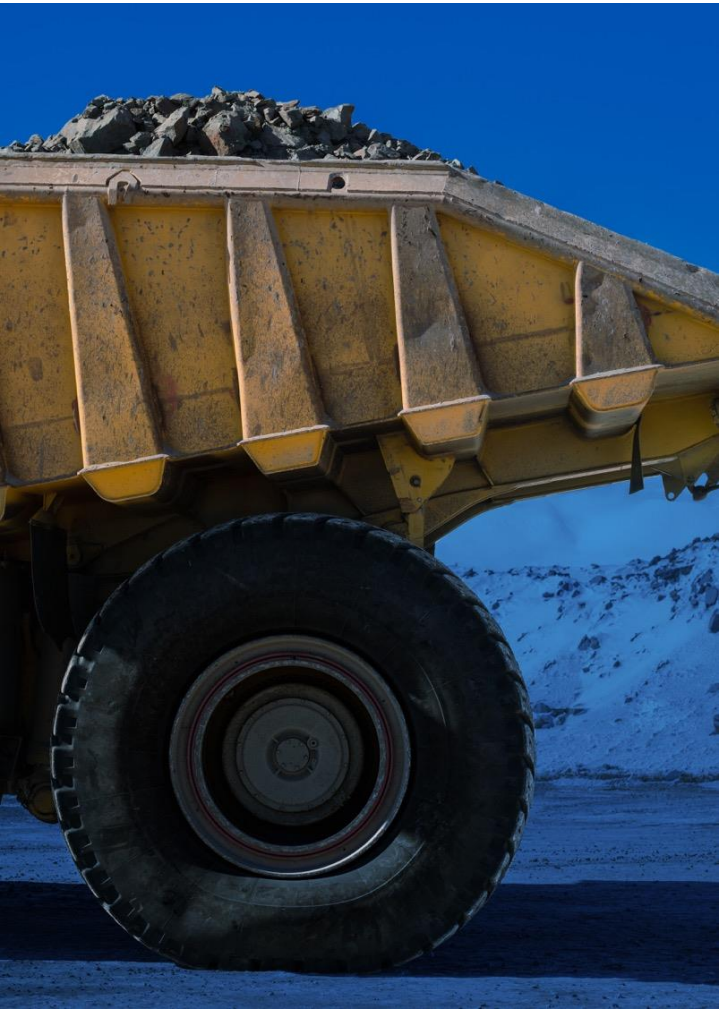




Increase Critical Equipment Reliability

Process and Asset Performance Visibility

AVEVA Predictive Analytics



Using AVEVA Predictive Analytics to benefit

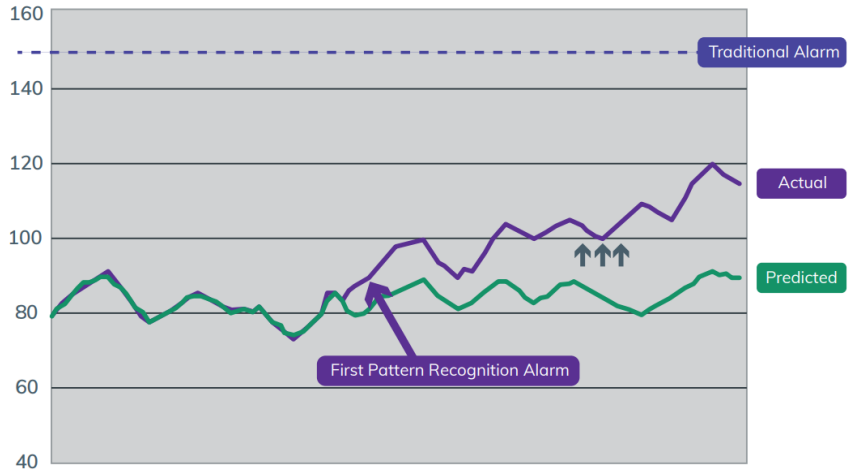
- Maintenance / Reliability engineers
- Operators

Started with pilot project

- Able to verify that the tool would have detected the failure in previous breakdown
- 3 assets monitored
- Analyzed the result with users

Current deployment

- Production rollout
- Phase One: 10 assets (50 models)
  - Coarse tailing pumps
  - AG Mill

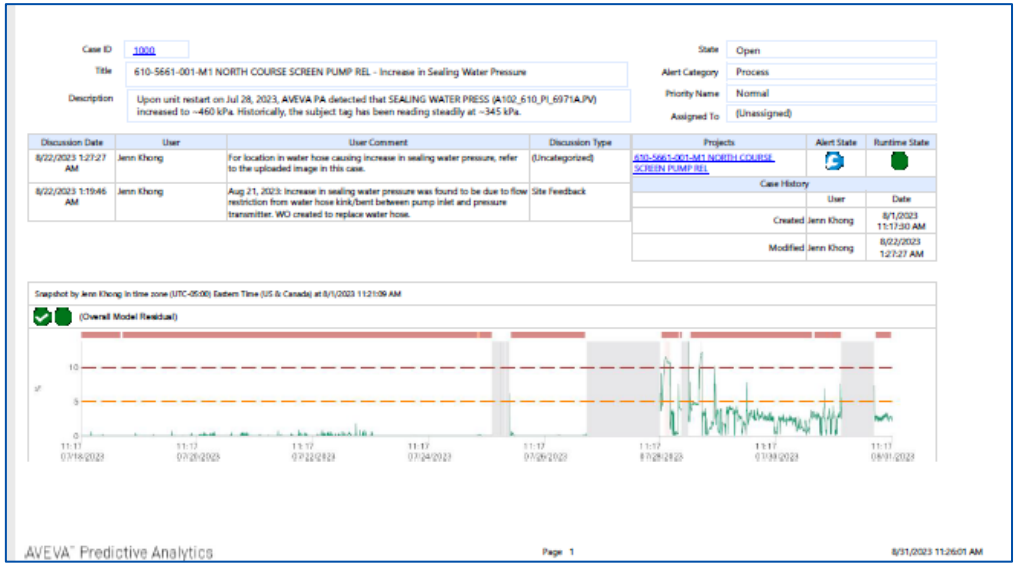


Increase Critical Equipment Reliability

Process and Asset Performance Visibility

AVEVA Predictive Analytics

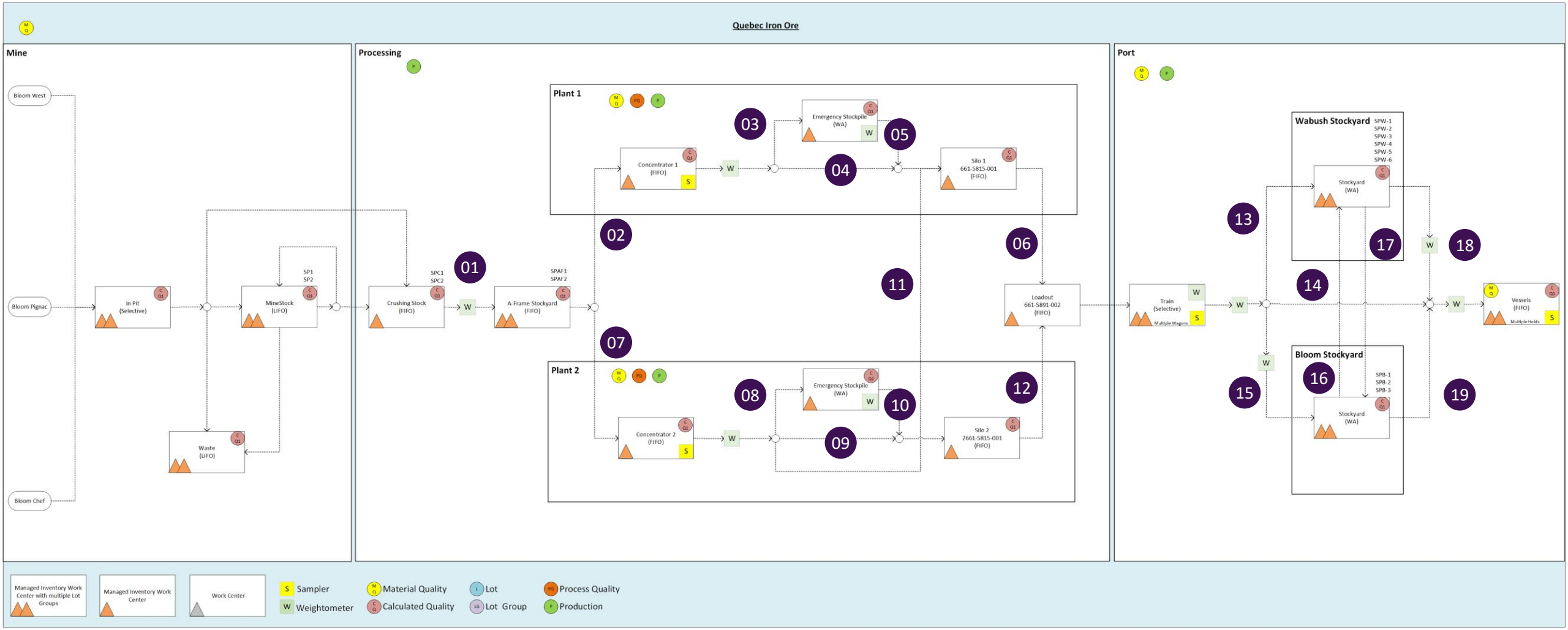
- Behavior identified: Increase in sealing water pressure
- Reason: Flow restriction from water hose kink/bent between pump inlet and pressure transmitter.
- Action taken: WO created to replace water hose
- Potential impact if abnormal behaviour was not identified in time:
  - Equipment damage
  - Higher maintenance costs



Pit to port inventory tracking and traceability of ore

Process and Asset Performance Visibility

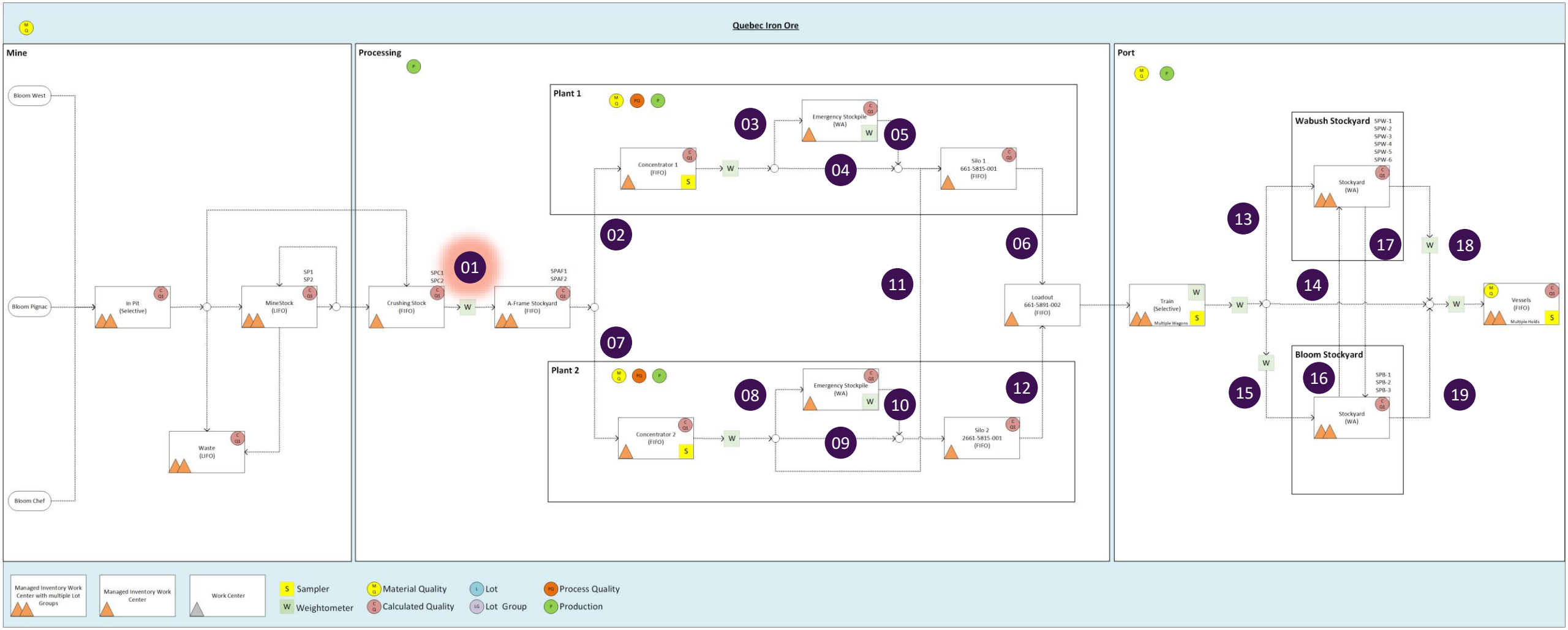
*AVEVA Production Management**



Pit to port inventory tracking and traceability of ore

Process and Asset Performance Visibility

AVEVA Production Management*

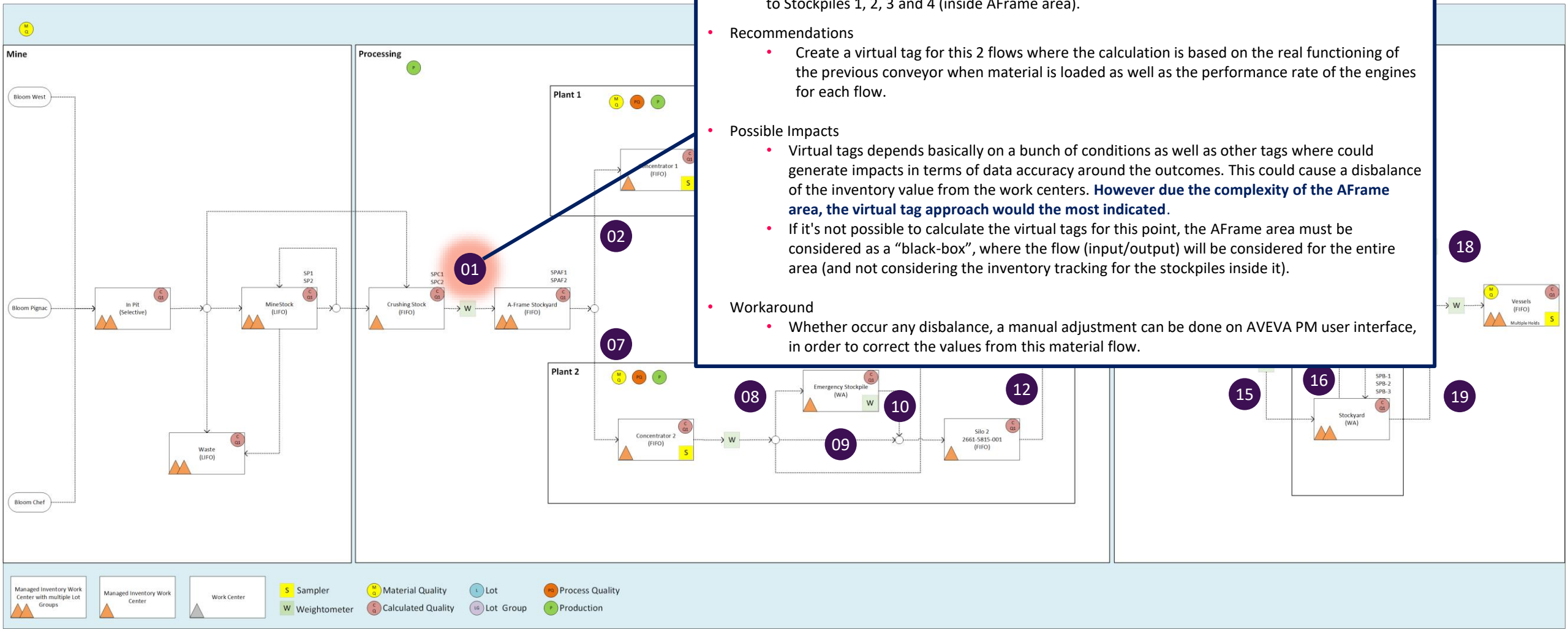


Pit to port inventory tracking and traceability of ore

Process and Asset Performance Visibility

VEVA Production Management

- Main Gaps
  - **A.** The A-Frame Area do not have any reliable Scale that represent the stacked material from Line 1 to Stockpiles 1 and 2 (inside AFrame area).
  - **B.** The A-Frame Area do not have any reliable Scale that represent the stacked material from Line 2 to Stockpiles 1, 2, 3 and 4 (inside AFrame area).
- Recommendations
  - Create a virtual tag for this 2 flows where the calculation is based on the real functioning of the previous conveyor when material is loaded as well as the performance rate of the engines for each flow.
- Possible Impacts
  - Virtual tags depends basically on a bunch of conditions as well as other tags where could generate impacts in terms of data accuracy around the outcomes. This could cause a disbalance of the inventory value from the work centers. **However due the complexity of the AFrame area, the virtual tag approach would the most indicated**.
  - If it's not possible to calculate the virtual tags for this point, the AFrame area must be considered as a “black-box”, where the flow (input/output) will be considered for the entire area (and not considering the inventory tracking for the stockpiles inside it).
- Workaround
  - Whether occur any disbalance, a manual adjustment can be done on AVEVA PM user interface, in order to correct the values from this material flow.



IT and OT data sharing through AVEVA Data Hub

Sharing data across IT and OT ecosystem

AVEVA Data Hub

Identified areas of need

- Share operational data with management systems.
- Build efficient reports from operational data.
- Have a simple way for suppliers to get data from our ops

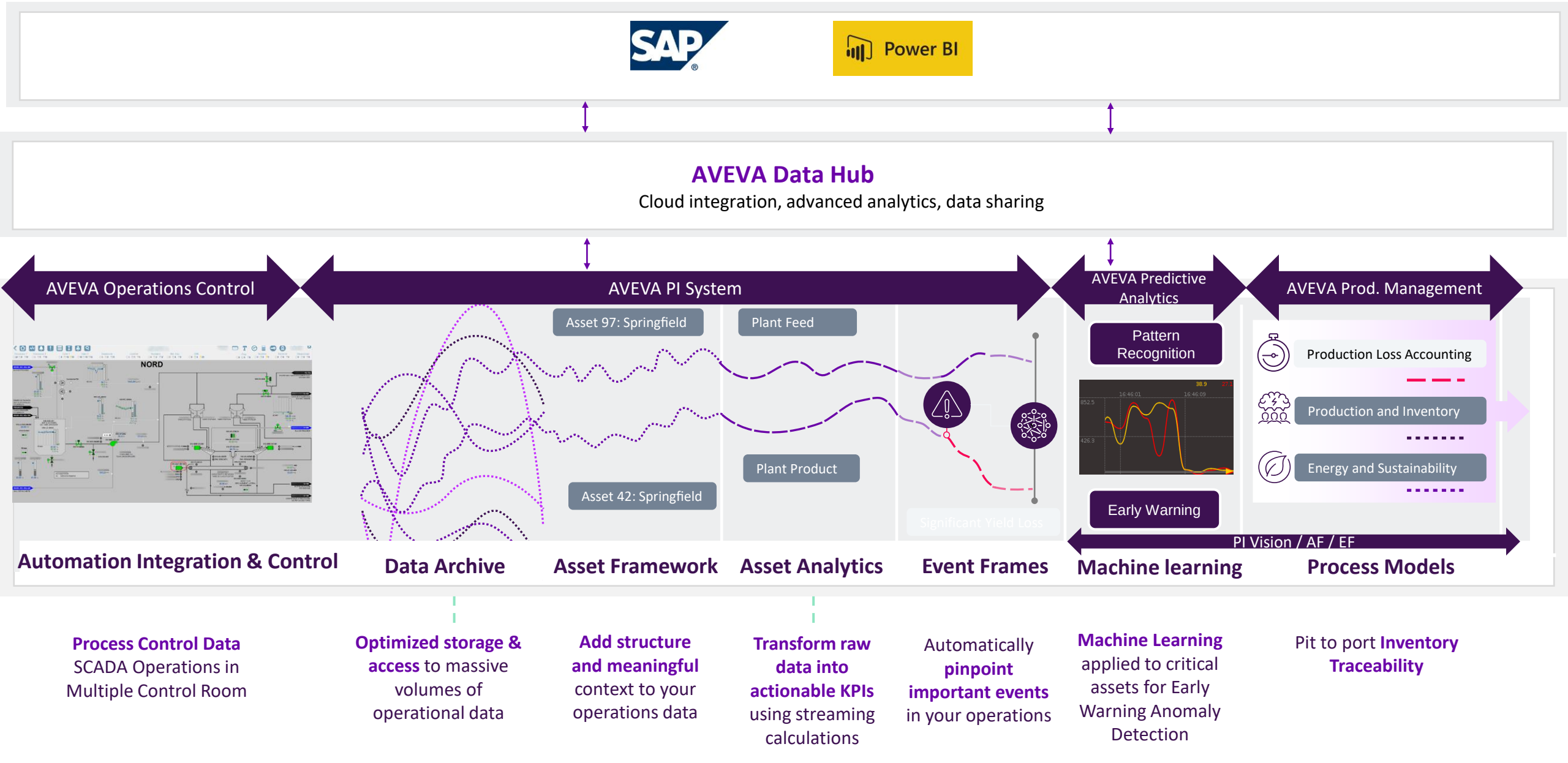
How it improved the data ecosystem

- Allow management layer to make faster decisions based on aggregated operational data
- Bridge the data layer between OT and IT
- Make data more accessible to other users

Current Deployment

- AVEVA Data Hub deployed
- Increased the efficiency of the data transfer between different platforms
- Simplified the reporting via PowerBI

From Raw Data to Refine to Response



Process Control Data SCADA Operations in Multiple Control Room

Optimized storage & access to massive volumes of operational data

Add structure and meaningful context to your operations data

Transform raw data into actionable KPIs using streaming calculations

Automatically **pinpoint important events** in your operations

Machine Learning applied to critical assets for Early Warning Anomaly Detection

Pit to port **Inventory Traceability**

Recap

Challenges

- Reliability of critical equipment needs to be improved to support expansion
- Increase throughput to full nameplate capacity by debottlenecking production
- Lack of pit to port inventory tracking and traceability of ore

Solution

- AVEVA Operations Control
- AVEVA PI System
- AVEVA Data Hub
- AVEVA Predictive Analytics
- AVEVA Production Management

Results

- Improved health tracking of critical equipment.
- Catch equipment anomalies during operation.
- Identified where we lacked instrumentation throughout the process.
- Solid base for business intelligence decisions.

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Questions?

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State your name and company.

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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.

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