NEXT ORE

Magnetic Resonance for Grade Control & Sorting

A CASE STUDY

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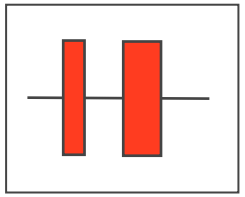


NEXT ORE

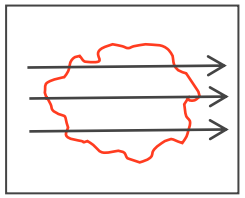
THE TECHNOLOGY

Medical MRI, tuned to copper

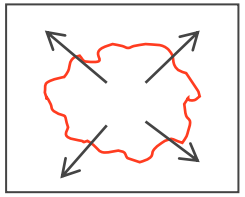
1. Radio-frequency pulse excites the target mineral at its resonant frequency
2. Echo strength = quantity of mineral present through the full bed depth
3. Grade compared to cut-off or plan; every measurement, in real time



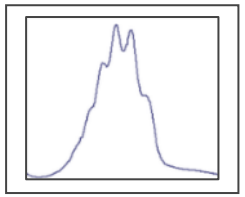
RF Pulse



Sample Penetration



Echo Response



Echo Measured



NEXT ORE

THE SITE

Candelaria — Lundin Mining, Atacama, Chile

25 Mtpa
PROCESSING CAPACITY

6 kt/h
PEAK ORE RATE

IOCG
OREBODY STYLE

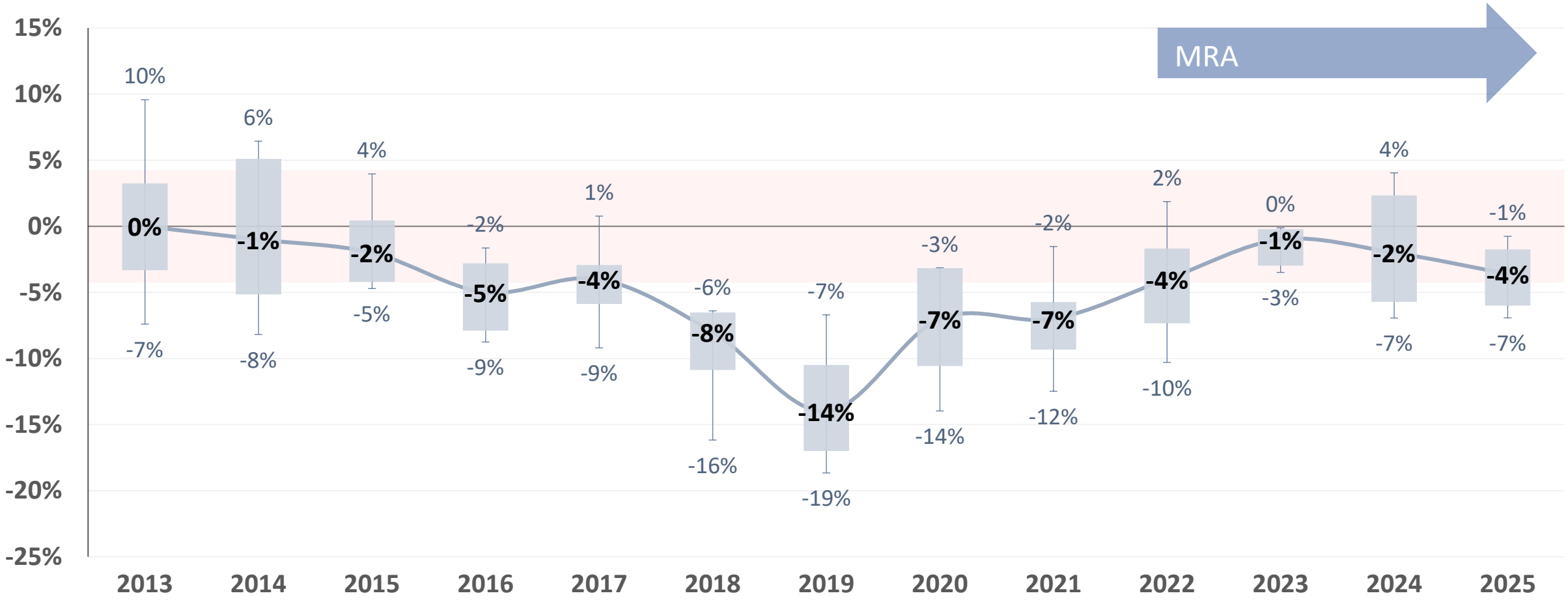
2 + 2
OPEN PITS + UNDERGROUND MINES

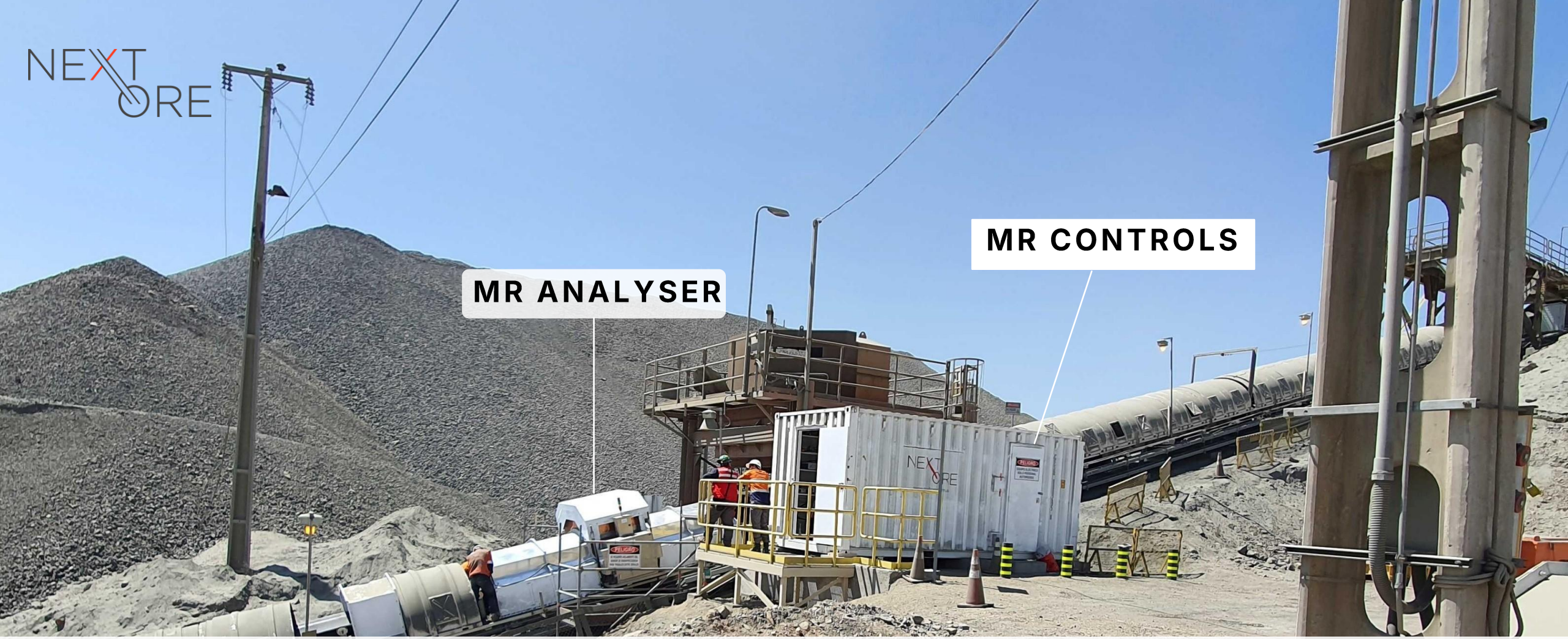


NEXT ORE

THE PROBLEM

Mine-to-mill metal reconciliation





THE PHYSICAL SOLUTION

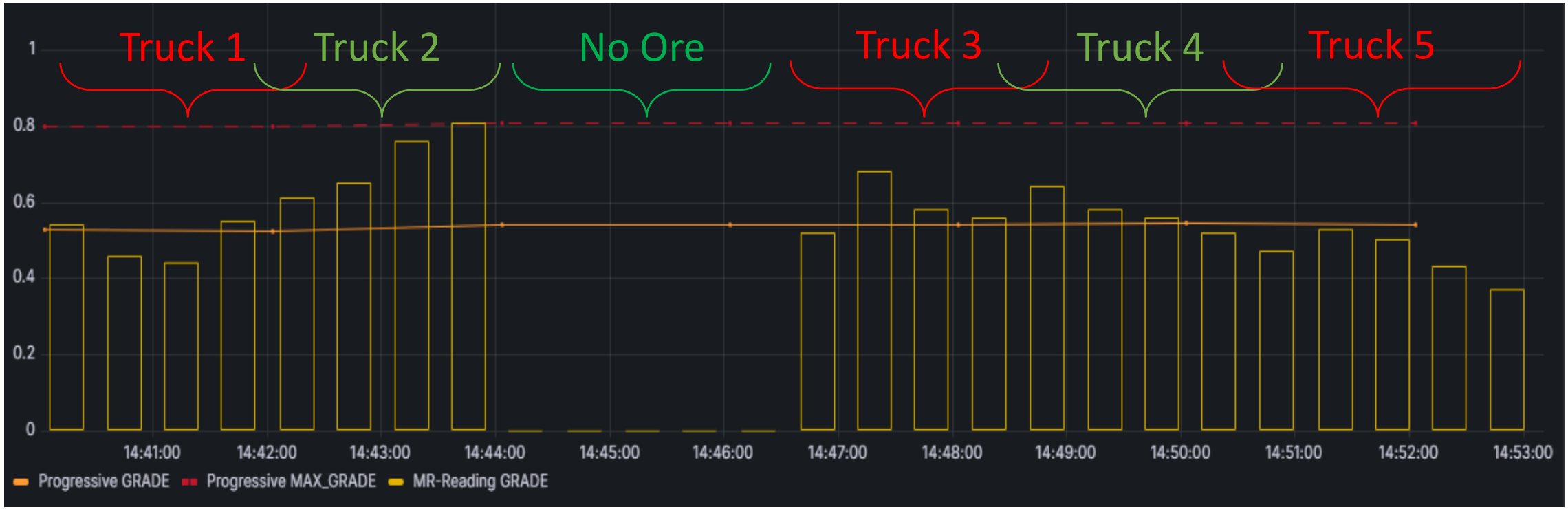
Retrofit MR analyser on the primary crusher discharge belt

Candelaria · 6,000 tph Capacity · installed on the existing conveyor — no new infrastructure

NEXT ORE

THE SOLUTION IN CONCEPT

Grade every 30 seconds. Every truck traced back to its source



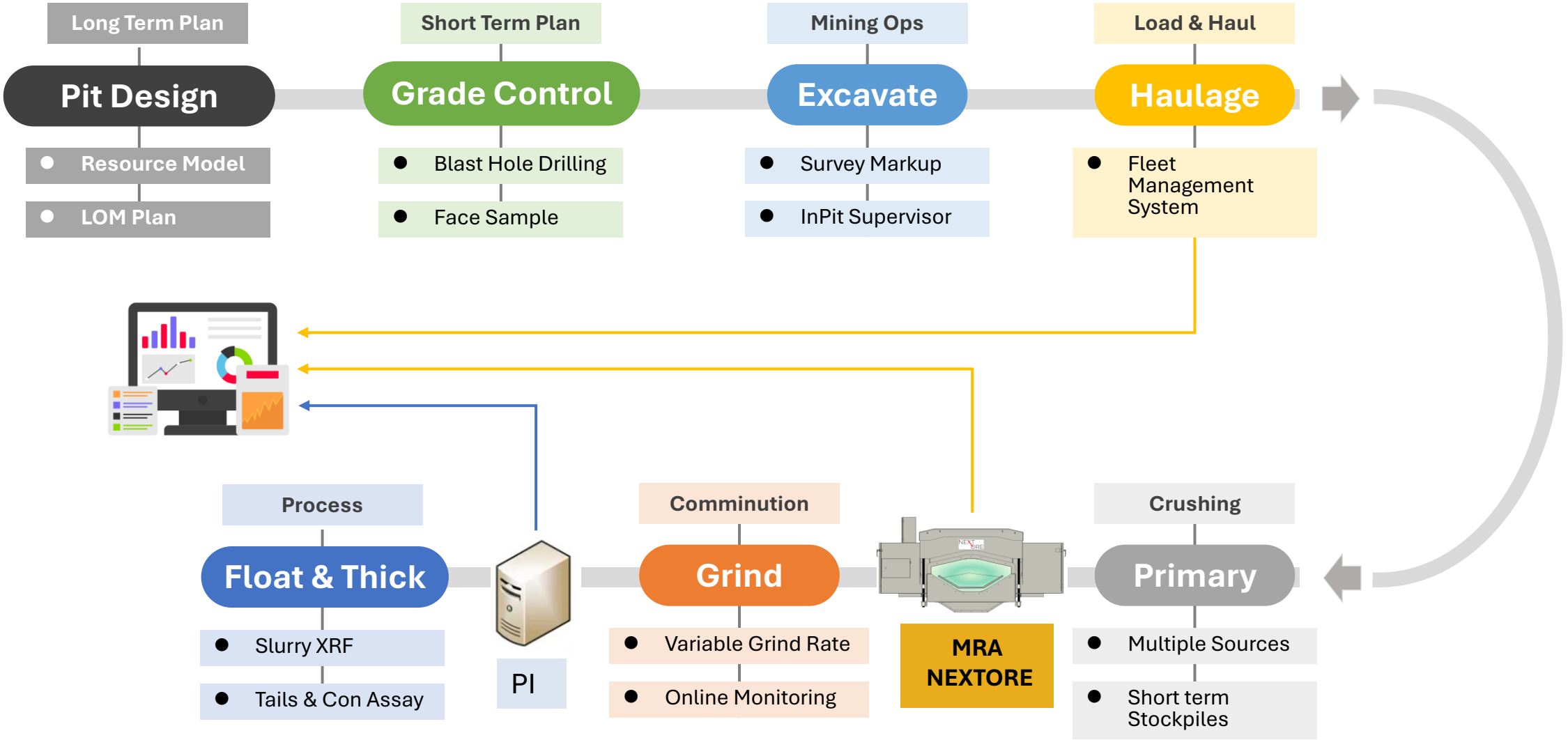
30 s
READING INTERVAL

~50 t
PER MEASUREMENT POD

5
READINGS PER TRUCK

100 %
OF FEED MEASURED
OF TONNES TRACED TO SOURCE

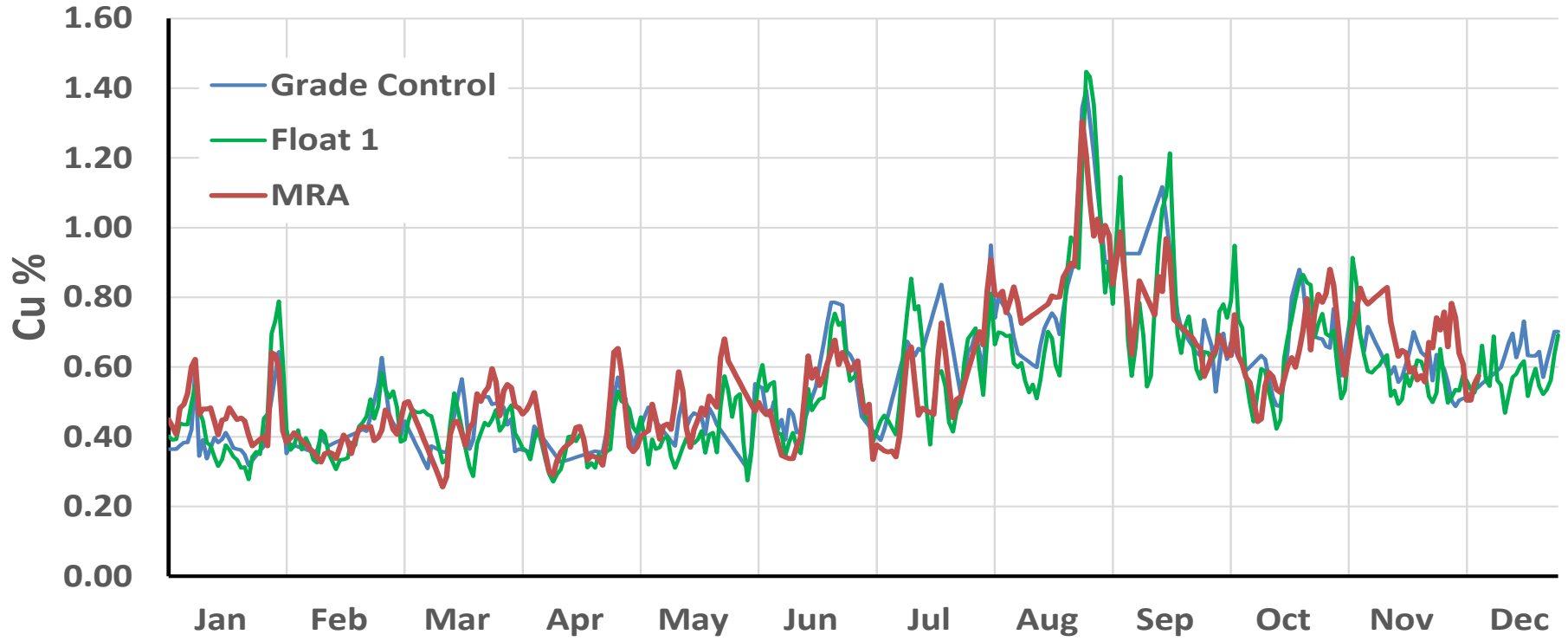
THE PROCESS FLOW



NEXT ORE

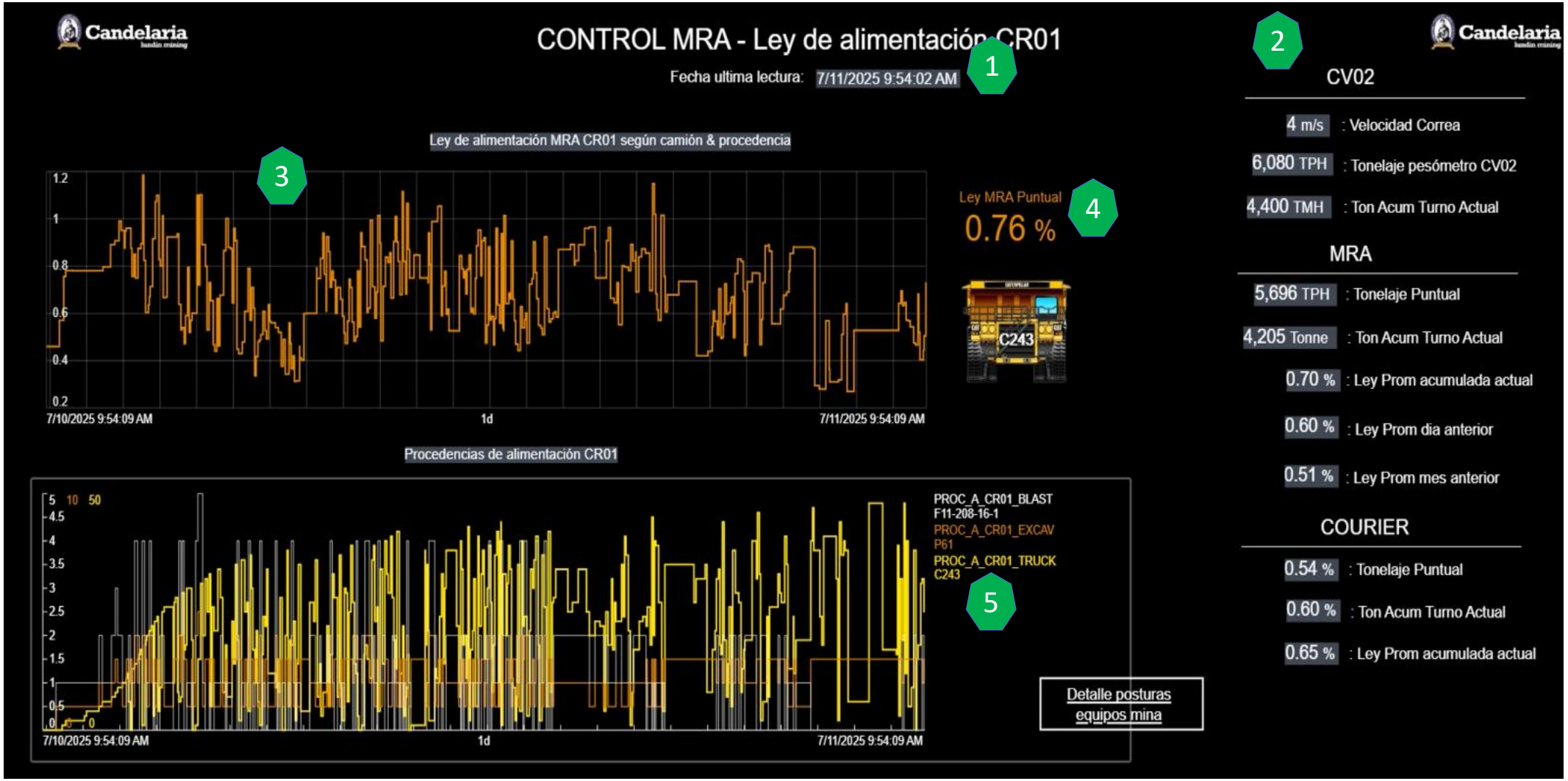
THE RESULT

Daily plans, independently verified, that agree with the mill



SOURCE	MEASUREMENT POINT	FREQUENCY
MR Analyser	Conveyor, post primary crusher	Every 30 s
Slurry XRF	Flotation feed 1	Continuous, on delay
Grade Control	Blast Hole Assays + Model	Daily Forecast

THE USER EXPERIENCE



NEXT ORE

THE OUTCOME

Reconciliation improved as three teams changed how they work

Grade control geology

Real-time actual grades at 50 t resolution feed dig-direction and destination calls.

→ *Proactive, grade control*

Medium-term planning

Better grade estimates flow into the coming periods of the plan.

→ *Metal forecasts the business now trusts.*

Mine operations

Live deviation-from-plan monitoring, shift by shift.

→ *Course-correct **today**, not next month.*

NEXT STEPS

From measuring the ore, to acting on it

AT CANDELARIA

- Mobile bulk-sorting pilot, leading to full industrial bulk ore sorting
- AI-assisted improvements to resource-grade estimates, based on 30s readings
- Deeper integration with planning and dispatch systems

ACROSS THE INDUSTRY

- **New Minerals**: Magnetite, Arsenopyrite & Pyrrhotite & Enargite (Gold Proxy & Arsenic), Lithium
- **New geometries**: haul trucks trialled, underground LHDs next
- **New delivery models**: sorting-as-a-service; complete-sensing alliances



OUR LEARNINGS FOR YOU...

Pilots need site ownership and objectives. Bulk samples without control prove little benefit

Real feed is mixed more than what the IS Heterogeneity says. Assess this properly; Operations practice, Blasting and stockpiles matter

Use the data to update geology and cut-offs, or value leaks

Integration into the mine life takes time. Plan for learning and change management.

Questions?

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Let’s connect