Protecting Ore Quality Starts with Cleaner Material Flow

Summary:

Modern mining operations invest significantly in grade control through geological modelling, online ore analysers and laboratory testing to ensure ore meets strict quality specifications. However, preserving ore quality extends beyond extraction. Residual material retained in haul trucks, excavator buckets, crushers, chutes and transfer points can contribute to cross-contamination between ore grades, increase dilution and reduce process consistency throughout the material handling chain.

Carryback and build-up material can become operational sources of contamination and here we discuss the importance of maintaining clean equipment surfaces to support grade integrity. It also discusses how improving material release can reduce residual material, minimise cleaning interventions and contribute to more consistent ore handling.

ECORA complements existing grade control practices by reducing material adhesion at the source, helping mining operations preserve ore integrity, improve material flow and support operational excellence from the mine face to the processing plant.

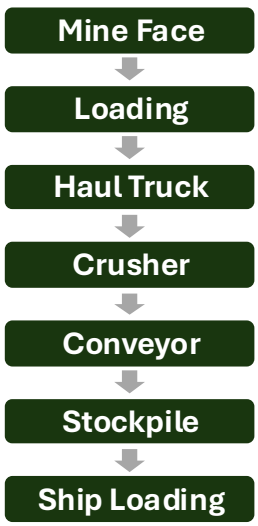
How Does Ore Contamination Happen?

Ore contamination can occur throughout the material handling process whenever residual material remains on equipment or different ore types are unintentionally mixed.

The most common operational sources include:

- **Carryback** remaining in haul trucks, excavator buckets and rail wagons between loading cycles.
- **Residual material** left inside crushers, chutes, hoppers and transfer points during ore changeovers.
- **Mixing of different ore grades**, particularly when transitioning between mining blocks or stockpiles.
- **Material loss on haul roads**, where spilled ore may be collected and reintroduced into the process.
- **Mechanical cleaning** using excavators or loaders, which can introduce waste rock or foreign material.
- **High-pressure water cleaning**, which may increase moisture content and mobilise fine particles.

Every transfer point is a potential contamination point.



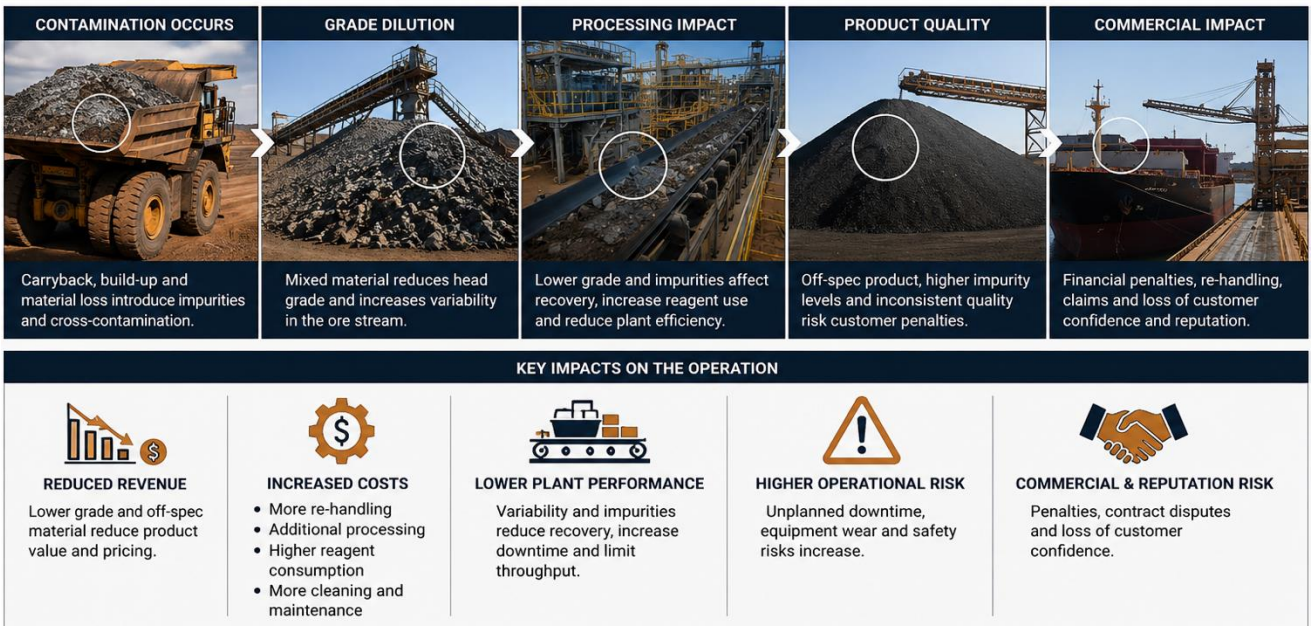
This is particularly relevant for: Iron ore (Fe grade, silica, alumina, phosphorus), Lithium, Bauxite, Nickel, Copper, Gold (high-grade ore campaigns).

ECORA helps preserve ore integrity and reduce operational sources of contamination

Even small variations in these parameters can influence processing performance, product quality and commercial value.

What is the Impact of Ore Contamination in Mining Operations?

Even small amounts of contamination can reduce ore quality, increase costs, and create operational and commercial risks across the value chain.



Best Practices Used by Leading Mining Companies

- Grade control,
- Online analysers,
- Ore tracking,
- Stockpile management,
- Automated sampling,
- Controlled blending,
- Material handling optimisation,
- Equipment cleanliness

Conclusion

✓ Grade control starts in the pit but continues throughout material handling.

✓ Every transfer point is a potential source of contamination.

✓ Preventing contamination at the source is more effective than correcting it later.

Reducing carryback and build-up helps minimise operational contamination, supporting more consistent ore handling throughout the mining process.