

Innovation

GRI 3-3

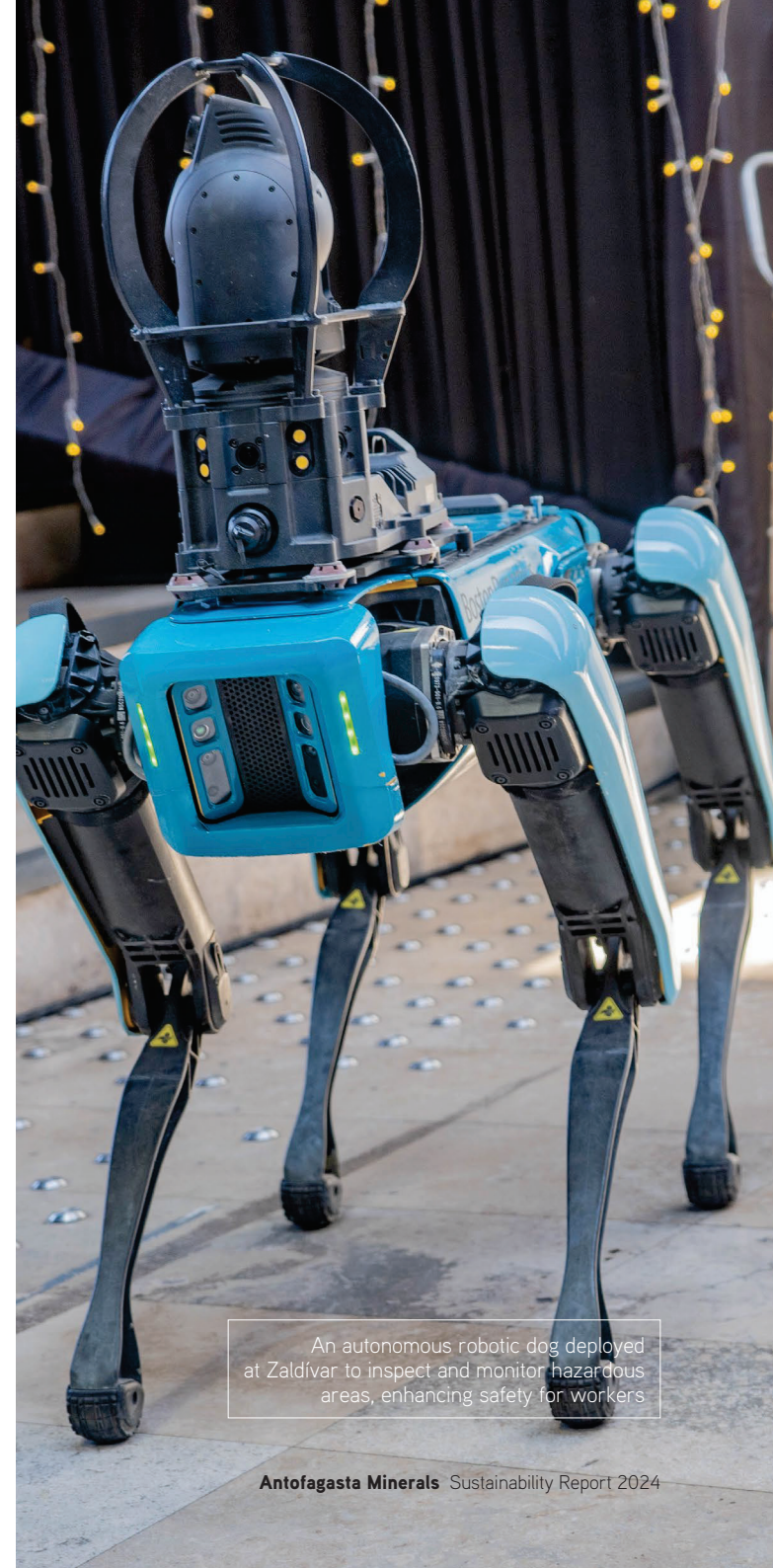
We incorporate cutting-edge modern technology into our existing operations and new projects, to improve our efficiency and competitiveness. We distinguish between initiatives addressing daily operational challenges and those driving long-term transformation, exploring new mining methods.

Our open platform, InnovaMinerals, presents our main operational challenges, inviting employees, contractors, and external parties to propose ideas and solutions.

In 2024, Antofagasta Minerals, in collaboration with MIT, held the seminar 'Disruptive Innovation for the Future of Mining' addressing key topics like electrification and energy security, which imply increased demand for minerals, especially copper. Over 220 attendees participated, along with a sizeable streaming audience.

During 2024, we have continued to develop a series of initiatives, further increasing and optimising our use of technology throughout our business:

- **Cuprochlor-T®:** Is our proprietary technology, developed by Antofagasta Minerals, for the leaching of primary sulphides, which represents a major goal for the global copper industry. Previous work has demonstrated success in achieving 70% recoveries of contained copper over a leaching cycle of approximately 220 days, in addition to developing low-cost heating methods for leach pads and registering patents globally. Efforts in 2024 focused on engineering studies and commercial validation with third parties, with positive results in exploratory tests.
- **Daily Plan Optimiser (SIRO Mezcla):** This tool, which was launched in 2024, automates daily blending of extracted materials to meet production targets while respecting operational and mineralogical constraints. By replacing manual, time-intensive processes, the Daily Plan Optimiser generates optimal extraction scenarios through balancing equipment availability, tonnage and ore quality. It also has the ability to provide contingency plans to address unexpected changes, such as fleet availability adjustments. This level of flexibility enables planners to maintain alignment with production goals, even in dynamic operational environments.
- In 2024, the Daily Plan Optimiser achieved a 100% adoption rate by the end of the year our operations.
- **Technologies for Competitiveness:** This initiative represents a collaboration between Los Pelambres and Fundación Chile, and seeks innovative technologies to improve productivity. Selected initiatives are invited to work with Los Pelambres on a proof of concept, or industrial pilot project, at one of our operations.
- **Shovel maintenance:** This initiative aims to improve productivity at Los Pelambres, as well as additional safety benefits. Through incorporating a new method of changing the tracking on excavators that almost completely avoids interactions between heavy mining equipment and operators when equipment is being lifted. A dedicated tool was designed by the Group's workers, and an initial deployment was completed in 2024 without incident.
- **GPT Aminerals:** We understand the potential of artificial intelligence, and through a Generative Artificial Intelligence (GenAI) initiative titled "GPT Aminerals", we are developing a platform that can process large volumes of data, learn and deliver a tailored responses. Applications to date include excavator maintenance at Centinela and the supervision of occupational health and safety practices in our activities.
- **Operational Excellence Management System (OEMS):** This has been applied at Antucoya to reduce downtime in mobile mining equipment relating to tyre failure. Through an improvement in road design, and tyre usage time, downtime relating to the availability of tyres was reduced from 2.9% to 1.4%.
- **Hopper Lining Project:** Using a high-density rubber lining of haul truck beds reduces wear and downtime related to maintenance. This initiative also improves the working environment since it reduces noise levels and therefore improves occupational health conditions. This project has been initiated at Los Pelambres and is being trialled at Centinela.
- **Tailings Innovation Programme:** We continue to evaluate alternative technologies for tailings deposition and improvements to boost water recovery rates. In 2024, advanced technologies were analysed to provide alternatives to conventional tailings, implementing a prototype for water recovery.



An autonomous robotic dog deployed at Zaldivar to inspect and monitor hazardous areas, enhancing safety for workers

Internally developed initiatives awards from the Group in 2024



IonoGuard – Minimising scintillation shutdowns – Antucoya: IonoGuard is a technology designed to mitigate the effects of ionospheric scintillation, which relates to solar radiation disrupting GPS tracking systems, causing unplanned downtime in key equipment.

In 2024, IonoGuard was implemented in Antucoya's bucket-wheeled excavator (pictured above), and involved system updates, installation of Trimble R750 equipment, and the continuous analysis of solar projections to adapt the system to changing conditions.

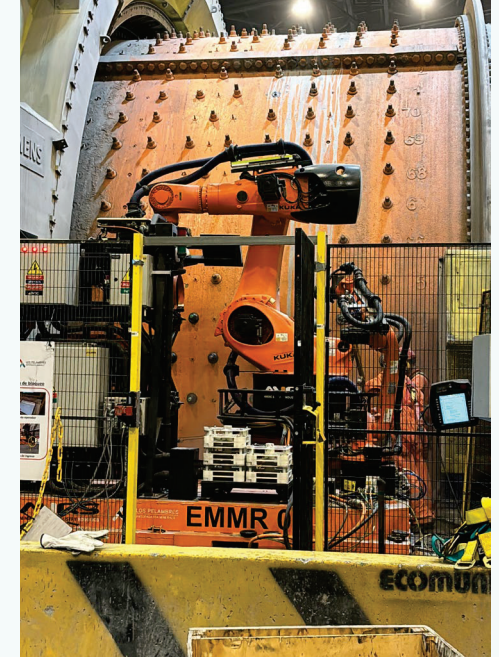


ShovelSense – Centinela: A cutting-edge technological solution designed for real-time monitoring of the quality of ore being loaded by mining shovels. Utilising high-precision sensors and advanced analytical algorithms, ShovelSense determines material composition directly at the mine face, delivering critical data on ore grade and other essential parameters in real time through integration with the mine Fleet Management System (FMS).

This innovation has significantly improved the efficiency of ore dispatch to processing plants, enhancing selectivity, improving ore recovery and preventing waste material from entering the ore stream.



Mineral Tracking – Zaldivar: A centralised system that stores and manages data, allowing efficient access, search, retrieval and applications. Its purpose is to trace minerals throughout the process flow sheet, promoting data-driven operational decision-making to meet the goal of maximising copper stacking and recoveries.



Robotic Arms – Los Pelambres: Seeks to reduce safety risks and achieve a 30% reduction in downtime associated with the changing of bolts and lining plates in Semi-Autogenous Grinding (SAG) mills.

This initiative improves the safety and efficiency of maintenance activities through the removal of workers from high-risk environments. The robotic arm incorporates a range of sensors and actuators, enabling operators to conduct activities at a safe distance.