

**Submission
No 76**

**INQUIRY INTO CURRENT AND POTENTIAL IMPACTS OF
GOLD, SILVER, LEAD AND ZINC MINING ON HUMAN
HEALTH, LAND, AIR AND WATER QUALITY IN NEW
SOUTH WALES**

Organisation: Newcrest Mining Limited

Date Received: 5 September 2023



Submission to NSW Parliament Legislative
Council Portfolio Committee No. 2 – Health

**Inquiry into current and potential impacts of gold,
silver, lead and zinc mining on human health, land,
air and water quality in New South Wales**

5 September 2023

Forward looking statements

This document includes forward looking statements and forward looking information within the meaning of securities laws of applicable jurisdictions, including within the meaning of Section 27A of the Securities Act and Section 21E of the Securities Exchange Act of 1934, as amended. We intend the forward-looking statements contained in this communication to be covered by the safe harbor provisions of such securities laws. All statements other than statements of historical fact in this communication or referred to or incorporated by reference into this communication are “forward looking statements” for purposes of these sections. Forward looking statements can generally be identified by the use of words such as “may”, “will”, “expect”, “intend”, “plan”, “estimate”, “target”, “anticipate”, “believe”, “continue”, “objectives”, “outlook” and “guidance”, or other similar words and may include, without limitation, statements regarding estimated reserves and resources, internal rates of return, expansion, exploration and development activities and the specifications, targets, results, analyses, interpretations, benefits, costs and timing of such activities; certain plans, strategies, aspirations and objectives of management, anticipated production, sustainability initiatives, climate scenarios, dates for projects, reports, studies or construction, expected costs, cash flow or production outputs and anticipated productive lives of projects and mines. Newcrest continues to distinguish between outlook and guidance. Guidance statements relate to the current financial year. Outlook statements relate to years subsequent to the current financial year.

These forward looking statements involve known and unknown risks, uncertainties and other factors that may cause Newcrest’s actual results, performance, and achievements to differ materially from any future results, performance or achievements, expressed or implied by these forward looking statements. Relevant factors may include, but are not limited to, changes in commodity prices, foreign exchange fluctuations and general economic conditions, increased costs and demand for production inputs, the speculative nature of exploration and project development, including the risks of obtaining necessary licences and permits and diminishing quantities or grades of resources or reserves, political and social risks, changes to the regulatory framework within which Newcrest operates or may in the future operate, environmental conditions including extreme weather conditions, recruitment and retention of personnel, industrial relations issues and litigation. In addition, with respect to the Newmont Transaction, relevant factors may include, among others: (1) the risk that the Newmont Transaction may not be completed in a timely manner or at all, (2) the failure to receive, on a timely basis or otherwise, the required approvals of the Newmont Transaction by Newmont stockholders or Newcrest shareholders or the required approval of the scheme of arrangement by the Australian court, (3) the possibility that any or all of the

various conditions to the consummation of the Newmont Transaction may not be satisfied or waived, including the failure to receive any required regulatory approvals from any applicable governmental entities (or any conditions, limitations or restrictions placed on such approvals), (4) the possibility that competing offers or acquisition proposals for Newcrest or Newmont will be made, (5) the occurrence of any event, change or other circumstance that could give rise to the termination of the SID, including in circumstances which would require Newcrest to pay a termination fee, (6) the effect of the announcement or pendency of the Newmont Transaction on Newcrest’s ability to retain and hire key personnel, its ability to maintain relationships with its customers, suppliers and others with whom it does business, or its operating results and business generally, (7) risks related to diverting management’s attention from Newcrest’s ongoing business operations, (8) the risk of litigation in connection with the Newmont Transaction, including resulting expense or delay, and (9) (A) those risks discussed in Newcrest’s Financial Report for the year ended 30 June 2023 and the Annual Information Form dated 13 December 2022, and (B) those risks discussed in other documents Newcrest files with the ASX and the Canadian Securities Administrators. For further information as to the risks which may impact on Newcrest’s results and performance, please see the risk factors discussed in the Operating and Financial Review included in the Appendix 4E for the year ended 30 June 2023 and the Annual Information Form dated 13 December 2022 which are available to view at www.asx.com.au under the code “NCM” and on Newcrest’s SEDAR profile.

Forward looking statements are based on management’s current expectations and reflect Newcrest’s good faith assumptions, judgements, estimates and other information available as at the date of this report and/or the date of Newcrest’s planning or scenario analysis processes as to the financial, market, regulatory and other relevant environments that will exist and affect Newcrest’s business and operations in the future. Newcrest does not give any assurance that the assumptions will prove to be correct. There may be other factors that could cause actual results or events not to be as anticipated, and many events are beyond the reasonable control of Newcrest. Readers are cautioned not to place undue reliance on forward looking statements, particularly in the current economic climate with the significant volatility, uncertainty and disruption caused by global events such as geopolitical tensions. Forward looking statements in this document speak only at the date of issue. Except as required by applicable laws or regulations, Newcrest does not undertake any obligation to publicly update or revise any of the forward looking statements or to advise of any change in assumptions on which any such statement is based.



Contents

Introduction	5
Executive summary	6
About us	8
The history of the region	10
Community concerns about dust	12
Responding to community concerns	13
Independent environmental studies	18
Commitment to health and safety	26
Local water quality and land rehabilitation	28



Introduction

Newcrest Mining Limited (Newcrest) welcomes the opportunity to provide input into the Legislative Council's Inquiry into current and potential impacts of gold, silver, lead and zinc mining on human health, land, air and water quality in New South Wales.

Our company is a significant producer of gold and copper. We are the largest gold producer listed on the Australian Securities Exchange and have been the owner and operator of Cadia Valley Operations (Cadia), which is located 25 kilometres from Orange, since the 1990s.

Cadia is one of the world's largest producing gold and copper mines. In the last financial year, more than 98,000 tonnes of copper in concentrate were produced at the site, representing nearly half of the state's total copper production.

Copper is a critical commodity for global energy transition efforts and the copper produced at Cadia last year alone is enough to contribute to producing nearly 21,000 three-megawatt wind turbines, including for cabling and wiring, turbine/power generation and transformers.¹

With global demand for copper projected to double over the next 12 years², this copper is vital in helping the world reach net zero goals. It is an integral part of the electricity grid, a key component for solar, hydro and thermal energy and an essential material component of both electric vehicles (EVs) and the infrastructure needed to support EV charging.

Nearly 600,000 ounces of gold were also produced at Cadia in the past financial year. After coal, gold was the second most valuable goods export for New South Wales in 2021-22. As well as being a central part of global financial markets and important to the investment strategies of private investors and central banks, including the Reserve Bank of Australia, gold is also used in our everyday lives. This includes smartphones, global positioning system units, electronic devices, smoke detectors, hi-tech health care and aerospace technology.

The third commodity derived from Cadia is molybdenum, which is used to make steel lighter and stronger, with particular application in vehicle, aircraft and aerospace manufacture and shipbuilding. Its durability, high melting point and resistance to corrosion is used in stainless steel to add strength and longevity. At Cadia, some 660 tonnes of molybdenum were produced in the last financial year.

This submission provides information on a range of current and planned measures designed to ensure Cadia remains in compliance with regulatory requirements and meets the environmental, health and safety expectations of both the local and broader communities.



Transitioning Cadia's energy consumption

The decarbonisation of Cadia's power usage is expected to be a major contributor to Newcrest's goal of net zero operational Scope 1 and Scope 2 emissions by 2050. In July 2023, the Rye Park Wind Farm began generating electricity and early supply has commenced under Cadia's Power Purchase Agreement (PPA) with Tilt Renewables.

Newcrest has a 15-year renewable PPA to secure a significant portion of Cadia's future projected energy requirements from 2024. The wind farm is expected to be fully operational in mid-2024.

¹ Based on figures available via the [Copper Development Association Inc.](#)

² [Growing appetite for copper threatens energy transition and climate goals | S&P Global \(spglobal.com\)](#)

Executive summary

The Central West region of New South Wales is an area rich with natural minerals and one that has a proud history associated with mining for the past 150 years.

As owners and operators of the Cadia mine, Newcrest has been a custodian of this legacy for the past quarter of a century. During this time the company and the mine have been a significant and enduring contributor to the district, through generating jobs, supporting local businesses, stimulating economic development and investing back into the community.

We recognise that having a strong and healthy community around our operations means we are best placed to succeed both now and across the future lifespan of our Cadia mine. Noting that transparency is fundamental to our operations, we not only regularly monitor air quality and water management, we also ensure this information is made available publicly on our website.³

Working with the local community – whether that be residents living nearby the mine or across Orange more broadly – is a key focus area for us. That’s why when the community raises an issue, we take it seriously. And it’s why when a compliance issue emerges, we work to address it.

When it comes to dust emissions from either our tailings storage facilities or our ventilation rises, we acknowledge and understand that some residents have concerns.

Earlier this year, a number of residents advised us that their own personal tests showed elevated traces of heavy metals. In response, we moved with urgency to commission extensive studies from accredited, independent experts to look closely at water quality, ore samples and health impacts.

The results of each study have been shared publicly and are available on our website.

Together, these studies are based on strong scientific principles and show overall that:

- Air quality in the region is very good
- Drinking water quality is within government-set guidelines
- Human health impacts conform with stringent health standards.

Beyond the testing and studies we instigated in response to these concerns, further independent research on drinking water quality has been undertaken this year by NSW Health and the Environment Protection Authority (EPA).

Results from NSW Health found drinking water was safe to drink. The EPA’s results released to date have shown that drinking water was safe for nearly all residences tested. In the small number of cases where tap water exceeded guidelines, these tests found tank water was safe to drink. It also found a small number of tank water samples exceeded guidelines but in those cases the tap water did not contain the same metals. In response, the EPA has highlighted the importance of maintaining tanks and their connections to drinking taps.⁴

In relation to Cadia’s tailings storage facilities, the slump of part of the tailings storage facility embankment wall has unfortunately led to dust lift-off events in the area. In response, a number of initiatives have been funded and undertaken to curtail incidence of dust emissions following the slump of part of a tailings storage facility embankment wall. This includes applying dust suppression coatings by crop dusting aircraft and the use of hydromulch rigs. Beyond these endeavours, we are also currently procuring a new irrigation system to limit and prevent dust events and expect this to be installed from the end of this year.

The scale of the tailings storage facilities and changing topography within them following the embankment slump means the identification

³ [Air quality reports](#) and [water management reports](#) are available online at www.cadiavalley.com.au

⁴ NSW Environment Protection Authority [updates on Cadia](#), as at 1 September 2023



of a proper, safe and adequate long-term solution has been a complex process. We acknowledge the time taken to find and implement a permanent solution has been longer than the community expects, however we remain committed to delivering this outcome. In the meantime, works to strengthen the wall, including buttressing, are currently in progress.

In managing air quality, continuous monitoring and analysis is undertaken across our Cadia site to avoid or minimise our potential contribution to elevated ambient dust conditions. An independent air quality audit report from August 2022 identified that measured total solid particles at Ventilation Rise 8 (VR8), which extracts dust from our deep underground mining operations, exceeded regulated standards. However, as outlined in a model prepared by a leading air quality expert:

“...the measured total solid particle concentrations in VR8 are not a reliable measure of any dust that may be transported off-site.”⁵

It should be noted that action taken this year has resulted in the total solid particles measured at VR8 now being within clean air regulations. The results of this monitoring are being regularly provided to the EPA. Cadia has consistently remained in compliance with clean air regulations in relation to metals emissions.

Working to maintain compliance with our regulatory obligations is, and remains, a key priority for our business and aligns with our operating principles.

In response to the issues identified at VR8, we worked with experts to design and procure an engineering solution, moved to curtail particulate emissions by temporarily reducing underground mining rates (and supplementing this with existing ore stockpiles) and are sourcing and installing additional filtration equipment.

Protecting the environment and the health and safety of both our workforce and the community are at the forefront of how we operate. We recognise that good environmental practice is critical to our operational performance as well as building community trust and acceptance.

Community engagement and acceptance is something we value and are fundamental to our licence to operate. We see ourselves as an integral part of the local community. As one of the region’s largest employers, our people not only work in this community but live in it too. Having a strong community around our operations is vital for our business at Cadia and significant steps have been taken to address concerns raised by members of the local community.

We will continue to work hard to rebuild trust and appreciate that cannot be done by words alone. It additionally requires deliberate intent and action across all levels of the company.

⁵ [Air Dispersion Model 2022](#) (dated 4 July 2023), Todoroski Air Sciences Pty Ltd, p. 33

About us

Newcrest's headquarters are in Melbourne with operating mines in Australia (Cadia and Telfer, Western Australia), Canada and Papua New Guinea.

We are also exploring for copper and gold in Australia (Queensland, New South Wales, Northern Territory and Western Australia), the United States (Nevada and Oregon), Canada (British Columbia) and Ecuador, where we also part-own mining companies.

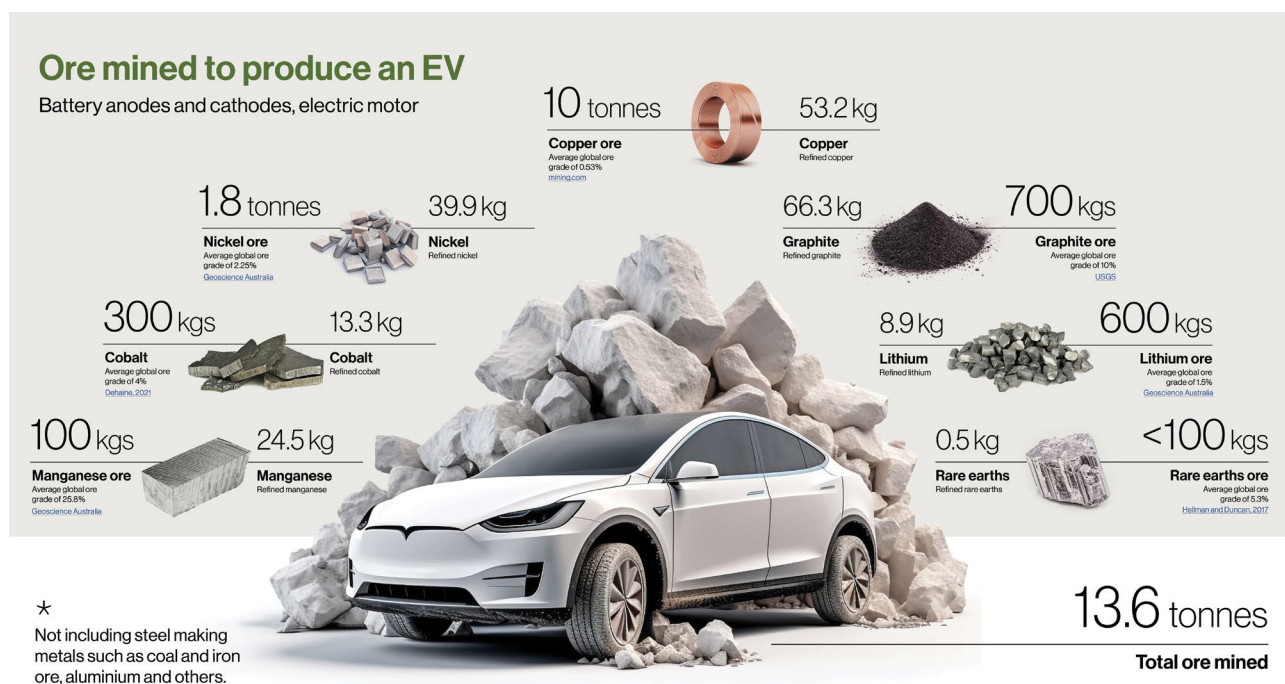
On 15 May 2023, Newcrest entered into a binding Scheme Implementation Deed (SID) with US-based gold mining company Newmont, under which the companies have reached agreement to proceed with a proposal for Newmont to acquire 100 per cent of the issued shares in Newcrest by way of an Australian scheme of arrangement.

The transaction is subject to shareholder, regulatory and other conditions with implementation targeted for November 2023. It is expected to establish the world's largest gold producer with a significant and growing exposure to copper.

Our increasing level of copper production will help support global decarbonisation. If the world is to reach net zero by 2050, global copper production will need to be doubled.⁶ This is due primarily to the significant copper demand required for the electrification of vehicles as well as renewable energy generation and electricity transmission infrastructure.

As an example, an average electric vehicle requires around 10 tonnes of mined copper ore to produce the 53 kilograms of copper required for its battery and powertrain.⁷

The Cadia site includes the Cadia East underground mine, which is one of the largest gold and copper deposits in the world. Cadia East commenced commercial production in January 2013 and uses the large-scale mining method known as block caving, the underground equivalent to open pit mining that involves undermining an ore body to make it collapse under its own weight.



⁶ Source: [Growing appetite for copper threatens energy transition and climate goals | S&P Global \(spglobal.com\)](https://www.spglobal.com)

⁷ Source: Minerals Council of Australia

Cadia is one of the world's largest block mines, using Newcrest's world-leading expertise in this technique to support a low-cost, long-life operation with reduced environmental impact.

The site also comprises ore processing facilities, maintenance infrastructure, tailings storage facilities including the Cadia Hill Pit Tailings Storage Facility, and the Ridgeway underground mine, which is currently in care and maintenance.

Cadia produces gold doré bars from a gravity circuit and gold-rich copper concentrate from a flotation circuit. The concentrate is piped to a dewatering plant at nearby Blayney and sent by rail to Port Kembla for export.

Cadia also produces silver and molybdenum and operates Australia's only molybdenum plant. This was commissioned during the March 2022 quarter and delivers an additional product stream in the form of molybdenum concentrate.

How innovation is central to Cadia's operations

Cadia's operations are a showcase for Newcrest's commitment to using technology, innovation and automation to improve safety and increase productivity and efficiency. This includes:

- One of the most advanced integrated automated underground production levels in the world
- Minimising surface environmental impact and mining smarter with block caving mining techniques, in which Newcrest is a global leader
- Trials of advanced 4G and 5G mobile technologies to assess the potential of cellular delivery of data and video to support a smarter, safer and more sustainable mine
- Trialling and operational use of advanced equipment such as the Hard Rock Continuous Miner, Eccentric Rolls Crusher and Stringer Chain Telehandler to improve safety
- Development and implementation of the SmartHog underground inspection robot by Newcrest graduates
- The first commercial implementation of the Epiroc/Orica Avatel wireless underground development charging solution, which enables a single operator to prepare and wirelessly complete a full charging cycle from the safety of an enclosed cabin without compromising the quality of blast outcomes.



The history of the region



The history of the Cadia Valley begins with the Wiradjuri people, whom Newcrest acknowledges as the traditional owners of the land. To this day, we work proudly in partnership with the Orange Local Aboriginal Land Council. As short-term custodians of the land in which we operate, we respect the values of historic assets and places on our site and the role of traditional owners and custodians of the land.

We undertake conservation management to monitor and manage our environmental impacts on cultural heritage to preserve their legacy for future generations.

Newcrest has been mining the copper-gold deposits in the local granite porphyry since the late 1990s. There are only trace elements of lead, nickel and selenium in the Cadia deposits. These porphyrys are part of a bigger more complex mineralisation system in the region that has been historically mined for more than 150 years.

The Scottish Australian Mining Company commenced major mine workings at Cadia in around 1861, building an engine house and smelting works.

Cadia Village was soon established and survived through several stages of mining activity for copper, gold and finally iron ore before being deserted in the 1940s, making Cadia Valley one of the oldest copper mining localities in Australia.

From the 1860s, mines were opened on either side of Cadiangullong Creek which flows through the valley into the Belubula River, while Cadia village developed on its eastern bank.

Newcrest Mining discovered the Cadia Hill orebody in 1992, which was large enough to secure Newcrest's future in the valley with the final estimate of gold potential for Cadia Hill projecting a 12-year mine life.



Working in partnership with Indigenous organisations

Cadia's partnership with the local Indigenous community includes support for Orange Local Aboriginal Land Council (OLALC) social, cultural, health and economic programs and initiatives.

For example, Cadia has provided support to the Ngurang-gu Yalbilinya Program which provides a positive educational setting for disengaged Aboriginal youth. The program works with disengaged Indigenous youth to build connection to culture and community, with Cadia's funding enabling the purchase of fitness equipment to set up an on-site gym to promote the benefits of a healthy lifestyle to the students.

The mine has previously supported a Natural Resources Coordinator for OLALC and the organisation has conducted regeneration and revegetation work on site.

Cadia has also supported the purchase of an ATV and equipment for land management and lawn and garden maintenance services to build the capacity of employment opportunities for Indigenous people in our community.

The Cadia Legacy Fund has provided significant support to the Orange Aboriginal Medical Service through a \$590,000 commitment towards the Orange Aboriginal Medical Service Hydrotherapy Pool.

Cadia also has a strong relationship with the Clontarf Foundation which exists to improve the education, discipline, life skills, self-esteem and employment prospects of young Aboriginal and Torres Strait Islander men.

Community concerns about dust

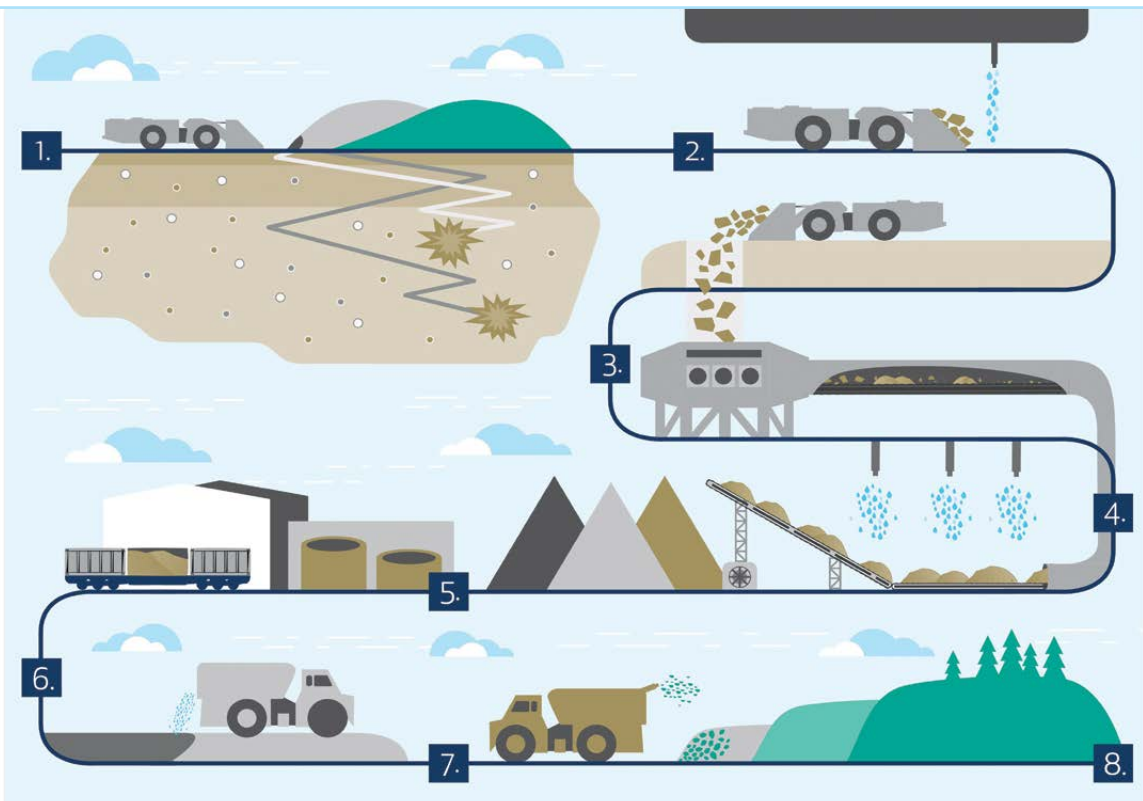
We acknowledge that dust emissions from Cadia's tailings storage facilities and vent rises have created concerns in some parts of the community around the mine and we have taken the community's concerns seriously.

The health and safety of people is not negotiable for Cadia. Working to maintain compliance with our environmental, health and safety obligations is, and remains, a key priority consistent with our values and operating principles.

Since becoming aware of the measured solid particle levels at VR8, we have worked to reduce emissions and taken steps to make the changes a permanent part of our normal operations.

We continue work to repair the slump in the Northern Tailings Storage Facility (NTSF) wall and to strengthen that section of the NTSF while taking steps to reduce dust emissions across our tailings storage facilities.

The work we are doing in these areas is detailed in the next section of this submission.



1. Drilling and Blasting

Blasts are controlled and optimised for explosive content to ensure efficiency of earth breakage. This prevents the overuse of explosives and reduces dust generation.

2. Ore Extraction

Spray curtains operate in the underground drive system to suppress ore as it is extracted.

3. Crushing

Dust extraction units operate underground that act like giant vacuum cleaners. Loose dust is captured into bags and transported the surface where is it then mixed with wet tailings.

4. Conveyor System

Conditioning sprays add moisture to the ore as it travels along the conveyor from underground.

5. Dewatering Facility

The dry copper concentrate is loaded onto sealed containers at the Cadia Dewatering Facility near Blayney and sent by train to Port Kembla. The dewatering facility is enclosed to minimise dust.

6. Haul Roads

Water carts are used across the site to wet down unsealed haul roads. There are daily routines in place to water all haul roads.

7. Tailings Storage Facilities

A tracked machine applies hydromulch (a wood fibre product) while crop dusters are used to aerially apply a polymer dust suppressant. This this dyed green to track coverage.

8. Rehabilitation

Cadia progressively rehabilitates areas of its mining lease to better control dust in open areas.

Responding to community concerns

Dust emissions from Tailings Storage Facilities

Tailings are the resulting material from finely-ground processed ore bearing rock that has been through several sizing, grinding, and processing steps and are discharged as dense slurry into containment areas known as tailings storage facilities (TSFs).

An isolated slump of a section of the NTSF embankment, into the Southern Tailings Storage Facility (STSF) in March 2018, resulted in the suspension of active deposition to the facility pending a full investigation and remedial work to the satisfaction of the Resources Regulator. The slump has unfortunately led to dust lift-off events in the area, which we have since been working to address.

In the interim, Cadia applied for and received approval to deposit tailings in the disused Cadia Hill Open Pit.

As part of Modification 14 to its Project Approval, Cadia applied to allow the repair of the NTSF embankment to ensure wet tailings from Cadia can be once again safely placed in this facility and expansion of the TSF disturbance footprint (allowing for a modified TSF embankment design).

Work to repair the TSF slump and strengthen the wall includes:

- Construction of access roads to enable the execution of construction works on multiple fronts
- NTSF wall buttressing which is currently underway
- Repair of the slump along the remainder of the NTSF
- Further wall construction and buttressing activities in various levels of study to complete the TSF to the high standards inherent in the international standards and commitments made by Newcrest.

When the slump occurred, the surface layer of the tailings storage facilities quickly dried out and continued to do so as drought conditions worsened.

When the STSF was filled to its capacity and deposition stopped, it too dried out in the same manner.

Below the dry surface layer, the tailings remained wet and inaccessible to the types of equipment usually available to apply dust suppression or other forms of cover.

To solve this problem initially, Cadia applied dust suppression coatings using crop dusting aircraft, a technique that is still employed as part of the array of solutions in operation.

Once the tailings surface had become accessible to specialised low ground bearing pressure vehicles, Cadia secured the services of the first of the Panther hydromulch rigs that remain in operation to this day.

Cadia is also in the procurement phase of implementing a tailings dam irrigation system using pivot irrigators where sprinklers point at the ground and limit water loss due to wind and drift.

This system will operate on predictive weather forecasting, which allows Newcrest to predict evaporation rates and wet appropriately, even in adverse weather conditions. Spray rates can be changed by increasing the flow.

The majority of the irrigation system is intended to be installed across the NTSF by the end of December 2023 and across the STSF in mid-2024. Around 68 per cent of the water used at Cadia is recycled.

Ventilation Rise 8 (VR8)

Cadia continuously monitors and analyses the air quality around our site and has a range of controls in place to avoid or minimise our potential contribution to elevated ambient dust conditions.

Cadia's operations are subject to the *Protection of the Environment Operations (Clean Air) Regulation 2022*, which came into force on 16 December 2022 and replaced the *Protection of the Environment Operations (Clean Air) Regulation 2021*.

An Independent Air Quality Audit Report prepared by Zephyr Environmental, dated 11 August 2022, identified that measured total solid particles of 360mg/m³ at VR8 exceeded regulated standards.

However, as explained in the Air Dispersion Model 2022⁸:

“...the measured total solid particle concentrations in VR8 are not a reliable measure of any dust that may be transported off-site due to entrainment in the sample of large droplets of slurry material...[VR8] is sampled at approximately ground level in a ninety-degree bend in the duct. The velocity of the air in this bend in the duct is approximately 100km/hr. After the sampling, the duct splits into three horizontal branches, each of the three branches have a ninety-degree bend leading into fans discharging into vertical risers. The risers taper outwards (increasing diameter with height), which causes the vertical velocity to reduce with increasing height up the vertical riser.”



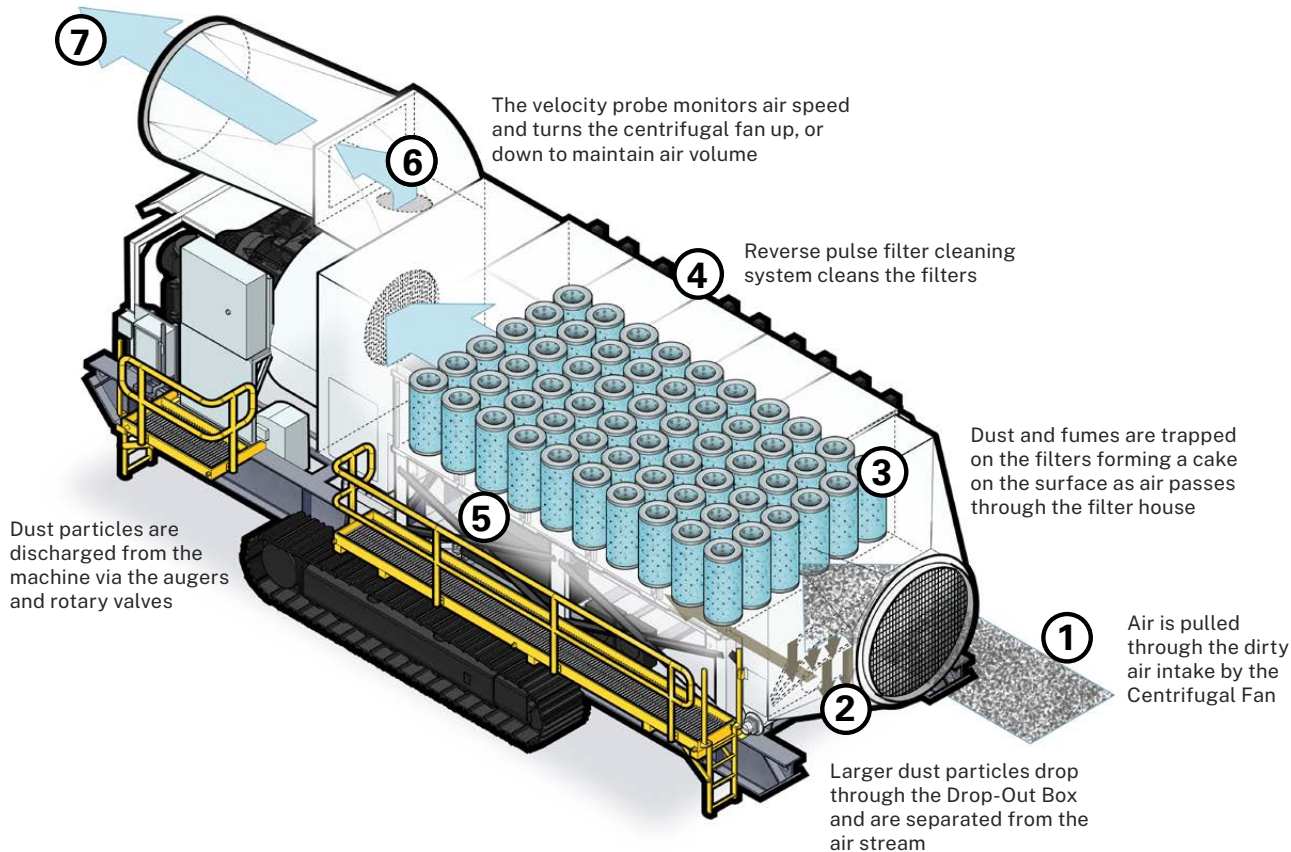
⁸ [Air Dispersion Model 2022](#) (dated 4 July 2023), Todoroski Air Sciences Pty Ltd, pp. 33, 40-41

“This causes the mud slurry droplets to also reduce their vertical velocity and would facilitate greater agglomerating and thus to fall back into the duct or onto the ground next to the vent when there is a cross-breeze... This is consistent with the authors observations of there being many tonnes of mud coating the inside of the vertical risers (necessitating larger cranes for servicing), and the stack testers van becoming entirely coated in mud slurry in a short period of time when parked near the vent. Due to this, it is not possible for stack samplers, using the required EPA sampling method, to take a reliable reading of the dust that may travel away from the vent at the available vent monitoring point.”

Whilst particulate levels were measured in exceedance, it is noteworthy that Cadia has consistently remained in compliance with Clean Air Regulations in relation to metals emissions.

Cadia commenced engineering on sourcing and installing dust emission mitigation measures for VR8 and consulted with the EPA as the high-level scope and schedule for this work were drafted into our Environment Protection Licence (EPL). The first of the dust filtration systems secured on an accelerated schedule were commissioned in May 2023.

Clean air exhausts from the machine with a filtration efficiency of 99.99% at 0.067 micron



In June 2023, upon review of the emission testing undertaken on VR8 in May 2023, the EPA issued Cadia with a direction to take all necessary action to immediately address the issue. Cadia took all necessary steps to comply immediately upon receipt of this direction. The EPA also stipulated changes to Cadia's EPL in June 2023 to formalise work largely already underway by the mine along with an additional works program to reduce dust emissions across mine operations. This requires fortnightly monitoring and subsequent reporting of total solid particles at VR8.

To ensure these measures were safe and effective, our site team implemented a revised operating plan that automated the link between mining production and dust monitoring instruments and allowed Cadia to reduce dust emissions from that point.

This approach increased assurance that Cadia's management systems and technology was able to self-regulate the mine below compliance levels while maintaining production at optimum levels, including drawing on ore stockpiles where required, until dust filtration units were in place.

Cadia is currently commissioning seven dust filtration units on an accelerated timeframe with five now operating 24 hours a day, seven days a week. Various measures which have been implemented above and beyond those already described include:

- The installation of additional dust sprays and spray curtains
- Re-configuration of dust extraction systems
- Further monitoring of vent rise emissions
- Design and trialling of additional dust sampling instrumentation in the underground mine
- Monitoring of surface and underground dust sampling instruments.

We remain focused on expanding dust mitigation equipment across our operations including dust filtration units and changes to the ventilation system to maintain compliance.



Cadia a key driver of jobs and opportunity

Cadia is a significant contributor to the local and regional economy. There has been a large year-on-year increase in contribution as measured by key economic indicators, such as employment, household income and overall benefits received by regional households from increased economic activity attributed to Cadia's operations.

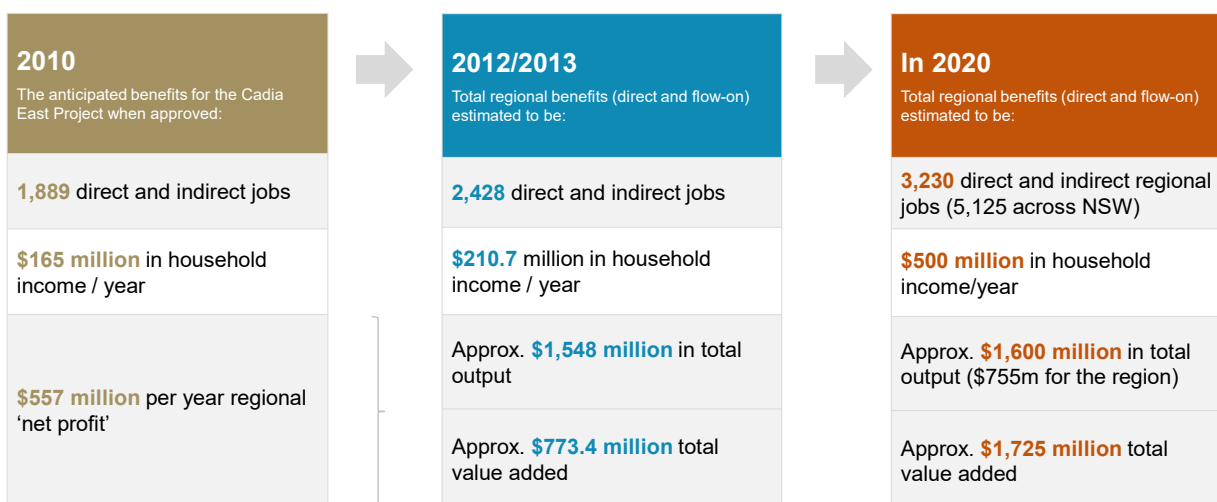
More than 1800 people are directly employed at our Cadia operations. A 2020 socio-economic study⁹ showed the mine generated over 3200 direct and indirect jobs. Around 85 per cent of our workforce lives in the Orange region, with no fly-in fly-out camp accommodation. Most of our workforce and their families have grown up in the region and we have families spanning multiple generations working at the site. More than 200 different types of roles, ranging from engineers and management positions through to trades assistances and truck operators, are supported at our operations. More than 30 apprentices are also employed at site for roles such as electricians, mechanics and boilermakers.

The average tenure of Cadia's workforce is 6.1 years, with around one fifth of our workforce having at least 10 years of service.

Cadia is one of the region's most significant economic drivers, with the study estimating regional household income derived from the site at \$500 million over the life of the mine. Around one third of the mine's service spending, or some \$217 million in 2021-22, goes directly to paying the salaries and wages of our workforce.

In 2022-23, Cadia also paid \$86 million in royalties to support better services and infrastructure across the state and more than \$6 million in rates to Blayney and Cabonne Shire Councils.

A significant contributor to the local and regional economy



Source: Cadia Valley Operations, Socio-Economic Study, 2020

"Total Output" = the value of sales and any income earned from provision of services

"Total Value Added" = sales and service income plus any capital expenditure for project use less inventory adjustments, less costs, and services

⁹ February 2020 study was completed by Umwelt (Australia) Pty Ltd

Independent environmental studies

February 2022

Cadia commissions Australian Nuclear Science and Technology Organisation (ANSTO) to conduct a 12-month study to assess the mine's contribution to the regional air shed with samples taken across Panuara, Millthorpe, Mandurama and background site at Orange. Air quality monitoring at Cadia's boundary upgraded to include PM2.5.

August 2022

Independent Air Quality Audit report highlights dust emission exceedances from a ventilation exhaust rise. Cadia commences work with NSW Environment Protection Authority (EPA) to address exceedance and install underground dust filtration plants.

February 2023

Independent water sampling program commences after a small number of residents living near Cadia self-test the quality of water in their rainwater tanks and report elevated levels of contaminants, including lead.

March 2023

To assist in identifying the source of lead particles found in sludge samples, a lead isotope fingerprinting analysis is commissioned through University of SA. SAGE Environmental also commences a human health risk assessment, looking at air and water quality against health guidelines.

March & April 2023

- 145 residences participate in independent water sampling program.
- 8 residences return readings above Australian drinking water guidelines.
- 7 residences results attributed to building and/or plumbing materials.

Cadia cleans and re-fills water tanks of residents, and where appropriate installs flush or filtration systems, regardless of the contamination source.



May 2023

Work with local community and NSW EPA continues with draft variations to Cadia's Environment Protection License. The variations largely formalise actions already underway.

June 2023

NSW EPA issues notice to immediately comply and curtail vent emissions. Various measures implemented include:

- Additional dust sprays and spray curtains
- Re-configuration of dust extraction systems
- Further monitoring of vent rise emissions
- Installation of additional dust sampling instrumentation in the underground mine
- Monitoring of surface and underground dust sampling instruments
- Identification of further acceleration of the additional dust filtration units currently on order and proposals for alternative sampling locations.

Latest monitoring results show Cadia continues to operate in compliance with clean air regulations.

July 2023

Results from ANSTO study determine Cadia only contributed to small a portion of the soil particulate matter with <10% of particles. Metals of concern, like selenium, nickel and chromium were not significant drivers of the soil fingerprint.

July 2023

A lead isotope analysis finds no evidence linking Cadia to the lead sampled in the district's rainwater tanks.

September 2023

An expert report assessing risks to human health finds risks from air and dust/particulate emissions from Cadia are low and acceptable when measured against Australian health standards.



Air quality

Cadia has commissioned a number of independent scientific studies and analysis in response to issues raised by the community.

These independent studies show that the air quality around Cadia is very good, with no exceedance of the relevant ambient air quality criteria.

Todoroski Air Sciences Pty Ltd, a specialist environmental consultancy focused on air quality, prepared a report on air dispersion modelling for Cadia during the period January 2022 to February 2023 to quantify the potential air quality impacts of Cadia on the surrounding environment during that period.¹⁰

The study was developed to provide a contemporary assessment of the potential impacts of the mine. Modelled predictions were compared against the results of ambient air quality monitoring to validate the model. Actual ambient air quality monitoring data showed no exceedances of ambient air quality criteria at any time during the period at any location.¹¹

In addition, a 12-month particulate characterisation study was commissioned through the Federal Government's Australian Nuclear Science Technology Organisation (ANSTO).¹²

The study by ANSTO was commissioned in collaboration with the local community as the first in a comprehensive suite of independent air and water quality investigations.

ANSTO conducts and enables inter-disciplinary research using nuclear and isotopic techniques to address some of Australia's and the world's most challenging environmental problems, focusing on water resource sustainability, climate change, and the impact of contaminants.

It undertakes partnerships and collaborations with other eminent research and science organisations and industry and provides advice to all levels on government on environmental issues.

ANSTO sampled and characterised fine particulate matter (PM2.5) for a 24-hour period twice each week at four sampling sites (Millthorpe, Mandurama, Panuara and Orange) around the Cadia mine for a 12-month period from February 2022 to February 2023.

The report assessed the PM2.5 dust contribution from Cadia to the regional air shed and revealed that Cadia contributed to only a small percentage of dust characterised by ANSTO as 'soil' particulate matter. Soil was the least significant source of air pollution over the 12-month period, with the soil contributing less than 10 per cent to the total PM2.5 mass.¹³

The study also highlighted that metals of concern recently identified by the community, such as lead, nickel, selenium and chromium, were not significant drivers of the soil fingerprint. In addition, the study found those metals occurred at very low levels in the PM2.5 fraction and were not in exceedance of any national standard.

In short, the data indicated that air quality around Cadia is very good.

¹⁰ [Air Dispersion Model 2022](#) (dated 4 July 2023), Todoroski Air Sciences Pty Ltd

¹¹ [Air Dispersion Model 2022](#) op. cit., p71

¹² [Particulate Characterisation Study](#) (dated June 2023), Australian Nuclear Science Technology Organisation

¹³ [Particulate Characterisation Study](#) op. cit., p69



Ambient air quality monitoring by Cadia

Air quality monitoring at the site boundary and within the local community is conducted through an extensive array of measurement devices in the area, including:

- PM10 and PM2.5 ambient air quality monitoring via Beta Attenuation Monitors (BAMs) provide continuous PM10 and PM2.5 particulate concentration measurements using the proven principle of beta ray attenuation, with eight BAMs in continuous operation at various locations around the Cadia district since 2011
- Dust deposition gauges are located at 11 sites around the Cadia District and the Cadia Dewatering Plant, which are analysed monthly for metals and total dissolved and insoluble solids
- Visual dust monitoring during routine inspections and when complaints are received, for which mitigation measures are implemented where excessive dust generation has been identified
- High volume air samples measuring a 24-hour sample on six-day cycle, which enables assessment of annual average Total Solid Particles (TSP), TSP-PM10 correction and collect physical sample for elemental/chemical analysis (including heavy metals), located at four sites surrounding the mine (at BAM locations)
- Meteorological monitoring, where we also use our on-site weather stations as part of our air quality monitoring program.

The results of this monitoring are reported monthly on the Cadia website.¹⁴

¹⁴ Cadia [website](#), documents archive

Independent air quality monitoring by Department of Planning and Environment

The NSW Department of Planning and Environment operates a comprehensive accredited air quality monitoring network to provide the community with accurate and up-to-date information about air quality.¹⁵

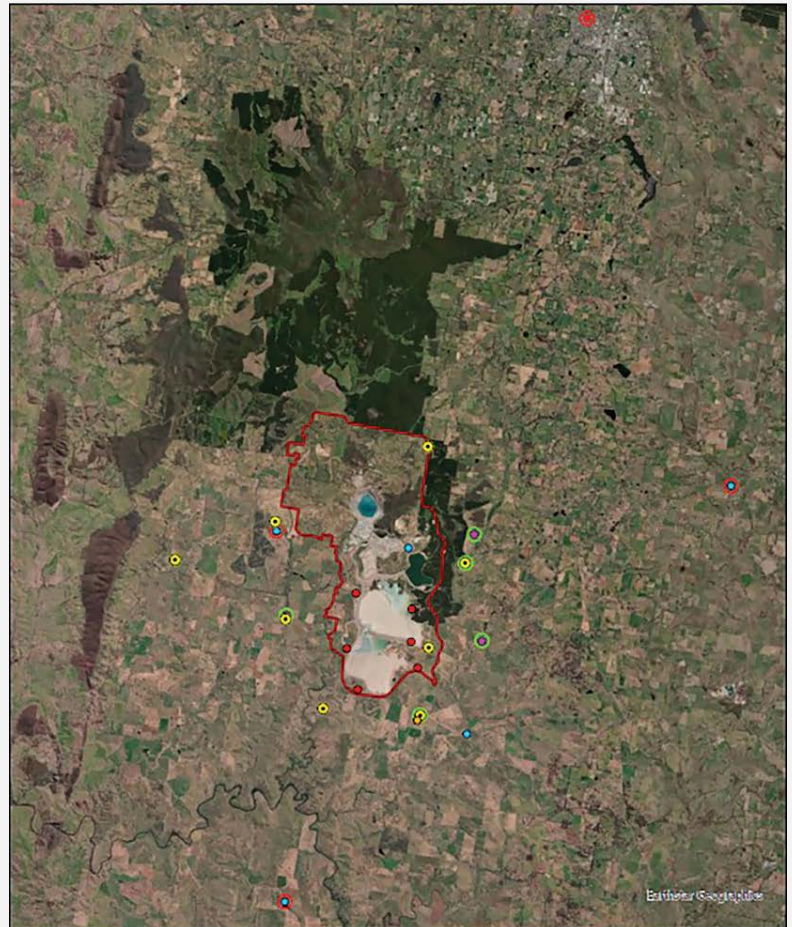
Monitoring sites are set up in Sydney and several regional areas of NSW, with the networks continuously measure particles (PM10, PM2.5), sulphur dioxide (SO₂), carbon monoxide (CO), ozone (O₃), nitrogen dioxide (NO₂) and visibility. Wind speed and direction, air temperature and humidity are also recorded and short-term campaign monitoring activities are conducted.

The monitoring network in regional and rural New South Wales covers key regional centres – including Orange – and multiple rural stations from the Community DustWatch network.




The extensive network of National Association of Testing Authorities accredited air quality monitoring stations uses Standards Australia methods where available. Data is reported as ambient concentrations and air quality category ratings which are updated hourly and stored in a searchable database.

A subset of the EPA’s monitoring stations are National Environment Protection Measures (NEPM) designated and are reported on annually through the NSW Annual NEPM Compliance Reports.

According to the department, data undergoes a rigorous quality assurance process to ensure reliability.



Dust Monitoring Locations

Legend ● TEOM ● HighVols ● DDGs ● DustTraks ● Envirosuite ● ANSTOs ● BAMs ■ MiningLeaseBoundary		  
<small>Generated via ArcGIS Webmap</small>		

¹⁵ NSW Department of Planning and Environment [website](#)



Water quality

Cadia Community Drinking Water Sampling Program

When some community members came to us having self-sampled drinking water, we commissioned the Cadia Community Drinking Water Sampling Program, which collected and tested 256 samples from 144 households.

Based on sampling by Australian Laboratory Services (ALS), 95 per cent of households had drinking water that met the Australian Drinking Water Guidelines. Importantly, no clusters were identified and results were provided by ALS directly to residents.

Specifically, the study found eight point of use (POU) exceedances of the Australian Drinking Water Guidelines, with seven of those attributed to building and/or plumbing materials such as copper piping, galvanised steel, and old roofing. The source of exceedance was not able to be determined for the final household.

All properties which registered a POU exceedance were offered building inspections and either first flush and/or filtration systems, regardless of the source of potential contamination.

NSW Health kitchen tap water testing

Many residents in the area surrounding Cadia mine rely on rainwater tanks for their domestic water supply. In response to community concerns, NSW Health tested the quality of residents' kitchen tap water in March 2023. NSW Health reported that results show drinking water was safe to drink, with measurements below the Australian Drinking Water Guidelines.¹⁶

Each resident was provided with their individual results and any further precautionary advice as required.

NSW Environment Protection Authority water testing

Following tests conducted by NSW Health, the EPA offered further testing in June 2023 for residential properties that are rainwater dependent as part of a broader monitoring program. The EPA tested more than 85 properties in the region for the presence of metals and these were subsequently analysed by the NSW Government's Environmental Forensic Laboratory.

The EPA stated in July 2023 that results from the first 50 properties samples have been received and compared to the Australian Drinking Water Guidelines. The majority of results from kitchen tap samples showed metal concentrations below the guideline values. At two properties, lead was detected at or marginally above the accepted level of lead at the kitchen tap, but water tank samples from the same properties were below guideline values.¹⁷

Meanwhile, water tank samples showed six properties had levels of lead above the guideline values, while kitchen tap samples at these properties were below guideline values.

Origins of lead in local soil and water

In response to community concerns about the source of lead in their rainwater tanks, Newcrest commissioned an independent study to examine the origins of lead in local soil and water. This lead fingerprinting analysis was conducted by the University of South Australia.¹⁸

The analysis tested samples of soil, rock, rainwater tank sludge and water containing lead above Australian Drinking Water Guidelines which were tested for their isotopic signatures to determine the point of origin.

This testing showed 74 of the 88 samples (84% of the total) had no correlation with Cadia ore.¹⁹ Of the remaining 14 samples (16% of the total), both the Cadia orebody and district soil samples exhibit similar characteristics to the extent that they could not be discriminated from each other. Notably, these 14 samples recorded amongst the lowest concentration of lead of all the sludge samples taken by the Cadia sampling program.

¹⁶ NSW Environment Protection Authority [updates on Cadia](#), as at 1 September 2023

¹⁷ NSW Environment Protection Authority [updates on Cadia](#), as at 1 September 2023

¹⁸ [Interpretation of Lead Isotope Analysis and fact sheet](#) (dated July 2023)

¹⁹ [Interpretation of Lead Isotope Analysis and fact sheet](#), op. cit., Figure 16, p24

Investing in the community where we operate

Nearly \$2.2 million was donated to support community programs, education and infrastructure in 2021-22 alone.

This investment ranged from tertiary and Indigenous scholarship programs, a COVID vaccine rollout support program alongside the Orange Aboriginal Medical Service, support for local community groups, legacy projects, tourism, agriculture, health care and employee matching donation initiatives.

In addition to similar programs being supported in 2022-23, \$420,000 was provided to the Canobolas Zone Rural Fire Service has helped transform a water filtration facility into a state-of-the-art Hot Fire Training Facility at Spring Creek. This facility will provide specialist training to RFS volunteers, external agencies, and private enterprises using the most advanced technology available for firefighting techniques.

New investments have also been made through the Newcrest Sustainability Fund in the past financial year. This includes funding to establish a unique Rural Health Education Simulation Centre in Orange at the Charles Sturt University. The Centre will enable rural medical students to access world-class education, equipment and facilities in their own backyard, removing the tyranny of distance of having to travel hundreds of kilometres to Sydney to complete their training. As one person connected to the project has said:

“Support from community partners such as Newcrest enables us to provide students with the very best start to their careers, which is crucial in bridging the gap between the quality of healthcare offered to country residents in comparison to their city counterparts.”



Newcrest
Sustainability Fund

In partnership we thrive.

The Newcrest Sustainability Fund also backs local farmers in their efforts to control and eradicate the invasive sticky nightshade weed to protect regional biodiversity. As one person involved in that initiative told us:

“A thank you from those on the ground who are dealing with this weed. I cannot thank you enough for your efforts in helping us fight Sticky Nightshade. It’s already been a huge boost to the region to see some action being taken and assistance being delivered.”

This supports a partnership between the NSW Government’s Local Land Services, the Department of Primary Industries and the local community to fast-track research and action including the use of new technologies such as using drones to apply herbicides.

Beyond this, \$300,000 was donated to support Rural Aid and the Foundation for Rural & Regional Recovery to deliver on-the-ground relief to Central West communities in New South Wales impacted by the 2022 floods.

Cadia is proud of its significant role in the local community and its ability to co-exist as a responsible miner alongside other important local industries such as agriculture, tourism and winemaking.

Commitment to health and safety

Health and safety for the community

Consistent with Newcrest's values, and the principle that statements regarding any human health impacts should be based on independent scientific evidence, a further study was commissioned on water quality and the human health impacts of Cadia. SAGE Environmental Services Pty Ltd was engaged to undertake a human health risk assessment concerning potential air quality impacts of our operations.

The assessment focused on locations in which residential samples were collected as part of the community drinking water sampling program previously outlined from point of use (POU) and water tanks. These include across locations such as Spring Terrace, Spring Side, Tallwood, Waldegrave, Errowanbang, Forest Reefs, Mandurama and Browns Creek.

SAGE concluded that based on its assessment of risks to human health, risks from air, dust/particulate emissions from Cadia are low and acceptable when measured against Australian health standards.

The report did find that elevated levels were observed in six locations (copper) and one location (cadmium). For copper, it was concluded that there was a definitive source of copper between the tank and the property, likely to be copper piping as the source of the copper in the POU sample (as taps were not flushed prior to sample collection).

Cadmium was detected at a single property, however the review of the tank noted the capture system was a galvanised metal roof with significant rust. As such, the result is considered to be isolated to the property and not from any outside emission source, noting no nearby properties produced positive samples for their tanks.

The level of all other contaminants measured was low and within relevant human health standards.



Health and safety for our workforce

No exceedances of SafeWork Australia's Workplace Exposure Standards (WES) for lead or other inhalable metals have been detected amongst the Cadia workforce based on testing and 113 personal air monitoring samples in the last five years.

Samples were collected at various locations on site and within multiple work groups – static and personal samples underground, at various surface locations and satellite sites at Blayney and the molybdenum plant.

The gold room at Cadia has regular monitoring for lead, arsenic and mercury. No exceedances of the WES have been recorded.

Our people driving community outcomes

Cadia staff regularly contribute to volunteer projects in and around Orange. For example, when Central West NSW was affected by significant flooding in November 2022, Cadia was able to support the response through support of numerous activities equalling to more than 770 volunteer hours, including but not limited to:

- Electrical re-wiring of the local supermarket in Eugowra
- Electrical assistance at the Rural Transaction Centre
- Repainting of the Cenotaph in Eugowra Memorial Park
- Assistance at the local recreation ground in Cudal
- Assistance with clean up in local homes, businesses and community facilities.

Our staff also conduct annual Garden Blitzes. Calare Public School, Rotary Park and The Orchard Domestic Violence Crisis Centre have received garden renovations. As someone involved in the garden renovations project said:

“We are so thrilled to be able to welcome clients and show them the garden that they can use, learn from, play in and enjoy. We can’t thank all the volunteers and organisers from Cadia enough for their time, effort and passion for the project.”



Cadia's *Good Onya!* Program encourages Newcrest employees and their partners to volunteer their time to support local community groups and organisations.

When they contribute 25 hours of more of their own time to an eligible organisation, Cadia donates \$250 to that organisation on their behalf. Some 60 *Good Onya!* grants were awarded in 2022, with more than 5,500 volunteer hours being contributed to the community.

Local water quality and land rehabilitation



Newcrest's Water Stewardship Policy and Water Management Standard recognise that a holistic catchment-based approach to water management is required to achieve resource sustainability.

Our Standard defines the requirements for water monitoring at all managed Newcrest sites and supports the establishment of local monitoring processes to ensure that relevant regulatory requirements and permit conditions are met.

Cadia operates under an approved Water Management Plan, which has been developed in accordance with PA06_0295 and EPL 5590.

The Plan documents the site water management strategy, site water efficiency plan and monitoring and management of any potential impacts to local surface water and groundwater resources.

Results of the monitoring program are submitted to the relevant regulators as part of the Annual Environmental review and are also made publicly available on the Cadia website as part of its summary of environmental and social performance for the preceding reporting period. The Annual Review is developed in accordance with the requirements of the Cadia East Project Approval and the DPE Annual Review Guidelines.

The Cadia Rehabilitation Strategy and Rehabilitation Management Plan are also publicly available on the Cadia website. The Rehabilitation Strategy outline the regulatory conditions to be met, while the Rehabilitation Management Plan also details the methodologies, implementation, monitoring and management of rehabilitation.

Opportunities for progressive rehabilitation are managed in line with mine plans to avoid rehabilitated areas being disturbed later.

How community consultation shapes our work

The local community is routinely and regularly updated on Cadia's operations and future plans. These updates are supported by issue-specific agenda items/meetings as needed. The community is welcome to approach Cadia in relation to any specific concerns.

Cadia is currently engaging with regulators and the local community in relation to Modification 15 to its Project Approval and the Cadia Continued Operations Project.

Engagement channels include:

- Community Consultative Committee meetings
- Meetings with groups of local residents
- One on one meetings with landholders (as needed/requested)
- Information sheets via an email distribution list
- Social media
- Cadia website
- Advertisements
- Public exhibition of modification applications.

We aim to provide an open and responsive case management process for any concerns, complaints or grievances in relation to our operations. Cadia operates a toll-free Community Complaints Hotline, which enables community members to speak to a community relations officer. All complaints are responded to within a 24-hour period. Our Community Concerns, Complaints and Grievance Management Protocol is used to facilitate early resolution of cases in a consistent and effective manner. When dealing with a concern, complaint, or grievance, we focus on:

- Being community-minded, understanding that we are a long-term member of the local community
- Being responsive to facilitate early resolution
- Being objective and fair
- Communicating effectively
- Protecting privacy and disclosure.



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