

FOLLOW-UP
PERFORMANCE AUDIT

At the department of Mineral Resources and Energy

On the rehabilitation of derelict and ownerless mines



AUDITOR - GENERAL
SOUTH AFRICA

Auditing to build public confidence



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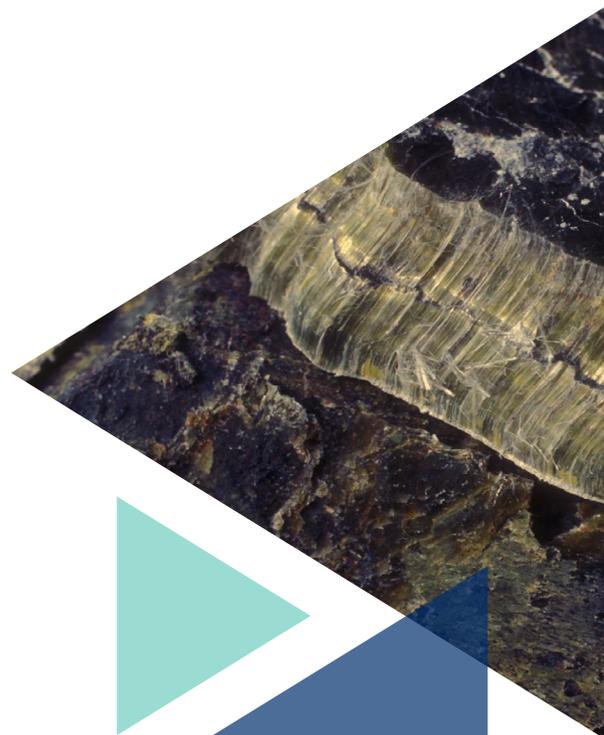
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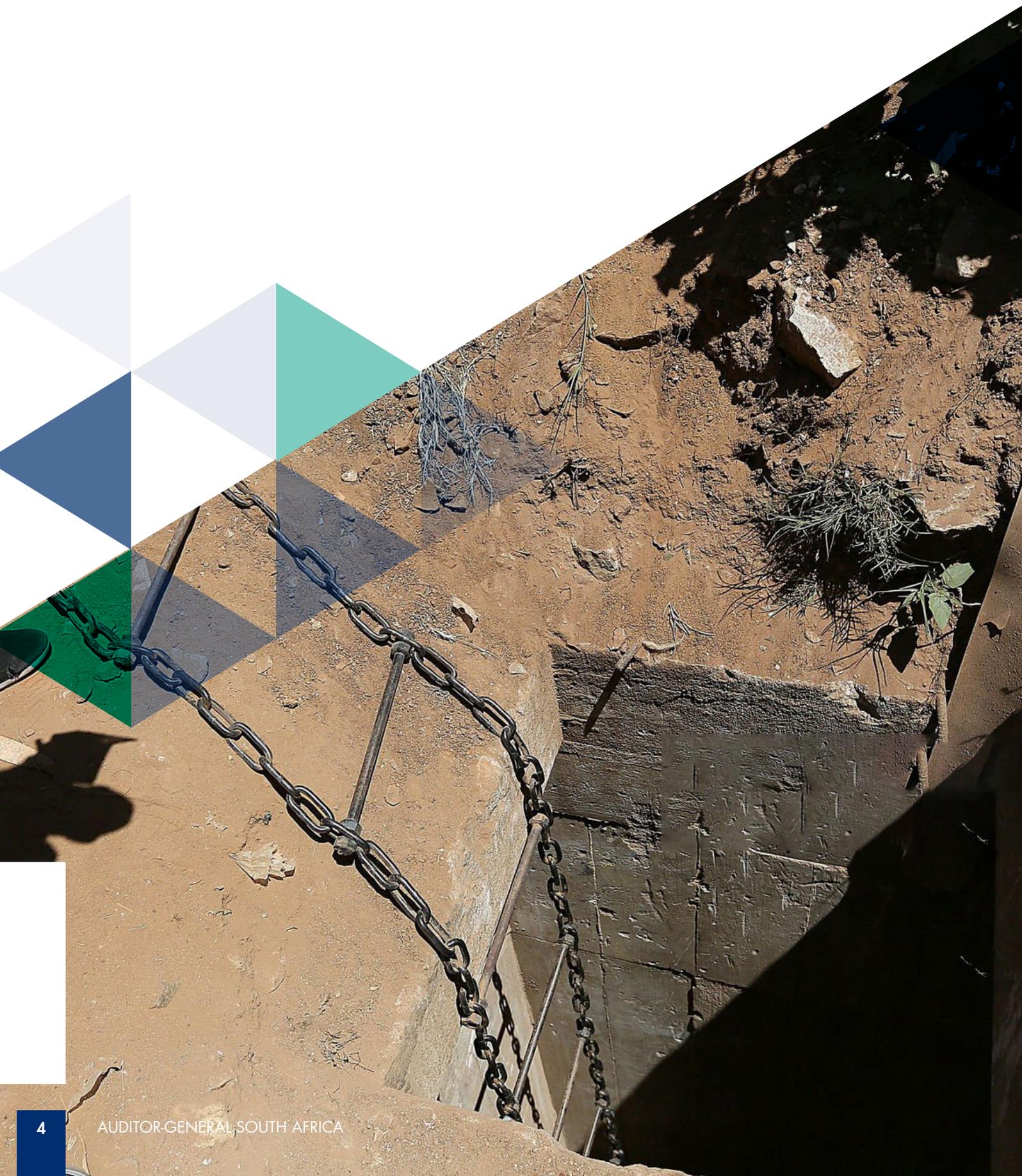
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Foreword



When derelict and ownerless mines are not sustainably rehabilitated, it affects the environment and the health and safety of local communities.

It is my pleasure to present this follow-up performance audit report on the rehabilitation of derelict and ownerless mines at the Department of Mineral Resources and Energy (the department).

In 1991, the Minerals Act required holders identified by the Act to manage the environmental impact of their mining sites and rehabilitate the land surface. The 2002 Mineral and Petroleum Resources Development Act repealed the 1991 Act, and strengthened the definition of a holder and the rehabilitation requirement by compelling the holder to fully rehabilitate mines before the department issues a closure certificate.

The 2002 Act also mandated the department to manage mines that had been abandoned prior to 2002, known as derelict and ownerless mines. This management includes rehabilitating mines.

Our first audit of abandoned mines in 2009 was based on the 2002 Act. It highlighted that unrehabilitated derelict and ownerless mine sites have a negative effect on the environment and the health and safety of local communities. This negative impact remains a key issue in South Africa and at mining sites globally.

We completed a follow-up audit during 2021 to evaluate the progress the department has made since 2009 in rehabilitating these derelict and ownerless mines, focusing on whether the issues highlighted in the previous report still exist. In this evaluation, we considered the value chain that represents the process for planning, implementing projects, and monitoring and reporting on derelict and ownerless mines.

Although we recognise that the department has made some progress since the previous audit, there are still many critical areas that affect economical, efficient and effective rehabilitation and that need to be improved. This report details these critical areas and recommends interventions to improve the pace of rehabilitation going forward, which will potentially improve both the environment and the health and safety of the local communities.

I wish to thank the department and public entities for their assistance during this audit. I also commend my team for their sterling work.



01

Executive summary



OVERALL AUDIT QUESTION

Is the process for identifying and rehabilitating derelict and ownerless mines to minimise their social and environmental impact timely and cost-effective?

1.1. INTRODUCTION

Derelict and ownerless (D&O) mines¹ are mines that are not operational, are not being maintained to manage their safety, and whose holders, as defined in the Act, have abandoned the mine and cannot be traced. If these mines are not rehabilitated, they could pose a serious hazard to the environment and to the health and safety of communities.

Mine rehabilitation is the process of repairing the damage done by mining activities by making the site safe and stable. This process is needed because of the cumulative impact of mine residue deposits and surface deformation. The Department of Mineral Resources and Energy (the department) also seals and closes D&O quarries, mine shafts and trenches that are located close to residential areas and pose an immediate threat of injury to humans and animals. This is referred to as the holing programme and is part of the department's strategy for managing D&O mines in South Africa.

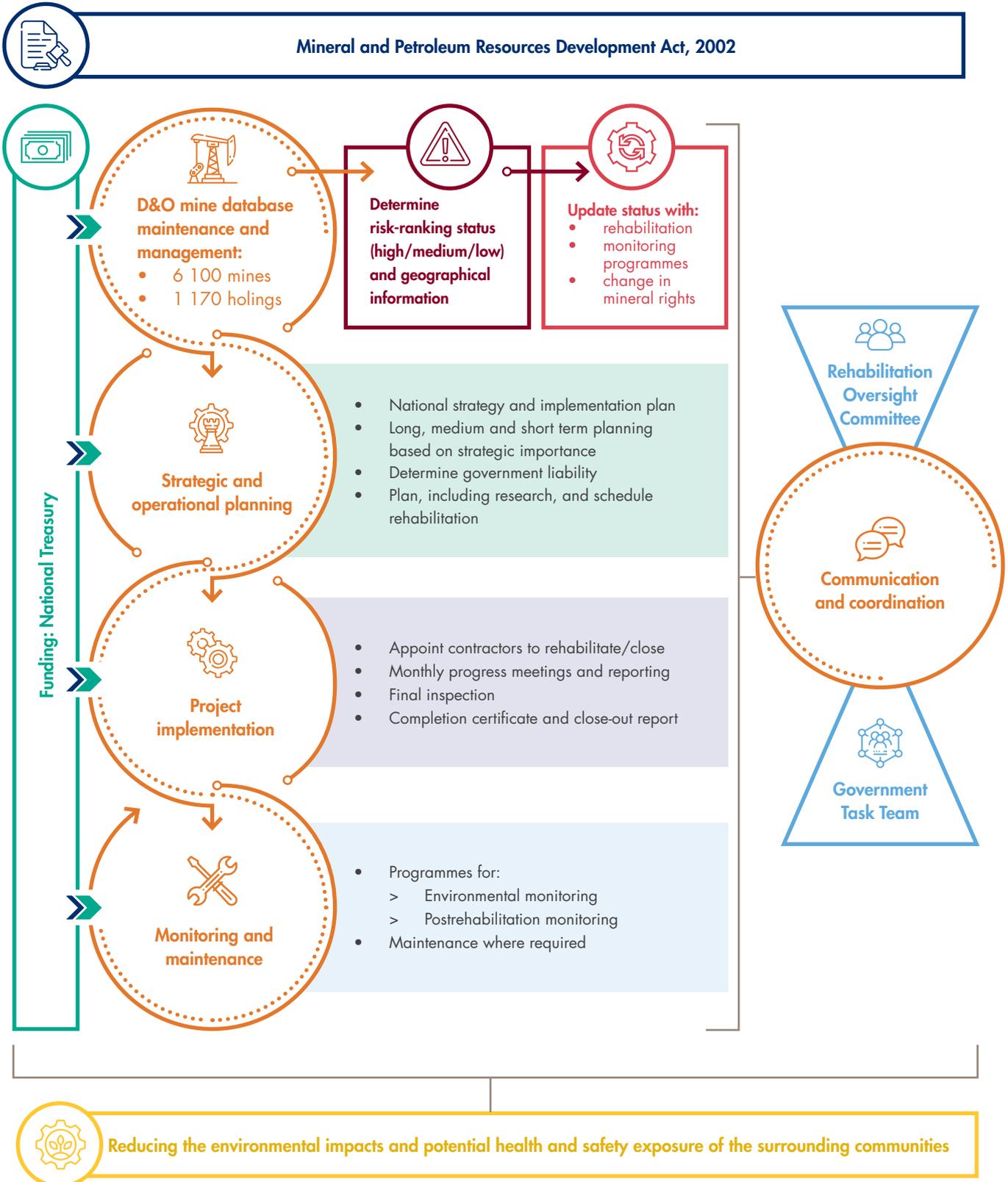
Fulfilling the department's mandate to rehabilitate D&O mines upholds South African citizens' constitutional right to an environment that is safe, healthy and promotes conservation, as contemplated in section 24 of the South African Constitution.

Managing D&O mines is not just about rehabilitation, but also includes alternatives such as creating a landscape that can support future uses of the land.

Figure 1 shows the value chain that represents the planning, implementing, monitoring and reporting processes for the D&O mines and holings programmes.

1. The public report on the 2009 performance audit referred to 'abandoned mines'. The change in terminology to 'derelict and ownerless mines' was initiated by the accounting officer in his responses included in the 2009 public report.

Figure 1: Value chain for the D&O mines rehabilitation and holing closure programmes



Our 2009 audit on D&O mines found that measures were not in place to ensure that abandoned mines were rehabilitated effectively and within a reasonable time frame. Due to a lack of accountability, delays with the progress of planned projects and inefficient service delivery, the environmental and social impact of these mines remained unaddressed.

In this follow-up audit, we considered this value chain to evaluate whether it had been configured to respond to our previous findings, focusing on the following areas:

- Strategic and operational planning
- D&O mines database management
- Project implementation
- Monitoring and maintaining rehabilitation projects
- Communication and coordination.

Our audit revealed that the rehabilitation programme achieved only minor improvements over the past 12 years (years ending 31 March 2010 to 31 March 2021), with the average number of mines rehabilitated in a year increasing from 1,67 mines in 2009 to 2,25 mines in 2021. Details of the approach for this follow-up audit are described under the audit methodology and approach section of this report.

1.2. IMPACT OF SLOW PROGRESS ON ENVIRONMENT AND CITIZENS

Citizens have a constitutional right to a safe, healthy environment that promotes conservation. The department's slow progress in dealing with D&O mines leaves unrehabilitated mining sites that often change the natural environment. This takes the form of air pollution from dust or toxic gases, infertile soil and severely degraded water resources that are often devoid of life. In South Africa, unrehabilitated D&O mines are not geographically isolated; rather, they are located close to communities and natural habitats. People who live close to these sites risk exposure to toxic contaminants through the air that they breathe, the food that they eat and the water that they drink.

The audit found that the national Department of Health did not keep health-related statistics on the impact of unrehabilitated D&O mines on the health of affected communities.

In addition, open mine shafts, quarries and trenches create physical hazards and promote illegal mining, which poses a social and safety risk to these communities. The nature of the hazardous exposure from unrehabilitated D&O mines to communities and the environment are discussed in the citizens' lived experience section of this report.

1.3. KEY CONTRIBUTORS TO DEFICIENCIES

Our audit identified a number of critical areas that affect the economical, efficient and effective rehabilitation of D&O mines. Although the audit found that the information recorded in the D&O mines database contained errors, as reported in paragraph 5.2 of the detailed audit findings and recommendations, it was the best information available to illustrate our findings. This report lays out the factors that contributed to progress on rehabilitating D&O mines remaining slow.

The findings are grouped by the key controls needed to deliver the D&O mines rehabilitation programme. In some instances, the department did not adequately respond to requests for information, which limited our ability to identify root causes and develop recommendations that would address or resolve the findings we identified.

1.3.1. Leadership and oversight

- a. The department's national strategy and its implementation plan are vital to effectively implementing the rehabilitation programme. The department is required to review and update its national strategy on a five-year cycle, but did not do so. Its implementation plan was also not costed or approved, and did not include all the key components (deliverables) of the approved national strategy, as reported in paragraph 5.1.1(d) of the detailed audit findings and recommendations section of this report.
- b. The objectives of the national strategy also called for alternative opportunities (different end-land use) to repurpose D&O mines instead of using rehabilitation as the only remedy. However, the enabling national mine closure strategy (NMCS) was only gazetted for public comment on 21 May 2021, more than 11 years after the national strategy set this objective (see paragraph 5.1.1(h) of the detailed audit findings and recommendations). Without the NMCS, the department could not finalise the policy that would

enable different end-land use, which could have reduced government's liability to close these D&O mines.

- c. Between 2011-12 and 2018-19, the department reported on the rehabilitation of both asbestos mine sites and holings under one measure in its annual performance plans. Because of this combined reporting, the slow progress of rehabilitating D&O mines was not evident. As a result, and because of the merger of the Department of Mineral Resources and the Department of Energy in 2019, the department's five-year strategic plan for 2020–25 did not include the rehabilitation of D&O mines and its annual performance plans only began to differentiate between asbestos mines and holings programmes from the 2019-20 financial year. Performance measures and targets for other high-risk mines² were also never included in the annual performance plans.



Holings programme

The focus is on mines with a smaller geographical scale, but that pose an immediate threat, such as quarries, mine shafts and trenches located close to residential areas

- d. In December 2009, the former director-general established the rehabilitation oversight committee (ROC) to oversee how the D&O mines programme is managed. However, the committee's terms of reference was not approved. It also did not meet regularly, and did not execute all functions and track recommendations to assess the success of their implementation.
- e. The department did not establish whether government is liable for the 2 238 D&O mines identified as possibly having mineral rights that fall within the boundaries of licensed mining areas or private property ownership (see paragraph 5.2.3 of the detailed audit findings and recommendations). If any of these mines are confirmed to fall within the boundaries of licensed mining areas, this could reduce the department's rehabilitation liability.

2. High-risk mines are those with mined extracts (commodities) that pose a high risk to the environment. These mines are more likely to have severe consequences on the environment and health and safety of local communities.
3. Subsequently the department found that not all 6 100 D&O mines need to be rehabilitated by government, or there could be potential for different end-land use.

- f. The department did not include key requirements of the national strategy in performance contracts for its officials. Some measures and targets that were included did not adhere to the Smart principles. Officials were therefore not held accountable for delivering the programme.



Smart principles

Targets are specific, measurable, achievable, relevant, and time-based

1.3.2. Funding

The level of annual funding allocated by the National Treasury was not sufficient to ensure that all 6 100 D&O mines will be rehabilitated by 2038³ and that, of those, all 261 asbestos mines will be rehabilitated by 2033 (see paragraph 5.1.1(c) of the detailed audit findings and recommendations). The allocated funding was prioritised to rehabilitate D&O asbestos mines, close holings, manage the database, and perform research and monitoring activities. As such, the budget did not include the rehabilitation of the other 2 322 high-risk commodity D&O mines.

1.3.3. Contract management and operations

- a. The department did not develop and implement processes and procedures to direct the D&O mines programme. Because of this, we found shortcomings in the following areas:
- Compiling project plans
 - Including information in project files and loading them onto the D&O mines database
 - Recording additional mine sites and holings identified during rehabilitation/closure
 - Implementing and monitoring programmes and remedial action

These shortcomings were among the reasons that high-risk asbestos mines and high-risk holings were not prioritised and scheduled for rehabilitation or closure (see paragraphs 5.1.2(a) and 5.1.2(c) of the detailed audit findings and recommendations). The department did not effectively monitor D&O mine sites to determine whether they were successfully and sustainably closed or rehabilitated (see paragraph 5.4.1(f) of the detailed audit findings and recommendations).

- b. The department's contracts with the parties implementing the rehabilitation programme did not contain enough detail to keep these parties accountable. Because of this, the department could not apply corrective actions. More detailed information should have been included for:
 - sections regulating contractual relationships and document management
 - sections regulating monitoring activities
 - recording additional D&O mine sites and holings that were identified during rehabilitation.
- c. A stakeholder engagement framework is needed to manage interaction with communities and gain their support. However, the department only implemented a stakeholder engagement framework on 21 June 2019 to respond to enduring community unrest. Because this framework did not include solutions for unsuccessful stakeholder engagements, certain asbestos mine rehabilitation projects have remained suspended for significant periods (see paragraph 5.3.3(c) of the detailed audit findings and recommendations).
- d. These deficiencies resulted in the following:
 - Rehabilitation and closure projects were not prioritised and scheduled to ensure that the department gets the most value for the money spent on equipment and other costs (economies of scale).
 - The key elements required for economical delivery were compromised in some areas, and significant delays in completing rehabilitation projects will result in substantial future cost increases.
 - The department did not properly monitor closed holings and rehabilitated mines. Therefore, when these mines and holings reopened due to illegal mining or shifting ground, the danger was not detected immediately and repair work was not

done. This increases the eventual cost of reclosing the holings and the additional rehabilitation of asbestos mines.

- e. The D&O mines database contained errors because it was not regularly updated or effectively monitored. This resulted in outdated, inaccurate and incomplete information (see paragraph 5.2.2(a) of the detailed audit findings and recommendations).

1.3.4. Intergovernmental coordination

The directors-general of the department, the Department of Water and Sanitation and the Department of Forestry, Fisheries and the Environment did not approve the terms of reference for the government task team on mine closure and water management (GTT). The terms of reference would include the GTT's mandate and function. Without this directive, the GTT did not function effectively to strengthen communication between government departments on the D&O mines rehabilitation programme.

1.4. KEY RECOMMENDATIONS

1.4.1. Leadership and oversight

- a. The department must review the national strategy every five years, as required, to ensure that the strategy is still appropriate and reflects the changes in the D&O mines environment. This review should include a comprehensive implementation plan to achieve the national strategy objectives (see recommendation 1.4.2).
- b. The department should finalise and adopt the NMCS. Once this has been done, the department should compile a comprehensive national mine closure policy and an implementation plan that uses opportunities for different end-land use in order to reduce the government's liability to close these mines where possible.
- c. The department should determine the strategic importance of the D&O mines programme within the department's strategic objectives. This must include an assessment to determine how important this programme is within the department's current mandate, given competing priorities and available funding.

- d. The department should finalise and approve the ROC terms of reference to mandate its oversight functions.
- e. The ROC should discharge its responsibility by meeting regularly, as required, executing all its functions and tracking recommendations to assess how successfully they have been implemented.
- f. Instead of only focusing on D&O asbestos mines and holings, the department should perform an assessment (including research) and decide on an approach for rehabilitating or repurposing all 6 100 D&O mines as reported in the D&O mines database. This should include establishing government's liability for identified D&O mines with mineral rights and private property ownership.
- g. The department should include all the relevant requirements of the national strategy as part of the deliverables and responsibilities in the individual performance contracts for its officials. The key performance measures and targets should be set using the Smart principles to ensure that each official's individual performance is measurable.
- c. The department should amend its current contracts with implementing agents to include enough detail about the contractual relationship, document management, and the number and frequency of monitoring activities. The contract should be monitored continuously so that challenges can be identified promptly and corrective action can be implemented where needed.
- d. The department should allocate roles and responsibilities for maintaining and managing the D&O mines database to ensure that information is accurate and complete. The D&O mines database should be monitored and reviewed once per quarter. Transferring the database from the Council of Geoscience (CGS) to the department should be considered a separate project.
- e. The department's current stakeholder engagement framework should be revised to include appropriate dispute resolution processes that will address the current challenge of disputes between local communities and the department about suspended asbestos mine rehabilitation projects.

1.4.2. Funding

The department should compile, cost and approve a comprehensive D&O mines implementation plan that covers all the key deliverables of the national strategy. This should be used to compile the departmental five-year strategic plan, rolling three-year plan and annual performance plan to support the request for appropriate annual funding from the National Treasury.

1.4.3. Contract management and operations

- a. The department should develop processes and procedures to direct the planning, execution, monitoring and reporting of the D&O mines programme.
- b. The department should develop monitoring programmes (including the required costing) so that it can allocate a sufficient budget to this crucial activity according to international best practices. The department should identify and allocate roles and responsibilities for implementing corrective actions.

1.4.4. Intergovernmental coordination

The directors-general of the relevant departments should approve a terms of reference to direct the GTT's mandate and functions. This terms of reference should include responsibilities relating to mine closure and water management at D&O mines.



02

Key initiatives planned or implemented



The department noted the AGSA's recommendations in response to this audit and has committed to implementing a number of initiatives to address the findings included in this report. We received the director-general's comments on 14 December 2021. The comments included the following:

01

The department will only update the national D&O mine rehabilitation strategy after the finalisation of the NMCS. The national D&O mine rehabilitation strategy is dependent on the NMCS because the post land use should be aligned with other legislations/ policies/ strategies of other government departments as defined in the NMCS. The NMCS was gazetted for public comments in May 2021. The final strategy will be gazetted by March 2022.

02

The department will revise rehabilitation project targets to align with historical budget and funding trends from the National Treasury.

03

The department will immediately implement action plans to help the rehabilitation oversight committee fulfil its responsibilities according to the terms of reference.

04

The department will conduct a liability study in the 2022-23 financial year to quantify the government's liability for all abandoned mines on the D&O mines database. As part of this study, the department will audit and verify information that is contained in the database.

05

The department will implement performance contracts that include all key requirements of the D&O mines rehabilitation programme starting in the 2022-23 financial year.

06

Procedures will be developed with immediate effect before the end of the current financial year (March 2022) to direct the D&O mine rehabilitation programme.

07

The department will continue to expedite the monitoring of D&O mine sites and this will be covered in the procedures pertaining to monitoring and maintenance activities. These procedures will be developed before end of the current financial year (March 2022).

08

The department will review and revise its contracts with implementing agents, and will implement the revised contracts in the next financial year.

09

The migration of the D&O mines database from the CGS to the department is currently being looked at as part of the merged department's IT requirements. The database transfer will be finalised in the 2023-24 financial year.

10

The department will engage both the CGS and Mintek about putting in place an interim arrangement that will ensure that the database is kept live and regularly updated until the migration has been completed.

11

The department will update the stakeholder engagement framework to include what action should be taken if stakeholder engagements with communities are not successful.

12

The original mandate of the government task team on mine closure and water management (GTT) did not address the D&O mines, but the department noted the AGSA's comments and will propose that this item be added to the GTT agenda.



03

Overview

South Africa is a mineral-rich country with a long history of mining. While the Minerals Act of 1991 required holders⁴ to rehabilitate the surface of land, it was only when the Mineral and Petroleum Resources Development Act 28 of 2002 came into effect that mine closure processes in South Africa were regulated. Without such regulation, many historical mining operations had been abandoned by their holders with little or no regard to managing the impact on public health and safety, or the environment.

Government, in its quest to maintain citizens' constitutional rights as contemplated in section 24 of the Constitution, mandated the department to do what was necessary to minimise the environmental, social and health impact of these D&O mines, including rehabilitating them. In December 2009, after our 2009 audit report, the department approved the national strategy, which set out the following key deliverables necessary to manage D&O mines:

- Develop a national database of D&O mines
- Rank the mines by their potential impact on public health, safety and the environment
- Implement a programme to address the impact of D&O mines, through rehabilitation programmes and other measures that aim to minimise risks to the public and the environment

The D&O mines database contains 6 100 D&O mines, which are ranked as high, medium, low or no rehabilitation necessary depending on their potential impact on public

health, safety and the environment, as well as 1 170 D&O holdings. It was not practically possible for us to determine how complete and accurate this information is because of the nature and geographical distribution of the mine sites and holdings. Deficiencies relating to the D&O mines database were raised with the department and management has committed to rectify these (as noted in paragraph 5.2.2).

To address the significant number of D&O mine sites, the national strategy required the rehabilitation programme to run parallel at two levels:

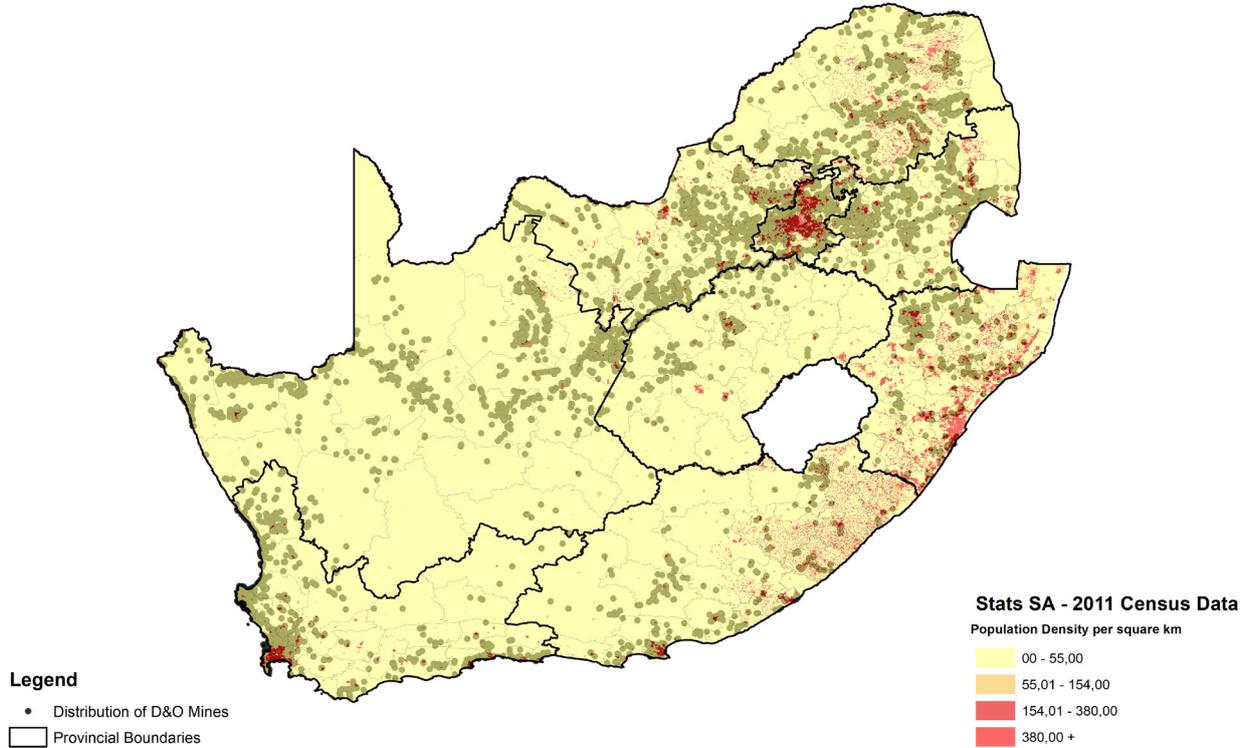
- Large- and medium-scale regional programmes – focusing on larger multiple mine clusters that have a cumulative impact on the environment, such as asbestos, gold and coal mines.
- Small-scale local programmes – focusing on mines with a smaller geographical scale but that pose an immediate threat, such as quarries, mine shafts and trenches that are located close to residential areas (included in the holdings programme).

The status of mineral deposits changes over time, as new rights are awarded or existing rights expire. These changes make it necessary to continually update the D&O mines database, which requires close cooperation between the department, Mintek and the CGS. From 2015-16 to 2019-20, the CGS allocated R40 522 003 of its departmental funding to developing, managing and maintaining the D&O mines database.

4. As defined in the Act

3.1. DISTRIBUTION AND STATUS OF 6 100 D&O MINES IN 2021

Figure 2: Geographical distribution of 6 100 D&O mines and population density in South Africa



Map source: The department; CGS, November 2021

As seen in figure 2, a significant number of the D&O mines are located in Gauteng and the Western Cape, in areas where the population density exceeds 380 citizens per square kilometre. Of the 445 D&O mines situated in Gauteng, only six had been rehabilitated.

The department's progress in rehabilitating the 6 100 D&O mines (excluding holings) is shown in figure 3. Only 55⁵ (1%) of the D&O asbestos and other mines have been rehabilitated, while 2 908 (48%) mines do not require rehabilitation based on the initial risk assessment of their potential impact on public health, safety and the environment.

5. This number includes all D&O mines that have been rehabilitated, not just those rehabilitated by government.

Figure 3: Progress with rehabilitation of 6 100 D&O mines

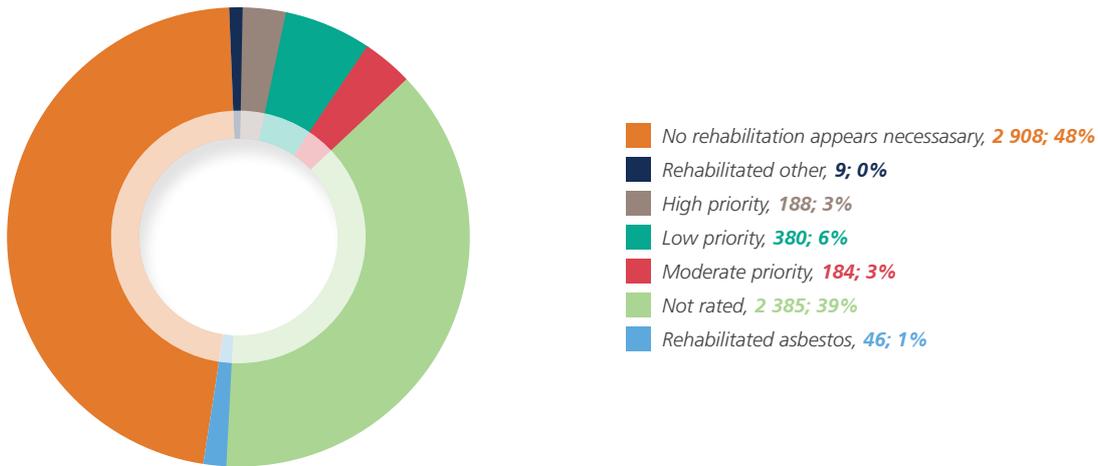


Figure source: D&O mines database, September 2021

Of the 6 100 D&O mines, 2 568 were classified as high-risk D&O mining commodities (including the 246 asbestos mines) based on their potential impact on the environment and their proximity to communities. When we analysed this

category of mines, we found that 1 560 (61%) of the mines were for one of four main mining commodities – gold, coal, asbestos and copper – with asbestos representing 16% of this total.

Figure 4: Four main high-risk D&O mining commodities

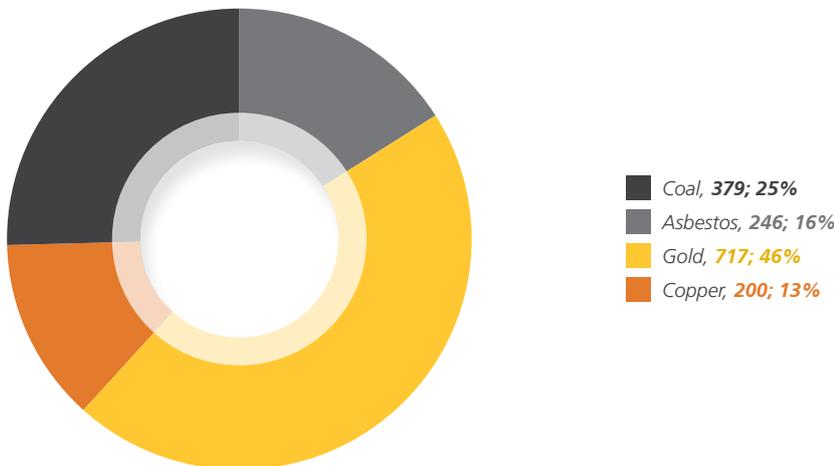


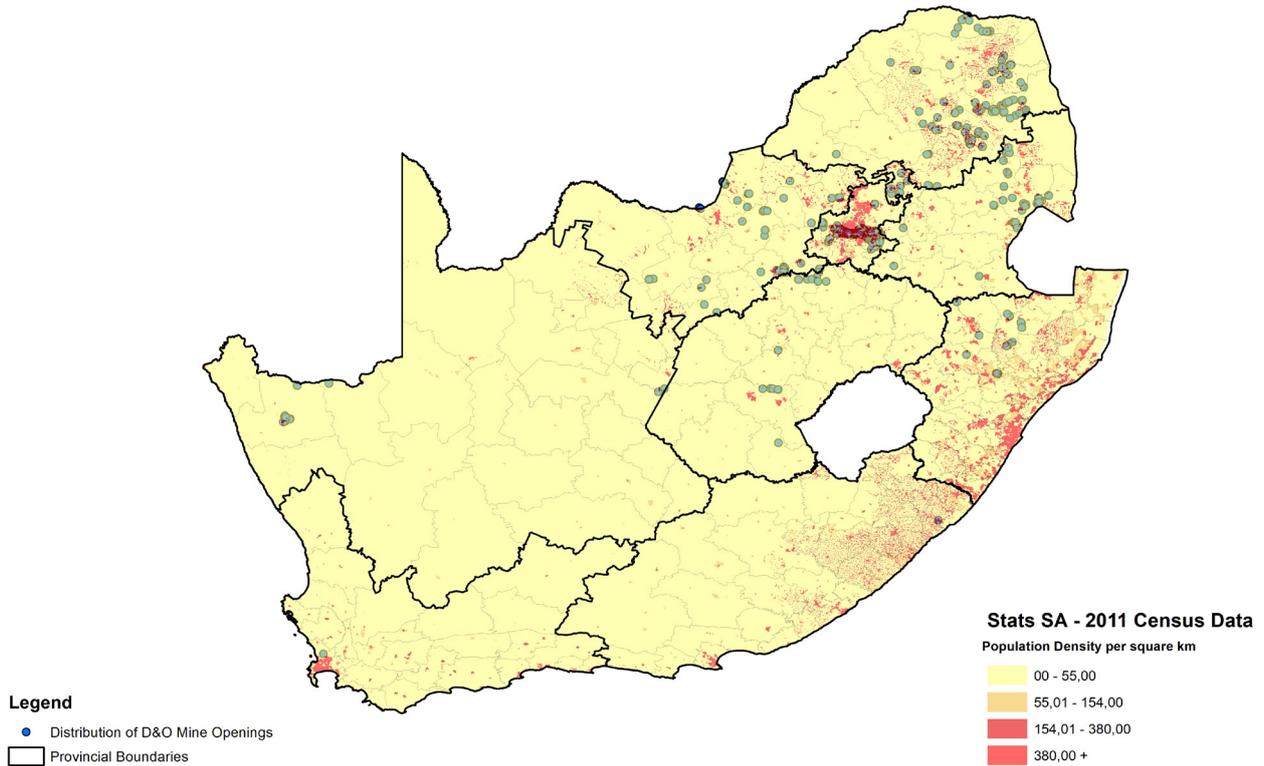
Figure source: D&O mines database, September 2021

3.2. DISTRIBUTION AND STATUS OF HOLINGS IN 2021

The D&O mines database also recorded 1 170 D&O holings. Figure 5 shows the geographical distribution of the 1 170 D&O holings in relation to the population density per square kilometre in South Africa. A significant number of the D&O holings are located in Gauteng where the population

density exceeds 380 citizens per square kilometre. According to the D&O mines database, 507 (43%) of the holings were closed and 322 (49%) of the remaining 663 holings were rated as high risk.

Figure 5: Geographical distribution of 1 170 D&O holings and population density



Map source: The department; CGS, November 2021

3.3. IMPLEMENTATION OF REHABILITATION PROGRAMME

The department has gone through a number of reforms since the 2009 performance audit, as reflected in the figure below.

Figure 6: Announcement dates of the historical name changes of the Department of Mineral Resources and Energy



The department has focused on rehabilitating asbestos mines and closing holings. Every year, the department calculated the future liability to rehabilitate all the asbestos mines and reported the result in a valuation report. The 2021 valuation report indicated that it would take 12 years (up to 2033) to rehabilitate the remaining 229 D&O asbestos mines at a cost of R3 860 741 741.

Complete rehabilitation is not the only solution for managing D&O mines. The national strategy directed that, in a number of areas, mining may form part of South African heritage sites. These sites attract tourists because of their mining heritage, and contribute to other economic activities, such as facilitating and controlling legal secondary mining of waste deposits by small-scale miners. The strategy refers to this as ‘different end-land use’.

The department commissioned two public entities, Mintek and the CGS, as implementing agents for the rehabilitation programme. Their contract period and value during the contract are reflected in table 1. Their scope of work was as follows:

- CGS – Managing the D&O mines database and closing dangerous mine holings until 31 March 2020 (including the backlog of holings); performing specialist studies and post-rehabilitation monitoring.
- Mintek – Rehabilitating D&O asbestos mine sites and closing dangerous mine holings (from 2019-20 financial year).

Table 1: Contract period and value of implementing agents

Implementing agent	Contract period	Total contract value (R)
Mintek	1 April 2016 to 31 March 2019	150 000 000
	1 April 2019 to 31 March 2022	420 000 000
CGS	1 April 2015 to 31 March 2018	123 000 000
	1 April 2018 to 31 March 2019	48 000 000
	1 April 2019 to 31 March 2020 (Addendum)	0
	1 April 2020 to 31 March 2024 (Addendum)	No value indicated

The audit scope focused on certain deliverables included in the selected contracts. We have summarised the deficiencies identified on selected projects and deliverables in the executive summary (reported in detail in chapter 5).

The national strategy specifies that ongoing monitoring is needed to identify and characterise the impact of D&O mines, while a degree of post-rehabilitation monitoring is required to determine how effective and sustainable the implemented rehabilitation measures were.

International best practices also require post-rehabilitation monitoring to ensure the sustainability of mine closure. In addition, regulation 62 of the Mineral and Petroleum Resources Development Regulations highlights the importance of monitoring, maintenance and post-closure management, and states that mine closure plans must include details for financial provision.

The department contracted the CGS to monitor D&O mines during the 2015-16 to 2019-20 financial years. Monitoring activities covered both rehabilitated and unrehabilitated

asbestos mines, and consisted of individual site inspections and reporting, as well as environmental monitoring campaigns.

The following oversight and coordination structures were established to deal with the D&O mines programme:

- The directors-general of the then departments of Minerals and Energy, Environmental Affairs and Tourism, and Water Affairs and Forestry established the government task team on mine closure and water management (GTT) in August 2005. The GTT coordinates issues of sustainable mine closure and mining water management between the agencies.
- The former director-general of the Department of Minerals and Energy established the rehabilitation oversight committee (ROC) in December 2009 to implement a well-coordinated, safe and sustainable D&O mines rehabilitation programme. The ROC consisted of the department and the two implementing agents – the CGS and Mintek.



04

Citizens' lived experience of D&O mines



Many of the D&O mines have still not been rehabilitated because of the slow progress with the rehabilitation programme. In this section, we identify and analyse the main effects of unrehabilitated mines on the environment and on the health and safety of local communities.

Unrehabilitated D&O mines are not geographically isolated in South Africa, but are located close to communities and natural habitats. The department identified 2 568 D&O mines⁶ with commodities that pose a high risk to the environment, and 2 513 of these mines have not been rehabilitated or closed. There are also 322 high-risk holings that have not been rehabilitated or closed.

Mines continue to affect the surrounding area long after they have stopped operating. Some of the effects include altered topographical characteristics, open pits, shafts, abandoned tailings dumps, modified hydrological and groundwater regimes, eroded and damaged soil, contaminated aquatic sediments, and changes in vegetation. There are also changes to the natural environment in the form of air pollution from dust or toxic gases, infertile soil, and severely degraded water resources that are often devoid of life. People that live close to these sites and rely on these resources risk being exposed to toxic contaminants through the air that they breathe, the food that they eat and the water that they drink. Vast areas of degraded, unusable land are also hindering sustainable economic development.

4.1. ENVIRONMENTAL EFFECTS OF UNREHABILITATED MINES AND HOLINGS

Unrehabilitated D&O mines and holings contributed to environmental effects that led to social and health problems. These environmental effects include:

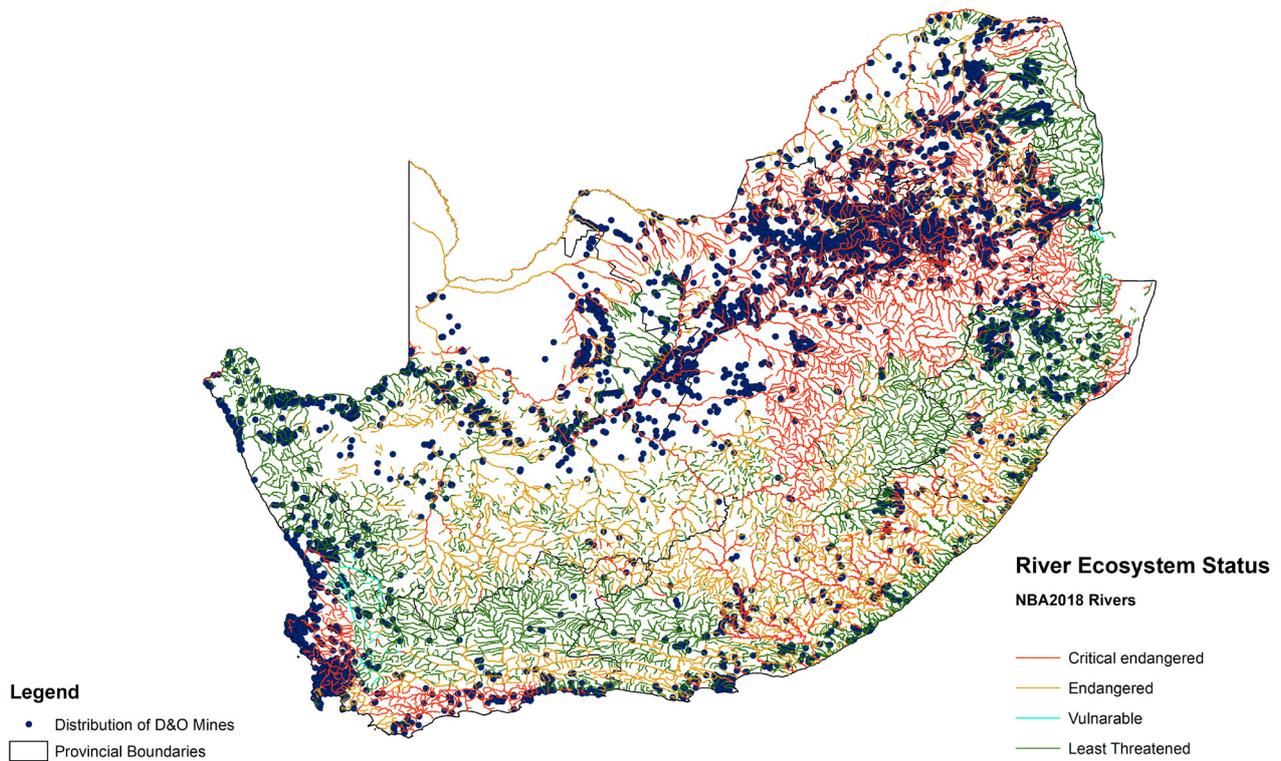
- contamination of soil, groundwater and surface water with acid and metals
- air pollution by dust
- uncontrolled combustion from burning mine workings or dumps
- surface deformation
- illegal mining activities.

4.1.1. Contamination of soil, groundwater and surface water with acid and metals

South Africa is recognised as a water-scarce region that depends on rivers and groundwater for food production and economic activity. Figure 7 shows the proximity of the D&O mines to endangered and critically endangered river ecosystems in South Africa.

6. D&O mines database figures used

Figure 7: Distribution of D&O mines and river ecosystem status in South Africa



Map source: The department; CGS, November 2021

Contaminated soil and water from acid mine drainage (AMD) and potentially toxic elements eroding from mine waste are considered to have the largest environmental impact in mining areas. AMD is considered responsible for degrading physical, chemical and biological stream habitats, and for causing significant biodiversity loss in aquatic communities.

South Africa has major challenges with AMD in catchments where mining features prominently, for example in the Vaal River and Olifants River systems. Usually, after active mining has ceased, water is allowed to fill mining voids, which promotes the formation of AMD.

Areas in South Africa that are reported to be severely affected by AMD include the Witwatersrand gold fields; the North West, Free State, Mpumalanga, and KwaZulu-Natal coal fields; and the O’Kiep copper district.

According to the Department of Water and Sanitation, three AMD treatment plants were fully implemented by mid-2016 in the Witwatersrand basin, at a total capital cost of R2,59 billion. These plants had infrastructure for pumping underground AMD, neutralising (partial treatment) polluted water, recovering waste sludge and discharging the partially treated water into the Vaal or Crocodile (West) river systems. There are no other plants or methods to treat AMD from D&O mines in other regions, such as the Olifants River system. The CGS is performing a hydrogeological baseline assessment of the Olifants River system catchment area to investigate the extent of contaminated ground and service water resources near mining regions.

4.1.2. Air pollution by dust

Estimates show that 1,6 million people in South Africa live near, or right next to, tailings storage facilities (both operating and D&O mines). The effects of post-mining landscapes on surrounding air quality are very similar to

those during active mining. Unmonitored mining waste pollutes environments as it releases potentially toxic elements into the air through dustfall. Dust is kept suspended in the air or transported from sources by wind and can travel long distances, transferring contaminants to ecosystems. Exposure to dust is reportedly associated with increases in illnesses such as respiratory infections, heart diseases (chronic cardiopulmonary diseases) and lung diseases (e.g. lung cancer). People with existing respiratory diseases such as asthma and or cardiovascular diseases are considered to be at a higher risk of adverse health effects from exposure to potentially toxic elements in the air. Dustfall from mine waste was also identified as the major source of soil contamination as it prevents vegetation from growing.

People who live in post-mining environments with either partially rehabilitated or unrehabilitated asbestos waste dumps continue to be at risk of contracting asbestos-related diseases. There is no “safe” level of asbestos exposure. Airborne asbestos fibres can pose a risk to health, as inhalation is the main pathway for asbestos to enter the body. Breathing in asbestos fibres can cause asbestosis, lung cancer and mesothelioma. South Africa has the highest rate of mesothelioma in the world. As documented in our detailed audit findings, we identified rocks containing asbestos and asbestos fibres, unvegetated spoil dumps and unstable, unsealed shafts at rehabilitated asbestos mine sites as well as adjacent to a rehabilitated site.

The biggest source of radioactivity in South Africa is mining commodities such as coal, gold and platinum. Uranium is the most concerning contaminant produced by the gold mining industry. Uranium and other radioactive elements are known to be toxic and to remain in the environment. They can also bio-accumulate in food chains and endanger ecosystems. The biological effects of ionising radiation on the human body include genetic changes (genes and chromosomes get altered), and non-genetic or body damage (the harm is visible immediately in the form of birth defects, burns, some types of leukaemia, miscarriages, tumours). If people inhale radioactive particles from mine waste, there is a risk that their lungs may be affected. If these particles are then absorbed into the body, this can result in radiotoxicity.

A recent study in South Africa reported that elderly people living near (within 1-2 km) tailings storage facilities, or tailings dams, in Gauteng and North West had a higher level of chronic respiratory symptoms and diseases than those living 5 km away.



Example:

An informal settlement in the Witwatersrand gold fields is located opposite a mine tailings waste dump. On a windy day, particles from the mine dump are blown over the community.

Proximity of informal settlement to gold mine tailings



Radioactive particles blown from mine dump opposite informal settlement



The National Nuclear Regulator maintains that it is responsible for regulating naturally occurring radioactive radionuclides and has no legislative control over D&O mine dumps. Previous collaborations between government entities on the informal settlement above have taken the form of intergovernmental steering committee meetings held with the department, the Department of Forestry, Fisheries and the Environment, the Department of Water and Sanitation, the relevant municipality and the National Nuclear Regulator.

Our engagements with the Department of Planning, Monitoring and Evaluation revealed that it had sent a letter asking the department’s director-general to intervene in removing and remedying mining tailings at the informal settlement in the above example. The department did not respond to our request for progress on this matter.

4.1.3. Uncontrolled combustion from burning mine workings or dumps

Discarded coal dumps may contain low-quality fine coal, which puts them at risk of spontaneous combustion. Burning coal dumps contribute to air pollution that affects the whole area, including poor communities that are reclaiming this coal under dangerous conditions. These coal fires can release pollutants into the atmosphere that can negatively affect air quality and human health as follows:

- Coal contains sulphur and other elements (including dangerous metals such as mercury, lead and arsenic) that escape into the air when coal is burned.
- Damage to land ultimately destroys the natural habitat.
- Burning coal releases carbon dioxide into the atmosphere. These emissions have been shown to increase the greenhouse effect in the atmosphere and lead to global warming.

4.1.4. Surface deformation

Mining activities in South Africa have altered the natural environment in many ways over the last 120 years. Surface deformation, particularly mining surface subsidence (i.e. sinking of the land surface) caused by abandoned mine infrastructure, changes the hydrological⁷ pathways (i.e. where water flows on and under the earth's surface). The groundwater circulating through mining cavities becomes polluted and flows into the natural environment, where it contaminates wetlands, streams and dams. Two areas that are particularly concerning when it comes to surface subsidence are the undermined areas of the Witwatersrand gold fields (i.e. areas where underground mines have made the land more prone to subsidence) and underground coal mining in the Witbank coal fields. Land subsidence could result in injury and death to people and livestock, as well land disturbance and damage to surface infrastructure, including houses, buildings, rails and roads.

4.1.5. Illegal mining activities

Historical mining activities are not the only cause of environmental and health and safety concerns for local communities; current illegal mining could also contribute to these problems, including subsidence. Illegal miners' unsafe mining operations (hand-dug and automated excavation) could disturb old shafts and excavated holings, which could lead to their collapse, particularly after rainfall.

Illegal mining has a range of negative social and financial effects on government, the mining sector, and the country and its citizens. It also threatens the viability of government's holing programme, as the illegal miners open previously sealed holings.



Example:

A previously closed holing that had been reopened is located next to an informal settlement in the Witwatersrand. Illegal mining activities were detected at the specific shaft.

Opened ventilation shaft



7. Hydrology is the study of earth's water, especially its movement in relation to land (Oxford English Dictionary).

4.2. SOUTH AFRICAN HUMAN RIGHTS COMMISSION DIRECTIVES AND RECOMMENDATIONS

The South African Human Rights Commission published the *National hearing on the underlying socio-economic challenges of mining-affected communities in South Africa* in 2016. Although the report mainly focused on current mining operations, it did touch on certain areas relating to D&O mines, and made the following relevant directives and recommendations:

- The department must work together with relevant stakeholders to develop a regional master plan to address environmental rehabilitation and the remediation of D&O mines. The plan should specifically refer to legacy issues such as AMD and illegal miners, as well as sites with potential nuclear contamination, and must include timelines and funding mechanisms.
- The department, in partnership with the National Department of Health and key stakeholders, is directed to commission a study to assess the impact of mining activities on communities' health, particularly respiratory and brain health. Until this has been done, the department and the National Department of Health are directed to introduce mechanisms to monitor and assess health levels in mining-affected communities.

- The Department of Forestry, Fisheries and the Environment and the department must jointly report on the measures taken to streamline the control of the cumulative air pollution impacts of mining operations.

We could not assess whether the department had adequately implemented any of the directives and recommendations made by the South African Human Rights Commission because the department did not submit the required regional master plan or any reports relating to monitoring health levels and controlling air pollution in mining-affected communities.

In addition, the National Department of Health confirmed that monitoring and evaluating the impact of unrehabilitated D&O mines on the environment and the health of the affected communities does not form part of the National Department of Health's strategic objectives or operations. We also confirmed that no health-related statistics were kept on the impact of unrehabilitated D&O mines on the health of affected communities.



05

Detailed audit findings and recommendations

Figure 8 summarises the changes that are needed in key areas to improve the success of managing the rehabilitation programme. Change in these key areas will help to mitigate the negative effect of D&O mines on the environment and on communities' health and safety.

Figure 8: Key areas in three stages of D&O mines rehabilitation process



The following key findings, listed by the areas of the value chain that we focused on, contributed to the uneconomical, inefficient and ineffective management of the D&O mines programme.

5.1. STRATEGIC AND OPERATIONAL PLANNING

5.1.1. Progress with rehabilitation programme

- a. The department’s slow progress on the D&O mine programme meant that it did not address the environmental and social impact of large-scale D&O mines. In 2010, the department targeted approximately 2 000 large-scale D&O mines for rehabilitation by 2021. These mines posed the greatest risk and have an extensive impact on society and the environment. All 6 100 D&O mines were targeted for rehabilitation by 2038.
- b. In stark contrast to the target, the rehabilitation progress as at 31 March 2021 was as follows:

- Except for asbestos mines, none of the 2 322 high-risk commodity D&O mines was rehabilitated. The department did not set a specific target except for the overall target for 2038.
- Of the 1 170 identified holdings, 507 (43%) were closed according to the D&O mines database. The department did not set a specific time frame to close the remaining holdings.
- Of the 261 asbestos mines, only 32 (12%) were reported as having been rehabilitated since the start of the programme in 2006-07. The rehabilitation programme saw only minor improvements over the past 12 years (years ending 31 March 2010 to 31 March 2021), with the average number of mines rehabilitated in a year increasing from 1,67 mines in 2009 to 2,25 mines in 2021.
- The remaining 229 asbestos mines were targeted for rehabilitation by 2033. The 2021 valuation report and the D&O mines database did not show the same number of D&O asbestos mines (see table 2). The department could not explain the difference.

Figure 9: Rehabilitation progress at 31 March 2021

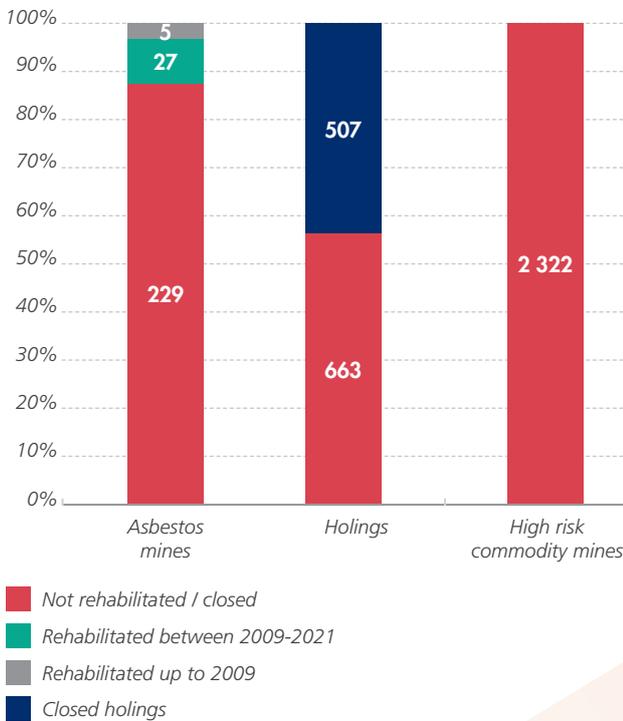


Table 2: Number of D&O asbestos mines – 2021 valuation report vs D&O mines database

Source	Total number of asbestos mines	Total rehabilitated	Number still to be rehabilitated
Valuation report (March 2021)	261	32	229
D&O mines database (September 2021)	246	46	200

c. From the beginning of the rehabilitation programme, the National Treasury has not provided enough annual funding to ensure that all D&O mines will be rehabilitated by 2038. The Medium-Term Expenditure Framework (MTEF) allocated funding that was limited to rehabilitating D&O asbestos mines and the holings programme, and did not consider the budget required to rehabilitate the other 2 322 high-risk commodity D&O mines.

The 2021 valuation report estimated that R3 860 741 741 will be needed to rehabilitate the remaining 229 D&O asbestos mines by 31 March 2033. At its current level of funding, the MTEF would have allocated only 44% of this amount (R1 696 528 316) to the asbestos rehabilitation programme by 31 March 2033, and the funding required to rehabilitate the remaining 229 D&O asbestos mines would only be received by 2043.

In addition to inadequate funding, the planned time frame for rehabilitating the remaining 229 D&O asbestos mines does not consider the actual rate at which Mintek (the department’s implementing agent for asbestos rehabilitation) plans and implements asbestos rehabilitation projects.

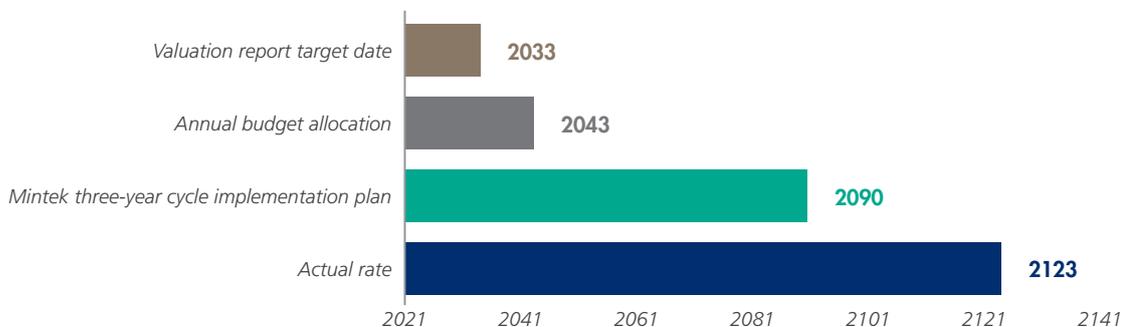


Example:

Mintek’s 2019-20 implementation plan showed that it had identified 10 asbestos projects in Limpopo to be completed between 1 April 2019 and 31 March 2022 – an average of 3,33 asbestos rehabilitation projects per year. At this rate, it will take approximately 69 years to rehabilitate the remaining 229 D&O asbestos mines, which will only be completed in 2090.

Figure 10 shows the misalignment between the planned and actual completion time frames to rehabilitate the remaining 229 D&O asbestos mines, based on funding allocation levels and operational implementation plans.

Figure 10: Expected year of completion for remaining 229 D&O asbestos mines across actual, strategic and operational plans and funding levels (from 1 April 2021)



- d. The national strategy has not been reviewed since it was approved on 14 December 2009. As such, it does not recognise the dynamic nature of the D&O mines database and of rehabilitation rates. The strategy was intended to be reviewed every five years to consider how circumstances had changed over time.

Some of the national strategy's key deliverables to achieve the rehabilitation programmes were not included in its implementation plan, and those that were included did not have responsibilities, time frames and resources directed or allocated. The rehabilitation oversight committee (ROC) had also not finalised the implementation plan during 2010, as instructed by the director-general.



Example:

The time frame in the implementation plan for rehabilitating large- and medium-scale D&O mines was stated as "To start as soon as reasonably practical", without giving any further details.

- e. Between 2011-12 and 2018-19, the department reported on the rehabilitation of both asbestos mines and holings under one measure in its annual performance plans. Because of this combined reporting, the slow progress of rehabilitating D&O mines was not evident. As a result, and following the merger of the Department of Mineral Resources and the Department of Energy in 2019, the department's five-year strategic plan for 2020–25 did not include the rehabilitation of D&O mines.

Since 2019-20, the department was inconsistent in including measures on rehabilitating asbestos mines and closing holings in its annual performance plans. The performance measures for key deliverables of the rehabilitation programme were not all included.

- f. The performance contracts for the staff who are responsible for the rehabilitation programme did not include all the key deliverables and targets for the rehabilitation programme. The deliverables and targets that were included did not adhere to the Smart principles. As such, the staff's performance was not directed towards all the goals of the rehabilitation programme.

- g. By September 2021, the department had not completed targeted research into high-risk, large-scale and complex groups of D&O mines with a combined impact on communities and the environment. The national strategy required this research to identify and develop the appropriate rehabilitation methods and corrective measures needed to fast-track the rehabilitation programme.

- h. According to paragraph 8.4 of the national strategy, rehabilitation is not the only solution for managing the 6 100 D&O mines. Some of these mines could be used as heritage, recreational and residential sites, or for economic activities (referred to as different end-land use). More than 11 years after the national strategy objective was set, the department had not yet implemented different end-land use opportunities for D&O mines. Research during 2018 on re-mining opportunities was not completed and no research was done on residential and recreational opportunities.

The implementation plan did not direct or give time frames for identifying different end-land use opportunities or include a requirement to develop the prescripts for different end-land use. The CGS was thus only instructed to develop the enabling NMCS legislation in its 2018-19 contract. The NMCS was gazetted for public comment on 21 May 2021.

5.1.2. Prioritising mine sites for rehabilitation and closure

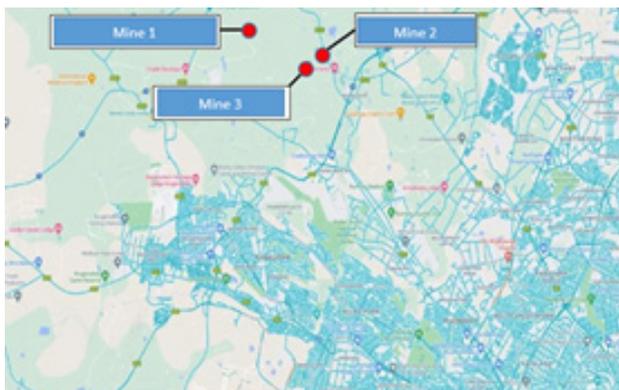
- a. The department did not always prioritise rehabilitating high-risk asbestos mines and unsafe holings. Low-risk asbestos mines and holings were rehabilitated and closed, while many high-risk mines and unsafe holings were not attended to.

Example:
A total of 235 (88%) of the 268 holings closed between 2012 and 2019 were low-risk holings, despite the D&O mines database listing 322 (49%) of the 663 remaining open holings as high-risk. There was no documentation available to support prioritising these low-risk holings during this period.

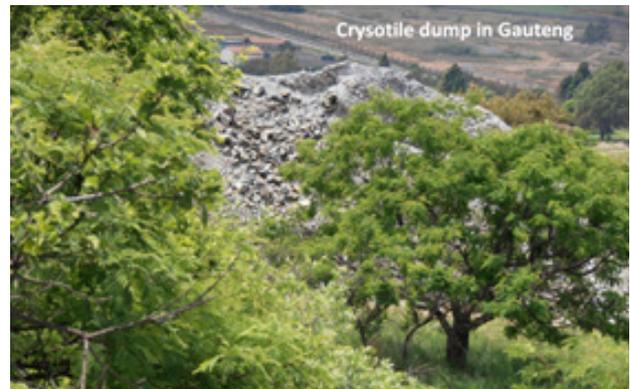
- b. According to the D&O mines database received in September 2021, 200 of the 246 (81%) asbestos mines had not been rehabilitated. Of these, 81 (41%) are classified as high- and moderate-risk mines and should have been prioritised for rehabilitation.

Example:
Included in the 81 high-priority asbestos D&O mines are three mines in Gauteng – the country’s most densely populated province – that have not been prioritised and scheduled for rehabilitation to date.

Proximity of three high-risk D&O asbestos mines in Gauteng to surrounding communities



Asbestos mine dump showing exposed asbestos fibres on a dump in Gauteng



Source: CGS presentation at the 35th International Geological congress in August 2016

- c. The asbestos project implementation plan for the 2019-20 to 2021-22 financial period prioritised 10 asbestos projects in Limpopo, including low-risk mines and mines that did not require rehabilitation. It was not clear why these projects were chosen over the remaining seven high-risk asbestos mines in Limpopo.

Example:
In Limpopo, four of the 10 selected projects (40%) had either been classified in the D&O mines database as low-risk, no rehabilitation appears necessary, rehabilitated or could not be identified on the database.

- d. In some cases, high-risk asbestos mines and unsafe holings were not prioritised because the department did not give strategic direction:

- The implementation plan did not specify time frames or allocate responsibilities for compiling the project prioritisation and scheduling plans prescribed by the national strategy. The overall project prioritisation and scheduling plan for asbestos mines and the holings programme was thus not developed.
- The department did not have procedures for compiling project prioritisation and scheduling rehabilitation plans that include –

- > alignment to the available budget to execute the programme as efficiently as possible using the limited annual funding from the National Treasury
- > regular reviews to refine strategies that would speed up the rehabilitation programme, such as grouping projects that are close together.
- The ROC did not recommend and oversee the annual and three-year cycle implementation plan for rehabilitation projects, as required by its draft terms of reference.
- e. The department should amend and expand staff's individual performance contracts to include all the relevant key requirements of the national strategy. The key performance measures and targets should also comply with the Smart principles to help measure the official's performance.
- f. The ROC should:
 - review and finalise the amended implementation plan for the programme
 - recommend and oversee the annual and three-year cycle implementation plan for rehabilitation projects.

5.1.3. Recommendations

- a. The department should review the national strategy and compile a detailed implementation plan to prioritise and schedule the D&O mines rehabilitation and research efforts. The implementation plan should direct all key deliverables of the D&O mines rehabilitation programme (including research) by allocating responsibilities, time frames and resources to the national strategy's key deliverables.
- b. The department should finalise the NMCS to realign the national strategy. It should also use opportunities for different end-land use to reduce the government's liability to close these mines. A comprehensive national mine closure policy and implementation plan should be compiled once the NMCS has been adopted.
- c. The department should develop and implement a procedure that guides how to compile project prioritisation and scheduling rehabilitation plans that:
 - align to the available budget to execute the programme as efficiently as possible using the limited annual funding from the National Treasury
 - include regular reviews to refine strategies that will speed up the rehabilitation programme, such as grouping projects that are close together.
- d. The department should determine the strategic importance of the D&O mines programme within its strategic objectives. The costed implementation plan, strategic plan and annual performance plan should be used to expand discussions on annual funding from the National Treasury.

5.2. D&O MINES DATABASE MANAGEMENT

5.2.1. Custodianship and integration of D&O mines database

- a. During both the 2009 and our current audit, we found that the department did not have an integrated information system to record and report on the status of the mines.
- b. The CGS did not transfer custody of the D&O mines database to the department. Although the handover was planned for May 2019, the department did not have a project implementation plan to guide this handover. As a result, the department could not integrate the D&O mines database with other departmental information systems.
- c. Because the department did not have custody of, and access to, the D&O mines database, it did not provide us with information when we requested it and, when the information was provided, it was not complete. This contributed to delays during the audit.
- d. The department's contract with the CGS for the period 2020-21 to 2022-23 (dated August 2020) did not include project activities to maintain and manage the D&O mines database even though the database was still in its custody. As a result, since 1 April 2020, the CGS has not been responsible for maintaining the D&O mines database.

5.2.2. Accuracy and completeness of D&O mines information

- a. The information on the D&O mines database was not accurate and complete. We found the following differences and missing information for both mines and mine holdings:
- Several mine entries had exactly the same GPS coordinates.
 - Fields in the database, such as mine names, reference numbers and site descriptions, were not always completed.
 - The CGS did not always update the status of asbestos D&O mines and holdings on the database after they had been rehabilitated or closed.
 - The CGS did not upload rehabilitation project documentation, such as final completion certificates, close out reports, final accounts and as-built drawings, to the database for safekeeping and future reference. It also did not have procedures to describe the project documentation that needed to be uploaded.
- b. The department did not independently monitor the D&O mines database to ensure that its information and project documentation was complete and accurate. This review was not included in departmental officials' performance contracts.



Example:

In 2018, the department's internal audit division identified errors and omissions in the D&O mines database. In response, the directorate committed to review the database once per quarter and allocated an official in the directorate to the task. The allocated official did not perform these quarterly reviews because it was not set as a performance measure in their performance contract.

5.2.3. Finalising government's liability towards rehabilitating all D&O mines

- a. The department had not confirmed the D&O status of 2 238 (37%) of the 6 100 mines that were included on the D&O mines database. These mines included 961 operational mines, 674 mines with mineral right ownership attached and 922 mines⁸ verified as located on private land. The property ownership status of a further 276 mines was unknown.
- b. Two years after completing a project to verify the property ownership and mineral rights of 1 346 no-access D&O mines⁹, the department had still not confirmed its rehabilitation liability.
- c. At the time of our audit, the department was in the process of determining whether the no-access D&O mines fall within the boundaries of licensed mining areas. The department will be able to remove such mines from the database as they will no longer be classified as D&O mines. The performance contracts for the responsible departmental officials did not contain performance measures to expedite, track and monitor progress on the project.

5.2.4. Recommendations

- a. The department should compile a project implementation plan to guide the handover of the D&O mines database from the CGS to the department. This would make it possible to integrate the D&O mines database with departmental systems, and ensure that up-to-date information would be available to support planning and decision making.
- b. The department should identify and allocate roles and responsibilities to maintain and manage the D&O mines database. This will ensure that information is accurate and complete. If the department decides to continue to use the CGS, the contract should be amended to specifically include such project deliverables.
- c. The department should monitor and review the D&O mines database once per quarter to ensure that it includes complete and accurate information and that all relevant project documentation has been uploaded. The allocated official's performance contract should also contain the relevant performance measure to hold them accountable.

8. There could be some overlap between the 922 D&O mines on private land and the 674 D&O mines with mineral rights.

9. Mines were not accessible at the time of the field verification visit because they were on private/restricted properties where access was prohibited. These mines were included in the 2 238 mines in paragraph 5.2.3(a).

- d. The department should prioritise determining whether the no-access D&O mines fall within the boundaries of licensed mining areas. The department should also confirm the status of the D&O mines in operation so that it can remove the confirmed mines from the D&O mines database. This will reduce the government's legal liability to rehabilitate operational D&O mines and those mines that have mineral rights or are located on private property.
- e. The department should compile procedures to identify the project documentation that should be uploaded to the D&O mines database.
- c. The department's procedures and its contracts with the implementing agents did not specify that project designs and technical engineering information should be kept in project files to ensure their safekeeping.
- d. Additional D&O mine sites and shafts that are not included in the scope of work are sometimes identified during the rehabilitation or closure process. The department does not have processes and procedures to report and record these mines. The contracts with the two implementing agents (the CGS and Mintek) also do not specify such a process.

5.3. PROJECT IMPLEMENTATION

5.3.1. Capacitated role-players

- a. In 2009, the department's organisational structure did not support its objectives to rehabilitate abandoned mines. The lack of capacity led to the project implementation being delayed.
- b. The 2021 audit found that the department had appointed additional staff to manage the D&O mines programme, so capacity no longer hindered its ability to implement the programme. The department had also appointed Mintek as the implementing agent to rehabilitate asbestos mines.

5.3.2. Completeness and effectiveness of the rehabilitation or closure

- a. We could not determine the completeness of the scope and the effectiveness of the actual rehabilitation or closure because the technical information that we requested was not provided.
- b. Because we were not given the project designs and technical engineering information, we could not confirm whether:
 - the completed rehabilitation or closure followed the design specifications and the approved scope of work
 - unrehabilitated shafts, trenches and mine dumps identified during the audit site visits were initially included in the approved scope of work.



Example 1:

During our audit site visit at a rehabilitated asbestos mine site in Limpopo (project completed in March 2013), we identified the following:

- The roofs of two shafts or exploration trenches seemed to be unstable. This created a safety risk because of how close it was to the community.
- An unvegetated spoil dump downslope of one of the shafts.

Unstable incline shaft at asbestos mine site supported by a beam



Unvegetated spoil dump





Example 2:

During our audit site visit at another rehabilitated asbestos mine site in Limpopo (project completed in December 2012), we identified the following:

- Two unrehabilitated mine dumps
- Rocks containing asbestos and asbestos fibres on the southern slope
- Overgrown access roads and spoil heaps
- Small openings containing asbestos
- A derelict mine shaft, approximately 700 m away from the village, on a steep slope that was not easily accessible

Unrehabilitated mine dump on southern slope at asbestos mine site



Exposed asbestos fibres along southern slope



5.3.3. Community challenges affecting economic and efficient rehabilitation of asbestos mine sites

- a. Over the past few years, asbestos mine rehabilitation projects in Limpopo have been delayed by community challenges, mostly around their demands to use local labour. These delays were part of the reason for extension-of-time claims with costs.



Example:

At one project, which began on 31 March 2017, the community challenges delayed the project for 134 days. The resulting extension of time increased the project cost by R3 581 568 (6,8%).

- b. Before 21 June 2019, the department did not have a stakeholder engagement framework to guide the process of engaging with the community. Such a framework would have helped to get community cooperation and ensure that the asbestos mine rehabilitation projects were successful.
- c. Other asbestos rehabilitation projects that were already in progress have been suspended and are at risk of not being completed because of community disagreements. Although the department did implement a stakeholder engagement framework on 21 June 2019, the framework did not include a resolution mechanism for unsuccessful stakeholder engagements with communities.



Example:

Two asbestos mine rehabilitation projects in Limpopo were suspended from 26 March 2021. This has resulted in delays of more than 24 months at one project and more than 27 months at the other as at 31 October 2021, compared to their initial planned completion dates.

- d. As far as we can determine from the limited minutes provided, the ROC did not offer any guidance or direction to accelerate the current slow-moving or suspended rehabilitation projects. According to its draft terms of reference, the ROC is responsible for recommending appropriate policy, legislation and any other government intervention to ensure the D&O programme is implemented as swiftly as possible.

5.3.4. Recommendations

- a. The department should craft, approve and implement processes and procedures to ensure:
 - that project designs and technical engineering information are safeguarded and included in the project files
 - that the project manager declares that the project file contains all the required technical information
 - that additional D&O mine sites and shafts that are identified during the rehabilitation process and not included in the scope of work are reported, recorded, ranked and monitored in the future.
 - b. The department should amend its current contracts with the implementing agents accordingly to the points above.
 - c. The department should revise the stakeholder engagement framework to include solutions for unsuccessful stakeholder engagements with communities.
 - d. The ROC should monitor slow-moving rehabilitation projects and provide guidance and direction to expedite their completion and ensure that the D&O mines programme is implemented as swiftly as possible.
- From October 2015 to 2020, the CGS focused its monitoring activities on asbestos D&O mines only and did not monitor any other D&O mines.
 - The CGS only monitored eight (25%) of the 32 asbestos mines that have been rehabilitated since the programme started.
 - D&O mines have not been monitored since 1 April 2020.
- c. The department did not include post-rehabilitation monitoring measures in either its annual performance and operational plans or the performance contracts for the staff responsible for the monitoring.
 - d. The department did not have standard monitoring processes and procedures in place to ensure that its monitoring activities were consistent and effective. The department also did not develop a formal, comprehensive monitoring programme to direct site-specific and regional monitoring, the frequency and period of monitoring, and recording and consolidating monitoring results. This programme would have helped the department to calculate enough of a budget to track whether the D&O mines rehabilitation was sustainable.
 - e. The CGS contract for 2015-16 to 2019-20 was not specific and did not include the number and frequency of monitoring activities required. Since 1 April 2020, the department has not identified and allocated specific role-players (internal or external resources) for monitoring activities.
 - f. These inadequate monitoring activities led to significant delays between rehabilitating an asbestos mine and monitoring it. The delays prevented significant problems in the rehabilitated asbestos mines from being immediately identified and corrected.

5.4. MONITORING AND MAINTENANCE OF REHABILITATION PROJECTS

5.4.1. Monitoring¹⁰ D&O mines and holings

- a. During the 2009 audit, we found that the department did not have the capacity to take an active part in decision-making, monitoring and site inspections for the rehabilitation projects.
- b. While the department has since improved its involvement in monitoring D&O mines, the improvement is not enough to meet the national strategy requirements for ongoing monitoring:
 - Monitoring activities were not performed between 2009 and 2015.



Example:

The earthworks at an asbestos mine in the Northern Cape was completed in June 2007. The first post-rehabilitation monitoring at the site took place almost ten years later, on 24 October 2016. Significant problems (open and collapsed, subsiding shafts) were noted at the site. Corrective actions had still not been performed by 25 November 2020.

10. Monitoring includes monitoring, maintenance and post-closure management of D&O mines (including holings).

Open and collapsed, subsiding shafts



Source: CGS monitoring report number 2017-0061, 15 March 2017

- g. Because post-rehabilitation monitoring and reporting did not focus on the holings programme, the department did not detect and respond appropriately to active illegal mining and vandalism.



Example 1:

We observed the following at the Gauteng holings (project completed in September 2006):

- Clear indication of active illegal mining activities close to residential areas.
- Multiple headstone markers were vandalised.
- Multiple reinforced capping slabs were damaged or undermined in an apparent attempt to gain access to the underground workings. This was despite the sites being sealed using reinforced concrete slabs and headstone markers.

Vandalised headstone marker removed from original position

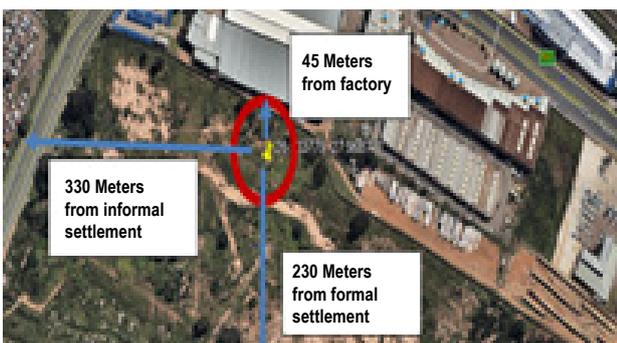


Example 2:

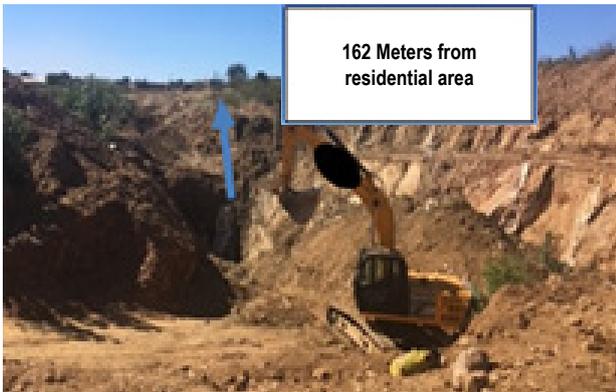
We observed the following at the Limpopo holing site (project completed in March 2017):

- Extensive, well-organised informal mining was in progress close to a residential area.
- Excavations and dumping seemed to be done haphazardly: the excavations were not deemed safe and a deep trench with very steep side slopes was visible.
- The current hazardous operations consisted of an excavator that was digging material and loading it onto a single 10-ton tipper truck, which transported it to another site where it was treated.
- The current excavations are at locations of historically sealed shafts. We saw no evidence of the shaft or the shaft markers during our visit.
- The site was not fenced. We saw no formal security and the access control seemed informal. There were no facilities and infrastructure associated with a formal mine.

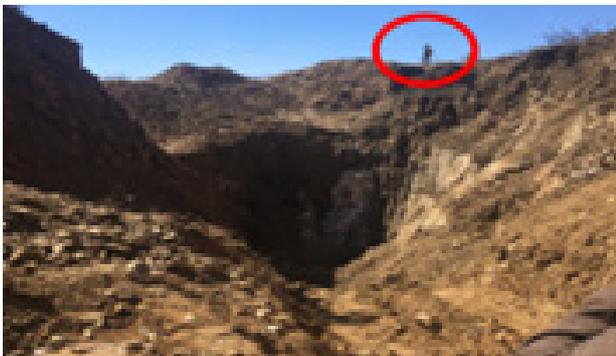
Holing site close to residential area



Active mining close to residential area



Deep excavation and very steep slope



5.4.2. Corrective actions to address maintenance needs identified during monitoring activities

- a. Monitoring activities identified what maintenance needed to be done to ensure that mine rehabilitation and closure was sustainable, but no corrective actions were taken to address those needs. Common maintenance activities would include repairing or armouring areas of erosion, addressing areas where vegetation had not successfully taken root, and repairing or replacing signs or access points.
- b. The department did not fulfil its responsibility to implement corrective action. It did not:
 - have documented processes and procedures to promptly implement corrective actions and ensure sustainable rehabilitation
 - have a corrective action plan to, for example –
 - > analyse the monitoring reports, determine appropriate corrective action and implement that action
 - > combine and record all corrective actions on a database so that the actions could be tracked and monitored

- > identify and allocate roles and responsibilities for implementing corrective actions.

- c. The ROC did not track the results of monitoring activities to ensure that the department applied corrective action where needed.



Example:

At an asbestos site in the Northern Cape that was rehabilitated in October 2012, corrective actions had not been implemented. On 23 September 2016, the CGS paid a monitoring visit to the site and recommended that the subsiding and open holes be closed because of how close they were to human settlements. Later CGS reports showed that sink holes had made the site so unstable that post-rehabilitation activities could not safely continue at the site.

Location of asbestos site in the Northern Cape indicating proximity to human settlement



5.4.3. Recommendations

- a. The department should develop and implement procedures to standardise monitoring activities and corrective actions, so that they are consistently performed, and include appropriate designs. This will ensure that rehabilitation or closure is sustainable.
- b. The department should compile monitoring programmes that can be used to direct environmental monitoring campaigns and individual site inspections. This would measure and track how effective rehabilitation or closure activities are at reducing

the environmental impact and the potential health exposure of the surrounding communities. Having such programmes will help the department to allocate enough funds to this crucial activity.

- c. The department should collect all the data from the various monitoring programmes and enter it into a database. This can then be used to track the progress and impact of the rehabilitation, note and track any deficiencies, and track recommendations made and corrective actions implemented over time.
- d. The department should assess the scope of the monitoring programme and use the results to identify and allocate roles and responsibilities for implementing the programme. The department should include clear deliverables in its annual performance and operational plans, individual staff performance contracts, and contracts with external suppliers. It should keep a constant eye on the progress of the monitoring programme so that it can promptly identify any challenges and carry out corrective action where needed.
- e. The ROC should track and monitor the results of the monitoring activities to ensure that the department carries out corrective action when needed.

- c. The directors-general of the relevant departments did not approve the GTT terms of reference, which would direct the GTT's mandate and functions. The GTT agenda also did not include D&O mines rehabilitation as a standing point on the agenda, even though the department had committed to add it. The GTT also did not function effectively because it did not meet often and did not keep minutes for all meetings.



Example:

Of the 36 meetings that were supposed to take place between 2015 and 2020, 26 (72%) either did not take place or did not have minutes kept safe and available for audit purposes.

5.5. COMMUNICATION AND COORDINATION

5.5.1. Functioning of the government task team on mine closure and water management

- a. During 2009, the department did not have any communication policies or procedures on rehabilitating abandoned mines, and did not have any formal external communication channels. The government task team on mine closure and water management (GTT) did not deal with rehabilitating abandoned mines. The main¹¹ government departments represented on the GTT are the department, the Department of Water and Sanitation and Department of Forestry, Fisheries and the Environment.
- b. During this audit, we found that the GTT still did not deal with rehabilitating D&O mines. However, one of the GTT's key functions is to facilitate and coordinate dealing with challenges in mine water management and mine environmental management, including sustainable mine closure options.

5.5.2. Functioning of the ROC

- a. The ROC did not function effectively. It did not oversee the implementation of either key deliverables of the national strategy or matters discussed during meetings. This oversight was needed for the D&O mines rehabilitation programme to be swiftly implemented.
- b. The following contributed to the ROC's inadequate functioning:
 - The ROC's terms of reference have not been finalised and approved since it was established in December 2009.
 - The ROC did not meet every quarter, as laid out by the draft terms of reference.
 - Sixteen (67%) of the 24 meetings that were supposed to be held between 2015 and 2020 either did not take place or did not have minutes kept safe and available for audit.
 - Committee members did not always attend meetings, which affected the overall coordination and communication between the different role-players.
 - The ROC's functions as required by the draft terms of reference were not always executed because the committee did not properly track and monitor whether its resolutions were implemented.

11. Subsequent draft terms of reference reflected additional members to form part of the GTT.

**Example:**

The ROC did not ensure that the following key resolutions were implemented because they were not monitored and tracked:

- Finalise an implementation plan – to date, the plan is still a draft and is incomplete.
- Develop a rehabilitation and prioritisation plan/list including all commodities – no such rehabilitation plan and prioritisation list has been created (see paragraph 5.1.2(d) on the lack of a prioritisation and scheduling plan).
- Develop a schedule for monitoring rehabilitated sites – to date, no such schedule has been developed (see paragraph 5.4.1(d) on the lack of monitoring programmes).

5.5.3. Recommendations

a. The GTT and ROC should ensure that:

- they approve the draft terms of reference at the appropriate level
- they hold regular meetings as required by their terms of reference
- they improve the document management systems to ensure that all minutes are kept safe
- they investigate the circumstances that led to the lack of record keeping and set up appropriate control measures to prevent this from happening in future.

b. The GTT's terms of reference should include responsibilities relating to mine closure and the water management aspects of D&O mines, and D&O mines should be included as a standing item on the agenda to ensure communication and coordination between the departments.

c. The ROC should:

- ensure that members attend the meetings to improve overall communication and coordination between the different members
- compile action lists to track, monitor and finalise its resolutions.





06

Audit methodology and approach

6.1. BACKGROUND

This performance audit was conducted at the department in accordance with section 188(4) of the Constitution of the Republic of South Africa, 1996, read in conjunction with sections 5(1)(aA) and 5(3) of the Public Audit Act 25 of 2004.

Auditing government institutions is based on the principle that the accounting officer is responsible for putting in place measures to ensure that resources are procured economically and used efficiently and effectively.

The primary objective of performance auditing is to confirm independently that these measures do exist and are effective. A structured reporting process is used to provide management, Parliament and other legislative bodies with information on shortcomings in management measures and, where applicable, examples of the effects of these shortcomings and suggestions for how to improve them.

The function of the AGSA is not to question policy, but rather to audit the effect of policy and the management measures that ensure effective implementation of policy.

In 2009, we conducted a performance audit (RP 257/2009) of the rehabilitation of the abandoned mines at the department. Our focus areas included strategic and operational planning, management information on D&O mines, project management of rehabilitation projects, coordination and communication, as well as monitoring and reporting on rehabilitated mines.

6.2. AUDIT OBJECTIVE AND SCOPE

This audit is a follow-up of the 2009 performance audit on the rehabilitation of abandoned mines. It aimed to evaluate the department's progress since 2009, focusing on whether the findings or situations we had identified in the 2009 audit still existed. Because of the time that had passed since the previous audit, changes in management, and the reconfiguration and merger of the Department of Mineral Resources and the Department of Energy into a new department, the focus on recommendations and corrective actions was not always related. As such, we used the findings from the previous audit to facilitate a consistent approach and reporting.

The audit objective was to evaluate the department's measures to ensure that the available resources were being used economically. We also evaluated how efficiently and effectively the department managed the rehabilitation of D&O mines in South Africa.

The overall audit question of the performance audit was *Is the process for identifying and rehabilitating derelict and ownerless mines to minimise their social and environmental impact timely and cost-effective?*

The following sub-questions addressed the overall audit question:

- Does the department provide strategic guidance and operational plans for the rehabilitation to ensure that the policy is translated into effective service delivery outcomes, which are linked to set budget, time frames and responsibilities to ensure effective rehabilitation of the D&O mines?
- Does management have access to the necessary information to manage / monitor & evaluate the rehabilitation processes, determine future liabilities and keep role players responsible and accountable?
- Does the department ensure that it is effectively organised and have capacitated role players to effect efficient, effective and economic project execution in the rehabilitation of D&O mines?
- Does the department effectively monitor, evaluate and report the progress made regarding the rehabilitation of abandoned mines to ensure timely, cost-effective and quality rehabilitation?
- Are relations and communication channels between the different role players in the rehabilitation process formalised to ensure effective rehabilitation of D&O mines?

The audit also touched on the citizens' lived experience of D&O mines. During the audit we visited six rehabilitated asbestos mines and five closed mine holdings. Detailed testing focused on the period from April 2016 to October 2020, unless otherwise indicated.

6.3. AUDIT METHODOLOGY

All performance audits are conducted according to ISSAI 3000, *Standard for performance auditing*, and the *AGSA Performance audit manual 2019*, which contains the standards and methodology for planning, executing, reporting and following up performance audits in the public sector. Because the environment to be audited is so complex, each performance audit focuses on only a specific section of the activities of a particular institution, with the focus being on the more important areas.

We gave the department's management detailed information about the objectives of the audit and the audit questions that would be addressed during the audit. In addition to regular interactions, we also established a steering committee consisting of the audit team and senior departmental staff. The main purpose of the steering committee was to ensure that the findings were factually correct. During the steering committee meetings, members deliberated on issues and the department's representatives were given the opportunity to submit their input to the final management report. This approach should lead to corrective steps being promptly implemented where weaknesses have been noticed.

However, the steering committee is not intended to, and does not, give the institution a veto on the nature and

scope of the performance audit or the resulting report. A steering committee is a forum in which to consult and reach agreement, but the AGSA retains the relevant legal powers. Consensus about the factual correctness of the findings contained in the report was reached during a meeting held with the department's management on 25 November 2021.

As required by the *Performance audit manual 2019*, we obtained enough audit evidence to support the findings and examples in this report. We included these examples to show what happens when management measures are deficient, and they do not fully reflect the extent of audit work conducted at the entities.

The methods we applied when conducting the audit and obtaining evidence included:

- interviews with management and relevant staff
- observations
- analysis, inspection and review of information and data
- comparisons of information.

When there was no data or information available for the audit team to evaluate, we used the best information available to illustrate the problem and not as evidence to support the findings. This data or information was therefore not used in the audit conclusions.

The chapters of this report also include more detail on the limitations of the data, namely:

- project design and technical and engineering project information
- minutes of oversight and coordinating committees.

6.4. AUDIT CRITERIA

For the 2009 performance audit, we developed audit criteria and discussed these criteria with the department before we started the audit. Because this audit is a follow-up of the 2009 audit, we did not develop any new audit criteria. To execute this audit, we followed up on the findings of the 2009 report to find out if corrective actions were put in place and, if so, if they are functioning effectively to address the shortcomings identified in the previous audit.





07

Summary of key findings and recommendations



The summary below shows the key findings and the progress the department has made since 2009, as well as new findings we identified during this audit.

7.1. STRATEGIC AND OPERATIONAL PLANNING



Audit question

Does the department provide strategic guidance and operational plans for the rehabilitation to ensure that the policy is translated into effective service delivery outcomes, which are linked to set budget, time frames and responsibilities to ensure effective rehabilitation of the D&O mines?

Our 2009 audit found that the department's rehabilitation efforts had not effectively addressed the environmental and social impact of unrehabilitated, abandoned mines, as only five of the 5 906 abandoned mines had been rehabilitated in three years. The department did not have an approved national strategy or policies and procedures to clearly link rehabilitation objectives to set time frames, priorities and responsibilities.

During this audit, we found that the department's rehabilitation efforts for asbestos mines were ineffective and did not address the environmental, social and health impact of unrehabilitated D&O mines within a set time frame. Between 2009 and 2021, only 27 of the remaining 256 asbestos mines were rehabilitated. Considering the current allocated funding and planned targets, as well as the progress made in the past, the department is not likely to achieve its objective of having all 261 asbestos mines rehabilitated by 2033 unless it reprioritises. None of the 2 322 other high-risk commodity D&O mines have been rehabilitated to date.

Since 2009, the department has finalised a national strategy and compiled an implementation plan, but the implementation plan has not been finalised and does not include all the key deliverables in the national strategy. As a result, certain key initiatives have been delayed or not implemented. The department still has not developed policies and procedures for all key deliverables identified in the national strategy.

7.2. D&O MINES DATABASE MANAGEMENT



Audit question

Does management have access to the necessary information to manage / monitor & evaluate the rehabilitation processes, determine future liabilities and keep role players responsible and accountable?

Our 2009 audit found that there was no integrated information system to record and report on the status of the D&O mines. The department had also not implemented any policies and procedures to ensure that it had access to information to identify abandoned mines. Because of the department's inadequate capacity, systems and funds, the D&O mines database had not been regularly updated. As a result, the department could not confirm whether the database contained accurate, relevant and valid information.

In this audit, we found that the D&O mines database contained errors because its data was outdated, inaccurate and incomplete. There were no procedures to maintain and manage the D&O mines database, and this responsibility has not been allocated since 1 April 2020. The database was also not regularly monitored and reviewed once per quarter to ensure the information was reliable enough to support planning and decision-making.

We also found that the planned handover of the D&O mines database to the department had been delayed by more than two years. As such, the department did not integrate the D&O mines database with other departmental information systems to ensure that the D&O mines database was efficiently maintained.

The department has not established government's legal liability for 2 238 identified D&O mines with mineral rights and private property ownership because it has not determined whether these mines fall within the boundaries of licensed mining areas. There is also no process and procedure in place making this determination.

7.3. PROJECT IMPLEMENTATION



Audit question

Does the department ensure that it is effectively organised and have capacitated role players to effect efficient, effective and economic project execution in the rehabilitation of D&O mines?

In 2009, the department's organisational structure did not support its objectives for the rehabilitation of abandoned mines, and the lack of capacity had delayed project implementation.

During the current audit, we found that capacity did not impede the department's ability to implement the D&O mines programme. However, the department was not well organised. We could not determine how effective the actual rehabilitation and closure work performed was, because the technical information for some projects had not been safeguarded and could not be provided to us. There were no processes and procedures in place to facilitate an economical and efficient rehabilitation. The department also did not promptly address community challenges that contributed to projects being uneconomically and inefficiently executed.

7.4. MONITORING AND MAINTAINING REHABILITATION PROJECTS



Audit question

Does the department effectively monitor, evaluate and report the progress made regarding the rehabilitation of abandoned mines to ensure timely, cost-effective and quality rehabilitation?

In 2009, the department did not have the capacity to take an active part in decision-making, monitoring and site inspections for rehabilitation projects. The department had also not allocated funds for post-rehabilitation monitoring activities.

In this audit, with specific reference to decision-making, monitoring and site inspections for rehabilitation projects, the department improved its monitoring, evaluation and reporting on the progress made in rehabilitating D&O mines.

However, the department did not always carry out the monitoring, evaluation and reporting activities effectively. These activities, which were limited to some of the asbestos mines, were done haphazardly. The department also did not implement the recommendations included in monitoring reports to address deficiencies. Although there was a specific budget allocated for monitoring activities, it was not based on monitoring programmes and procedures to ensure that rehabilitation was sustainable. Therefore, we could not evaluate whether the current allocated budget was sufficient.

7.5. COMMUNICATION AND COORDINATION



Audit question

Are relations and communication channels between the different role players in the rehabilitation process formalised to ensure effective rehabilitation of D&O mines?

Our 2009 audit found that there were no communication policies or procedures for rehabilitating abandoned mines, and there were also no formal external communication channels. Internal and external communication channels had not been defined and structured in a way that ensured proper communication during rehabilitation projects. The government task team on mine closure and water management (GTT), which was established to strengthen all communication channels between government departments related to mining in South Africa, had not included the rehabilitation of abandoned mines as an agenda point for most of its meetings. The steering committee to address the issue of abandoned mines had not been established.

In this audit, we noted that the GTT did not deal with the D&O mines rehabilitation programme despite one of its key functions being to facilitate and coordinate challenges in mine water management and mine environmental management, including sustainable mine closure options.

The rehabilitation oversight committee (ROC), which was established in 2009 to implement a well-coordinated, safe and sustainable D&O rehabilitation programme in South Africa, also did not function effectively. The ROC did not meet regularly and did not track and monitor its resolutions and recommendations to ensure that they were implemented.

7.6. SUMMARY OF KEY RECOMMENDATIONS

The department should consider the strategic importance of the D&O mines programme within the department's strategic objectives and current mandate. Priority and funding for the D&O mines programme should be key considerations during this process.

The department should finalise and adopt the NMCS. Once this has been done, the department should compile a comprehensive national mine closure policy and an implementation plan that includes opportunities for different end-land use to reduce the government's liability to close these mines where possible.

The department should determine government's actual liability in managing the D&O mines programme. This should include the cost to rehabilitate or close the identified D&O mines or holdings, to manage and maintain the database, and to perform the required monitoring activities. The mines on the D&O mines database must be validated for the department to be able to determine the cost for rehabilitation and closure.

The department should compile and cost a comprehensive D&O mines implementation plan based on the determined liability of the D&O mines programme. This plan should be used to support the request for appropriate annual funding from the National Treasury.

Oversight and intergovernmental coordination committees should be strengthened to improve coordination between different role-players and to track and monitor the swift implementation of the D&O mines programme.



Acronyms and abbreviations

AMD	Acid mine drainage
CGS	Council for Geoscience
D&O mines	Derelict and ownerless mines
GTT	Government task team on mine closure and water management
MTEF	Medium Term Expenditure Framework
NMCS	National mine closure strategy
ROC	Rehabilitation oversight committee
Smart (goals)	Specific, measurable, achievable, realistic and timely



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