



# The state of mine closure in South Africa – what the numbers say

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## Synopsis

The consequences of ineffective mine closure in South Africa are evident from the number of abandoned mines and operations on extended care-and-maintenance, the on-selling of mines to less well-resourced companies to close, and increasing illegal mining activities. However, the data to substantiate these observations and provide insight into the underlying issues has not been available. Through the Promotion of Access to Information Act, a list of mine closure certificates applied for between 2011 and 2016 and a list of certificates granted over the same period for all nine regions of South Africa was obtained. From the analysis of this data, we show that the mine closure system as implemented in South Africa is largely ineffective. Although closure certificates are being granted, these are for prospecting sites and small-scale mines, which have a relatively small environmental impact. No large mines of any environmental significance were relinquished over the period under review, with very few applying for closure certificates. Furthermore, the issuing of closure certificates varies significantly between regional offices, with the success rate for applications being generally low and issuing of certificates taking an extended period.

## Keywords

mine closure, certification, legal process.

## Introduction

There are a number of concerns with the mine closure process as practiced in South Africa, and these have largely been laid at the door of government. Alberts *et al.* (2017) stress that the legislation generally conforms to international best practice. However, the system is 'complex and unwieldy', involving various pieces of legislation and different government departments with overlapping requirements and different interpretations of the law. A further area of concern is the capacity and competence of government to implement legislation. The '*shortage of relevant mine closure skills and knowledge within the regulator*' was identified by van Druten and Bekker (2017) as a key contributor to unsuccessful closure. Lack of capacity and resources within the regulator has also been highlighted by Botham, Kelso, and Annegarn (2011) and Milaras, McKay, and Ahmed (2014). A recent study of the mineral application process by Corruption Watch (2017) indicates that positions in the regulator have been frozen for many years, leading to a shortage of staff, and that unqualified individuals have been appointed. There is also the perceived reluctance of government to grant closure in order to limit transfer of the liability to the state and delay the inevitable job losses.

Notwithstanding this, there is also the inability and seeming lack of motivation from the side of mining companies to successfully rehabilitate and close mines. Closure often involves the management of difficult environmental issues, such as acid mine drainage (AMD), which are difficult to quantify and predict (van Druten and Bekker, 2017) and costly to manage. Closure costs are often underestimated by mining companies (Botham, Kelso, and Annegarn 2011). With the assumption that closure certificates are not being granted and the lack of concrete relinquishment criteria, some mines are not applying for closure. Milaras, McKay, and Ahmed (2014, p.10) quote a professional working in mine closure in South Africa:

*'The requirement to reduce mitigated risk to zero is unattainable, and since it cannot be achieved, no mines are getting closure permits. This means that the best possible practices are being rejected, and since undertaking best practice brings no reward, mines are not bothering to do their best.'*

Contributing to this perspective is the requirement for perpetual liability included in recent amendments to closure legislation, in terms of which a mining company will continue to remain liable

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for environmental pollution regardless of having been issued with a closure certificate. Industry argues that there is thus no incentive to obtain closure certificates (Alberts *et al.*, 2017). An alternative to closing a mine when it is no longer profitable is on-selling, the transfer of mining rights to a lower cost producer. This is a common practice in South Africa (Humby, 2014) and from a resource efficiency perspective, makes sense. Legislation allows for such a transfer provided that consent is obtained from the Minister of Mineral Resources and that the new holder is capable of carrying out and complying with the obligations and the terms and conditions of the right in question. This is often a preferred option for government as it limits the number of job losses. However, it has implications for the eventual rehabilitation and closure of these mines, which is left to less well-resourced companies mining now-marginal deposits. The current case of Blyvooruitzicht near Carletonville (Humby, 2014) is an example of the consequences of this. As stated by Humby (2014, p. 8):

*This “pass-the-parcel” approach to the custodianship of the closure plan, where the “gift” ends up in the hands of the weakest, seriously undermines the value and integrity of the forward planning approach to mine closure. Where the last link in the chain of mining companies operating a site then fails to apply for a closure certificate, it also undermines the rule of law.*

Although we understand what some of the problems may be, there is no country-wide, data-based perspective of the current state of mine closure in South Africa. A key indicator of the success of the mine closure process is the number of closure certificates issued (the number of mines relinquished). The granting of a closure certificate implies that a mining company has adequately rehabilitated the mine site in line with a closure plan and to the satisfaction of the regulator. A closure certificate allows a mining company to reclaim its financial provision and move on to other projects, and the land to be used for other productive purposes. This is the outcome of the mine closure process. During 2016, data on closure certificates issued across all nine regions of South Africa between 2011 and 2016 was obtained. This data, reviewed here, provides an insight into the state of mine closure in South Africa. Prior to discussing the data, an overview is presented of mining in South Africa and the legal process to obtain closure.

### Mining in South Africa

South Africa has a mature mining industry that dates back to

the 1860s with the discovery of significant diamond and gold deposits. Since then, a great number of other commodities have been exploited, including iron ore, chromium, manganese, coal, and platinum, the latter two, along with gold, making the largest contribution to the economy (Minerals Council South Africa, 2018). The major mineral deposits, high-value commodities, and operating mines in South Africa are clustered in six of its nine provinces: the Northern Cape, North West, Limpopo, Mpumalanga, Free State, and Gauteng (Table I). Even though the percentage contribution of mining in Gauteng to the provincial GDP is relatively low (2.3%) it is a substantial amount (R22.34 billion) and should be viewed against other economic activities in Gauteng, the industrial heartland of South Africa, and the historical importance of gold mining in this province. The bulk of South Africa’s mineral production is from large-scale mining. However, there are also a number of small-scale operators mining a range of commodities, predominantly construction materials and, in the Northern Cape and North West provinces, diamonds (Ledwaba and Mutemeri, 2017). Data on small-scale mining is limited.

Modern mining transformed the South African economy, and by 1980 it contributed 21% of South Africa’s GDP, second to manufacturing. Although mining still makes a significant contribution, adding R334 billion to the economy in 2017, its role has decreased, contributing 6.8% of the GDP (Minerals Council South Africa, 2018). This reduction is attributed, in part, to the closure of mines. Statistics presented by the Department of Water and Sanitation (July 2017) indicate that there are almost double the number of closed coal, gold and base metal mines in South Africa ( $n = 2787$ ) than operational mines ( $n = 1654$ <sup>1</sup>), yet very few of these, if any, have received closure certificates.

The environmental and social impacts of mining depend largely on the commodity mined, its location, and the type of mining practiced. Acid mine drainage (AMD) is a major concern in the gold and coal mining sectors in South Africa. The Mpumalanga Highveld, as well as being the focus of large-scale coal mining, is also home to South Africa’s most productive agricultural land and a key water catchment (Hermanus *et al.*, 2015). Platinum mining in Limpopo and the North West coincides with rural communal land and has seen intensive intra-community struggles (Mnwana, 2015; Hermanus *et al.*, 2015).

<sup>1</sup>This figure differs slightly from that mentioned in Table I. This may be due to the use of data from different years and reinforces the later finding on access to and quality of data.

Table I

Mining in South Africa, per province (source: Minerals Council South Africa, 2018; DMR D1 2016a database)

Province	Main commodities	Mining contribution to provincial GDP 2016 (%)	Mining GDP 2010 (R billion – nominal terms 2016)	Number of operating large-scale mines in 2016 (Total = 1741)
Northern Cape	Diamonds, iron ore, manganese	31.1	52.34	302
North West	PGMs, gold, diamonds	28.4	17.27	341
Limpopo	Coal, PGMs, iron ore	27.9	55.51	142
Mpumalanga	Coal and PGMs	24.8	49.93	219
Free State	Gold, diamonds	12.6	18.06	77
Gauteng	Gold	2.3	22.34	167
KwaZulu-Natal	Coal, construction materials	1.9	8.30	133
Eastern Cape	Construction materials	0.3	0.60	171
Western Cape	Construction materials, marine diamonds	0.2	0.95	189

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### Mining authorization and closure

Closure planning has been a requirement in South Africa since the Minerals Act of 1991, which stipulated that an environmental management programme (EMP) be submitted, rehabilitation be undertaken, financial provision made, and an application submitted for a closure certificate (Swart, 2003). Following this, and since the first democratic elections in 1994, there has been significant legal reform, including to mining and environmental legislation. This is continuing, as detailed by Alberts *et al.* (2017). The following is a summary of the current requirements to obtain a license and then close a mine, as is relevant to this paper.

The granting of mining authorizations, regulation of operations, and issuing of closure certificates is governed by the Department of Mineral Resources (DMR), predominantly through the Mineral and Petroleum Resources Development Act (MPRDA) and the National Environmental Management Act (NEMA), although other departments (most notably Environmental Affairs and Water and Sanitation) and various pieces of legislation are also relevant. While the regulation of mining is a national competence, it is operationalized by nine regional offices, largely aligning to the provinces.

In order to prospect and exploit a mineral resource, the MPRDA requires an application for a prospecting right, a mining right or a mining permit, as outlined in Table II. An application for a right or permit must be accompanied by an application for an environmental authorization, which includes the submission of an environmental assessment, environmental management plan, and closure plan, as well as sufficient financial provision for rehabilitation and closure. Over the life of the operation, the mine is expected to annually assess and update the financial provision and submit an audit report on its adequacy. An annual rehabilitation plan should also be completed.

In line with global best practice, the closure process is seen as extending throughout the life of an operation, with upfront planning for closure required. The MPRDA closure principles require ongoing assessment and management of environmental impacts, compliance with safety and health requirements, that residual and latent environmental impacts are identified and quantified, land be rehabilitated, as far as is practicable, to its natural state or to a predetermined and agreed standard or land use which conforms with the concept of sustainable development, and that this be done efficiently and cost-effectively.

The final application procedure for a closure certificate is complex, involves a number of different statutes and guidance documents (Alberts *et al.*, 2017) and is currently being amended.

Having previously been regulated almost entirely through the MPRDA by the DMR, as of 20 November 2015 it is also managed in line with NEMA and its regulations, but still principally by the DMR. Currently a closure certificate is required from the DMR, and the process to obtain this involves meeting requirements from both pieces of legislation. In terms of the MPRDA an application should be made to the Regional Manager and must be accompanied by a final rehabilitation, decommissioning, and mine closure plan, an environmental risk report, and a performance assessment of the closure plan. This should be done within 180 days of the end of mining or prospecting activities. In line with NEMA and its regulations, an environmental authorization, involving a basic assessment, should be obtained. This, together with an environmental audit of the closure plan and EMP, should be submitted. There is clearly overlap between these requirements, and the assumption is that a single process, meeting the requirements of both pieces of legislation (and the NEMA financial provision regulations) will be undertaken.

A closure certificate will be issued only if the Chief Inspector of Mines (responsible for health and safety) and other relevant government departments (particularly Water and Sanitation and Environmental Affairs) have confirmed in writing that the provisions pertaining to health and safety and management regarding pollution of water resources, the pumping and treatment of extraneous water, and compliance with the conditions of the environmental authorization have been addressed. These authorities have 60 days in which to respond.

A closure certificate allows companies to relinquish the mine. Historically, under the Minerals Act of 1991, an unconditional closure certificate was issued in terms of section 12, provided all the conditions stipulated in the Act had been complied with and the objectives of the closure plan met (Dixon, 2003). In terms of the MPRDA, the holder remains responsible for any environmental liability until a closure certificate has been obtained. However, recent requirements of NEMA introduce the concept of perpetual liability (Alberts *et al.*, 2017), where responsibility is allocated to the mining company notwithstanding the issuing of a closure certificate by the Minister responsible for mineral resources. This highlights the strengthening of legislation to hold mining accountable for pollution impacts and the minimization of state liability; understandable given their experience of dealing with post-closure acid mine drainage decant from the Witwatersrand basins and combusting coal mines in Mpumalanga. The Minister is entitled to retain a portion of the financial provision for latent and residual impacts.

In South Africa there are a number of mines on care and maintenance due to their inability to secure a government-issued

Table II

#### Types of mineral authorizations granted in terms of the MPRDA

**Prospecting right**, in terms of Section 17 of MPRDA

- No limit to physical extent of the right
- Valid for a period up to 5 years. It may be renewed once for a period not exceeding 3 years

**Mining right**, in terms of Section 23 of MPRDA

- No limit to the physical extent of the right
- Valid for up to 30 years and may be renewed for further periods each of which may not exceed 30 years
- This right is issued for large-scale mining

**Mining permit**, in terms of Section 27 of MPRDA

- Granted for an area not exceeding 5 hectares
- Valid for a period of two years and may be renewed three times for a period of up to a year each (*i.e.* an additional 3 years)
- Typically granted for small-scale mines

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closure certificate (Milaras, McKay, and Ahmed, 2014). Care and maintenance has traditionally been seen as an alternative to closing mines and has occasionally resulted in abandonment. An attempt to regulate care and maintenance was made in the 2015 Financial Provision Regulations under NEMA, which required mining companies to make an application for mines to be put on care and maintenance, which could be valid for a period not exceeding five years, after which it should be reviewed. However, this requirement has subsequently been removed from the 2017 draft regulations, leaving care and maintenance unregulated.

### Data and methodology

Data on mine closure is not in the public domain. In August 2015, one of the authors applied for and obtained access to this information in terms of the Promotion of Access to Information Act of 2000 (PAIA). Access was requested to a list of all closure applications made between 1 July 2012 and 1 July 2015 and a list of all closure certificates granted in the same period, across the country.

A second source of data used in this paper comes from a Parliamentary question submitted by the Democratic Alliances' shadow minister for minerals, James Lorimer, and answered on 22 April 2016. The shadow minister asked (a) *How many mine closure certificates were issued in the (i) 2011-12, (ii) 2012-13, (iii) 2013-14, (iv) 2014-15 and (v) 2015-16 financial years, and (b) what was the (i) name and (ii) location of each mine that was issued with a closure certificate, and (c) on what date was each specified certificate issued?*

The two data-sets were combined and entered into spreadsheets. The data was reviewed and any duplications removed. Judging from discrepancies between the two data sources, both data-sets are incomplete, although by small margins. Together this represents the most complete set to date of closure certificates granted in South Africa, for the period 2011 to 2016.

The certificates granted were grouped by region and type of authorization, and where relevant, compared with the DMR D1 spreadsheets of operating mines (for 2005 to 2014) to identify the commodity mined. Not all authorizations were identifiable as prospecting rights, mining rights, or mining permits. These are grouped as 'unlisted sites'. As the type of right or permit cannot be identified, unlisted sites are excluded from the analysis and

conclusions drawn about prospecting rights, mining permits, and mining rights. Some of the original unlisted sites have been followed up with the license holders, who were able to confirm what type of authorization they were. These were reallocated accordingly.

### Results

#### Access to and quality of data

The first finding relates to the availability and quality of data on mine closure. Data is held by the DMR and requires a legal process to access, granted through PAIA. The process is relatively straightforward, requiring the completion of a form with a description of the documentation required. However, in this case there was a delay in acquiring the data. Approval was granted by the national office of the DMR, yet it took approximately 21 months to obtain all the information from the provincial departments. Even after approval, not all the requested information was received (see Table III for summary of what was received and openAFRICA (2018) for the data). The Western Cape did not provide any data, and in some cases data exceeding the timeframe requested was provided. Information on closure applications made was provided for only four regions and by the Springbok office of the Northern Cape, which provided data on all applications made since 2004. The North West Province data included applications made since 2008.

The format and level of detail of data provided differ between regions. While all regions provided at least the company name and permit/right reference number, other regions' lists were more detailed and included property names and dates. One region provided copies of the closure certificates. Data from the Western Cape was obtained through the parliamentary question. From this data it appears that instead of converting old order rights to new order rights, as required by the legislation, the Western Cape regional office issued these with closure certificates, influencing the data.

From the exercise of accessing the data, it would appear that not even government has a national overview of mine closure in South Africa. The lack of readily available and complete data limits monitoring of closure and informed decision-making, contributing to perceptions which are not always helpful.

#### Closure certificates are being granted

As illustrated in Table IV, closure certificates are being granted

Table III

#### Information received from PAIA request

Region	Data obtained?	
	List of closure applications	List of closure certificates granted
Northern Cape (Springbok and Kimberley offices)	No (Kimberley) Yes (2004-2015, Springbok)	Yes (2012–2015)
North West	Yes (2008–2015)	Yes (2012–2015)
Limpopo	Yes (2012–2015)	Yes (2012–2015)
Mpumalanga	No	Yes (2012-2017)
Free State	No	Yes (2012–2015)
Gauteng	Yes (2012–2015)	Yes (2012–2015)
KwaZulu-Natal	Yes (2012–2015)	Yes (2012–2015)
Eastern Cape	No	Yes (2012–2015, incomplete)
Western Cape	No	No

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Table IV

### Closure certificates issued for prospecting rights, mining permits, mining rights, and unlisted sites, per region (2011–2016)

Region	Large-scale mines		Small-scale mines – mining permits	Prospecting rights	Unlisted sites	Total per region	% per region
	Mining rights (excl. road works)	Mining rights for road works					
Northern Cape	3	0	87	42	11	143	18%
North West	3	6	59	39	24	131	16%
Limpopo	0	0	65	77	3	145	18%
Mpumalanga	0	0	6	4	0	10	1%
Free State	1	45	63	99	13	221	28%
Gauteng	0	0	10	5	0	15	2%
KwaZulu-Natal	0	0	33	21	5	59	7%
Eastern Cape	0	0	29	0	12	41	5%
Western Cape	20	6	11	1	0	38	5%
Total per type	27	57	363	288	68	803	100%
% per type	3%	7%	45%	36%	9%	100%	-

across all regions and for all types of permits and rights. As would be expected given the validity period of mining permits and prospecting rights, the bulk of certificates have been granted for these (363 and 288 respectively). For a number ( $n = 68$ ) there is no indication of the type of right or permit (unlisted). A total of 84 (27 + 57) mining rights were relinquished during the period under review.

The granting of closure certificates varies among regions. Comparing different regions provides an interesting perspective, particularly for Mpumalanga and Gauteng. Both regions host significant large-scale mining activities (refer to Table I) yet have granted only 10 and 15 closure certificates, respectively, over the five-year period. Very few certificates have been granted for mining permits and prospecting rights and none to large-scale mines. The commodities mined in these regions (largely gold and coal) are linked to significant environmental pollution in the form of AMD, and many coal mines in Mpumalanga are opencast, making them more difficult and expensive to rehabilitate. These are also some of the oldest mining areas in South Africa. The situation is similar for large-scale mines in Limpopo, where no closure certificates have been granted in the study period. Based on this data, it would appear that large-scale operations mining commodities that have a significant environmental impact are not being relinquished.

#### Closure of large-scale mines

The majority of the mining rights relinquished ( $n = 57$ ) are for the closure of works associated with road construction and maintenance (e.g. borrow pits), which are issued to the South African National Road Agency Ltd (SANRAL) or provincial authorities responsible for public road construction and maintenance. These organs of state are exempt from having to apply for prospecting or mining rights or mining permits for activities to remove any mineral for the construction and maintenance of dams, harbours, roads, and railway lines. However, they do follow a process to ensure the information is captured on the South African Mineral Resources Administration System (SAMRAD) and are issued with the appropriate permit, for which they must eventually apply for closure in terms of

Section 43 of the MPRDA – the 57 certificates issued during this time period.

The remaining 27 closure certificates for mining rights (3% of all certificates issued) went to large-scale mines that are not related to road works. Of these, 20 were granted in the Western Cape, a region with minimal significant mining activities (according to the DMR's D1 2016 list of operational mines, the Western Cape has no operational coal, gold, or platinum mines). Analysis of the certificates issued in the Western Cape revealed that 11 were for old order rights (it appears that closure certificates were issued when converting old order to new mining rights following the implementation of the MPRDA). The remaining nine are for operations mining construction materials, largely sand.

The other three regions that issued closure certificates for mining rights, and where mining is an important contributor to the economy, were the Free State, Northern Cape, and North West, as elaborated below.

#### Region – Free State

1. On 26 June 2013 a closure certificate was granted to Invest In Property (Pty) Ltd for mining right 180MR at the remaining extent of Kalkfontein A 13, district Boshof. This mine does not appear on the DMR list of operating mines (D1) from 2005 to 2013, and no other reference to it could be found. It is thus unclear what the commodity is. Other commodities mined in this area are diamonds and salt.

#### Region – North West

2. On 15 October 2013, a closure certificate was issued to Etruscan Diamonds (Pty) Ltd for mining right 38MR located at remaining extent of the farm Klipgat 18 IQ, Ventersdorp. This was a diamond mine (according to DMR D1 2006 database).
3. On 18 January 2013, a closure certificate was issued to Wynand Johannes Visser for mining right 212MR (in conjunction with 6/2/2/2674) located on certain portion of the farm Christiana Town and Town Lands 326 HO, Christiana. This was a diamond mine (according to DMR D1 2006 database)

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- On 3 September 2014, a closure certificate was issued to Carel-Lo-Andries Botha for mining right 443MR located at remaining extent of the farm Webb 159 HO, Wolmaransstad. It is unclear what commodity was mined as this does not appear on the DMR operating mines database (D1) from 2005 to 2013. This is an alluvial diamond mining area.

### Region – Northern Cape

- Lafarge Gypsum Holdings (Pty) Ltd applied for a closure certificate of mining right number 508 in the Springbok region on 12 March 2015 and was granted the certificate on 15 June 2016. This is gypsum mine (DMR D1 database).
- De Beers Consolidated Mines applied for a closure certificate for mining right 514 in the Springbok region on 23 August 2013 and was granted the certificate on 9 June 2015. This was a diamond mine.
- JK Plant Hire cc was issued a closure certificate on 17 April 2013 for its mining right (NC 30/5/1/2/2/211 MR) on Portion 2 of the farm Morgenzon no. 35 and portion 12 of the farm Slypklip in the Kimberley region. No reference to the mining right could be found in the D1 database; however, JK Plant Hire holds another mining right, for diamonds (on the farm Mazelsfontein in the Northern Cape). Based on this, and the location of the right, it is assumed that the commodity mined was diamonds.

At least three, possibly six, of these closure certificates are for the closure of alluvial diamond mines. When taken together with the closure certificates granted for sand mining in the Western Cape, one can again conclude that, for large-scale mines, only those with a relatively low environmental impact are being relinquished.

### Closure of small-scale mines and prospecting permits

Almost half the closure certificates granted over the five-year period have been to the holders of mining permits ( $n = 363$ ) for small-scale mining operations. Unfortunately, there is very little reliable data on the number of operating small-scale mines. Unverified data presented by the DMR puts the number of permits at 3574 (Department of Mineral Resources, 2016b). If this is the case, and given the period for which permits are valid (two years, renewable for up to five years), the number of closure certificates granted seems very low.

There is no consolidated database on the number of prospecting permits issued by the DMR. Prospecting permits can either be converted to a mining right or closed. Although

prospecting permits have been issued with closure certificates ( $n = 288$ ), the number also appears very low.

### Closure applications in five regions

The data on applications for closure certificates is limited, with only five regions supplying this information. As indicated, in some cases the data obtained extended beyond the period (*e.g.* North West and the Springbok office of the Northern Cape), with some provinces listing all closure certificates granted in the period (*i.e.* for applications made prior to 2012) and others including only certificates granted for applications made since 2012. Table V summarizes this data, but due to information limited to the period 2012 to 2015, and indicates the success rate for applications made *during the period under review that were granted during this period*. However, we know from Table IV that more closure certificates were issued than are indicated here. These were for applications made prior to 2012.

With the exception of the Springbok office of the Northern Cape, very few applications made *during the period under review were granted during this period*, indicating that processing closure applications takes time and that even though some closure certificates are being granted, many are not. The relatively high application success rate in the Northern Cape may be due to the nature of mining in this region, where alluvial diamond mining predominates.

It is unclear what the status is of the mines and permits where closure certificates have been applied for but have not been granted. As described by Milaras, McKay, and Ahmed (2014), these may be under care and maintenance. As regards the applications for closure of mining rights (including for road works), very few applications were made *during the period under review*, with only four being granted *during this period*. Again, additional data for all regions over a longer time period is needed to better understand the practice here.

### Conclusion

The data confirms that mine closure in South Africa is problematic, with many questions remaining unanswered.

It is clear that closure certificates are not being issued as envisaged by the legislation, particularly for large-scale mines. For a closure certificate to be granted, a mine must be rehabilitated to an agreed standard by the rights holder and an application for closure made. There is currently insufficient data to determine the extent to which this is happening and how much of the problem sits with mining companies. The lack of

Table V

### Applications for closure certificates made and certificates granted between 2012 and 2015, for regions where complete information was provided

Region	For all types of rights and permits (2012–2015)			For mining right only (incl. for road works)	
	Applications for closure	Closure granted for applications made	Success rate	Applications for closure	Closure granted for applications made
Northern Cape (Springbok office only)	97	53	56%	2	2
North West	334	81	24%	9	2
Limpopo	227	59	26%	0	0
Gauteng	33	16	48%	3	0
KwaZulu Natal	52	15	29%	0	0

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applications for closure and the low application success rate may be an indication of the difficulty in successfully rehabilitating large mines, confirmation of the extended time needed to do this, and the perception that, with underfunded financial provision, it is easier and cheaper to put a mine on indefinite care and maintenance or sell it to avoid closure.

As regards government's role, the lack of transparency, incomplete data, regional inconsistencies, and low number of certificates issued for all types of rights points to problems within the DMR. This supports previous findings by Botham, Kelso, and Annegarn, (2011), Milaras, McKay, and Ahmed (2014), van Druten and Bekker (2017), and Corruption Watch (2017) regarding the capacity and competence of the regulator, resulting in the inability, and perhaps unwillingness, of officials to make the judgement call that rehabilitation is sufficient.

A recommended first step in addressing these concerns is to better understand the current closure certification process through access to additional data. Reliable, complete, detailed, and comparable data from all regions over a longer time period should be analysed to increase the validity of findings and focus responses and further research. Government's acceptance of the PAIA applications to obtain the data reviewed in this paper has set a precedent for further data requests. It would also be in the regulator's interest to establish a national-level database with this information, to assist with monitoring the implementation and effectiveness of the new closure regulations.

The ongoing review of the financial provision regulations offers an opportunity to engage with currently willing regulators to compel further transparency that could advance this line of study. Additionally, an integral part of this amendment process should be to better align the regulations towards providing a business incentive for responsible closure and the use of best practices. Finally, collaboration with government at this stage could act as a springboard toward increased national dialogue on these ever-salient issues surrounding mine closure and post-mining land use.

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