

INVESTIGATING WATER DISCLOSURE PRACTISES IN THE PLATINUM MINING INDUSTRY

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ABSTRACT

Increased population growth and urbanisation have led to significant stress on natural resources, in particular water resources. Various mining-related operations, especially in the platinum industry, are located in underdeveloped and remote areas, leading to unsustainable water management practices. The objective of this article is to investigate the disclosure of water practices within the platinum mining industry.

A disclosure index was developed based on researched literature, mainly about standards set out in the Global Reporting Initiative (GRI) framework. The research methodology involved implementing content analysis, applied to the water disclosures in integrated and sustainability reports of platinum mining companies.

The developed disclosure index results focused on three pillars: compliance to the GRI guidelines, different frameworks used, and risks factors. The total level of compliance towards the GRI guidelines for the different platinum mining companies indicated that only 42% complied, 16% partial compliance, and 32% displayed no

compliance. The compliance between the various companies indicated a substantial difference between full compliance and low levels of compliance. Two risk factors, physical and regulatory risks, were identified as the main items to be reported on.

It is recommended that a standardised framework be developed and implemented by platinum mining companies to improve comparability and transparency within the industry.

Keywords The platinum mining industry, sustainability reporting frameworks, reporting and disclosure of water, risk factors.

1. INTRODUCTION

Water is one of the essential natural resources that humans depend on. In addition, water is profoundly imperative for sustainable development within the business framework. More than twenty years ago, Xu et al. (2002) already stated that sustainable water management is a significant challenge for decision-makers. What enhances the complexity between human and natural water systems is the increase in population and urbanisation (Evers et al., 2017).

Water scarcity research has attracted considerable political and public attention and has developed into significant socio-economic constraints (Liu et al., 2017). As stated by the World Wide Fund (WWF, 2015), rapid growth within the developing economies over the last few decades, especially within the mining, agricultural and manufacturing sectors, has come at a high cost to the environment, particularly within the water resources. It has been reported by the World Economic Forum (WEF, 2018) that four of the top five most significant risk factors in terms of impact on society are associated with water.

The mining industry is of critical importance when considering the high volume of freshwater it uses and the negative



environmental concerns related to this activity. According to the Department of Water and Sanitation (DWS, 2017), water percentage usage of South African mining accounts for roughly 5% of total usage. The quantity and quality of water used in the mine industry is eminently measurable and need to be reported on. The lack of compliance, and poor reporting by many mines are regarded as unacceptable.

2. BACKGROUND TO THE STUDY

Numerous mining-related operations are located in developing countries. These activities outpace the expansion of surrounding infrastructure, causing poor sustainable water management practices (McIntyre et al., 2015). This situation is earmarked particularly within the platinum mining industry, where between 80-90% of the global platinum operations are situated in semi-rural regions of South Africa, Zimbabwe and Russia, as stated by the World Platinum Investment Council (WPIC, 2018). The mining sector is dependent on the location where the ore-bearing reefs are located, often in areas of water constraints or underdeveloped regions.

The United Nations (UN) acknowledges access to freshwater as a human right since its availability is essential for human life and welfare. As part of the 2030 Agenda for Sustainable Development, the UN has adopted Sustainable Development Goals. Goal 6 addresses explicitly sustainable water management and states the following 'Ensure accessibility and sustainable management of water and sanitation for all. As a result of Goal 6, targets have been set to address water scarcity issues, enhance water quality, and provide worldwide access to safe and affordable drinking water (GRI, 2018).

Mining and processing of ore produces a high number of wastewaters due for discharge either to storage dams, recycling and reuse or discharge into the environment. As this commodity sector is a water-intensive industry, several anthropogenic

factors are associated with it that negatively affect the surrounding human and natural capital (Jenkins, 2017). According to the Safe Drinking Water Foundation (SDWF, 2017), four significant impacts that platinum mining has on water resources include:

- Acid Mine Drainage (AMD);
- Heavy Metal Contamination and Leaching;
- Processing Chemicals Pollution; and
- Erosion and Sedimentation.

These environmental issues associated with mining result in extensive economic, health and financial repercussions for organisations, communities surrounding these industries and, ultimately, governmental departments.

Thus, the need for improved compliance, monitoring and reporting in terms of water management and its associated risks in the mining sector is ever-increasing, especially from investors, society and regulator. The necessity for reporting on natural and human capital in terms of environmental impact and social responsibility should be viewed as necessary because of the crucial role in the economic value of any business (Kenton, 2019). The WEF's Global Risk Report (WEF, 2015) recognises the water crisis as the most considerable societal and economic global risk for the following decade in terms of probable impact. Water scarcity has a significant impact on any business's strategic plan formulated within a water-constrained future and, therefore, is a vital aspect that needs to be reported on. Considering this information makes it apparent that the long-term viability is affected by how corporations report and manage their available natural capital (Main & Eric, 2012).

Current organisations are to encourage principles of sustainable business practice and stakeholder accountability successfully in their everyday operations. Therefore, the integration of non-financial and financial information is of supreme importance.

Mining companies in South Africa are no exception to this requirement since this industry subsidises the country's employment, gross domestic product and international capital inflows (Carels et al., 2014).

Several guidance and disclosure frameworks have been established to create reliable mechanisms for industries, including mining-related companies, to report and disclose information on these concepts through a holistic, integrated report or within their respective sustainability reports.

3. PROBLEM STATEMENT

According to Ochieng et al. (2010), mining activities alongside streams and rivers in South Africa threaten the water resources because the discharge of water used during mining activities lowers the water quality and, ultimately, contributes to human health and food security concerns. For example, it was reported by the British Broadcasting Corporation (BBC) in 2016 that the Russian platinum and palladium producer Norilsk Nickel polluted a river with heavy minerals. This incident happened after one of its tailing dams burst, causing the river to turn bright red due to contaminated water.

Stakeholders, potential shareholders, and investors find it problematic not to know the company's stance on water reporting and disclosure protocols. Since companies use a diverse set of guidelines and frameworks, it has resulted in a lack of uniformity and comparability. The lack of a uniform language, structure and procedure for water reporting creates a need for a meaningful and systematic reporting framework, as stated by the CEO of the CDP (Botha & Middelberg, 2016).

4. OBJECTIVES OF THE RESEARCH

This research aims to investigate the disclosure and reporting on water practices, for companies within the platinum mining industry, in terms of regulatory guidelines and standards.

5. LIMITATIONS OF STUDY

Since mining is associated with several environmental problems, this study investigates the degree of disclosure and sustainable reporting on water practices within the platinum mining industry, which may be overlooked to achieve a company's main objectives of revenue and growth. Thus, the data conveyed in the integrated reports can sometimes generate a false sense of the essential elements, especially because some organisations do not report these factors.

6. LITERATURE REVIEW

The first part of the literature review focuses on sustainability reporting and disclosure requirements concerning water practices. This is followed by a discussion on the various frameworks and guidelines in use. The following section concentrated on the industry framework guidelines and primarily on platinum mining producers. While the latter section conceptualises previous research undertaken within the platinum mining industries' water practises, followed by risk factors associated with water in this industry.

6.1 Reporting and disclosure

Within the business context, reporting can be conducted on several features of an organisation, in the form of mandatory to discretionary reporting, for example, integrated-, sustainable- or internal management reporting. Transparency and accountability are two fundamental issues stakeholders attempt to manage in reporting (Coultridge, 2015), while they exhibit interest in both the financial and non-financial side of reporting (Hoque, 2017). Business reporting is fundamental to organisations for sustainable growth, financial markets and economies, according to the International Federation of Accountants (IFAC, 2019). The IFAC suggests that business reporting assists organisations exhibit accountability and allow for a clear communication channel between stakeholders.



The concept of accountability is supported by numerous theories, which include the stakeholder and the legitimacy theories. Improved disclosure requirements and a rise in sustainability reporting result from an increasing need for information related to corporate sustainability practice (Botha & Middelberg, 2016).

Disclosure within the business environment can be viewed as releasing all relevant information that may positively or negatively influence an organisation (Segal, 2019). Disclosure reports are mainly produced for internal and external stakeholders to showcase a company's business activity and performance (Kluwer, 2019).

6.2 Integrated reporting

According to the International Integrated Reporting Council (IIRC, 2013), the concept of integrated reporting originated from the principle of intellectual thinking. According to Main & Eric (2012), a company can better understand and manage various dimensions of value through utilising integrated reporting (IR). Integrated reporting's primary purpose is to explain to financial capital providers how an organisation creates value over time (IIRC, 2013). As identified in IR, the six capitals are typically linked and recognise the dependencies amongst capitals (David et al., 2017). One improvement is integrating natural capital into companies' decision-making and strategy procedures (Ermgassen & Rogers, 2016).

Water-related reporting and disclosure in terms of integrated and sustainable reporting falls under natural capital and can be described as applying a consistent and structured approach to identify, measure and report water resource information (Garstone et al., 2017).

6.3 Frameworks for sustainable reporting and disclosure

Different stakeholders have developed numerous reporting and disclosure frameworks on water-related issues to provide guidance and inform a more

structured manner of reporting and disclosure. Examples include the Global Reporting Initiative (GRI), Carbon Disclosure Project (CDP), The Ceres Aqua Gauge and CEO Water Mandate. These frameworks are not utilised in isolation but instead form part of an alignment for a holistic and transparent water reporting structure. For example, the linkages between the GRI and the CDP are well documented because the organisations work together to bring disclosure metrics into line while ensuring that the replication of disclosure standards is limited (GRI, 2018). In addition, corporate Social Responsibility (CSR) and the sustainability disclosures' prospects from Russia, where platinum production is prominent, are increasing because there is a holistic change towards more transparency for non-financial disclosures within a business (Fifka & Pobizhan, 2014).

Major companies have had a strong uptake of the GRI based sustainability reporting, even though it is a voluntary initiative (Northey et al., 2019). In addition, to improve the quality of disclosures by the mining sector, several reporting supplements have been made available to the industry.

6.4 Industry guidelines Mining platinum

The International Council on Mining and Minerals (ICMM) has noted the increased interest from regulators, civil society and investors on mining companies' water-related principles of reporting and disclosure. As the ICMM believes that even though the CDP, GRI and CEO Water Mandate have considerably improved water use disclosure standards, it still has its limitations (ICMM, 2017). Inconsistent reporting on waters related matters has forced the ICMM to develop its minimum water disclosure standards.

Once mining companies recognise the comprehensiveness of their water use, it enables them to determine their overall impact on water resources, their effect on other water users, and their own business.

6.5 Previous research on reporting and disclosure on water practises within the platinum mining industry

The critical difference between the literature noted, and the current research is that although mining companies have been analysed, none of the researchers has focused solely on platinum mining producers. Several methodologies and approaches were also noted, with assistance from voluntary to regulatory disclosures.

Barton (2010) researched several different organisations from all sectors, but the mining producers were part of a diverse mining commodity structure. Nevertheless, the outcomes showed that the mining industry indicated the highest degree of water disclosures, water-related regulatory risks and stakeholder engagement, compared to all other sectors (Barton, 2010).

According to Mudd (2012), sustainable reporting remains a challenge for platinum mining producers, even though water consumption reporting has improved. Moreover, the study originates limited companies report on disclosures involving water indicators based on the GRI G4 Guidelines related to discharges and water recycling.

Critical findings on research performed by Botha & Middelburg in 2016 revealed that 76% of the mining companies identified water as a material topic. Over two-thirds of the mining companies acknowledge the usage of frameworks, such as the CDP, in their water disclosures. Factors involving physical, regulatory and reputational risks were best recognised within the mining organisations, compared to other sectors (Botha & Middelberg, 2016).

A study based on the Ceres Aqua Gauge guidelines indicated that mining companies generally have good disclosures, accountability, and stewardship on water-related principles. However, low interest was noted in reporting and disclosure on

water supply chain management (Askham & Van der Poll, 2017).

Northey et al. (2019) performed a more recent study on water accounting reporting and disclosures in the mining sector, with over 359 reports analysed. A key observation reveals that water reporting and disclosure levels on water withdrawal and water inputs are far greater than the volume of water discharged or stored on-site (tailing dams and evaporation lakes). Additionally, it was noted that within mining operations across various regions, water reporting and disclosures vary considerably (Northey et al., 2019). Based on the observations from previous research, it is eminent that the quality of water disclosures has progressively improved, but the lack of uniform standards is still apparent.

6.6 Geolocations requirements and guidelines for sustainable reporting

Since each country has its water-related challenges, followed by crucial role players, regulatory requirements differ. For example, mining companies in South Africa, listed on the JSE, have to follow the JSE listed requirements, implying the KING reports. According to the Chartered Professional Accountants of Canada (CPA, 2013), multiple guidelines and standards have been developed for sustainable reporting, from globally recognised to industry-specific standards, including the GRI, CDP and the Mining Association of Canada's Towards Sustainable Mining principles. Companies in Canada use a combination of the frameworks to report and disclose on all sustainability issues. Sustainability reporting in Russia is supported by the Russian Union of Industrialists and Entrepreneurs (RSPP) by serving as a foundation for sustainable development in the country. In addition, the non-financial material reported and disclosed is put through a public verification process, as the RSSP utilised as an independent validation tool on public reports (RSPP, 2019). The GRI Sustainability Standards and specific Mining & Metals Sector Standard



recommendations are also widely used as frameworks for sustainability reporting within the Russian Federation (Schwery, 2017).

6.7 The global reporting initiative

Under the Global Sustainability Standards Boards (GSSB) entity, the GRI framework is responsible for formulating universally recognised standards for reporting on sustainability. In addition, the GRI sets out a common language for non-financial reporting that moves toward organisations achieving a comprehensive issue-based specific sustainability reporting code (Taneva & Bergkamp, 2018).

Thus, the current GRI G4 Guidelines formerly used by most organisations have been substituted by the GRI Standards, since 1 July 2018, with a final recommended date of execution on 1 January 2021, whilst earlier implementation is recommended (GRI, 2019). The main concepts and disclosures that have been incorporated within the GRI Standards are based on the G4 Guidelines. Hence organisations adhering to the latter will almost fully comply with the new GRI Standards of reporting and disclosures (GlobalReporting, 2018).

The GRI Standards are designed to assist organisations in all sectors through three universal standards, relevant to all establishments, followed by 33 topic-specific standards within economic, environmental and social fields, as seen

below in Figure 1. The universal standards include those of the GRI (2018), followed by the topic-specific standards:

- Foundation – GRI 101: Related to the starting point of the GRI Standards
- General Disclosure – GRI 102: Aimed at reporting contextual information about the specific industry.
- Management Approach – GRI 103: Specific for reporting on management material topics.

For this study's objective, the focus has been positioned at the GRI 303: Water and Effluents specific topic standard. This standard is the essential reporting and disclosure framework involving water principles within organisations.

- Management approach disclosures: This approach disclosure forms part of the description of how organisations manage the identified material topics, which in this case are water and effluents.
- Disclosure 303-1 Interaction with water as a shared resource;
- Disclosure 303-2 Management of water discharge-related impact;
- Disclosure 303-3 Water Withdrawal;
- Disclosure 303-4 Water Discharge; and
- Disclosure 303-5 Water Consumption.

These abovementioned disclosure items are included in the disclosure index developed based on the literature study. In



FIGURE 1 : ILLUSTRATING THE GRI FRAMEWORK, FROM THE UNIVERSAL STANDARDS TO THE TOPIC OF THE SPECIFIC STANDARD. IMAGE ADAPTED FROM BASF (2019).

addition, water risks discussed in the next section are also a prominent part of water disclosures.

6.8 Risk factors about platinum operations

The way mining companies safeguard and utilise water sources is currently recognised as a crucial issue given the need for water and its significance for mining operations (IFC, 2014). Both the efficiency of an operation and the kind of mining activity will impact its water use.

The level of companies' preparation for uncertainty can be demonstrated to stakeholders through their clarity about the main risks their operations are facing and the plans in place to mitigate these risks. According to the Association of Chartered Certified Accountants, this information is of specific importance when investors use the completeness of a company's risk assessment plans to evaluate how well a company is managed, according to the Association of Chartered Certified Accountants (ACCA, 2013).

Business feasibility can be negatively affected over both the short and long term when companies are subjected to water-related risks. According to Barton (2010), CIMA (2011) and CDP (2012), five broad categories can be utilised to group water risks, such as regulatory risks, physical risks, reputational risks, financial risks and litigation risks.

- Regulatory risks: these include, for instance, matters such as rates regulating water withdrawal, water permits and distribution, and discharge amounts, as well as limitations on pollutant levels and types.
- Physical risks: these are related to occurrences when there is water stress (water shortages), pollution (decline in water quality) and flooding (increase in water).
- Reputational risks: these develop when

water capacity and accessibility results in pressure amongst local communities and companies.

- Financial risks: these risk factors are related to the costs involved in the treatment and conversion of water.
- Litigation risk: these risks involve the growing competition, whereby adjacent companies can influence one another over legal, regulatory water rights, with could entail legal encounters restraining operations.

A study by Barton (2010) involved a diverse set of mining companies' disclosure of risk assessment about physical, regulatory, reputational and litigation risks. The research concluded that all mining companies make disclosures on physical and regulatory risks, while only 33% and 66% report on their reputational and litigation risks.

According to CDP (2011), a widespread and substantial level of opportunities and risks were reported by South African respondents. The top three risks identified for direct operations by respondents included the following: high water prices (42%), physical scarcity of water (85%) and declining water quality (42%). Furthermore, the top risks relating to the supply chain included: declining water quality (15%), physical water scarcity (35%) and reputational damage and inadequate infrastructure (8%).

A disclosure index was developed in order to analyse the chosen companies. The GRI 303 Standards formed the basic framework of the index for the analysis of the different reports by the platinum mining producers. The research methodology is discussed next, followed by the results and conclusions.

7. RESEARCH METHODOLOGY

In this study, content analysis as a research method was utilised. The reports from the platinum producers were analysed by focussing on the narrative (qualitative) and the quantitative disclosures involving water items being reported. Moreover,



TABLE 1: NAMES OF THE MINING COMPANIES INVESTIGATED

Platinum Mining Producer	2017–2018: Publicly Available Reports Used				
	Annual & Integrated Report	Sustainability Report	Supplementary Report	Natural Capital Specific Report	Framework Specific Report (GRI etc.)
Northam Platinum	x				x
Royal Bafokeng Platinum	x				
Impala Platinum	x	x			
Lonmin Plc	x	x			
Anglo Platinum	x		x		
Sibanye Stillwater	x				
Platinum Group Metals	No reports found				
Sedibelo Platinum	Reports found outdated from 2010-2011				
African Rainbow Minerals	x	x			
Eastern Platinum	x				
Wesizwe Platinum	x				
Glencore	x	x		x	x
Bauba Platinum	x				
North American Palladium	No reports found				
Vale Sa		x			
NorNickel		x			
Sedibelo Platinum	Reports found outdated from 2010-2011				
African Rainbow Minerals	x	x			
Eastern Platinum	x				
Wesizwe Platinum	x				
Glencore	x	x		x	x
Bauba Platinum	x				
North American Palladium	No reports found				
Vale Sa		x			
NorNickel		x			

TABLE 2: THE DISCLOSURE INDEX SEVEN MAIN SECTIONS

Section	Disclosure Index Summary	Data Format:
A	GRI 303 – 1: Management Approach	Qualitative
B	GRI 303 – 2: Management of Water Discharges	
C	GRI 303 – 3: Water Withdrawal	Quantitative
D	GRI 303 – 4: Water Discharges	
E	GRI 303 – 5: Water Consumption	
F	Frameworks and Governance Reporting and Disclosures	Qualitative
G	Water Risk Factors Reporting and Disclosures	

Source: Own compilation

the narrative data involves companies reporting and disclosing management approaches, governance of water aspects and the various water risk factors. The data (quantitative and qualitative) was collected concurrently, analysed independently and incorporated into the results by merging and convergence (Creswell & Plano Clark, 2011).

7.1 Research population and sample

The sample population includes the major platinum mining organisations that are producing tonnage and ounces throughout the globe. The majority are located within Southern Africa and a few within North America and Russia. The sample size was determined by employing a non-probability method (Maree & Pietersen, 2012). The sampling was done through purposeful selection. No random companies were chosen, only companies by the most significant output of tonnage & ounces and published reports. A total number of sixteen (16) companies have been incorporated in the investigation, during which their 2017-2018 compulsory and voluntary public available reports and disclosures were analysed. However, the data of three (3) companies out of the 16 were not used because two (2) had no public domain reports available, and one (1) presented an outdated 2010 Annual Report. Table 1 provides the names of the investigated mines.

The content to be analysed can be categorised into several measures, by coding the specific text in question related to the research (Neuman, 2003). Water will be the key text code in the analysis of the publicly available reports of the sample population, based on the specific developed disclosure index parameter. Thus, for the empirical research, the context and text refer to the platinum mining producers mandatory and voluntary reports with specific items related to water disclosures.

The disclosure index comprises of seven main sections (A-G) as indicated in Table

2. The first two sections (A and B) deal with more narrative (qualitative) information. The last two sections (F and G) are also disclosed in a narrative way by addressing the various frameworks used as well as the different risks. Section C, D, and E dealt with more quantifiable characteristics.

On examination of the disclosures from the various platinum mining producers' reports, the level of compliance was investigated for each section as stated in the disclosure index developed. The compliance and coding parameters used for these sections (A-E) are explained in the following paragraphs. The level of compliance for this research study has been divided into four sections for the analysis. The levels include:

- Full Compliance: Disclosure in question displayed full compliance with the reporting framework or disclosures stated in the GRI 303: Water and Effluents.
- Partial Compliance: The framework disclosure is partially compliant. Thus some aspects were not fully stated according to the specific GRI 303 parameters. For example, a company disclosed its water discharges, but not in mega litres or gave its total water withdrawal disclosure but not its site source-specific water withdrawals.
- No Compliance: No compliance or disclosure was found in the reporting framework against the GRI 303 Standard in question.
- Not Applicable: When a guideline or standard stated in the GRI is not relevant to the specific topic for inland based mining operations, for example, water withdrawal from seawater.

The data point for each mining house was captured on an excel spreadsheet, based on the disclosure index parameter in question, against the reported disclosure.

8. EMPIRICAL RESULTS

The first part involved the overall compliance level based on GRI 303 Standards for

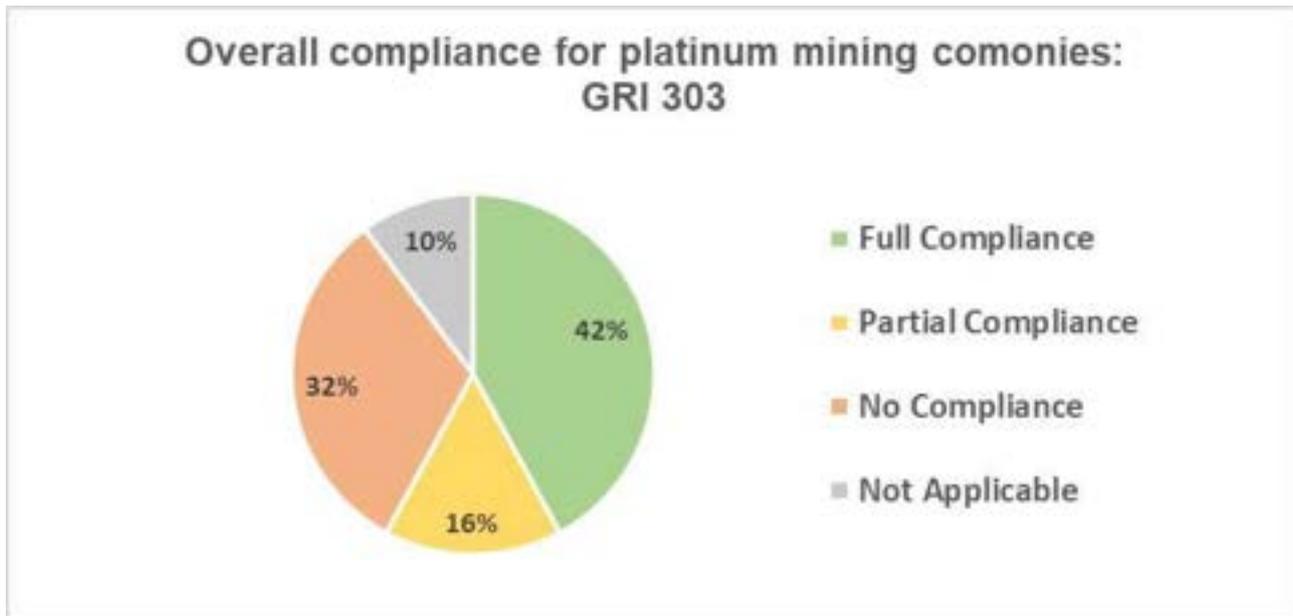


FIGURE 2: COMPLIANCE LEVEL OF PLATINUM PRODUCERS, BASED ON THE GRI 303 FRAMEWORK. SOURCE: OWN COMPILATION.

the different companies mentioned in the sample. The second part (sections A and B) addresses the companies' governance and management approach. Finally, the third part (sections C, D and E) reveals the results of those water-related features that could be measured and reported on by the companies. This is followed by the different frameworks and guidelines used (section F), which is concluded by the critical risk factors in section G.

The combined compliance level for all platinum mining producers, based on the GRI 303: Water and Effluents Standards, are illustrated in Figure 2. Full compliance regarding the framework is only 42%, whilst 16% is attributed to partial and 32% to no compliance. Standards recommended by the framework that was not applicable for reporting and disclosures predictable to 10%.

8.1 WATER GOVERNANCE

This section (A and B) focused on how companies govern and manage their water and effluents. The investigating issues are water stewardship efforts (GRI 303-1) and how the company interacts and manages its water-discharge-related impacts (GRI 303-2).

Compliance level for the Management Approach GRI 303-1

The compliance level in Figure 3 below for the Management Approach amounted to 75% entirely, while 15% to partial compliance and 10% to no compliance. Thus it was noted that, in general, most platinum mining companies report readily on these recommended disclosures, with only one company not reporting on the Management Approach to water. Another company was partially vaguely affirming its interactions with water as a shared resource.

Compliance level for the Management Discharge Approach: GRI 303-2

This disclosure involves the minimum standards recommended for the management of the quality of water effluent discharges. The compliance levels noted for the GRI 303-2, as seen in Figure 4, indicated 52% full compliance, 21% partially compliance and 27% no compliance. In addition, three companies did not disclose any water discharge management practices and interactions with other stakeholders.

The compliance for water management of discharges decreased significantly compared to the general management approach in GRI 303-1. This decrease can

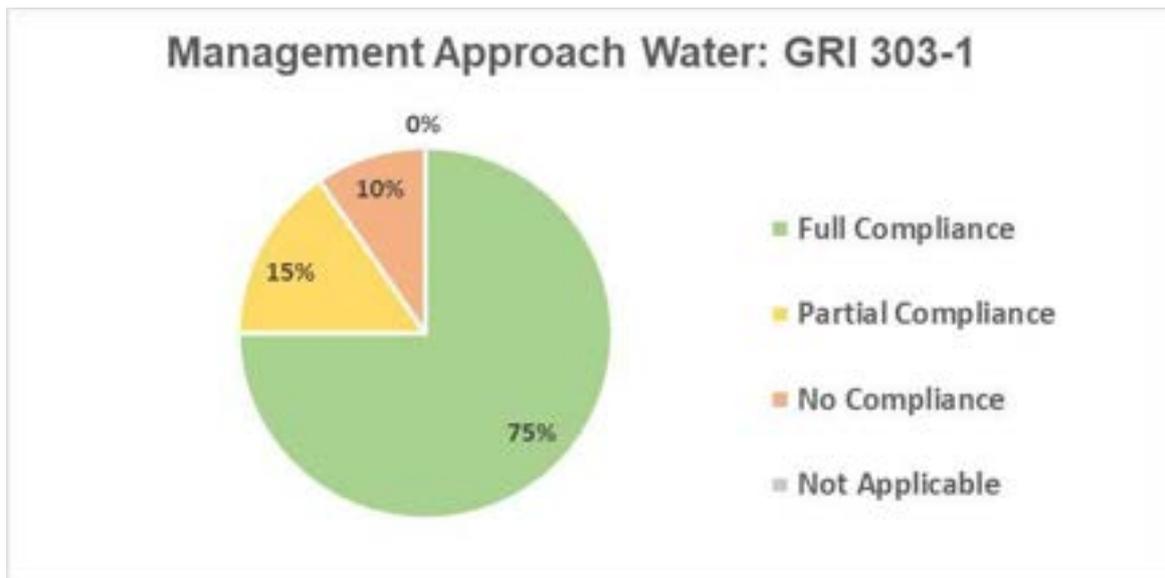


FIGURE 3: THE COMPLIANCE LEVEL FOR THE GRI 303-1 MANAGEMENT APPROACH TO WATER AS A SHARED RESOURCE.
SOURCE: OWN COMPILATION

be attributed to specific companies' lack of reporting of water body discharges, how specific sites with no regulatory requirement discharges are carried out, or the absence of any internal water quality developed framework. The following three sections (C, D and F) deal with more measurable aspects related to the amount of water withdrawal (303-3), the amount of water discharge (303-4) and the amount of water consumed (303-5).

Compliance level for the Water Withdrawal: GRI 303-3

The compliance levels for water withdrawal indicated only 38% full compliance, 15% partial compliance, 34% no compliance and 13% not applicable (see Figure 5 below). It was noted that only two companies had full compliance with the water withdrawal standards out of the 13 companies analysed. Compliance was affected as many companies did not disclose water withdrawal from site-specific sources or water-stressed areas. This problem was further increased by a lack of disclosures on water withdrawal quality.

Compliance level for the Water Discharge: GRI 303-4

Full compliance for water discharge was

only 29%, while 14% showed partial compliance, and 39% indicated no compliance. Therefore, 18% of the GRI 303-4 Standards did not apply to the respective company reports, as shown in Figures 3-6 below. Three companies indicated that no water bodies are discharged into the environment, resulting in a high number of not applicable data. A total of 6 companies reported on water discharges qualitatively but without providing actual measurable data. The partial compliance on water discharged can be attributed to companies that do not fully report on all discharges, including site-specific and water stress area discharges, and do not disclose the data in mega litres as recommended by the GRI 303.

Compliance level for the Water Consumption: GRI 303-5

Compliance on water consumption (Figure 7) for the platinum mining producers resulted in 49% complete -, 18% partial- and 33% no compliance. No compliance on water consumption standards was noted for 2 of the 13 companies analysed. It was generally noted that the level of compliance decreased when companies disclose water consumption from water-stressed areas, followed by the change of water storage

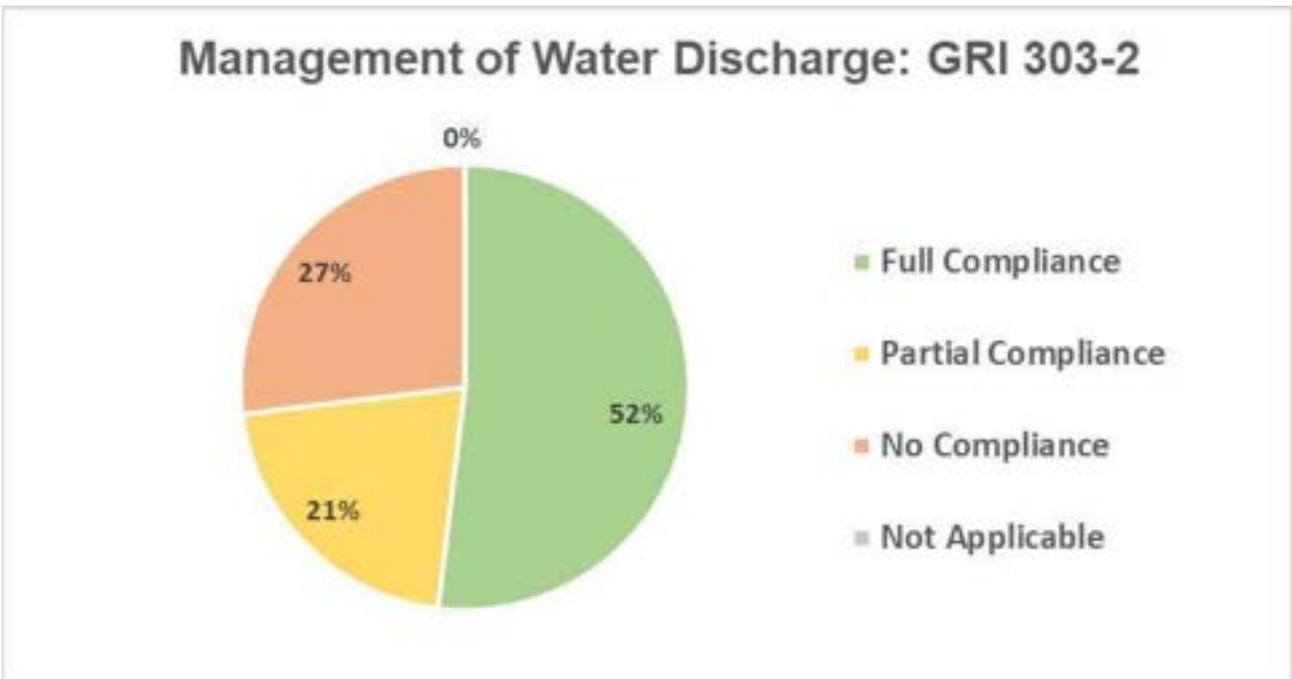


FIGURE 4: THE MANAGEMENT APPROACH FRAGMENT OF THE GRI 303-2.
SOURCE: OWN COMPILATION

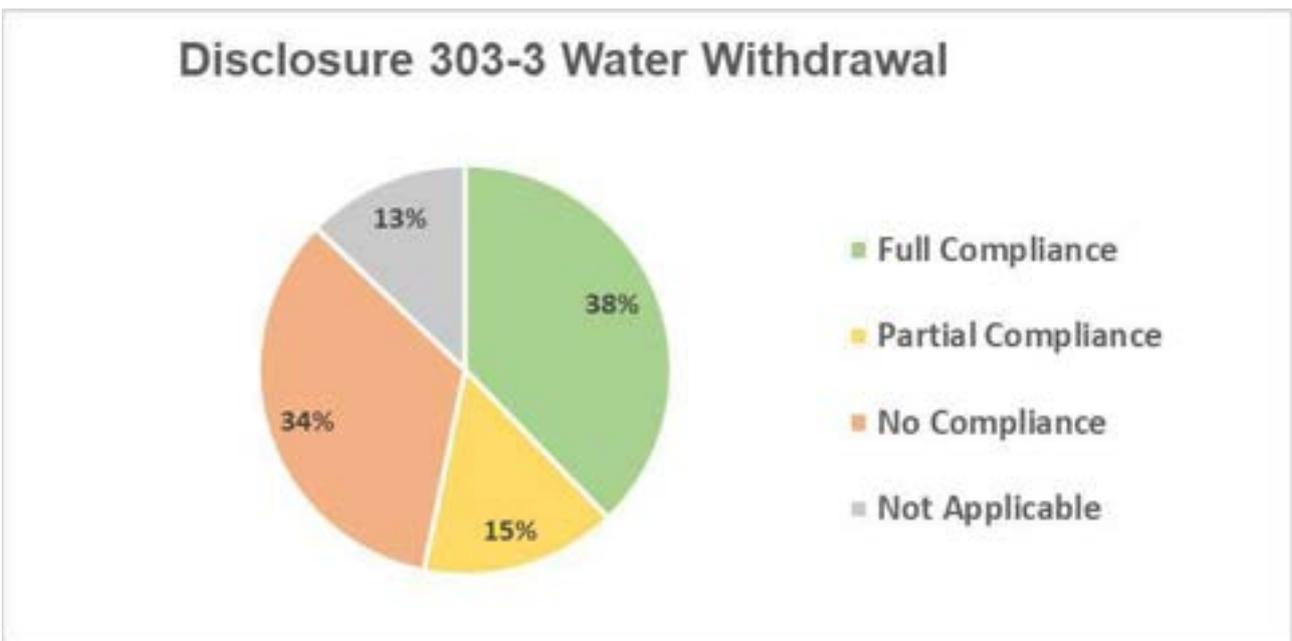


FIGURE 5: THE GRI 303-3 WATER WITHDRAWAL STANDARD.
SOURCE: OWN COMPILATION

in the specific area, calculated as the difference between the end and beginning of the storage reporting period.

Combined discussion on Water Withdrawal, Consumption and Discharge

A misconception between water withdrawal and water consumption was noted because many companies solely reported and

disclosed water usage. As per the GRI glossary, water withdrawal involves the total water drawn from all sources, including surface water, groundwater, and water from third parties, over the reporting period. Water consumption refers to the sum of all water withdrawn for production purposes that are not suitable for other users upon release. This situation was noted for Northam Platinum, which reported on the total usage

of water, with no clear separation of the two concepts described above.

The GRI 303-4 water discharge standard compliance performed the worst, and it was noted that several companies stated in their respective reports that no water bodies are discharged into the environment, only recycled for reuse or stored in tailing facilities or storage dams. Likewise, certain companies stated that regulators license their water discharges or that no discharges occurred but disclosed no quantifiable numbers or quality, even though they are made into tailing storage facilities or waste dams.

Furthermore, on the analysis of the reports, a not applicable indication was given for three companies' water discharge disclosures. However, some companies indicated that no water bodies are discharged into the environment, which could potentially enhance the no compliance reporting and disclosure because essentially no water principles were reported on. For example, Impala Platinum indicated no quantifiable water discharge information, only mentioning that all its respective water discharges are licensed. Additionally, it is planning to create discharge wetlands in the future for improved quality of water. These

results are concerning because the effect of water discharges into the environment usually creates additional complications, which, in turn, involve not only the mining company but adjacent communities and stakeholders.

Platinum mining producer's total combined compliance level: GRI 303

This section aims to determine the total compliance to the disclosure index for the different platinum mining companies based on the GRI 303 Standard. The level of compliance for the platinum mining companies is illustrated below on the radar chart depicted in Figure 8 below. The companies that displayed the highest overall compliance percentage according to the GRI 303 Standards was Glencore, followed by African Rainbow Minerals and Anglo Platinum, all of these scorings over 74% full compliance. Companies with a total compliance percentage in the middle regions (30% to 65%) involved, in decreasing order of compliance, Impala Platinum, NorNickel, Sibanye Stillwater, Lonmin Plc, Royal Bafokeng Platinum, Vale SA and Northam Platinum. Total compliance percentages of under 10% consisted of Wesizwe Platinum, Bauba Platinum and Eastern Platinum, respectively.

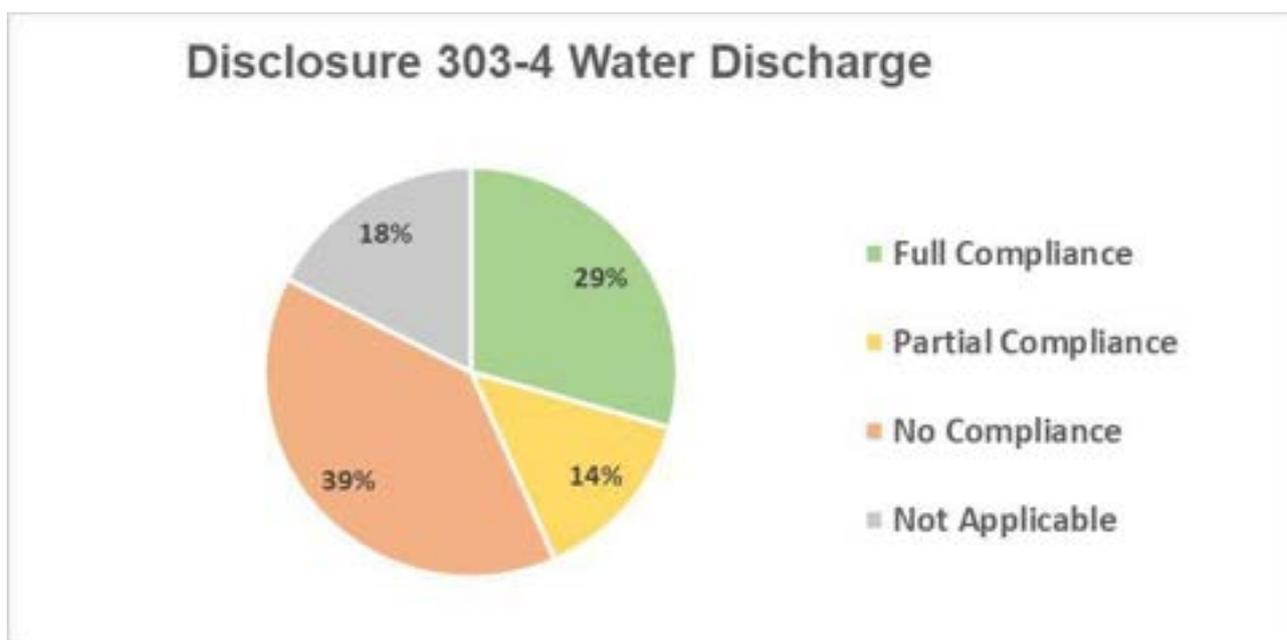


FIGURE 6: ILLUSTRATING THE GRI 303-4 WATER DISCHARGE. SOURCE: OWN COMPILATION.

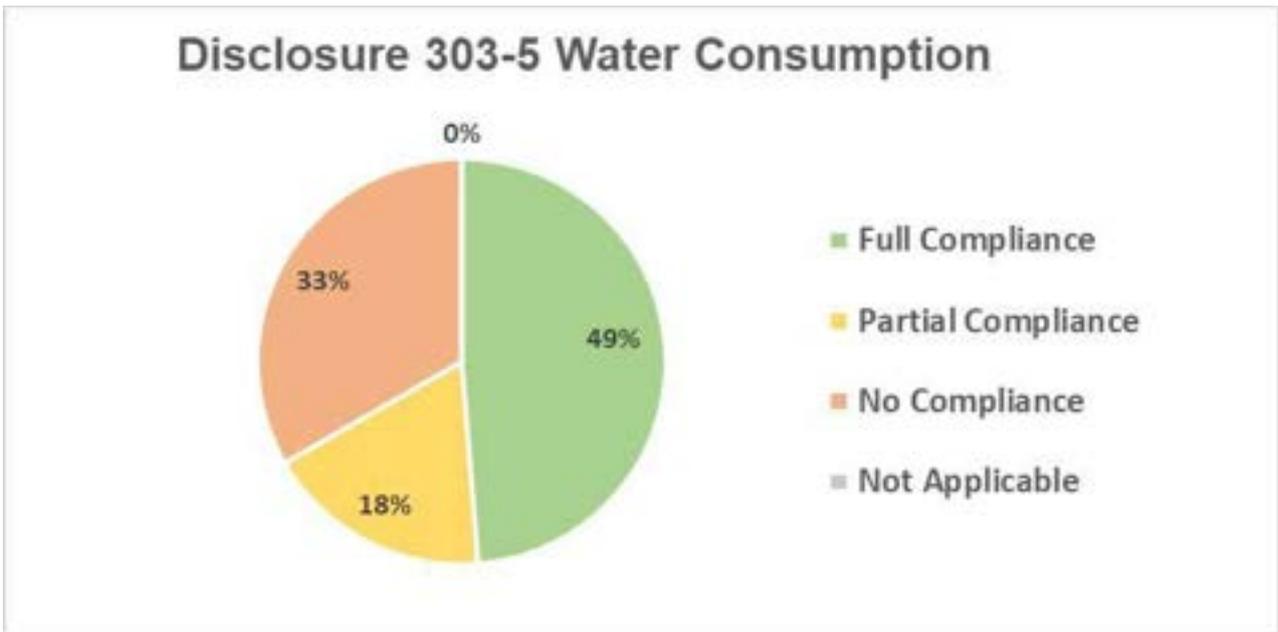


FIGURE 7: SHOWING THE GRI 303-5 WATER CONSUMPTION. SOURCE: OWN COMPILATION.

It was noted that Royal Bafokeng Platinum, Northam Platinum and Wesizwe Platinum had a relatively high percentage of not applicable data points, which considerably affected the total compliance levels. The data points which were excluded from the content analysis could potentially increase noncompliance for these companies. This is mainly because these companies reporting that no water discharges into the environment occurs but only the existence of recycled water, which in reality might not

be the actual case.

Companies with a high partial compliance level of approximately 30% involved Vale SA, Wesizwe Platinum and Sibanye Stillwater. Although the Wesizwe Platinum compliance level could be affected by the explanation mentioned above, Vale SA and Sibanye Stillwater compliance level could increase, with slightly improved reporting and disclosures. For example, Vale SA compliance level was affected by water discharges' disclosure due to not



FIGURE 8 :THE RADAR CHART DISPLAYS THE OVERALL COMPLIANCE LEVELS FOR THE PLATINUM MINING COMPANIES ANALYSED. SOURCE: OWN COMPILATION

fully specifying the site-specific discharges, but only the total discharges. Similarly, Sibanye Stillwater stated its total treated water disclosures per operational unit but did not specify site-specific discharges. Another factor for lower compliance levels is that several companies disclosed their respective numeric data in volume and not according to the GRI 303 Standard in mega litres.

Compliance trends between platinum mining companies located and listed in different regions and stock exchanges, respectively, are visible. However, most of the companies analysed are located in South Africa and listed on the JSE, while one company operates in Russia and

another in North America.

8.2 GOVERNANCE AND FRAMEWORKS

Based on an analysis of the data set in this section (section F), the following frameworks were reported and disclosed accordingly, as seen in Figure 9.

It is noted in Figure 9 that platinum mining companies predominately reported and disclosed on the GRI Standards. At the same time, the CDP and ICMM frameworks are also used, aligning the reporting and disclosures. This alignment demonstrates a positive tendency, as mining companies generally have an appropriate understanding of utilising different frameworks for sustainability reporting. This is highlighted

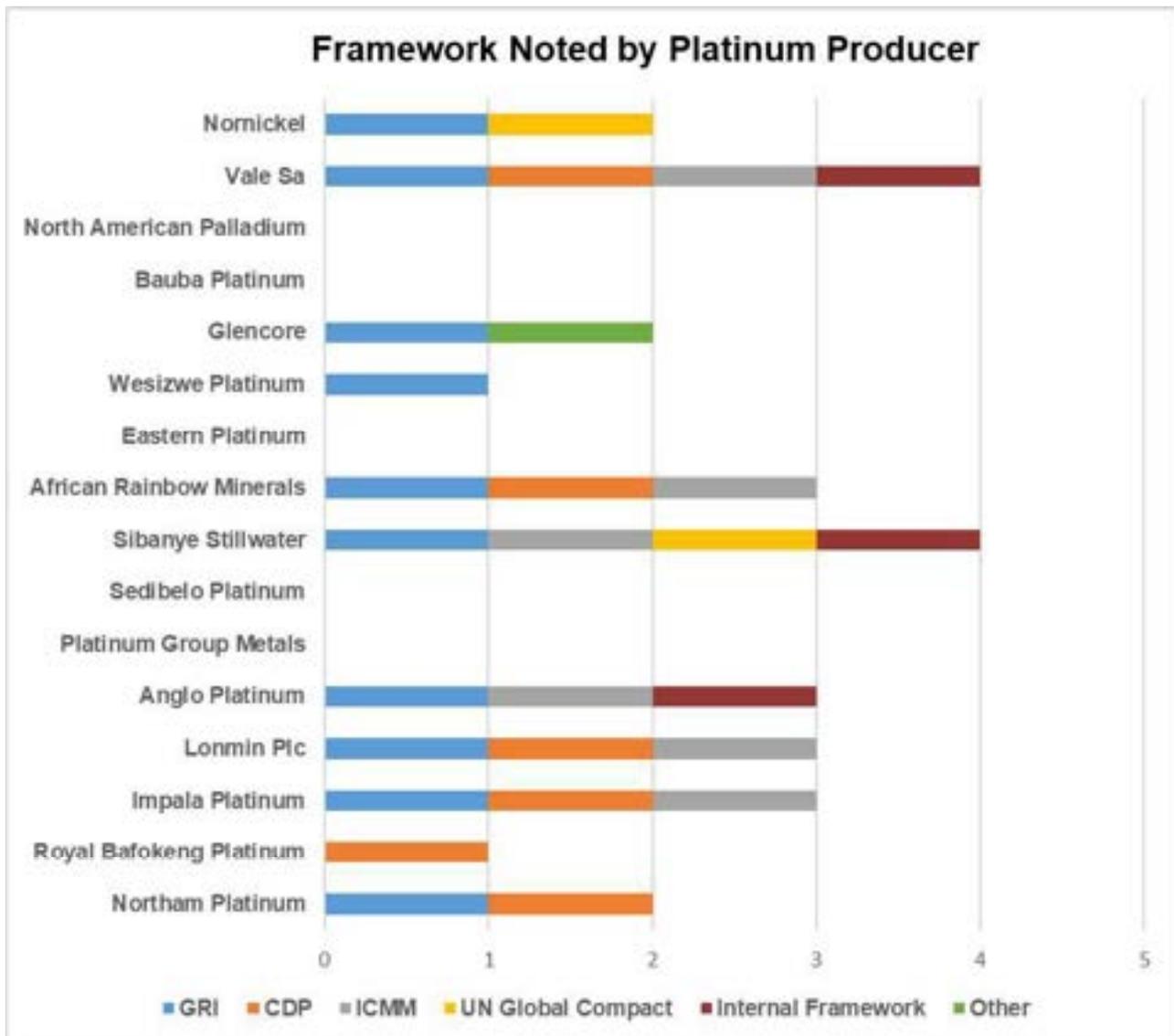


FIGURE 9: INDICATING THE FRAMEWORKS DISCLOSED BY THE PLATINUM MINING ORGANISATION.
SOURCE: OWN COMPILATION



by previous research, which found the mining sector with the highest compliance with guidelines frameworks compared to other industries outside of mining.

8.3 RISK FACTORS DISCLOSED

This section (section G) investigated the risk factors reported and disclosed by the different mining companies. For example, Anglo American Platinum highlighted the need for a continuous water source as a sole key risk factor in its operations. In contrast, secondary off-site factors included the uncontrollable discharge of water into the environment (Anglo American Platinum, 2018).

In addition, in its 2018 Supplementary Report, Anglo Platinum stated that both the lack of an assured water supply and having all its operations located in water-scarce environments as its primary water-related risk. This problem could potentially limit the production or growth of mining operations. Thus the mine is implementing holistic, innovative technologies to ensure future water efficiencies.

According to the Royal Bafokeng Platinum's 2018 Annual Report, water risks about the company can limit its production growth or prevent it from operating in a worst-case scenario. This problem occurs because the company is situated within an arid and water-scarce region where the future decrease in the annual rainfall is expected, together with progressively hot and dry periods. Furthermore, Lonmin (2018) stated that the utilisation of input resources needs to be optimised for mining operations, primarily since they are located in an area where the water demand is exceeded by supply and, consequently, the lack of a secure water supply is a potential risk. Six of the seven environmental incidents reported by Lonmin Plc during 2018 have a potential surface-related water impact. All of these incidents occurred at smelter and concentrator facilities.

Glencore's 2018 Water Report indicated that

Glencore acknowledges water as a shared and limited resource. It was further stated that Glencore is aware of the cumulative concerns raised by local water users and stakeholders regarding the availability and quality of water within the area and the likelihood of a probable adverse impact on the water supply.

The most substantial environmental concern identified in Impala Platinum's 2018 Sustainability Report is water. This report stated that the mine faces the following primary risks in terms of water:

- Potential operational disruptions due to water stress;
- Growing costs relating to water recourses and management;
- Uncontrollable discharge of contaminated water into the environment; and
- Dissatisfaction amongst the local community and reputational risks.

According to the Northam Platinum's 2018 Annual Report, an identified risk is the necessity for significant amounts of water for the mining and processing minerals, which could lead to the loss of production through operational downtime because of water supply constraints. This identified risk has the possibility of leading to increased production costs, negatively affecting water-related licences, and compromising profitability. To address this identified risk, Northam Platinum focuses on conserving water and having a demand management programme. Furthermore, it strives to improve its water usage through recycling, establishing water storage facilities on-site and incorporating water management in its sustainability strategies. Additionally, longer-term risk management plans identified in the Annual Report include climate change. Most of Northam Platinum's operations are located within water-stressed regions, where the lack of a reliable and sustainable water supply could affect its operations and future growth.

The different risk factors reported by the

platinum mining companies had one similar trend because most operations' water sustainability could potentially be affected by climate issues about physical risk factors (41%). In addition, the majority of these mining companies are located in arid to dry regions, lacking reliable and sustainable water sources, which could further progress to water-deficient operations.

The second highest risk factor observed was regulatory risk factors (29%), reported by the mining companies. Water use licenses, water -withdrawal, -discharge and -consumption limits and limitations on pollution restrictions all contribute to this factor.

9. CONCLUSIONS

According to the GRI 303 constructed disclosure index, compliance levels for

the platinum mining companies indicated Glencore, Anglo Platinum and African Rainbow Minerals as the top organisations in terms of compliance, at over 74%. Additionally, compliance with other companies is lacking far behind, with over half of these companies sitting below the 50% full compliance with the GRI 303 Water and Effluents Standards. However, no clear indication per geolocation can be interpreted because the data analysed from particular locations is limited.

A key finding in the content analysis was that most mining companies have a higher compliance level when reporting on the management of water resources compared to the provision of quantifiable data of actual water withdrawal, consumption and discharges, based on the disclosure index developed. The low-level disclosures of

TABLE 3: INDICATING THE MINING COMPANY, COMPARED TO THE DIFFERENT RISK FACTORS STATED

Platinum Mining Company	Risk Factors Categories				
	Regulatory	Physical	Reputational	Financial	Litigation
Northam Platinum	X	X	X	X	
Royal Bafokeng Platinum	X	X		X	
Impala Platinum	X	X	X	X	
Lonmin Plc	X	X		X	
Anglo Platinum	X	X			
Sibanye Stillwater	X	X	X		
Platinum Group Metals	No reports found				
Sedibelo Platinum	Reports found outdated from 2010-2011				
African Rainbow Minerals	X	X			
Eastern Platinum		X			
Wesizwe Platinum					
Glencore	X	X	X		
Bauba Platinum					
North American Palladium	No reports found				
Vale Sa		X			
NorNickel		X			
Combined Total (%) Risks	29%	41%	15%	15%	



water discharges into the environment were identified as the vital area lacking complete compliance levels in the platinum mining industry.

It was noted that most platinum mining companies acknowledge specific frameworks, usually involving a combination of two and more. In general, the GRI Standards were used most often, followed by the CDP and the ICMM.

A leading risk factor observed involves most platinum producers foreseeing water scarcity and lack of reliability affecting its operations short to long term due to climate risks, which falls broadly under physical risk factors.

The majority of platinum mining companies identified water as one of the fundamental key risk factors for the sustainability of their operations. Thus they ought to improve their reporting and disclosures while ensuring improved compliance levels with industry frameworks.

10. MANAGERIAL IMPLICATIONS

Management has to more comprehensively comply with, and report against, the standards that it adopts, especially with respect to water discharge from the mining operations. Given the scarcity of water as a resource -in the areas where the mines are located- it is necessary to identify high-impact and low-compliance users. To comply management must understand its operational water usage, the sources, quantities the life-cycle and quality of water used and discharged.

Stricter adherence to compliance and monitoring standards must be implemented at operational units within the platinum mining industry. Water discharges were identified as a critical aspect of the reporting and disclosure framework neglected to a certain extent, based on the available quantifiable data. Thus, discharges of water bodies should be reported and disclosed to the fullest extent possible. Improved

compliance in terms of water discharge and quality control is required. Improve reporting and disclosure on site-specific data should a company have more than one operational unit. This site-specific data would allow for better transparency, identifying high impact water users and low compliance level with the specific framework reporting on.

The two main risk factors from the five categories analysed were identified regarding water principles within the various platinum mining reports. Physical risk factors amounted to 41%, which is mainly affected by climate-related issues. These include mining operations, which are mainly located in arid to dry regions, resulting in a lack of sustainable water resources. Regulatory risks had an overall score of 29%, mainly affected by regulatory requirements such as water use licenses, water-withdrawal, -discharge and -consumption limits and limitations on pollution restrictions.

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APPENDIX B: DISCLOSURE INDEX

SECTION	LEGEND:			DISCLOSURE INDEX: INVESTIGATING DISCLOSURE OF WATER PRINCIPLES IN PLATINUM MINING									
	3	FULLY COMPLIANCE	REPORTS NOTED	GEOGRAPHIC LOCATION		SOUTH AFRICA							
	2	PARTIALLY COMPLIANCE		MINING COMPANY		NORTHAM PLATINUM	ROYAL BAFOKENG PLATINUM	IMPALA PLATINUM	LONMIN Plc				
	0	NO COMPLIANCE	YES	FY YEAR REPORTED/DISCLOSED		2018	2018	2018	2018				
	N/A	NOT APPLICABLE	NO										
1. MANAGEMENT APPROACH DISCLOSURES													
A	DISCLOSURE 303-1 INTERACTION WITH WATER AS SHARED RESOURCE	INTERACTIONS WITH WATER AS A SHARED RESOURCE	A	A description of how the organization interacts with water, including how and where water is withdrawn, consumed, and discharged, and the water-related impacts caused or contributed to, or directly linked to the organization's activities, products or services by a business relationship (e.g., impacts caused by runoff).									
			B	A description of the approach used to identify water-related impacts, including the scope of assessments, their timeframe, and any tools or methodologies used.									
			C	A description of how water-related impacts are addressed, including how the organization works with stakeholders to steward water as a shared resource, and how it engages with suppliers or customers with significant water-related impacts.									
			D	An explanation of the process for setting any water-related goals and targets that are part of the organization's management approach, and how they relate to public policy and the local context of each area with water stress.									
B	DISCLOSURE 303-2 MANAGEMENT OF WATER DISCHARGE IMPACT	MANAGEMENT OF WATER DISCHARGE RELATED IMPACTS	A	A description of any minimum standards set for the quality of effluent discharge, and how these minimum standards were determined, including:	How standards for facilities operating in locations with no local discharge requirements were determined;								
				Any internally developed water quality standards or guidelines;									
				Any sector-specific standards considered;									
				Whether the profile of the receiving waterbody was considered.									
2. TOPIC - SPECIFIC DISCLOSURES													
C	DISCLOSURE 303-3 WATER WITHDRAWAL		A	Total water withdrawal from all areas in megalitres, and a breakdown of this total by the following sources, if applicable:	Surface water								
					Groundwater								
			B	Total water withdrawal from all areas with water stress in megalitres, and a breakdown of this total by the following sources, if applicable:	Seawater	N/A	N/A	N/A	N/A				
					Produced water								
					Third-party water								
					Surface water								
					Groundwater								
					Seawater	N/A	N/A	N/A	N/A				
			C	A breakdown of total water withdrawal from each of the sources listed in Disclosures 303-3a and 303-3b in megalitres by the following categories:	Freshwater (<1000 mg/L TDS)								
					Other water (>1000 mg/L TDS)								
			D	Any contextual information necessary to understand how the data have been compiled, such as any standards, methodologies, and assumptions used.									
			D	DISCLOSURE 303-4 WATER DISCHARGE		A	Total water discharge to all areas in megalitres, and a breakdown of this total by the following types of destination, if applicable:	Surface water					
								Groundwater					
Seawater													
B	A breakdown of total water discharge to all areas in megalitres by the following categories:	Freshwater (<1000 mg/L TDS)											
		Other water (>1000 mg/L TDS)											
C	Total water discharge to all areas with water stress in megalitres, and a breakdown of this total by the following categories:	Freshwater (<1000 mg/L TDS)											
		Other water (>1000 mg/L TDS)											
D	Priority substances of concern for which discharges are treated, including:	how priority substances of concern were defined, and any international standard, authoritative list, or criteria used;											
		the approach for setting discharge limits for priority substances of concern;											
		number of incidents of non-compliance with discharge limits.											
E	Any contextual information necessary to understand how the data have been compiled, such as any standards, methodologies, and assumptions used.												
E	DISCLOSURE 303-5 WATER CONSUMPTION		A	Total water consumption from all areas in megalitres.									
			B	Total water consumption from all areas with water stress in megalitres.									
			C	Change in water storage in megalitres, if water storage has been identified as having a significant water-related impact.									
			D	Any contextual information necessary to understand how the data have been compiled, such as any standards, methodologies, and assumptions used, including whether the information is calculated, estimated, modelled, or sourced from direct measurements, and the approach taken for this, such as the use of any sector-specific factors.									
F	Frameworks and Governance Reporting and Disclosures			GRI									
				CDP									
				ICMM									
				UN GLOBAL COMPACT									
				INTERNAL									
				OTHER									
G	Water Risk Factors Reporting and Disclosures			Regulatory									
				Physical									
				Reputational									
				Financial									
				Litigation									



SECTION	LEGEND:			DISCLOSURE INDEX: INVESTIGATING DISCLOSURE OF WATER PRINCIPLES IN PLATINUM								
	3	FULLY COMPLIANCE	REPORTS NOTED	GEOGRAPHIC LOCATION								
	2	PARTIALLY COMPLIANCE		MINING COMPANY		ANGLO PLATINUM	SIBANYE STILLWATER	PLATINUM GROUP METALS	SEDIBELO PLATINUM			
	0	NO COMPLIANCE	YES	FY YEAR REPORTED/DISCLOSED		2018	2018	2018	2010			
	N/A	NOT APPLICABLE	NO									
1. MANAGEMENT APPROACH DISCLOSURES												
A	DISCLOSURE 303-1 INTERACTION WITH WATER AS A SHARED RESOURCE	INTERACTIONS WITH WATER AS A SHARED RESOURCE	A	A description of how the organization interacts with water, including how and where water is withdrawn, consumed, and discharged, and the water-related impacts caused or contributed to, or directly linked to the organization's activities, products or services by a business relationship (e.g., impacts caused by runoff).	●	●			NO INTEGRATED REPORT NOTED	INTEGRATED REPORT OUTDATED. ONLY 2010 FOUND IN PUBLIC DOMAIN		
			B	A description of the approach used to identify water-related impacts, including the scope of assessments, their timeframe, and any tools or methodologies used.	●	●						
			C	A description of how water-related impacts are addressed, including how the organization works with stakeholders to steward water as a shared resource, and how it engages with suppliers or customers with significant water-related impacts.	●	●						
			D	An explanation of the process for setting any water-related goals and targets that are part of the organization's management approach, and how they relate to public policy and the local context of each area with water stress.	●	●						
B	DISCLOSURE 303-2 MANAGEMENT OF WATER DISCHARGE RELATED IMPACT	MANAGEMENT OF WATER DISCHARGE RELATED IMPACTS	A	A description of any minimum standards set for the quality of effluent discharge, and how these minimum standards were determined, including:	●	●						
				How standards for facilities operating in locations with no local discharge requirements were determined;	●	●						
				Any internally developed water quality standards or guidelines;	●	●						
				Any sector-specific standards considered;	●	●						
				Whether the profile of the receiving waterbody was considered.	●	●						
2. TOPIC - SPECIFIC DISCLOSURES												
C	DISCLOSURE 303-3 WATER WITHDRAWAL		A	Total water withdrawal from all areas in megalitres, and a breakdown of this total by the following sources, if applicable:	Surface water	●	●					
					Groundwater	●	●					
					Seawater	N/A	N/A					
					Produced water	●	●					
					Third-party water	●	●					
					B	Total water withdrawal from all areas with water stress in megalitres, and a breakdown of this total by the following sources, if applicable:	Surface water	●	●			
					Groundwater		●	●				
					Seawater		N/A	N/A				
					Produced water		●	●				
					Third-party water		●	●				
					C		A breakdown of total water withdrawal from each of the sources listed in Disclosures 303-3-a and 303-3-b in megalitres by the following categories:	Freshwater (<1000 mg/L TDS)	●	●		
					Other water (>1000 mg/L TDS)			●	●			
D	Any contextual information necessary to understand how the data have been compiled, such as any standards, methodologies, and assumptions used.											
D	DISCLOSURE 303-4 WATER DISCHARGE		A	Total water discharge to all areas in megalitres, and a breakdown of this total by the following types of destination, if applicable:	Surface water		●	●				
					Groundwater		●	●				
					Seawater		●	●				
					Third-party water		●	●				
					B	A breakdown of total water discharge to all areas in megalitres by the following categories:	Freshwater (<1000 mg/L TDS)	●	●			
					Other water (>1000 mg/L TDS)		●	●				
					C	Total water discharge to all areas with water stress in megalitres, and a breakdown of this total by the following categories:	Freshwater (<1000 mg/L TDS)	●	●			
					Other water (>1000 mg/L TDS)		●	●				
					D	Priority substances of concern for which discharges are treated, including:	how priority substances of concern were defined, and any international standard, authoritative list, or criteria used;	●	●			
					the approach for setting discharge limits for priority substances of concern;		●	●				
					number of incidents of non-compliance with discharge limits.		●	●				
					E	Any contextual information necessary to understand how the data have been compiled, such as any standards, methodologies, and assumptions used.						
E	DISCLOSURE 303-5 WATER CONSUMPTION		A	Total water consumption from all areas in megalitres.	●	●						
					B	Total water consumption from all areas with water stress in megalitres.	●	●				
					C	Change in water storage in megalitres, if water storage has been identified as having a significant water-related impact.	●	●				
					D	Any contextual information necessary to understand how the data have been compiled, such as any standards, methodologies, and assumptions used, including whether the information is calculated, estimated, modelled, or sourced from direct measurements, and the approach taken for this, such as the use of any sector-specific factors.						
F	Frameworks and Governance Reporting and Disclosures				GRI	●	●					
					CDP	●	●					
					ICMM	●	●					
					UN GLOBAL COMPACT	●	●					
					INTERNAL	●	●					
OTHER	●	●										
G	Water Risk Factors Reporting and Disclosures				Regulatory	●	●					
					Physical	●	●					
					Reputational	●	●					
					Financial	●	●					
					Litigation	●	●					

SECTION	LEGEND:			DISCLOSURE INDEX: INVESTIGATING DISCLOSURE OF WATER PRINCIPLES IN PLATINUM							
	3	FULLY COMPLIANCE	REPORTS NOTED	GEOGRAPHIC LOCATION							
	2	PARTIALLY COMPLIANCE		MINING COMPANY				EASTERN PLATINUM	WESIZWE PLATINUM	GLENGORE	BAUBA PLATINUM
	0	NO COMPLIANCE	YES	FY YEAR REPORTED/DISCLOSED				2017	2018	2018	2018
N/A	NOT APPLICABLE	NO									
1. MANAGEMENT APPROACH DISCLOSURES											
A	DISCLOSURE 303-1 INTERACTION WITH WATER AS SHARED RESOURCE	INTERACTIONS WITH WATER AS A SHARED RESOURCE	A	A description of how the organization interacts with water, including how and where water is withdrawn, consumed, and discharged, and the water-related impacts caused or contributed to, or directly linked to the organization's activities, products or services by a business relationship (e.g., impacts caused by runoff).	●	●	●	●	●	●	
			B	A description of the approach used to identify water-related impacts, including the scope of assessments, their timeframe, and any tools or methodologies used.	●	●	●	●	●		
			C	A description of how water-related impacts are addressed, including how the organization works with stakeholders to steward water as a shared resource, and how it engages with suppliers or customers with significant water-related impacts.	●	●	●	●	●		
			D	An explanation of the process for setting any water-related goals and targets that are part of the organization's management approach, and how they relate to public policy and the local context of each area with water stress.	●	●	●	●	●		
B	DISCLOSURE 303-2 MANAGEMENT OF WATER DISCHARGE RELATED IMPACT	MANAGEMENT OF WATER DISCHARGE RELATED IMPACTS	A	A description of any minimum standards set for the quality of effluent discharge, and how these minimum standards were determined, including:	●	●	●	●	●	●	
			How standards for facilities operating in locations with no local discharge requirements were determined;	●	●	●	●	●			
			Any internally developed water quality standards or guidelines;	●	●	●	●	●			
			Any sector-specific standards considered;	●	●	●	●	●			
Whether the profile of the receiving waterbody was considered,	●	●	●	●	●						
2. TOPIC - SPECIFIC DISCLOSURES											
C	DISCLOSURE 303-3 WATER WITHDRAWAL	WATER WITHDRAWAL	A	Total water withdrawal from all areas in megalitres, and a breakdown of this total by the following sources, if applicable:	Surface water	●	●	N/A	●	●	
					Groundwater	●	●	N/A	●	●	
					Seawater	●	●	N/A	●	●	
					Produced water	●	●	N/A	●	●	
			Third-party water	●	●	●	●	●			
			B	Total water withdrawal from all areas with water stress in megalitres, and a breakdown of this total by the following sources, if applicable:	Surface water	●	●	N/A	●	●	
					Groundwater	●	●	N/A	●	●	
					Seawater	●	●	N/A	●	●	
					Produced water	●	●	N/A	●	●	
			Third-party water	●	●	●	●	●			
			C	A breakdown of total water withdrawal from each of the sources listed in Disclosures 303-3-a and 303-3-b in megalitres by the following categories:	Freshwater (<1000 mg/L TDS)	●	●	●	●		
					Other water (>1000 mg/L TDS)	●	●	●	●		
			D	Any contextual information necessary to understand how the data have been compiled, such as any standards, methodologies, and assumptions used.							
D	DISCLOSURE 303-4 WATER DISCHARGE	WATER DISCHARGE	A	Total water discharge to all areas in megalitres, and a breakdown of this total by the following types of destination, if applicable:	Surface water	●	●	●	●	●	
					Groundwater	●	●	●	●	●	
					Seawater	●	●	●	●	●	
					Third-party water	●	●	●	●	●	
			B	A breakdown of total water discharge to all areas in megalitres by the following categories:	Freshwater (<1000 mg/L TDS)	●	●	●	●		
					Other water (>1000 mg/L TDS)	●	●	●	●		
			C	Total water discharge to all areas with water stress in megalitres, and a breakdown of this total by the following categories:	Freshwater (<1000 mg/L TDS)	●	●	●	●		
					Other water (>1000 mg/L TDS)	●	●	●	●		
			D	Priority substances of concern for which discharges are treated, including:	how priority substances of concern were defined, and any international standard, authoritative list, or criteria used;	●	●	●	●		
					the approach for setting discharge limits for priority substances of concern;	●	●	●	●		
number of incidents of non-compliance with discharge limits.	●	●			●	●					
E	Any contextual information necessary to understand how the data have been compiled, such as any standards, methodologies, and assumptions used.										
E	DISCLOSURE 303-5 WATER CONSUMPTION	WATER CONSUMPTION	A	Total water consumption from all areas in megalitres.	●	●	●	●	●		
			B	Total water consumption from all areas with water stress in megalitres.	●	●	●	●	●		
			C	Change in water storage in megalitres, if water storage has been identified as having a significant water-related impact.	●	●	●	●	●		
			D	Any contextual information necessary to understand how the data have been compiled, such as any standards, methodologies, and assumptions used, including whether the information is calculated, estimated, modelled, or sourced from direct measurements, and the approach taken for this, such as the use of any sector-specific factors.							
F	Frameworks and Governance Reporting and Disclosures			GRI	●	●	●	●	●		
			CDP								
			ICMM								
			UN GLOBAL COMPACT								
			INTERNAL								
			OTHER								
G	Water Risk Factors Reporting and Disclosures			Regulatory			●	●	●		
			Physical	●			●	●	●		
			Reputational				●	●	●		
			Financial								
			Litigation								



SECTION	LEGEND:			DISCLOSURE INDEX: INVESTIGATING DISCLOSURE OF WATER PRINCIPLES IN PLATINUM MINING INDUSTRY						
	3	FULLY COMPLIANCE	REPORTS NOTED	GEOGRAPHIC LOCATION		SOUTH AFRICA	NORTH AMERICAS		EASTERN EUROPE	
	2	PARTIALLY COMPLIANCE		MINING COMPANY		AFRICAN RAINBOW MINERALS	NORTH AMERICAN PALLADIUM	VALE SA	NORNICKEL	
	0	NO COMPLIANCE	YES	FY YEAR REPORTED/DISCLOSED		2018	2018	2018	2018	
N/A	NOT APPLICABLE	NO								
1. MANAGEMENT APPROACH DISCLOSURES										
A	DISCLOSURE 303-1 INTERACTION WITH WATER AS SHARED RESOURCE	INTERACTIONS WITH WATER AS A SHARED RESOURCE	A	A description of how the organization interacts with water, including how and where water is withdrawn, consumed, and discharged, and the water-related impacts caused or contributed to, or directly linked to the organization's activities, products or services by a business relationship (e.g., impacts caused by runoff).						
			B	A description of the approach used to identify water-related impacts, including the scope of assessments, their timeframe, and any tools or methodologies used.						
			C	A description of how water-related impacts are addressed, including how the organization works with stakeholders to steward water as a shared resource, and how it engages with suppliers or customers with significant water-related impacts.						
			D	An explanation of the process for setting any water-related goals and targets that are part of the organization's management approach, and how they relate to public policy and the local context of each area with water stress.						
B	DISCLOSURE 303-2 MANAGEMENT OF WATER DISCHARGE RELATED IMPACTS	MANAGEMENT OF WATER DISCHARGE RELATED IMPACTS	A	A description of any minimum standards set for the quality of effluent discharge, and how these minimum standards were determined, including:	How standards for facilities operating in locations with no local discharge requirements were determined;					
				Any internally developed water quality standards or guidelines;						
				Any sector-specific standards considered;						
				Whether the profile of the receiving waterbody was considered.						
2. TOPIC - SPECIFIC DISCLOSURES										
C	DISCLOSURE 303-3 WATER WITHDRAWAL	WATER WITHDRAWAL	A	Total water withdrawal from all areas in megalitres, and a breakdown of this total by the following sources, if applicable:	Surface water					
					Groundwater					
					Seawater	N/A				
					Produced water					
		Third-party water								
B	Total water withdrawal from all areas with water stress in megalitres, and a breakdown of this total by the following sources, if applicable:	Surface water								
		Groundwater								
		Seawater	N/A							
		Produced water								
		Third-party water								
C	A breakdown of total water withdrawal from each of the sources listed in Disclosures 303-3a and 303-3b in megalitres by the following categories:	Freshwater (<1000 mg/L TDS)								
		Other water (>1000 mg/L TDS)								
D	Any contextual information necessary to understand how the data have been compiled, such as any standards, methodologies, and assumptions used.									
D	DISCLOSURE 303-4 WATER DISCHARGE	WATER DISCHARGE	A	Total water discharge to all areas in megalitres, and a breakdown of this total by the following types of destination, if applicable:	Surface water					
					Groundwater					
					Seawater	N/A				
					Third-party water					
			B	A breakdown of total water discharge to all areas in megalitres by the following categories:	Freshwater (<1000 mg/L TDS)					
					Other water (>1000 mg/L TDS)					
C	Total water discharge to all areas with water stress in megalitres, and a breakdown of this total by the following categories:	Freshwater (<1000 mg/L TDS)								
		Other water (>1000 mg/L TDS)								
D	Priority substances of concern for which discharges are treated, including:	how priority substances of concern were defined, and any international standard, authoritative list, or criteria used;								
		the approach for setting discharge limits for priority substances of concern;								
		number of incidents of non-compliance with discharge limits.								
E	Any contextual information necessary to understand how the data have been compiled, such as any standards, methodologies, and assumptions used.									
E	DISCLOSURE 303-5 WATER CONSUMPTION	WATER CONSUMPTION	A	Total water consumption from all areas in megalitres.						
			B	Total water consumption from all areas with water stress in megalitres.						
			C	Change in water storage in megalitres, if water storage has been identified as having a significant water-related impact.						
			D	Any contextual information necessary to understand how the data have been compiled, such as any standards, methodologies, and assumptions used, including whether the information is calculated, estimated, modelled, or sourced from direct measurements, and the approach taken for this, such as the use of any sector-specific factors.						
F	Frameworks and Governance Reporting and Disclosures			GRI						
				CDP						
				ICMM						
				UN GLOBAL COMPACT						
				INTERNAL						
OTHER										
G	Water Risk Factors Reporting and Disclosures			Regulatory						
				Physical						
				Reputational						
				Financial						
				Litigation						