

MINIMISING OUR ENVIRONMENTAL IMPACT

SETTING THE SCENE | WHAT DRIVES US | LEADERSHIP | DELIVERING ON OUR STRATEGY AND OUTLOOK | ANCILLARY INFORMATION



HOW WE DID IN 2019

SUCCESSES

8%
less water used for the Group

22%
less water purchased at our SA gold operations

Tailings monitoring equipment has been installed at the US PGM operations

CHALLENGES

FIVE
level 3 incidents. Although this has not increased year-on-year, we continue to work to prevent incidents

14%
increase in CO₂e intensity due to inclusion of the newly-acquired Marikana operations

APPROACH

Our environmental management team focuses on the execution of environmental initiatives aligned with Sibanye-Stillwater's strategic objectives, vision and purpose. Internationally recognised principles, including ISO 14001:2015, the ICMM, the World Gold Council's RGMP and the United Nations Sustainable Development Goals guide the team.

These principles are embedded in our systems, business risk and management plans. Compliance with local and international regulations, codes and duty of care supported by the principles, underscore our approach to environmental management.



Our SA gold operations manage extensive tracts of land

We have integrated and aligned environmental functions across our SA operations in terms of our environmental social and governance (ESG) strategy (illustrated below). In-depth alignment of the US PGM operations was concluded in 2019, while alignment of the Marikana operation from June 2019 onwards has progressed well to date. The ESG strategy informs the environmental operating model, strategic goals and objectives, and the associated performance measures for 2020 and beyond.

ESG STRATEGIC THEMES				
ENVIRONMENTAL	SOCIAL		GOVERNANCE	
Promoting natural resources and improving life – sustainable use through increased environmental consciousness and continual improvement, minimising environmental impacts with a measured transition to a low carbon future	Communities Unlocking the potential of communities affected by our operations through economic empowerment, institutional development and creating local benefit that inspires sustainable living	Stakeholder engagement Our stakeholders will be heard through transparent engagements and incorporating the knowledge gained into our business	Safety and health Aiming to improve the holistic wellbeing of our workforce through the pursuit of risk based monitoring of safety and health factors and improvement in safety and health performance	Respecting human rights of stakeholders and doing our business with integrity and from an ethical foundation by adherence to good governance principles and legal compliance

In line with the strategic goal to strengthen Sibanye-Stillwater’s position as a leading international precious metals mining company, we have begun working towards renewing and enhancing our ISO 14001 compliance across the Group. The Marikana operation’s mining, processing operations and shared business services are already certified according to ISO 14001:2015 environmental management standard and have retained certification during surveillance and recertification audits conducted during 2019. Certification for the SA PGM operations is expected by December 2020, and by December 2021 for the SA gold operations. An ISO 14001 gap analysis for both the SA gold and PGM businesses was conducted in 2019, and action plans developed and progressed. The US PGM operations also conducted an ISO 14001 gap analysis, and are implementing a plan that will create an ISO 14001:2015 compliant environmental management system in 2021.

In addition to monitoring performance and ensuring compliance with the relevant legislation in each jurisdiction, and inspections by relevant government departments and agencies, environmental performance reports are submitted to executive management, with ultimate oversight by the Social, Ethics and Sustainability Committee and the Board. ➕ Refer to the *Social, Ethics and Sustainability Committee’s report* on page 68 and regulatory compliance in ➕ *Corporate governance* from page 89.

The SA gold operations are currently not a signatory of the International Cyanide Management Code (ICMI) for the Manufacture, Transport, and Use of Cyanide in the Production of Gold third party audits. Cyanide is monitored in all ground and surface water monitoring programmes. Gap audits were conducted on all sites by an independent accredited ICMI auditor to ascertain the baseline compliance to the ICMI code requirements. These audits were completed to support the

“Sibanye-Stillwater recognises how vital it is to proactively manage our carbon footprint. We are committed to contributing to a global solution by deploying responsible strategies and actions in the areas within which we operate.”

intent of Sibanye-Stillwater becoming signatories to the ICMI Code. The audits entail both physical site inspections as well as a comprehensive review of the systems that the ICMI requires to be in place.

From the gap audit, areas of full compliance were identified. These require no additional information or systems to obtain accreditation. Only 4% of the compliance gaps were classed as significant with most of these issues identified as common throughout all plants. These included the transport and supply contract that required finalisation with the supplier and the probabilistic water balance per operation that will be completed by mid-June 2020. There are however items that will require capital expenditure to secure compliance such as the secondary containment requirements at both Cooke and Ezulwini plants. The plan is to close the significant gaps at all plants within the next 12 months. The gold plants will therefore be ready for certification audits within the next 12-15 months. These operations were signatories before Sibanye Gold was spun out of Gold Fields in 2013. The Cooke operation has never been accredited and it is anticipated that the process will take about two years.

MINIMISING OUR ENVIRONMENTAL IMPACT CONTINUED

PILLARS OF THE ENVIRONMENTAL COMPONENT OF THE ESG STRATEGY

Environmental vision

Promoting natural resources and improving life – sustainable use through increased environmental consciousness and continual improvement, minimising environmental impacts and a measured transition to a low carbon future.



ENVIRONMENTAL PRIORITIES

Maintain environmental licence to operate

- Respect legally designated protected areas and not mine or explore in World Heritage Sites
- Obtain and maintain environmental authorisations for relevant activities
- Understand and implement local environmental legal requirements
- Align and adhere to appropriate local and internationally recognised standards, guidelines and principles
- Align management of tailings storage facilities to global tailings standards
- ISO 14001 environmental management standard certification
- Manage and mitigate environmental risks
- Foster collaborative, symbiotic relationships with community and environmental groups

Effect continuous improvement

- Continuous improvement of our internal governance practices
- Effective use of technology and innovation in run-of-mine work and in new projects
- Drive leading value creating cost effective solutions

Responsible use of environmental resources

- Drive responsible socio-economic closure solutions for a post mining economy
- Reduce emissions and strengthen resilience to climate change
- Reduce the degradation of natural habitats, halt the loss of biodiversity and protect species on land and water
- Sustainable use and proactive management of environmental resources including energy
- Reduced water risks, including cost, and enhance water security and its quality
- Deliver sound environmental management of chemicals and all wastes – minimise waste to landfill

Drive environmental consciousness through awareness, stewardship and communication on environmental issues

- Influence policymaking and educate policy makers on the value of responsible economic development
- Manage expectations through engagement with key internal and external stakeholders
- Awareness, stewardship and communication on environmental issues
- Protect and enhance our environmental reputation
- Research and development and sharing knowledge

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US AND SA OPERATIONS: SYSTEMS SUPPORTING ENVIRONMENTAL MANAGEMENT

We use the following technologies for proactive environmental management enabling proactive and informed decision making:

- **Pivot-Occurrence:** system to capture and manage environmental incidents and complaints
- **An electronic legal aspect register:** will be developed and integrated into systems at all SA gold and PGM operations
- **Syncromine:** audit system for the management of environmental non-conformances – the environmental module has been customised to schedule audits at planned workplaces based on standard environmental checklists
- **ARC GIS:** platform where environmental water and air quality data is stored in the system and provides tools to determine compliance. A process is underway to record waste data across SA gold and SA PGM operations
- **Qlikview:** a data analysis tool for non-conformances, water quality, water volumes and air quality compliance to enable trend analysis and decision-making

During 2020 the above systems will also be implemented at Marikana.

- **Zednet:** automated system to monitor water flow, consumption, quality and critical reservoir levels allowing all SA operations to identify anomalies and critical trigger parameters, thereby minimising water losses and risks associated with regulatory licences. Also provides tools for proactive management and trend analysis
- **Continuous emissions monitoring system:** online hourly monitoring of SO₂ emissions at the Smelter and particulate matter (PM) emissions at the precious metals refinery (PMR). The PMR has a NO_x analyser and measures NO_x
- **Ambient air quality monitoring stations:** located in and around the Marikana operations to monitor PM and SO₂ emissions
- **BMS:** The business management system is used as a front end to the Safety, Health, Environmental, and Quality Management systems for the Marikana operations, making it easier for users to navigate to the relevant documented information
- **SAP EHS:** used for safety, health and environmental incident reporting at the Marikana operations
- **CURA:** operational risk registers and associated action plans are managed on this system for the Marikana operations
- **SANS Standards Software:** providing access to all SANS standards at the Marikana operations
- **Ecesis:** Used for environmental compliance task management at the US operations



■ A tailings storage facility close to our SA gold operations



■ Fish survey below Elk Creek close to the US PGM operations

MINIMISING OUR ENVIRONMENTAL IMPACT CONTINUED

GROUP PERFORMANCE

TARGETS AND ACHIEVEMENTS IN 2019: SA OPERATIONS

Targets:

Group targets:

- Reduce carbon emissions by **27.3%** for the Group by 2025 (premised on the 2010 Sibanye-Stillwater baseline).

Achievements/performance against Group 2019 Target

- Carbon emissions reduced by **26.4%**, from the 2010 base-year to end 2019 (i.e. we have already achieved 97% of the 2025 target stated above).

SA operations targets

- Reduction of purchased potable water of 15% and 5% for the SA gold operations and PGM operations respectively (2018 base year) to support the water independence strategy
- Zero (0) Level 4 incidents
- 10% reduction in level 3 incidents year on year with no repeats

Achievements/performance against SA operations

2019 targets

- A 22% reduction of purchased water achieved at the SA gold operations; a 11% reduction at PGM operations (excluding Marikana)
- Zero (0) Level 4 incidents
- 20% reduction in Level 3 incidents year-on-year (excluding Marikana operations)

In addition, the following was achieved at the SA operations:

- Gap analyses completed for all SA PGM and SA gold operations, in lieu of the 2020 and 2021 target dates, respectively
- Scope 1 and 2 carbon emissions decrease of 0.6% from 2018 (excluding Marikana operations)
- An energy intensity of 0.53GJ (2018: 0.52) per tonne of ore processed
- 81% compliance in respect of all Water Use Licence (WUL) audits year-on-year for the SA gold operations, with a 2% improvement on the combined year on year compliance
- 76% compliance in respect of all WUL audits year-on-year for the Rustenburg and Kroondal operations (excluding Marikana operations), with a 5% improvement on the combined year-on-year compliance
- 75% compliance in respect of all Environmental Management Plans (EMPs) external biennial audits year-on-year for the SA gold operations, with a 2% improvement on the combined year-on-year compliance
- 72% compliance in respect of all EMPs external biennial audits year-on-year for the Rustenburg and Kroondal operations (excluding Marikana operations), with a 4% improvement on the combined year-on-year compliance
- At the SA gold operations, an 80% compliance for all mine water discharges, and 91% compliance for all treated sewage discharges

Note: The energy intensity factor takes into consideration purchased electricity and direct fuels used, which includes petrol, diesel, aviation fuel, liquid petroleum gas, acetylene, coal and paraffin.

ACHIEVED IN 2019: US PGM operations

The following was achieved:

- Completed ISO 14001:2015 gap analysis and began work on an ISO 14001:2015 compliant environmental management system
- Secured multiple permits at all sites to support the ongoing Blitz and Fill the Mill projects
- Employed automated tailings operation, maintenance, and surveillance technology at all tailings facilities
- Streamlined environmental Key Performance Indicator (KPI) reporting process
- Conducted Initiative for Responsible Mining Assurance (IRMA) self-assessment at East Boulder mine

CDP score

The CDP, formerly the Carbon Disclosure Project, which runs the global disclosure system that enables participants to measure and manage their environmental impacts, awarded Sibanye-Stillwater an 'A' rating for our climate change action and disclosure in our 2019 CDP submission. This places the company in the prestigious global A-List of companies pioneering response to the climate change challenge. As the 2019 CDP is based on the previous year's activity (i.e. 2018), the Marikana operations made a separate CDP submission in 2019. The Marikana operations obtained a B score for its climate change submission. Going forward, the Marikana operations will be included in the Sibanye-Stillwater CDP submissions.

US PGM OPERATIONS

Cost savings and efficiency initiatives include:

- maximising tailings backfill volumes to extend the operating life of our surface tailings storage facilities
- minimising underground water inflows to reduce the volume of water treated and managed
- concurrent reclamation to reduce long-term closure liability
- four-year closure process of the original tailings' storage facility at the Stillwater mine to reduce long-term closure liability
- ongoing water-treatment optimisation to improve treatment efficiency
- ongoing LED lighting changes to improve lighting efficiency and reduce costs
- new product reviews to reduce hazardous waste generation and related costs
- formal environmental KPI data collection process to optimise data collection processes

CLIMATE CHANGE AND CARBON MANAGEMENT

In this year's integrated report, we have elected to head up our review of the various sectors of environmental performance with our report on climate change and carbon management, viewing this as the overarching environmental issue that, in one way or another, impacts all others in this section.

The scientific consensus on climate change is that the world's climate is changing and that these changes are in large part caused by human activities, mainly by emitting CO₂ from fossil fuel combustion. Sibanye-Stillwater considers climate change to be the most pressing global environmental challenge of our time, a challenge which is inextricably linked to all other environmental challenges we face, be it water scarcity, land degradation including erosion, pollution or biodiversity loss – or countless socio-economic issues resulting from these challenges.

Thus, Sibanye-Stillwater recognises how vital it is to proactively manage our carbon footprint. We are committed to contributing to a global solution by deploying responsible strategies and actions in the areas within which we operate.

As the largest primary producer of PGMs, which are used in the production of catalytic converters in automobiles to remove noxious

gases from exhaust fumes, Sibanye-Stillwater is committed to expanding its role in providing a cleaner and sustainable environment and improving lives.

We have been voluntarily monitoring and reporting on our carbon emissions in our integrated reports, and in those compiled for the CDP, using the World Resources Institute's Greenhouse Gas Protocol to determine our carbon inventory.

In 2017, the South African Department of Environment, Forestry and Fisheries (DEFF) promulgated regulations for mandatory annual reporting of carbon emissions, primarily to inform the national inventory. Sibanye-Stillwater's first annual report in this regard was submitted to DEFF in March 2018. The mandatory emissions reports to DEFF will also inform the carbon tax payable in terms of the Carbon Tax Act that came into effect from 01 June 2019.

The South African government has planned for the country's greenhouse gas emissions to peak between 2020 and 2025, to plateau for 10 years from 2025 to 2035, and to then decline from 2036 onwards. For our part, we strive to reduce our carbon emissions year-on-year.

During 2018, our 2010 base-year emissions were reviewed and recalculated in accordance with the Greenhouse Gas Protocol to incorporate our US operations acquired in 2017 and the DRDGOLD transaction concluded in July 2018. The base-year Scope 1 and 2 emissions amounted to 7,808,692 tonnes carbon dioxide equivalent (CO₂e). The base year carbon emissions are being reviewed to incorporate the Marikana operations and are expected to be completed during 2020.

Our carbon emissions were determined by following the World Resources Institute's Greenhouse Gas Protocol. The GHG Protocol seeks to develop internationally accepted GHG accounting and reporting standards. Emissions from companies using the protocol are easier to compare. Calculations were carried out through the application of appropriate emission factors from sources such as the South African Technical Guidelines TG2016-1, US Environmental Protection Agency publications, Intergovernmental Panel on Climate Change (IPCC) guidelines and the UK Department for Environment, Food and Rural Affairs publications. The Global Warming Potential (GWP) rates were selected from the IPCC third assessment report and based on a 100-year timeframe. GWP is a metric that compares the radiative forcing of a tonne of a greenhouse gas over a given period (e.g. 100 years for the purpose of annual greenhouse gas inventory) to a tonne of carbon dioxide. By using GWPs, greenhouse gas emissions can be standardised to a carbon dioxide equivalent (CO₂e). The GWP from the third assessment report was chosen as it is also used by countries when reporting their national inventories to the United Nations Framework Convention on Climate Change (UNFCCC). The quantification of carbon emissions for Sibanye-Stillwater included all applicable greenhouse gases, namely carbon dioxide, methane and nitrous oxide. The operational control consolidation approach was followed and is consistent with the Group's financial reporting. Sibanye-Stillwater quantified its Scope 2 emissions through both the location-based method and the market-based method, as required by the GHG protocol. For companies with operations in markets providing a choice of electricity supply, companies should report Scope 2 emissions according to a location-based method and a market-based method. Each method's results

MINIMISING OUR ENVIRONMENTAL IMPACT CONTINUED

reflect different risks and opportunities associated with emissions from electricity use and can inform different decisions and levers to reduce emissions. Our Beatrix operation in the Free State in South Africa and the Stillwater mine and Columbus metallurgical complex in Montana, US, have choice of supply. A location-based method reflects the average emissions intensity of grids on which energy consumption occurs (using mostly grid-average emission factor data). A market-based method reflects emissions from electricity that companies have chosen. The GHG protocol provides for companies to choose which method's results to use for goal setting and other benchmarks. Sibanye-Stillwater has chosen the market-based method for goal-setting and other benchmarks as it provides a better indication of progress against targets. The market-based method emissions are tracked throughout this report except where otherwise stated.

The IPCC fifth assessment report requires, by 2050, carbon emissions to decrease by 49% to 72%, relative to 2010 levels, and thereby to limit the increase in global average temperatures to below 2°C. This was the basis for setting our base year at 2010.

Our Group science-based emissions reduction target was set before the acquisition of the Marikana operations. Our Group Scope 1 and 2 carbon emissions, excluding the Marikana operations increased by 1.4% from 2018 to 2019. The Scope 1 and 2 emissions decreased by 26.4% from the 2010 base year and 97% of the 2025 target has been achieved.

Scope	2019 emissions (excluding Marikana operations)	2025 target
Scope 1	574,080	N/A
Scope 2 location-based	5,163,767	N/A
Scope 2 market-based	5,169,612	N/A
Scope 1 and 2 location-based	5,737,848	N/A
Scope 1 and 2 market-based	5,743,693	5,676,919

Our Group Scope 1 and 2 carbon emissions, including the Marikana operations increased by 30.8 % from 2018 to 2019.

 See the fact sheet: *Generating clean energy: the Beatrix methane capture and destruction project*

“To maintain alignment with the long-term national emissions reduction trajectory, switching to low-carbon fuel sources where feasible is desirable.”

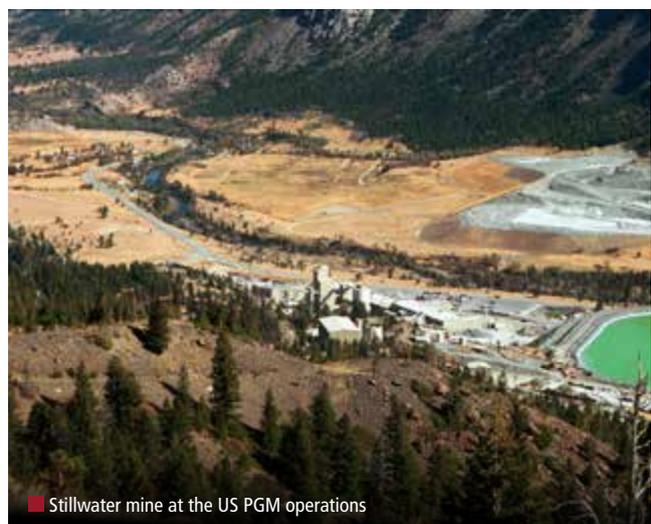
SIBANYE-STILLWATER AND THE SCIENCE BASED TARGETS INITIATIVE

The Science Based Targets Initiative (SBTi) is a collaboration between CDP, the United Nations Global Compact, the World Resource Institute and the World Wide Fund for Nature. The initiative mobilises companies to set meaningful, science-based targets and boost their competitive advantage in the transition to the low-carbon economy. SBTi's overall aim is that, by 2020, science-based target setting will become standard business practice and corporations will play a major role in driving down global greenhouse gas emissions.

In June 2018, Sibanye-Stillwater sent their Group target* – to reduce absolute Scope 1 and 2 GHG emissions by 27% by 2025 from a 2010 base year – to the SBTi for review against their assessment criteria. In March 2019, the SBTi approved the Group target, demonstrating that Sibanye-Stillwater's emissions reduction targets conform to the required science-based calculation methodology and is aligned to contribute to the global climate change challenge.

Targets adopted by companies to reduce GHG emissions are considered 'science-based' if they are in line with the level of decarbonisation required to keep global temperature increases below 2°C compared to pre-industrial temperatures, as described in the Fifth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC).

** The Group target excluded the Marikana operations as their emissions were not included in the base year emissions. The base year is being reviewed to include the Marikana operations and is expected to be completed in 2020. Thereafter, the Group emissions reduction target will be reviewed. Using a common methodology, we will then integrate the Group's carbon inventory, which takes into consideration the new greenhouse gas reporting regulations and the SARS rules in terms of the Customs and Excise Act.*



 Stillwater mine at the US PGM operations

SA operations

South Africa's carbon tax legislation came into effect on 1 June 2019. While certain aspects of the carbon tax remain uncertain, the direct financial implications of the carbon tax for Sibanye-Stillwater, in today's terms, at the 2019 carbon footprint and at the basic rate of R120 per tonne of CO₂e, would be approximately R3.3 million per annum for the period 1 June 2019 to 31 December 2019 (or R6 million annualised) on the basis that electricity (i.e. Scope 2 emissions) is excluded. In other words, Sibanye-Stillwater's final liability will be affected by the finalisation of the greenhouse gas reporting regulations and the extent to which it is able to make use of the full suite of allowances that are built into the carbon tax design. The first payment of the carbon tax is due by 30 July 2020. The carbon tax rate increases by CPI plus 2% annually until the end of 2022, and thereafter the tax liabilities will be adjusted and are expected to increase exponentially in the second phase (2023 onwards) through the inclusion of electricity in the tax net and the reduction and potential complete scrapping of the tax-free thresholds.

Early in 2019, Sibanye-Stillwater conducted a climate change scenario analysis, prompted by the Task Force on Climate-related Financial Disclosures (TCFD)'s recommendations. The TCFD is an industry-led task force established by the Financial Stability Board to develop consistent, voluntary climate-related financial risk disclosures for stakeholders. The analysis identified water as well as both the supply and the cost of electricity as a risk. See further details on Water Conservation and Water Demand Management (WCWDM) plan on [page 214](#) and the energy efficiency section on [page 212](#).

Flowing from the scenario analysis, a low carbon transition plan was developed, and which includes, amongst others, several initiatives aimed at reducing electricity consumption by approximately 2% per annum.

The SA operations' year-on-year annual average, Scope 1 and Scope 2 CO₂e emissions, excluding the Marikana operations, declined by 3.5% (2018: 3.9%) at the end of 2019 to 5,492,687 tCO₂e from the 2010 base year emissions of 6,539,971 tCO₂e, exceeding our year-on-year target of 2.1%. The Beatrix methane project in the Free State province continued to reduce Scope 1 and 2 emissions. The project entails the removal of methane from the Beatrix South underground sealed-off section to surface. This methane was routed to electricity generators and a backup flare. Approximately 3,747 MWh of electricity was generated. The backup flare combusted any methane that was not consumed by the electricity generators. Through flaring, the methane is transformed into carbon dioxide and thereby reduces the greenhouse gas effect. The Beatrix methane project also generated carbon credits during the first crediting period from 2011 to June 2018. During 2019, the second batch of 53,956 carbon credits was verified and issued by the UNFCCC. The verification of the third and final batch of carbon credits from this project is underway.

The appointment of energy service companies to assist with energy optimisation initiatives (optimisation of compressed air and water refrigeration circuits) has been instrumental in the continuous reduction of our carbon footprint and therefore the potential carbon

tax payable. Scope 2 emissions (purchased electricity), excluding the Marikana operations, decreased by 0.6% from 5,002,404 tCO₂e to 4,972,750 tCO₂e, primarily due to the implementation of energy efficiency initiatives. Reducing electricity consumption would, by extension, reduce our carbon emissions, and feed into our science-based target [+](#) (see box on page 208).

To maintain alignment with the long-term national emissions reduction trajectory, switching to low-carbon fuel sources where feasible is desirable. The first 50MW unit of the planned solar photovoltaic plant, proposed to be constructed in the West Rand near the gold operations, is expected to reduce carbon emissions by 129,858 tCO₂e per annum. [+](#) See page 212 for details.

The SA operations Scope 1 and 2 emissions, inclusive of the Marikana operations increased by 29.6% year on year from 5,525,134 tCO₂e to 7,162,778 tCO₂e. Our base year emissions will be restated in 2020 to incorporate the Marikana operations and following this our emissions reduction target will be reviewed and reset.

US PGM operations

Annual average Scope 1 and Scope 2 carbon emission levels increased by 74% (2018: decreased 5.0%) in 2019 to 245 tCO₂e. Scope 1 emissions (direct fuel use) increased by 17% due to higher consumption of diesel for transportation and explosives usage related to the Blitz expansion project. Scope 2 emissions (purchased electricity) increased by 101% due a change in the supply of electricity being a combination between renewable and non-renewable.



Our US PGM operations are situated in a pristine environment

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Total CO₂e emissions: Scope 1, 2 and 3 (000t CO₂e)

					2018				2017			
	US				US				¹ US			
	Group	operations	SA operations		Group	operations	SA operations		Group	operations	SA operations	
	Total	PGMs	PGMs ²	Gold	Total	PGMs	PGMs	Gold	Total	PGMs	PGMs	Gold
Scope 1 (excluding fugitive mine methane)	323	54	164	104	203	46	44	113	196	32	43	121
Scope 1 (fugitive mine methane)	366	na	0	366	366	na	na	366	565	na	na	565
Scope 2 location-based	6,719	191	2,984	3,544	5,097	95	1,398	3,604	5,837	183	1,573	4,081
Scope 2 market-based ²	6,725	197	2,984	3,544	5,097	95	1,398	3,604	5,837	183	1,573	4,081
Scope 3 ³	1,597	211	953	433	2,157	569	995	593	2,539	544	980	1,016
CO ₂ e intensity (per tonne milled) for scope 1 and 2	0.16	0.18	0.10	0.27	0.14	0.11	0.07	0.24	0.13	0.01	0.06	0.25

¹ January to December 2017 in accordance with World Resources Institute (WRI) Greenhouse Gas Protocol

² Scope 1 and 2 emissions include fugitive mine methane. The fugitive mine methane emissions for 2019 amounted to 366 037t CO₂e. We have chosen to report our Scope 1 and Scope 2 emissions separately from our Scope 3 emissions as Scope 1 and Scope 2 emissions are under our direct control while Scope 3 emissions represent the effect of our business activities across the supply chain. Although it is not a mandatory Intergovernmental Panel on Climate Change reporting category, we are also reporting our fugitive mine methane emissions in the Free State province of South Africa in line with the transparency principle of the ISO greenhouse gas quantification standard. Though the base year and prior year emissions has as yet not been restated to include the Marikana operations, as a first step, towards meeting the recommendations of the World Resources Institute, greenhouse gas protocol, A corporate accounting and reporting standard, revised edition, the scope 1 and 2 emissions and scope 3 emissions include the emissions from the Marikana operations for the 2019 calendar year. The Marikana operations were acquired in June 2019 and the full integration and alignment is still underway. For years prior to 2019, the location-based scope 2 emissions were used as a proxy for the market-based emissions in accordance with the WRI GHG Protocol

³ Scope 3 emissions decreased in 2019 as compared to 2018, as a result of operational downscaling (2, 6, 7 shafts at Driefontein and Beatrix 1 shaft and 1 gold plant) which led to lower levels of commodities being used, improvement in the emission factor for refining and smelting and the decrease of the Eskom electricity transmission and distribution loss emission factor for the SA operations from 0.0567 to 0.02.

For Scope 3 emissions from the US operations, in the absence of a site-specific or US country-specific emission factor, the South African-specific emission factor is used for the Stillwater operations as the bulk of Sibanye-Stillwater's emissions emanate from the SA operations. The US operations continue to refine the processes for the reporting of information for the Scope 3 categories.

The following Scope 3 categories are not included:

- Capital goods, fuel- and energy-related emissions not included in Scope 1 or Scope 2: emissions associated with extraction, production and transportation, waste generated in operations, downstream transportation and distribution, end-of-life treatment of sold products, and downstream leased assets from Marikana operations were not historically tracked and are excluded. These categories will be phased-in over the next few years
- Upstream leased assets: no significant upstream leased assets have been identified
- Use of sold products: emissions associated with use of products sold are deemed insignificant as only processing and end-of-life treatment of products sold are expected to have significant associated emissions
- Franchises: Sibanye-Stillwater does not have franchises

The following Scope 3 categories are included:

- Purchased goods and services: CO₂e emissions associated with extraction and production
- Capital goods: CO₂e emissions associated with production of purchased company-owned vehicles
- Fuel- and energy-related emissions not included in Scope 1 or Scope 2: emissions associated with extraction, production and transportation of diesel, petrol, liquid petroleum gas, coal, blasting agents, oxyacetylene and grid electricity
- Upstream transportation and distribution: CO₂e emissions associated with transportation and distribution of purchased commodities
- Waste generated in operations: CO₂e emissions associated with disposal and treatment of Sibanye-Stillwater's solid waste and waste water in facilities owned or operated by third parties (such as municipal landfills and waste water treatment facilities)
- Business travel: CO₂e emissions associated with employees work-related travel for the SA operations
- Employee commuting: CO₂e emissions associated with transportation of Sibanye-Stillwater's employees between homes and work sites
- Downstream transportation and distribution: CO₂e emissions associated transportation of products from Sibanye-Stillwater sites
- Use of sold products: CO₂e emissions associated with the use of products
- End-of-life treatment of sold products: CO₂e emissions associated with smelting to repurpose products
- Downstream leased assets: CO₂e emissions associated with the leasing of houses where emissions are generated from electricity use at the SA operations
- Investments: CO₂e emissions from investments

AIR QUALITY MANAGEMENT

SA operations

The procedure for air quality management monitoring and reporting is currently in the process of being reviewed to integrate the recently acquired Marikana operations.

Atmospheric emissions licences are in place at all operations where they are required including Beatrix, Burnstone, Cooke, Driefontein, Kloof, and the Marikana operations. Operations have a range of installed abatement technologies to assist with emissions management and abatement – these include but are not limited to electrostatic precipitators; variable throat scrubbers and sulphur fixation plants. All operations submitted annual reports for licensed activities to DEFF's National Atmospheric Emissions Inventory System online portal in March 2019.

At the SA gold operations, external audits on AELs commenced during Q4 2019 and the reports are expected to be finalised by the end of Q1 2020.

Several of the airsheds within which we operate and have mining operations in (e.g. the Waterberg-Bojanala area of North-West and the Highveld Priority Area in the Gert Sibande District Municipality) have been declared 'priority areas' which, in terms of the National Environmental Management: Air Quality Act (NEM: AQA) is believed to be an area where the ambient air quality standards are being, or may be, exceeded in the area and where air quality is perceived to be generally poor and/or deteriorating. Our Burnstone operation and the PMR are located in the declared Highveld Priority Areas. During 2019, Sibanye-Stillwater continued our active participation in the Highveld Priority Area and the Bojanala Implementation Task Team meetings. Following the acquisition of the Marikana operations, the smelter, BMR, PMR and assay laboratory have been added to the scope of air quality management in terms of point source emissions. The key challenges in terms of compliance to the 2020 minimum emission standards (and 2020 AEL limits) lie at the PMR in terms of particulate matter emissions from the main stack, in spite of the various scrubbing circuits in place to remove the key pollutants. A project has been initiated to upgrade the ignition scrubber and install a cloud chamber to reduce particulate matter levels to below the 2020 limits. The smelter and base metals refinery have implemented a number of projects to reduce emissions to below the 2020 limits ahead of the 1 April 2020 deadline, including upgrading and tweaking of existing scrubber and electrostatic precipitator pollution control equipment, as well as the tie-in of the selenium and tellurium removal stack at the base metals refinery into the smelter's SO₂ scrubbing circuit. In addition to this, a fugitive emissions reduction management plan has actively been implemented at the smelter to reduce our ground level concentrations of SO₂, resulting in a significant reduction in ground level concentrations of SO₂. Our strategy and emissions reduction management plans speak to the staggered implementation of these projects over the years to ensure compliance is achieved and maintained.

The Inspectorate from the Gert Sibande District Municipality carried out a compliance inspection of the Burnstone operation in May 2019 and no non conformities were raised.

Dust remains a challenge and a continual focus area. Dustfall regulations require areas to be classified as residential or non-residential in accordance with the local town-planning scheme.

Dustfall levels are compared with the limits stipulated in the dustfall regulations, and together with exceedances, reported to the authorities (district municipalities as legislated competent authorities together with action plans).

At our SA PGM operations dust management was prioritised as part of our 2017 Environmental Remediation Plan. In 2018 a five-year dust mitigation plan was developed. The plan called for several detailed specialist studies including shear modelling, dust dispersion modelling and dust bucket placement. These studies have since been concluded with the draft reports received in December 2019. Monthly dust deposition monitoring is conducted by external third parties. Current dust control and dust mitigation measures implemented include the use of netting, canon spraying and planting of tamarisk. The Marikana operations implemented chemical dust suppression on Western Platinum tailings dams 3, 4 and 5 and installed canon sprayers on Eastern Platinum tailings dam 1, where re-mining is taking place. Theft of the irrigation pipelines on the facilities continues to be an ongoing challenge.

Nitrogen oxide and sulphur dioxide emissions (tonnes)

	2019	2018	2017
Nitrogen oxides (NO_x)			
SA operations ²	1,472	1,119	1,126
SA PGM operations	1,184	662	667
SA gold operations	288	457	459
US operations	221	112	105
Group	1,693	1,231	1,231
Sulphur dioxides³ (SO₂)			
SA operations	1,889	n/a	n/a
SA PGM operations	1,889	n/a	n/a
SA gold operations	n/a	n/a	n/a
US operations	4	4	6
Group	1,893	4	6

¹ Marikana operations included from 01 June to 31 December 2019

² Nitrogen oxide emissions for SA are derived by the multiplication of fuels (diesel, petrol, liquid petroleum gas, coal, helicopter fuel and paraffin) by the corresponding emission factors.

³ Sulphur dioxide emissions are from the Marikana PGM smelters and quantified through a combination of stack measurements and mass balance

The US operations also include SO₂ emissions from the Columbus Metallurgical Complex

MINIMISING OUR ENVIRONMENTAL IMPACT CONTINUED

US operations

We continue to leverage technology to reduce air emissions to levels well below state and federal limits. Air quality at our US operations is mainly affected by sulphur dioxide (SO₂) at our processing facilities. Gases released from smelting operations are routed through a state-of-the-art, dual alkaline, gas/liquid scrubbing system, which removes approximately 99.8% of SO₂. During the year, four tonnes of SO₂ were released, amounting to 4.7% of our permitted limit. Monthly discharge rates have been routinely less than 5% of annual permitted levels.

ENERGY EFFICIENCY

SA operations

To counter the prospects of rising electricity costs and the impact of attracting a carbon tax liability in South Africa, management continues to pursue energy efficiency opportunities at our SA gold and PGM operations in order to limit or reduce the impact on our cost base  (See page 210 for details of our CO₂e emissions). Our energy management strategy focuses on holistic energy efficiency using digital applications, such as digital twinning, and the application of new technologies; as well as ongoing improvements in the use of compressed air, pumping, ventilation and refrigeration and the optimisation of our footprint. This differs to the traditional approach of pursuing and implementing standalone efficiency projects.

In 2019, the SA gold operations consumed a total of 3.42TWh of electricity – a 9.8% reduction from the 2018 consumption of 3.79TWh, largely as a result of energy efficiency improvements, the strike, the care and maintenance of four shafts and Eskom interruptions. Successfully implemented interventions enabled a 0.11TWh (3.1%) reduction in consumption and saved R171 million (2018: R179 million) in electricity expenditure.

2019 electricity consumption for the SA PGM operations increased to 2.23TWh (2018: 1.48TWh) with the inclusion of the Marikana operations. Active intervention, through the implementation of the energy management strategy, enabled the Kroondal, Rustenburg and Marikana operations to collectively achieved a 0.04TWh reduction in consumption and saved R38 million in electricity expenditure.

In terms of NRS048-9, in the event that Eskom cannot supply national electricity demand and initiates a system emergency, the operations are issued a 'load curtailment' instruction several hours in advance, requiring electricity consumption reduction of 10% (Stages 1 to 2), 15% (Stage 3) or 20% (stage 4), depending on the severity of the event. In response to the 28 load curtailment events experienced through Q1 2019 to Q4 2019, the operations managed to meet our obligations while minimising production losses, through the likes of revised pumping schedules at the D10 and K10 shafts. Further, optimised response plans have been put in place to minimise impact and risks associated with any potential future load curtailment events.

As part of the medium- to long-term energy management strategy, Sibanye-Stillwater is still pursuing the first 50MW phase of its 150MW solar photovoltaic project to be built on a site strategically placed between the Driefontein and Kloof mining complexes on the West Rand. The project, originally envisioned in 2014, represents a partial solution to securing alternative electricity supply and enables the power generated to be injected directly into the mine's electrical reticulation while reducing our overall electricity expenditure and

carbon footprint. Hamstrung by regulatory constraints, the project has stalled over the last two years. Sibanye-Stillwater is however encouraged by Government's recent public announcements that the red tape and bureaucracy that has inhibited such projects will be removed, allowing the private sector to aid in relieving the national power supply deficit. The project team is now actively working with government to remove the regulatory barriers and, subject to the required reforms, the project will be progressed through to financial close in 2020.

In parallel, management continues to participate in several forums with the aim of advocating for affordable electricity, resolving the operational and financial woes faced by Eskom and guiding the structural reform of the electricity supply industry, ultimately to ensure the sustainability of our operations and global competitiveness. These forums have included engagement with stakeholders such as Eskom, government, the National Energy Regulator of South Africa, the Energy Intensive User Group and the Minerals Council South Africa.

US PGM operations

Electricity procurement at the US PGM operations follows two distinct schemes due to nuances in Montana's electricity regulation laws. The Stillwater mine and Columbus Metallurgical Complex can purchase power on the wholesale market as a 'choice' customer. The East Boulder mine is required to procure power from a local rural electricity co-operative. In July 2018, the Stillwater mine and Columbus Metallurgical Complex signed a new contract to purchase power from a local Native American tribe.

The US operations have been actively engaged in LED lighting changes, implementing as needed, secondary ventilation, testing battery-powered equipment, identifying and repairing air and water leaks, employing variable-frequency drives to control pump motors, reducing peak-energy demand, and using soft-starts on all large stationary equipment. In 2019, the US upgraded an HVAC system with significant kW hours per year savings, as well as replaced hundreds of fluorescent and metal halide light fixtures with LED fixtures. These projects are done in partnership with utility providers under the University System Benefits (USB) programme. The Montana legislature created this programme after Montana deregulated its electric industry in the late 1990s. At the time, the utilities that were deregulated were undertaking energy efficiency projects that the legislature deemed beneficial. Such projects are funded with a surcharge on utility bills. Under electric USB legislation, utilities serving large customers such as the Stillwater Mine and the Metallurgical Complex, reimburse USB charges for internal energy efficiency projects. The US operations have worked closely with its electricity supplier on these energy efficiency projects through the USB programme since its inception.

Electricity consumption (TWh)

	2019	2018	2017
SA operations	5.65	5.28	⁵ 5.74
Gold	¹ 3.41	¹ 3.79	⁵ 4.14
Beatrix	0.49	0.57	0.63
Cooke	0.39	0.43	0.54
Driefontein	1.14	1.38	1.50
Kloof	1.37	1.39	1.47
PGMs	⁴ 2.22	^{4,5} 1.48	1.60
Kroondal	0.30	0.30	0.36
Rustenburg	1.06	1.18	1.24
Marikana	0.85	⁶ n/a	⁶ n/a
US operations	⁵ 0.35	0.32	² 0.72
Stillwater ³	0.26	0.24	² 0.19
East Boulder	0.08	0.08	² 0.53
Group	5.98	⁵ 5.57	⁵ 6.46

¹ Includes Burnstone's consumption of 0.02TWh

² May to December 2017

³ Includes the Columbus Metallurgical Complex

⁴ Includes Marikana ex Aquarius

⁵ Restated due to totalling errors

⁶ Marikana operation only acquired from June 2019

Energy intensity (GJ/tonne milled)

	³ 2019	2018	2017
SA operations	0.53	0.52	0.60
Gold	0.85	0.81	0.79
Beatrix	0.88	0.72	0.78
Cooke	0.33	0.38	0.53
Driefontein	4.60	1.61	0.91
Kloof	0.68	0.73	0.94
PGMs	0.34	0.28	0.22
Kroondal	0.17	0.17	0.21
Rustenburg	0.36	0.34	0.22
Marikana	0.51	n/a	n/a
US operations	1.41	1.34	¹ 0.95
Stillwater ²	1.94	1.89	¹ 1.40
East Boulder	0.70	0.67	¹ 0.49
Group	0.56	0.55	0.69

¹ May to December 2017

² Includes the Columbus Metallurgical Complex

³ Includes Marikana operations from 01 June to 31 December

The energy intensity factor takes into consideration purchased electricity and direct fuels used, which includes petrol, diesel, aviation fuel, liquid petroleum gas, acetylene, coal, paraffin, propane, natural gas, heavy fuel oil and methane.

MINIMISING OUR ENVIRONMENTAL IMPACT CONTINUED

WATER USE MANAGEMENT

Sibanye-Stillwater applies an integrated approach to the management of our water footprint and water systems infrastructure. Efficient water use is vital to ensure preservation and sustainability of the resource for the benefit of all stakeholders and an objective we are committed to. We aim to achieve this by minimising our use of water with a high socio-environmental value and utilising water with a low socio-environmental value.

Our water conservation and water demand management (WCWDM) plan outlines the key initiatives driving continuous water footprint management improvement. The plan consists of the following components:

- Potable water (clean water that is suitable for human consumption and may be used within mine processes) independence – improving security of supply and minimising our impact on external water resources using alternative available ground water sources and rainwater harvesting, thereby reducing reliance on purchased water sources (high socio-environmental);

- Reduce water loss through:
 - creating water footprint visibility through the implementation of effective real time metering (i.e Zednet), water balance management reporting, proactive leak detection and immediate repair initiatives
 - minimising losses of water through evaporation and seepage by optimising the density of tailings deposition and recovering and recycling of water at our tailing facilities
 - optimising water use efficiency by tracking and managing water use efficiency KPIs for all consumers
- Water quality management – comprehensive water quality monitoring programmes, minimising pollution of the resource through separation of clean and impacted water streams, recycling of impacted streams, treatment where required

Group water use summary

	2019					2018					2017			
	Group	US operations		SA operations		Group	US operations		SA operations		Group	US operations ¹		SA operations
		Total	Total	PGMs ⁹	Gold		Total ⁸	Total ⁸	PGMs ⁸	Gold		Total	PGMs	
Total water withdrawn ² (ML)	123,925	3,590	120,335	19,486	100,849	124,796	4,073	120,723	14,944	105,779	125,800	2,447	14,496	108,857
Water discharged ³ (ML)	75,299	4,029	71,270	152	71,118	70,791	3,580	67,211	0	67,211	70,586	1,714	0	68,872
Water used ⁴ (ML)	50,014	949	49,065	19,334	29,731	54,725	1,213	53,512	14,944	38,568	55,213	733	14,496	39,984
Total water purchased ⁵ (ML)	21,941	147	21,794	13,059	8,735	20,278	120.66	20,157	9,029	11,128	21,036	94	9,040	11,902
Water purchased from water services authorities (%)	44	16	44	68	29	37	10	38	60	29	38	13	62	30
Volumes treated ⁶ (Mt)	42.88	1.51	41.37	26.30	15.08	41.37	3.5	37.87	20.57	17.30	41.83	1.9	20.90	19.03
Intensity ⁷ (kJ/tonne treated)	1.17	⁷ 0.63	1.19	0.74	1.97	1.32	⁷ 0.35	1.41	0.73	2.23	1.32	0.39	0.69	2.10

¹ For eight months from May to December 2017

² Total water withdrawn: water abstracted from groundwater sources and total purchased

³ Water discharged into environment at licensed discharge points  (see incident management on page 222)

⁴ Water used: total withdrawn minus water discharged

⁵ Total water purchased: potable water purchased and waste water purchased at the Rustenburg operation

⁶ Volumes treated: dry tonnes processed in Sibanye-Stillwater metallurgical plants and concentrators

⁷ Intensity: water used/tonne (Volume) treated. For 2018, the intensity levels for the US operations were calculated using water tonnes treated, not mining tonnes treated

⁸ SA PGM figures restated for 2018 after the Kroondal Pits water abstracted was recalibrated.

⁹ Marikana from June to December 2019 included

Driving water independence

The focus of the SA operations is to drive independence from external water suppliers and simultaneously improve security of supply through the identification and licensing of other available sources. Our dependency on municipal water and external suppliers (e.g. Rand Water Board, Sedibeng Water Board, Rustenburg Water Service Trust) is 44% of our total water usage across the SA operations. Reducing our water footprint and dependency on external suppliers not only enables high value socio-environmental water security for local communities and towns, but also provides substantial opportunity to reduce costs.

One of the major opportunities to reduce our dependence on external water suppliers is to treat a portion of the approximately 200ML/day excess water at our SA gold operations to potable water standards and replace the current demand of approximately 25ML/day. Sibanye-Stillwater currently operates several water treatment facilities across the footprint. A project to install a 4ML/day facility as part of a phased approach at our Kloof operation is expected to be rolled out in 2020.

Municipal water independence at our SA PGM operations is critical. The PGM operations are located in and around Rustenburg, a city in a dry, water-constrained region of the North West Province, the region with the fastest growing population in South Africa. Rand Water Board, the biggest supplier of drinking water in the region, has announced their inability to keep up with the increasing demand due to insufficient infrastructure and the current state of the Integrated Vaal River System. Municipal augmentation projects to improve water security in this region are far behind schedule and there are limited medium- and long-term plans in place to support the growing demand.

Sibanye-Stillwater's WCWDM plan, aims to address water security in the region by securing and substituting potable water with grey and available ground water, the use of anthropogenic aquifers to optimise

rainfall harvesting, minimising seepage losses from tailings facilities by implementing scavenger well systems and integrating the water systems of Marikana, Rustenburg and Kroondal, such that water rich areas can supply water scarce areas.

Our water independence will not come at the cost of accessing water sources that have biodiversity value or are in sensitive areas.

Reducing water loss

The Zednet automated continuous water monitoring system, rolled out in 2018, is now used at all SA operations, except for Marikana. Marikana's current monitoring regime and requirements are being assessed against the Group standard. More than 300 potable water meters monitor water consumption continuously, enabling proactive water loss detection and improved leak repair management and monitoring.

With the availability of continuous monitoring and data, an assessment conducted in 2018 concluded that some 50% of our costly potable water supply was lost to leakage at our gold operations. Efforts to reduce the losses proved to be extremely effective (refer to table below). Our reliance on purchased potable water at our SA gold operations reduced by 2,393 ML (22%) year-on-year against a target of 15% reduction and 725 ML (11% excluding the Marikana operations) at our SA PGM operations against a target of 5% reduction. This reduction translates to a cost saving of more than R45 million.

In 2019, the SA operations spent R220 million (excluding Marikana) (2018: R245 million) on the purchase of potable water, which was 10% less than in 2018 despite tariff increases. The reduction can be attributed to the focus on reducing water losses combined with water use footprint reduction initiatives. The Marikana operations spent R60 million on potable water from 1 June to 31 December 2019.

SA operations: potable water purchased (ML)

Gold operations	2019	2018	2017	2016	2015
Beatrix	2,331	2,863	2,881	2,758	3,201
Cooke	1,546	1,790	2,123	2,692	4,112
Driefontein	452	1,603	2,210	1,657	1,726
Kloof	4,406	4,872	4,688	5,247	5,755
Gold – total	8,735	11,128	11,902	12,354	14,794
PGM operations					
Kroondal	1,853	1,917	1,744	2,333	–
Rustenburg	3,896	4,557	4,637	4,977	–
Marikana ¹	8,111	n/a	n/a	n/a	n/a
PGM – total	13,860	6,474	6,381	7,310	–
SA operations	22,595	17,602	18,283	19,664	14,794

¹ Includes Marikana operations for the full year.

MINIMISING OUR ENVIRONMENTAL IMPACT CONTINUED

Water quality management

South African legislation, primarily through the National Water Act and supported by the National Environmental Management Act, requires the management and protection of the water resource, for all users.

Within the SA operations, we influence the four major catchment areas in which we operate – Crocodile West/Limpopo (gold and PGM operations), Olifants (PGM operations) and Vaal (gold and PGM operations) – in terms of direct and indirect water quality and quantity contributions and abstractions, changes in habitat and flow patterns, as well as associated changes in biological components.

These influences are monitored using the following techniques:

- Routine sampling and analyses of water quality, including tracking of issues and management measures to ensure compliance with licences and the protection of other water users
- Monitoring biological indicators to determine spatial and temporal trends in terms of the influences exerted by mining-related activities (refer to Biomonitoring of rivers and biodiversity fact sheet)
- Water quantity monitoring and analyses using water and salt balances to determine improvements in terms of efficiencies and cost-saving initiatives to achieve WCWDM targets

Over and above the river systems for which the monitoring and management initiatives described above are performed, numerous smaller systems, such as drainage lines and wetlands are also managed by:

- specialist wetland assessments to determine wetland boundaries, health and management measures, as well as the monitoring of management measures
- floodline delineations to determine watercourse floodline boundaries, including drainage lines

The new water quality non-conformance procedure was instituted at the end of 2018. The procedure applies to all discharges into the environment and therefore has largely been applicable to the gold operations given that the SA PGM operations are largely discharge free and zero effluent/discharge operations. Under this procedure, we examine our water quality compliance in the downstream environment in terms of various limits, most of which are more stringent than official water use licence limits. Entries are recorded on a monthly basis, and issues are identified, investigated and corrected as per the non-incidents procedure. The Marikana operations have permission (in terms of the integrated WUL) to discharge from the final effluent dams at seven of the waste water treatment works across the property. This water is however re-used at the operations and is only discharged as a contingency when operations shut down for a number of operational reasons. As a result of the improved focus on the management of water quality, an average discharge compliance figure of 81% was achieved for the gold operations. This is an improvement on the 79% achieved in 2018 notwithstanding the increased stringent limits received for some new WULs.

While the PGM operations are zero discharge sites, infrequent and uncontrolled discharges do occur. All discharges are reported, and this information communicated to the authorities. Resulting water quality non conformances are primarily related to nitrates and sulphates.

Water quality compliance percentages for all water discharged

Water quality compliance is measured against the relevant WUL limits assigned for each discharge to the receiving environment. The compliance percentages reflected are only when discharges to the receiving environment are made and do not include where the discharges are re-circulated for other uses as is the case for all SA PGM operations except for the waste water treatment works at Marikana which discharges excellent water quality when there is no demand for re-use.



■ The SA gold Thuthukani shaft

Operation	Compliance (%) to WUL limits		Comment ¹
	2019	2018	
Beatrix Treated effluent	91	97	Good compliance to the new WUL received in July 2019 was shown, despite more stringent limits mainly related to the efforts to optimise operational control.
Burnstone	89	82	Moderate compliance was shown to the limits. The limits applied refer to instream reserve qualities and not discharge limits that are yet to be set.
Driefontein Underground water	98	97	Excellent compliance remaining largely in line with the 2018 reporting period.
Driefontein Treated effluent	90	91	Very good compliance similar to the previous year was shown for the treated sewage effluent discharges.
Ezulwini Underground water	66	62	Poor compliance to the WUL limits continues to be shown. It should be noted that some erroneous limits have been assigned and therefore an amendment application has been submitted to ensure the assignment of limits that are achievable and protective of the receiving environment and other water users. If the erroneous limits are excluded, compliance for the past year was found to be 86% (moderate) as compared to the 66% compliance when all limits are considered. Further initiatives are underway to ensure the continuous improvement in terms of water quality, which includes the continuous optimisation of the pH adjustment treatment process as well as the tracing of key dirty water streams to ensure changes occurring underground do not influence the effectiveness of the treatment strategy.
Kloof Combined underground and treated effluent	91	86	Very good compliance was shown for the underground and treated sewage effluent discharges.
Cooke Underground water	52	56	Poor compliance to the WUL limits. The Cooke operation is still waiting for the outcome of an amended WUL application which was submitted on 8 December 2017. The application addressed the overly stringent WUL compliance limits. Compliance against the application would have increased the 2019 compliance from 52% to 82%. The water from the Cooke 1 to 3 operations is treated via a pH adjustment process before discharge to the Wonderfonteinspruit catchment. Continues pH control and dam cleaning required to sustainably preserve pumping equipment and discharge compliance. The Department of Water and Sanitation has recently agreed to a co-discharge pilot of this water combining the separate discharges of Cooke 1 with Cooke 2 and 3. During the pilot, metal and salt discharge compliance increased as a result of the dilution provided by each water stream for the other. The following actions have been instituted to address the poor compliance: <ul style="list-style-type: none"> • Integrated management system to control pH both at the underground settlers and on surface. This required consistent lime supply and diligent control • Suspended solids control through regular dam cleaning/agitation • Pursuit of combined discharge application and an outcome for the December 2017 WUL amendment application. An application for permanent closure and cessation of the operations is underway which will ultimately address the discharge water quality.
Marikana treated effluent	100	100	All treated effluent is re-used in the mining process, save for a small portion of treated effluent which discharges excellent quality water under licence when there is no demand for re-use.

¹ Compliance classes are defined as follows: Excellent >95%; Very good >90% but <95%; Moderate >80% but less <90% and poor <80%. These classes define descriptive categories used throughout the report regarding water quality to inform management and provide alignment to National Standards.

MINIMISING OUR ENVIRONMENTAL IMPACT CONTINUED

Waste water treatment works – SA operations

During 2019, Sibanye-Stillwater SA operations embarked on a process to review the operation and management of all waste water treatment works under our control. The improvement in discharge compliance, efficiency improvements and a sustainable post mining economy underpin the key focus on the initiative. The review process will be concluded in H1 2020.

The waste water treatment works are currently running at compliance levels of between 85% and 95%. Automated flow-adjusted chlorine dosing stations and additional sludge drying beds will be implemented during 2020 to improve overall discharge compliance.

US PGM operations

The most critical component of the US PGM operations' water management is generally water quality when discharged. All discharged water is treated to state and federal drinking water standards, and no water, even when treated, is discharged directly to surface water. Instead, all discharged water is released to either percolation ponds, land application disposal systems, or deep injection wells.

Efficient and proper management of US PGM operations' water resources continues to be a critical and focused operational effort. Due to the nature of our rock associated with the J-M Reef, neither acid-rock drainage nor metal mobility is a concern. Our primary constituent of concern is nitrogen that is introduced by blasting agents and dissolved in the water flowing through the mines. Given the pristine environment where our mines are located, we focus on proper management of the water following treatment.

First, we employ all reasonable efforts to limit the volume of water encountered underground. Mine water grouting programmes are instrumental in limiting water inflows in our footwall laterals. While driving a footwall lateral, the area in front of the drive is constantly probed with drills to evaluate rock conditions and major water sources. Should a major water source be identified, the drill hole is then used to grout and seal off the water source and allow mining through that zone with limited inflow.

Water encountered in the stoping (mining) blocks must be managed through water treatment and management systems. Limited grouting occurs in these areas, because they are actively mined in multiple cuts. This water generally contains elevated nitrogen from the blasting process. From the stopes, this water is brought to surface to manage. Initially this water is recycled and reused as make-up water in the mill and tailings storage facilities, underground for drill water, in equipment washbays; and for dust control, among other uses. As a result of these water recycling efforts, very little fresh water is necessary for operations. Generally fresh water use is associated with potable water needs, including drinking and showering.

In a low-impact, state-of-the-art technical process, the balance of the mine water not recycled is treated through our mixed-bed bio-reactors. Here, nitrogen contained in the water is converted to nitrogen gas in a biological process and released to the atmosphere. These treatment plants remove upwards of 90% of the nitrogen contained in the water stream. As a result, the discharge of remaining nitrogen in the water is consistently 15% to 30% of regulatory limits or lower. Following treatment, the mine water is either returned to groundwater through a combination of percolation ponds or a

groundwater injection well or land-applied using agricultural pivots for beneficial use.

Through the Good Neighbor Agreement, we are working with the Stillwater Protective Association and Cottonwood Resource Council to develop a stakeholder-driven, independent water monitoring and assurance plan aligning with the goals and objectives of the Good Neighbor Agreement. This adaptive management plan (AMP) has been developed to adjust as conditions change, knowledge improves, regulatory criteria is modified or as targets change. The AMP is a tiered response plan that will lower our triggers for water quality reporting and action to levels below state or federal limits. The AMP is expected to be finalised in 2020.

US PGM OPERATIONS: WATER MANAGEMENT PROJECTS

During the year, the following specific water management projects were advanced at the US PGM operations.

Hertzler percolation ponds

As a result of the need for increased water disposal capacity at the Stillwater mine, the Hertzler percolation ponds were permitted and constructed. These new percolation ponds increase water disposal capacity by a minimum of 1,000 gallons per minute (gpm). This treated water exceeds drinking water standards and is percolated into the groundwater system near the Hertzler tailings storage facility to improve the hydrologic balance. In 2019, these ponds performed as expected with average disposal rates of approximately 600gpm.

Water treatment plant expansion

With ongoing expansion activities associated with the Blitz Project, the water treatment capacity at the Stillwater mine was increased from approximately 1,250gpm to 3,000gpm. This treatment plant expansion continues to focus on biological denitrification.

Disk filtration systems

Both the Stillwater and East Boulder mine sites continued to enhance their biologic water treatment systems. Lower metals and nutrients limits will take effect when the sites' Montana Pollutant Discharge Elimination System permits are renewed in the fall of 2020. To accommodate the total nitrogen and metals limits, a disk filtration system will be installed at each of the sites abutted to the biologic water treatment plants. While installed primarily for removal of organic nitrogen, this system also filters microscopic metals particles that accumulate on the biomass, thus leading to increased metals removal.

RESOURCE UTILISATION AND WASTE MANAGEMENT

MATERIALS CONSUMPTION

At the SA gold operations, the strike that ended in April 2019 and the closure of Beatrix 1 and Driefontein 2, 6 and 7 shafts contributed to lower consumption of timber, cyanide, explosives, hydrochloric acid, caustic soda, cement, diesel, lubricating oil and grease. During 2019, the volume of surface material processed at the gold plant increased to compensate for the lower tonnage from underground. The surface rock dump material has a low in-situ pH below 6, as well as having a mineralogy with deleterious copper. This resulted in more lime consumption. More lime was added to the gold plant process in order to increase the pH to levels that facilitate gold leaching as well as to thermodynamically suppress the formation of copper species that can adsorb onto activated carbon impacting on bullion purity. The SA gold operations' diesel consumption decreased by 49.7% when compared to 2018, as a result of the lower diesel utilisation during the wage strike and closure of Beatrix 1 and Driefontein 2, 6 and 7 shafts. The diesel consumption for the SA PGM operations increased by 37.5% compared to 2018 with the inclusion of the Marikana operations.

At the US PGM operations, a comparison of year-on-year use showed an increase in all commodity usage due generally to the expansion efforts at the US operations.

Materials consumed

	2019				2018				2017						
	US		SA operations		US		SA operations		'US		SA operations				
	Group	operations	PGMs	PGMs ²	Gold	Group	operations	PGMs	PGMs	Gold	Group	operations	PGMs	PGMs	Gold
Timber (t)	67,951	505	20,764	46,682	85,564	146	14,193	71,225	117,706	263	16,041	101,402			
Cyanide (t)	2,509	NA	NA	2,509	3,450	NA	NA	3,450	7,552	NA	NA	7,552			
Explosives (t)	34,813	4,409	27,999	2,738	30,437	4,331	21,920	4,186	31,942	3,893	22,140	5,902			
Hydrochloric acid (t)	5,472	1	876	4,595	5,148	1	0	5,147	4,469	0.4	NA	4,469			
Caustic soda (t)	3,242	128	749	2,365	2,632	0	0	2,384	3,378	204	NA	3,174			
Lime (t)	73,356	6,777	7,978	58,601	50,278	0	0	50,278	72,378	NA	NA	72,378			
Cement (t)	50,719	17,880	26,793	6,046	19,809	3,454	8,294	8,062	60,706	16,459	3,459	40,788			
Diesel (kL)	29,846	9,696	17,384	2,767	26,903	8,766	12,635	5,502	26,059	7,344	12,772	5,943			
Lubricating and hydraulic oil (kL)	8,778	568	7,135	1,074	8,730	447	6,817	1,466	7,170	565	5,194	1,411			
Grease (t)	220	23	106	91	154	15	17	122	224	11	26	187			

¹ Represents consumption from May to December 2017

² Includes Marikana for seven months from June to December 2019

WASTE MANAGEMENT

Sibanye-Stillwater supports responsible environmental management of all waste streams including chemicals and wastes and minimising waste to landfill. The existing waste management procedure is currently under review to fully integrate the Marikana operation as well as to ensure that our new waste procedure fully covers the suite of waste streams that we generate as well as all new and emerging waste legislation requirements.

Waste management (Mt)

	2019				2018				2017						
	US		SA operations		US		SA operations		'US		SA operations				
	Group	operations	PGMs	PGMs	Gold	Group	operations	PGMs	PGMs	Gold	Group	operations	PGMs	PGMs	Gold
Tailings storage facility deposition	33.76	0.66	22	11.1	29.08	0.67	15.0	13.41	32.70	0.39	17.05	15.26			
Tailings deposition into pits	3.9	NA	0	3.9	3.89	NA	0	3.89	3.27	0	0	3.27			
Waste rock/DMS deposition	2.23	1.4	0.83		6.44	1.3	5.14		3.39	0.87	12.52	0			
Retreated mineral waste from waste rock ²	8.21	0.81	0	7.4	12.18	0.69	0	11.49	11.45	0	0	11.45			
Retreated mineral waste from tailings dams ³	5.98	0	2.08	3.9											
Total mineral waste	24.89	2.06	22.83	15	29.27	1.97	10.00	17.30	39.36	1.260	19.57	18.53			

¹ May to December 2017

² Gold-bearing material such as waste rock dumps retreated at plant

³ PGM and chrome rich tailings material from tailings dams retreated at Concentrator Plant

MINIMISING OUR ENVIRONMENTAL IMPACT CONTINUED

SA gold and PGM operations mineral wastes

In the wake of the Vale tailings dam failure, a review was done during H1 2019 of the effectiveness of our tailings storage facilities management system and conditions. The Church of England, through its involvement in the Investor Mining and Tailings Safety Initiative, requested that the results of the report to be published on the Sibanye-Stillwater website at <https://www.sibanyestillwater.com/sustainability/environment/> under the Tailings storage facilities dropdown.

There are several tailings and waste rock reclamation initiatives ongoing across the SA operations which have a number of benefits including reducing of the residue footprint, reducing toxicity of the residue and beneficiating our PGMs, chrome and gold.

These hydraulically or mechanically reclaimed tailings and waste rock dumps are treated through the various metallurgical plants (gold plants and concentrators) for the recovery of gold, chrome and PGMs, and re-deposited on other tailings storage facilities or in pits. The total tonnages retreated at the SA gold and SA PGM operations are reflected in the preceding table.

Many of the waste rock dumps at our shafts across the SA operations are also being reclaimed as part of our concurrent rehabilitation initiatives. Waste rock in these instances is crushed to a suitable size fraction and used for road construction purposes, backfilling and for construction of large dams at the operations. External parties buy waste rock primarily for road construction including national, provincial and local roads around the operations as well as for railway sidings.

SA gold and PGM operations non-mineral wastes (general and hazardous waste)

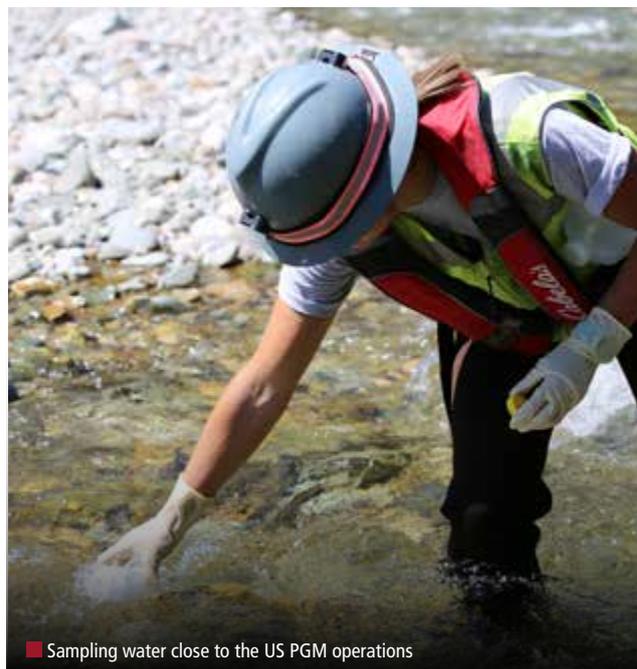
We identify and where possible, prioritise research or implementation of alternative solutions for disposal to landfill to reduce our environmental footprint, reduce resource utilisation, thereby minimising costs. Our strategic intent is to reduce the generation of waste, whilst engaging in research into long-term viable options with the aim of achieving zero waste to landfill in future. Our shaft and plants segregate wastes into general and hazardous waste streams and further separation into recyclable waste streams, allowing for more effective downstream recycling and reuse opportunities.

Specialist waste contractors are used for waste collection and internal and external waste transportation at our operations. General waste that cannot be reused, refurbished or recycled is disposed of at permitted municipal landfill sites. Both external general and hazardous waste facilities that reuse, recycle or treat our waste, need to have the relevant waste authorisations in place. In addition, we audit all external authorised hazardous waste facilities and landfills receiving our waste every two years.

The National Environmental Management Waste Management Act: National Information Regulations requires that hazardous waste generators and landfill owners are registered with the national (South African) and regional (Gauteng) waste information systems (WIS). The Driefontein gold operation and the SA PGM operations have been registered accordingly, and where applicable, other sites will be registered in 2020. The regulations highlight the importance of accurate waste information and waste record-keeping, as is the case for the landfills we operate.

In a further waste management initiative, a focused sewage sludge initiative began in 2018 to allow for the in-vessel composting of sewage sludge at two of the gold operations as a pilot to treat 20 tonnes of sludge per month. The project aims to investigate the beneficial use of sewage sludge waste that is typically sent to landfill and classified as hazardous. Trials have commenced with the first usable batch expected to be produced in the first half of 2020. At the Marikana operations, sewage sludge, along with garden waste and cow manure is being composted in windrow composting circuits, and the compost is being used at the sewer plant areas as well as at the tailings dams to assist with effective grassing programmes, thereby ensuring continuous rehabilitation of the slide slopes.

We adhere to legislation as it relates to the storage, transport and recycling, treatment and disposal of hazardous waste generated by our operations. In anticipation of the newly promulgated prohibition of liquid waste to landfill, in August 2019, we undertook a readiness inspection at our hazardous landfill facilities (Holfontein, Klinkerstene and Vlakfontein) that receive our liquid waste for disposal, to ensure that they practice solidification treatment of liquid waste prior to compliant landfill disposal. We currently comply with this prohibition requirement. A number of smaller hazardous waste streams are generated across all operations. These include among others, waste light bulbs including fluorescent tubes, hydrocarbon wastes, lead waste from the assay laboratory, chemical waste streams and electronic waste. Programmes are in place at some operations to divert these wastes from landfill for recycling and recovery opportunities. Others will follow in 2020 and beyond. Also planned for 2020, is the development and implementation of a waste database at all operations, to ensure detailed collection of waste information for reporting purposes, which will inform the development of waste targets and the execution of action plans pertaining to waste reduction and in accordance with zero waste to landfill philosophy.



■ Sampling water close to the US PGM operations

Our largest hazardous waste streams are calcium sulphite (CaSO₃) generated by our smelter at the Marikana operations, and liquid hazardous waste streams from our precious metal refinery in Brakpan. CaSO₃ is produced as a residue from the capture and treatment of sulphur dioxide (SO₂) emissions at the smelter and is disposed of at a licensed waste disposal site at a cost of approximately R35 million per annum. CaSO₃ is a challenging waste stream due to its hygroscopic nature and the volumes generated (approximately 4000t/m). Finding alternatives to landfill has proved difficult. We however continue to investigate alternatives be it through cleaner technology (conversion of CaSO₃ to gypsum, CaSO₄) or more conservative options such as soil amelioration. In November 2019, we installed a belt filter at the smelter which reduces the water content of the CaSO₃ by an additional 10-15%, reducing waste to landfill by this amount as well as decreasing the salt load in the waste, reducing its toxicity.

The chemical refining processes at the PMR produce approximately 2,200 tonnes of acid and alkaline hazardous liquid waste streams (effluent) per month. A portion of the waste stream is currently being recycled by an acid refinery with the remaining streams treated off-site and disposed to landfill. The stream is first blended and solidified before disposal. The operation has been proactive in finding possible solutions for diverting this waste from landfill. The goal is to run a closed-loop system on these waste streams, to recover PGMs or other beneficial metals and to reuse the substantial amount of water in this waste back into the process plant, reducing municipal water use.

At the PMR, we have received approval for the construction and operation of our hazardous waste incinerator, which means the ash generated from the incineration process, rich in PGMs, will go back into process for extraction. Until this is installed, waste streams such as PPE contaminated with PGMs, filter cloths and mops will continue to go to outside contractors for incineration and recovery of PGMs.

US PGM operations

Hazardous and non-hazardous waste generation rates at the US operations remained essentially unchanged during the year. The Stillwater and East Boulder mines are identified as conditionally exempt small-quantity generators by the EPA while the Columbus Metallurgical Complex is a large-quantity generator as a result of lead waste generation from the fire-assay process in the laboratory. Both mines continue to generate small quantities of hazardous waste associated with aerosol can disposal and the occasional need to dispose of waste chemicals. For many years, the US PGM operations have implemented a new product review process: any products proposed for use on site must first undergo an extensive chemical review by the environmental and safety departments. If the proposed product contains any chemicals that present a safety or environmental risk, they are rejected and not allowed on site. This process has enabled our waste generation rate to remain low.

During 2018, the Stage 2, Phase 1 section of the East Side waste dump at the Stillwater mine was lined to collect all meteorological water passing through the dump and leaching residue nitrogen from the waste rock. There are four proposed lining stages for the waste dump with Stage 1 complete and Stage 2, Phases 1 and 2 complete. All 'new' waste rock generated at the Stillwater mine is placed on a liner. The lining also serves to cap existing, historic waste rock not placed on the liner. The Stage 2, Phase 2 liner was completed in 2019, while Stage 3 and Stage 4 are scheduled for later years depending on

waste rock production rates. Similarly, at the East Boulder mine, the waste rock lining system was completed in 2016 and all waste rock is now stored on liners for water collection. At both mines, the water collected from the waste rock lining systems is transferred to the water treatment plants for denitrification and water management.

At Stillwater some 59% of tailings are used as backfill underground – just short of the maximum achievable – while at Blitz the percentage is between 49% and 50%.

Both Stillwater and East Boulder continued with extensive future waste rock and tailings design and permitting efforts, including identification of best available technologies, site investigations, alternatives assessments, failure modes effects analysis, and multiple accounts analysis for the various waste rock and tailings storage alternatives.

Work on future tailings storage facilities continued at the East Boulder site. Stage 4 of the current facility is under construction. A formal environmental assessment is underway for the future Stage 6 facility and a decision on the final environmental assessment is expected in the fourth quarter of 2020. Under Montana law, an Independent Review Panel (IRP) must review and approve all new tailings facilities. The company was instrumental in drafting and enacting this new law back in 2015. It requires employing the most advanced practices and technologies available, as well as expert review and approval of tailings facility design, operation, maintenance, and closure in advance of construction. The US operations IRP is made up of three internationally recognised tailings facility engineering experts. The East Boulder Stage 6 facility is the first in Montana to be reviewed under this process. In addition to the Stage 6 work, the same IRP experts will begin reviewing the next phase of tailings and waste rock disposal at both the East Boulder and Stillwater Mines.

These activities and efforts were all completed in collaboration with stakeholders including the Good Neighbors, regulatory agencies, independent review panel experts, and local communities. The Good Neighbor Agreement is helping this process run more smoothly and efficiently, especially bearing in mind that tailings storage facilities with a 40- to 50-year life are required.



■ Dust buckets monitoring surface dust close to our operations

MINIMISING OUR ENVIRONMENTAL IMPACT CONTINUED

US OPERATIONS: TAILINGS MONITORING EQUIPMENT

A NAVSTAR monitoring system has been installed and is now operational at the Nye and Hertzler tailings storage facilities to assist in remote monitoring and notification in the unlikely event of tailings storage facility movement. The new monitoring equipment has a GPS link capable of detecting movement in millimetres. Data is provided and trigger points send text messages. Survey monuments and inclinometer monitoring have been made operational at all facilities, although the survey monuments have been temporarily disabled while the facility undergoes expansion. Real-time data is slated to replace the current manual downloads in 2020.

Permitting efforts for the Blitz expansion project are nearly complete. Minor revisions to the operating permit have been received for a geotechnical investigation to support an expansion to the current Hertzler tailings storage facility and the site's waste rock dump, as well as for relocating the holding pond for the site's Land Application Disposal (cropland irrigation) of treated mine water. Montana Department of Environmental Quality is currently considering a minor revision to expand certain structures, as well as expand the mine's permit boundary.

Additionally, the US operations continue to pursue a long-term gypsum management strategy. Relationships have been established with area farmers for ongoing gypsum agricultural use and a long-term management contract has been established with a local landfill. Testing is taking place to see if our synthetic gypsum can be used in a cement plant in Montana.

INCIDENT MANAGEMENT

Sibanye-Stillwater's procedures require that all incidents are reported, investigated, classified and managed according to their potential risk and impact on the environment. Root-cause analyses are conducted to inform appropriate action plans that will mitigate potential impacts and prevent a recurrence of the incident. All incidents are classified, evaluated and reported internally on a monthly basis and externally to the regulators when required.

While we consider all environmental incidents serious, we disclose all level 3 (short-term impact), level 4 (medium-term impact) and level 5 (long-term impact) environmental incidents to the relevant competent environmental authority/regulator.

SA GOLD AND SA PGM OPERATIONS

In 2019, zero level 4 or 5 incidents were recorded. Five level 3 incidents were recorded at the SA operations compared with five recorded in 2018. All incidents were reviewed and impacts closed out. Three level 3 incidents were reported at our gold operations and two at the SA PGM operations. The impact of these incidents can be classified as negligible or low with a short duration.

See environmental incidents at www.sibanyestillwater.com for more detail on the level 3 and higher incidents reported during 2019.

US PGM OPERATIONS

The US PGM operations experienced no level 3 and 4 incidents and 64 internally reportable events during 2019, the latter being an indication of increased diligence in reporting. All releases were immediately cleaned up and remediated.

BIODIVERSITY AND BIOMONITORING OF RIVERS

Sibanye-Stillwater's vision of promoting natural resources and improving life further strongly advocates for the reduction in the degradation of natural habitats, halting the loss of biodiversity and protecting species on land and in water. Our management processes contribute to the conservation of biodiversity and take integrated approaches to land use planning, as guided by the ICMM.

One of the routine monitoring methods applied in order to ensure the effective management of biodiversity is biomonitoring which assesses the various potential stresses placed on the water system and its ability to support biodiversity, particularly in terms of macroinvertebrates (insects) and fish. The results inform management decisions that lead to the improvement of measures that enhance the resilience of these systems to allow for the protection of all water users including the environment.

Detailed disclosure about these topics can be found in the Biomonitoring of rivers and biodiversity fact sheet available at www.sibanyestillwater.com

HERITAGE

SA operations: heritage assessments

All environmental impact assessments for project authorisation, have for several years, included heritage assessments. Heritage sites are identified, placed on the local operational planning databases and mitigation measures proposed and implemented primarily where the operations could potentially impact on these sites. The following heritage sites have been identified at our operations.

- **Beatrix** – No sensitive heritage resources identified
- **Burnstone** – Sites of graves identified
- **Driefontein** – Sites of archaeological importance, graves identified and religious sites
- **Ezulwini** – Sites of cultural significance and archaeological importance identified
- **Kloof** – Sites of archaeological importance and graves identified
- **Rand Uranium** – Sites of graves identified
- **Rustenburg** – Sites of cultural significance, archaeological importance and graves identified
- **Kroondal** – Sites of cultural significance, archaeological importance and graves identified
- **Marikana** – Sites of cultural significance, archaeological importance and graves identified
- **US PGM operations** – As part of the Dry Fork Waste Dump Expansion; the East Side Waste Rock Expansion; and the Hertzler 4/5 Expansion, we have completed additional cultural resource inventory studies in 2019 with reviews by archaeological professionals

REHABILITATION AND CLOSURE

The strategic objective of our closure planning is to align our closure strategy to an over-arching, sustainable, regional closure strategy, current and pending environmental legislation as well as with socio-economic considerations such as acceptable end land-uses by relevant stakeholders. This entails the compilation of comprehensive closure liability assessments, closure plans for each operation as well as rehabilitation plans that seek to identify opportunities for concurrent and future demolition, remediation and rehabilitation of surface areas and infrastructure. In addition, part of our closure planning also focuses on the identification and establishment of sustainable projects such as the Bokamosa Ba Rona initiative on the West Rand (which entails the imminent donation of approximately 15,000 ha of land by Sibanye-Stillwater to the initiative and which is a mega-community project with an agricultural focus – a so-called ‘soil-to-export’ approach).

Total closure liability for the SA operations as at 31 December 2019 (including our portion of environmental liability in joint ventures and projects) was R10.31 billion. Of this, R5.63 billion was for the PGM operations (inclusive of the Marikana operations and third party Pull-and-Share Agreements) and R4.68 billion for the gold operations. The US PGM operations have a closure liability of R6.59 billion.

In South Africa, we own 47,015 hectares of land at and around our SA gold operations and 16,876 hectares of land at and around our SA PGM operations.

As an integral part of the footprint reduction project, infrastructure suitable for demolition and rehabilitation has been identified – this is primarily redundant buildings and associated infrastructure, and infrastructure on prolonged care and maintenance (such as shafts and plants). At our PGM operations, R1.34 billion (23.8%) of the total provision of R5.63 billion has been identified for potential demolition and rehabilitation. At our gold operations, R350 million (7.4%) of the total provision of R4.67 billion, which includes the Cooke operations, has been identified for potential demolition and rehabilitation. The execution of these demolition and rehabilitation projects is subject to the finalisation of the 2020 mine plans and beyond.

Sibanye-Stillwater has encouraged the South African government to extend the implementation date for the proposed Financial Provision (FP) Regulations. The amendment to the FP Regulations, 2015 published on 17 January 2020, extends the period of compliance, i.e. effectively the implementation date of the 2015 FP Regulations, as amended, by 18 months to 19 June 2021. Some of the current draft regulations include the potentially mandatory inclusion of 15% value-added tax (VAT) in all closure provisions as well as the quantification of the latent and residual liabilities. If promulgated, the addition of a 15% VAT would add approximately R1.55 billion to our existing closure liabilities and thus financial provisions. Sibanye-Stillwater, on its own, and in conjunction with the Minerals Council of South Africa, has commented extensively on the financially onerous and impractical nature of some of the FP Regulations, with the view to influencing Government to reconsider and appropriately amend the FP Regulations. All the SA operations are working actively towards meeting the June 2021 deadline, while in parallel engaging with Government and other key stakeholders to formulate less onerous final amended FP Regulations. The mining industry anticipates the long-awaited amendments to the FP Regulations to be published for public review comment during the first half of 2020.



■ *Lestes plagiatus* in southern Africa: our operating environment has a high level of biodiversity



■ Shaft at our SA gold operations



■ Stillwater mine site at the US PGM operations

MINIMISING OUR ENVIRONMENTAL IMPACT CONTINUED

SA OPERATIONS: THE USE OF WETLANDS IN REHABILITATION

In natural water systems, wetlands act as purifiers in freshwater systems. The wetland's natural ability to attenuate flows and reduce the concentration of potentially harmful constituents can be enhanced in constructed wetland systems to assist in water treatment.

Careful design is critical and, while wetlands are less intensive in terms of resource and maintenance, as opposed to conventional chemical and mechanical treatment technologies, they do require maintenance.

The ability to replicate the benefits of wetlands through artificially constructed wetlands has resulted in the implementation of several wetland initiatives. Sibanye-Stillwater is participating in the development of artificial wetlands. The aim of these initiatives is to re-establish once functional wetland systems that have been historically impacted. It should be noted that these wetlands do not form part of declared protected areas.

Increasingly, applications of these passive treatment solutions are becoming the preferred option for water quality management due to their comparatively low maintenance and operational costs. Moreover, they continue to perform beyond the life of an operation.

Ezulwini wetland

- General authorisation received
- 10% of tailings waste and historic paddocks removed since November 2018
- Improvement in water quality, decreasing from 600 microgrammes per litre to 100 microgrammes per litre of uranium, as a result of storm water improvements, drying out the site and instituting alternative discharge pathways

Driefontein rock dump number 6 wetland

- Historically impacted by tailings spills
- Authorisation for rehabilitation received and allowed to remove a downstream rock dump
- Implemented a new pipeline, flange protection measures, new bunding
- Removing tailings out of the watercourse and surrounding catchment, with rehabilitation starting second half 2020

Kloof number 1 rock dump

- The Department of Water and Sanitation required the mine to build a pollution control dam in the Leeuspruit, which would have resulted in the desiccation of the stream and therefore the availability of water to support the ecological functioning of the system as well as the downstream, water uses. Therefore, an alternative of a constructed wetland was proposed which would allow for the polishing of the water quality while maintaining flows within the system
- Water with qualities not achieving the set limits will be treated to an acceptable standard to be released back into the environment and ensure the stream continues to function
- Existing stream bed will also be rehabilitated as it is highly impacted by invasive alien species as well as historical and ongoing mining activities

Project to quantify residual and latent liabilities

We operate in complex surface water catchment areas, which have numerous water users, including our communities, farmers, other industrial users and mining companies. Although water resources are monitored extensively, limited information is available in terms of the quantification of residual and latent liabilities.

We have initiated a project to:

- quantify the potential liabilities associated with our mining activities
- provide recommendations for mitigation
- align the remediation approach (mitigation measures) with regulators and other water stakeholders

The project will consider all catchments in which we operate: the quality of our discharges, the diffuse seepage inputs, the impacts on soils in terms of the potential for release of contaminants in different situations and the potential influence of groundwater interactions. Prioritised areas have been aligned to the revised FP legislation date of 19 June 2021.

US PGM operations

In addition to responsible closure and reclamation, the US operations have conservation easements on nearly 40% of its owned land. These legal mechanisms protect scenic vistas, enhance wildlife habitat, and preserve wildlife migration corridors, while maintaining Montana's rural character and fostering biodiversity and healthy forests.

Reclamation and closure bonds are required at both mines in the US to ensure adequate resources are available to fund reclamation activities at closure. The amounts are adjusted at least every five years or as required by expansion and disturbance requirements, following a collaborative review by the US operations and its regulatory agencies. Based on a five-year review period, the East Boulder mine review began in 2019 while the Stillwater mine review is scheduled for 2020. State and federal regulatory authorities initiate and complete these reviews. The US operations assist in these reviews, provide information and data as requested, and ultimately sign off in agreement with the agency review and calculation.

The reclamation and closure bond is currently US\$25.3 million at the Stillwater mine, including the Benbow Portal, and US\$18.0 million at the East Boulder mine. An additional US\$0.3 million is held for exploration activities not directly tied to either mining operation, for a total of US\$43.6 million.

US PGM operations: land under management and rehabilitated in 2019 (hectares)

	Total and/or permitted	Disturbed	Undisturbed	Rehabilitated/reclaimed
East Boulder	134.6	102.0	32.6	20.8
Stillwater	432.9	359.4	73.5	218.0
Columbus Metallurgical Complex	82.6	13.0	69.6	0
Total	650.1	474.4	175.7	238.8

FUTURE FOCUS

SA OPERATIONS

- Further embed and implement our sustainability strategy, to drive a step change in environmental management and performance. Leverage our ESG focus as well as the principles, best practices and actions associated with the ICMM, World Gold Council and related industry codes and bodies
- Drive pioneering benchmark practice in all areas of environmental management including water, land, air, waste, heritage, biodiversity and closure; ISO 14001 certification for the SA PGM operations by December 2020 and for the SA gold operations by December 2021
- Challenge and influence the complex legislative and law reform environment through direct and indirect participation and advocacy in such areas as financial provision legislation and carbon tax to develop greater clarity and certainty at company and operational level
- Proactively participate in industry and Government forums and platforms to drive common environmental and sustainability agendas and to foster closer alignment and co-operation between industry, community, and local and national government
- Comprehensive carbon footprint disclosure and reduction of our carbon footprint through implementation of emission reduction measures. Advocate for carbon change mitigation
- Improve verifiable compliance to conditions in water use licences, environmental management programmes, atmospheric emissions licences and other regulatory, legal and generally accepted standards
- Reduce overall closure liability, through a focused and cost-effective concurrent rehabilitation programme and footprint reduction programme at our gold and platinum operations;
- Develop a GIS database and heat map for all heritage sites at the SA operations
- Greater focus on strategic and operational waste management issues across the SA operations. These include but are not limited to
 - the development and roll-out of a waste database/waste tracking system
 - the completion of a waste gap audit (followed by action plans to address any gaps)
 - the setting of specific, measurable, achievable, realistic and time-bound (SMART) waste reduction targets at Group and operational level in pursuit of a zero waste-to-landfill philosophy as the endgame
- Develop and implement programmes and initiatives that would enhance and promote environmental awareness/consciousness, stewardship and communication on environmental issues

US PGM OPERATIONS

- ISO-based environmental management systems with intent to submit for certification in 2021
- Formal stakeholder map and engagement plan
- Optimise integrated reporting system
- Widespread environmental compliance, Good Neighbor Agreement, and sustainability training at all sites
- Water treatment plant performance optimisation
- Enhance environmental incident metrics procedure and incident reduction plan
- Complete Good Neighbor Agreement Adaptive Management Plan