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| **Department:** | HEALTH, SAFETY, ENVIRONMENTAL AND QUALITY DEPARTMENT | |
| **Title:** | **Annexure 10: GROUP INTEGRATED QUARTERLY ENVIRONMENTAL REPORT ( Q2 FY 2021)** | |
| **Procedure Nr:** | HSEQ-GP-PO-18 | |
| **Distribution:** | Petra Diamonds Ltd | |
| **Originator:** | Group HSEQ Environmental Lead | |
| **Responsible HOD:** | Group HSEQ Environmental Lead | |
| **References:** | HSEQ-GP-PO-40 | |
| **Annexures:** | none | |
|  | |  |

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|  | |  | |
| **Original Date:** | 20 August 2014 | **Revision Date:** | 1 October 2020 |
| **Revision number:** | 04 | **Next Revision Date:** | October 2021 |
|  | |  | |

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| **Approved:** |  | **Authorised:** |  |
| **Name of official:** | JM Reynecke | **Name of official:** | P Nkuna |
| **Designation:** | HSEQ Environmental Lead | **Designation:** | HSEQ Manager |
| **Approval date:** | 8 October 2020 | **Authorisation Date:** | 12 October 2020 |
|  | |  | |

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| **RACIE** | **Record** |
| Responsible &  Accountable | Name: J M Reynecke  Job Title: Group Environmental Lead  Signed:    Date: |
| Endorsed | Name: Pat Nkuna  Job Title: Group Health, Safety, Environmental and Quality Manager  Date: |

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| 20/01/2021 | EC | Environmental Specialist: | KDM |
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| 20/01/2021 | EC | J Breytenbach | Bryanston |
| 20/01/2021 | EC | E Klapwijk | Bryanston |
| 20/01/2021 | EC | C Kraus | Bryanston |
| 20/01/2021 | EC | A Holder | Cullinan |
| 20/01/2021 | EC | I van der Westhuizen | Koffiefontein |
| 20/01/2021 | EC | N Janse v Vuuren | HDM |
| 20/01/2021 | EC | M Koekemoer | Cullinan |
| 20/01/2021 | EC | B Swart | Cullinan |
| 20/01/2021 | EC | P Nkuna | Kimberley |
| 20/01/2021 | EC | J Oosthuyzen | Cullinan |
| 20/01/2021 | EC | G Titi | Cullinan |
| 20/01/2021 | EC | W Rosenstrauch | Kimberley |
| 20/01/2021 | EC | K van der Merwe | Kimberley |
| 20/01/2021 | EC | H van den Heever | Kimberley |
| 20/01/2021 | EC | C van der Walt | Cullinan |
| 20/01/2021 | EC | A van Deventer | Cullinan |
| 20/01/2021 | EC | M le Roux | Kimberley |

# EXECUTIVE SUMMARY

This is the environmental report for **Q2 of FY 2021**. During the period under review, the following is noteworthy:

**Compliance:**

* No directives have been issued to any of the organisations in Q2, although FDM was issued by the DMRE with a Notice of Intent to issue a compliance directive ito NEMA Section 31L
* Two external complaints had been lodged at CDM relating to (i) a grave site and (ii) a snake hazard on an overgrown piece of land that is not the property of the mine.
* Under general compliance the following are noteworthy:

1. **CDM:** A detailed action plan (tracked on Isometrix) for the process to obtain an Environmental Authorisation and amendment to the Water Use License prior to the development of the new raw water supply infrastructure at the Wilge Dam, has been developed. The review and amendment of the CDM Water Use license (WUL), as well as the Environmental Management Programme (EMPr) is in progress.
2. **FDM** is awaiting formal feedback on the requested amendment on the Environmental Authorisation application for the dismantling of the Bulk Sampling Plant (BSP).
3. **WDL** is in communication with the authorities on closure requirements and training in surrounding communities has commenced after representatives from the villages had been selected for the joint Community of Water Users Association (Songwa and Nhumbu dams). Feedback reports regarding the annual Environmental Report have been submitted to the Mining commission and NEMC.

**Assurance:**

* KDM was recommended to retain their ISO 14001:2015 certification after the BSI audit conducted in December 2020.
* Petra set a KPI on the finalisation of the Annual Rehabilitation Plan document. CDM and FDM had meeting(s) with their management in order meet this KPI. Actions and decisions from the meetings are in the process of being implemented in order to finalise the document
* Williamson Diamond Mine had several interactions with the authorities regarding their closure plan and implementation of recommendations.
* Petra met its KPI of zero Major environmental incidents. One medium incident was reported by FDM: the overflowing of a process water dam onto neighbouring land due to heavy rain over a 24 h period.
* The FY 2021 Closure Liability Assessments for each of the South African organisations are being updated and will be submitted to the DMRE in February 2021.

**Monitoring:**

* **CDM:** Several surface and ground water quality samples exceeded the limits set in the Water use License (WUL). *Preventive action taken*: Water containment facilities are inspected regularly and managed at minimum level to prevent overflow. *Corrective action taken*: Mine continuously follow up on progress regarding the WUL amendment process at Department of Water and Sanitation (DWS). The amendment include amendments to the water quality standards set in the WUL. One dust fall-out monitoring point was above the maximum allowable levels. Environmental noise monitoring was conducted in Dec 2020 in response to a community complaint. The noise results shows compliance to the Noise Standards. CDM has appointed a noise specialist to conduct further investigations as it appears if infra-sound may be the reason for the complaint.
* **FDM:** Monitoring in the second quarter included the annual survey of environmental noise, PM10 and PM2.5. The new unit for purging was successfully commissioned during this quarter and all accessible boreholes were purged and thereafter sampled. There were some exceedances on the borehole water quality, only one exceedance on fall out dust standards and no exceedances to PM10, PM2.5 and environmental noise.
* **KDM:** Several ground and surface water monitoring sites exceeded the standards set in the WUL. No exceedances occurred for fall-out dust, PM10, PM2.5. Environmental noise was not monitored.
* **WDL:** Several surface water monitoring localities exceeded the standards. No other monitoring was conducted in this quarter.

**Performance:**

* To be noted that:

(i) Williamson Diamond Mine’s operating status is “Care and Maintenance”. Thus, KPI tracking could not be applied as most KPIs are normalised against tonnes treated.

(ii) Although the potable water, paper, fuel and electricity use of the Bryanston offices had not been considered in the reported Petra totals, their contribution to the Petra GHG emissions has been considered as GHG Protocol requirements.

* Finsch Diamond Mine completed the rehabilitation of 15.2 ha of disturbed mining land.
* *The KPI set by Petra Diamonds for maintaining total water use efficiency within 1% deviation from the FY 2020 figures have been met by both the Cullinan and Koffiefontein Mines, as well as Petra Diamonds with a decrease of 34%* in *total water consumption per tonne treated.* This was measured against the KPI value based on the FY 2020 annual water consumption.
* *Energy efficiency is a key performance area and the KPI for FY 2021 requires maintaining electricity use efficiency levels within 1% deviation from the FY 2020 figures. Only Cullinan Diamond Mine met the KPI.* Petra Diamonds did not meet the KPI, as the combined electricity efficiency was 26% higher than the KPI value based on the FY 2020 annual electricity efficiency figure. It is mainly as a result of lower production tonnes at the South African mines and the Williamson Mine’s electricity use being included in the total Petra electricity use, without any contribution to total tonnes treated.
* *The second KPI that was set to improve energy use efficiency requires a 1% improvement in TMM diesel use per tonne treated. The Cullinan and Finsch Mines met the KPI, as well as Petra Diamonds with a combined TMM diesel use efficiency figure that was 40 % lower* than the KPI value based on the FY 2020 annual TMM diesel use efficiency figure. A significant contributing factor to this improved value was the lower volumes of TMM diesel used at Williamson Diamond Mine while under “Care and Maintenance.”
* *The KPI for a year on year reduction of not less than 1% in waste sent to landfill has been met by the Cullinan and Koffiefontein Mines.* Most of the mines disposed in Q2 of the remainder of waste that could not be disposed of in the Lockdown period. It resulted in increased volumes of waste disposed to landfill as compared to the KPI values based on the annual FY 2020 waste disposal figures. The total volume of waste disposed to landfill for Petra Diamonds was 51% above the KPI value.
* The normalised carbon footprints expressed in tCO2-e/ct, for Cullinan Diamond Mine, as well as for Petra Diamonds were lower than the Q2 FY 2020 normalised carbon footprint values. The total GHG emissions (non-normalised carbon footprint) in tCO2-e were lower for all the mines as compared to Q2 FY 2020. The lower fuel and electricity use at Williamson Diamond Mine is an important factor contributing to the decrease in total GHG emissions.

**ENVIRONMENTAL COMPLIANCE, ASSURANCE, PERFORMANCE**

**Quarter 1 FY 2021**

Table 1: Summary

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Paragraph** | **KPI** | **TARGET** | **CDM** | **FDM** | **KDM** | **WDL** | **PETRA** |
| **COMPLIANCE** | | | | | | | |
| **1.1** | **Directives and Instructions** | **≤1 directive/**  **instruction per org.** | 0 | Notice of Intent | 0 | 0 | 0 |
| **1.2** | **Authority Audits and Inspections** |  | none | DMRE: 6 findings | none | none |  |
| **1.3** | **General Compliance** |  | Several | BSP de –commission-ing | None Reported | Several |  |
| **1.4** | **External Complaints** |  | 2 | none | none | none |  |
| **ASSURANCE** | | | | | | | |
| **2.1** | **ISO 14001: 2015 Certification – all South African operations** | **100 %** | June 2020 certified | Feb 2020 certified | Dec 2020 recommend certification | N/A |  |
| **2.2** | **Reporting of Environmental Incidents (total incidents)** |  | 317 | 248 | 8 | 61 | 634 |
| **2.3** | **Significant Environmental Incidents** | **0 Major incidents** | 0 | 1 med | 0 | 0 | 1 med |
| **2.4** | **Internal Audits and Assessments** |  | Legal Compliance audit | CAP | 0 | None Reported | GHG emissions audit |
| **2.5** | **Mine Closure and Rehabilitation: Finalised Annual Rehabilitation Plan document, proof of management workshops** | **100%** | Meeting Q1 and Q2 | Meeting Q1 | No meeting | Authority meetings |  |
| **2.6** | **Financial Liability** |  |  |  |  |  |  |
| **MONITORING** | | | | | | | |
| **3** | **Non-conformances to monitoring standards:**  **Surface water** |  |  | N/A |  |  |  |
| **3** | **Non-conformances to monitoring standards:**  **Ground water** |  |  |  |  |  |  |
| **3** | **Non-conformances to monitoring standards:**  **Air quality** |  |  |  |  |  |  |
| **3** | **Non-conformances to monitoring standards: Environmental noise** |  |  |  | Not due Q2 | N/A |  |
| **3** | **Non-conformance to monitoring program** |  |  |  |  |  |  |
| **PERFORMANCE** | | | | | | | |
| **4.2** | **Land Management (increase/decrease of footprint since previous year)** |  |  | -15.2ha |  |  |  |
| **4.3** | **Water management: total water consumption per tonne treated-**  **Maintenance (measured against KPI value = FY 2020+1%)** | **≥ 1%** | -26% | +12% | -18% |  | -34% |
| **4.4** | **Effluent Management** |  |  |  |  |  |  |
| **4.5** | **Energy Management, Electricity efficiency-**  **Maintenance (Measured against KPI value = FY 2020+1%)** | **≥ 1%** | -20% | +3% | +15% |  | +26% |
| **4.5** | **Energy Management, Diesel use (TMM) efficiency-**  **Year on year improvement (Measured against KPI value = FY 2020-1%)** | **≥ 1%** | -40% | -11% | +1% |  | -40% |
| **4.6** | **Materials consumption: FeSi consumption per tonne treated (t/t)** |  |  |  | 413min |  |  |
| **4.7** | **Percentage change in total tonnage of waste to landfill (hazardous and general):**  **year on year improvement (Measured against KPI value= FY 2020 -1%)** | **≥ 1%** | -12% | +84% | -51% | +65% | +51% |
| **4.8** | **Biodiversity Management** |  |  |  |  |  |  |
| **4.9** | **Ozone depleting substances** |  |  |  |  |  |  |
| **4.10** | **Carbon footprint (Reduction in tCO2-e/ct)** |  | -28% | +16% | +29% |  | --1% |
| **`**  **LEGEND** | | | | | | | |
|  | **Meet KPI or requirement / no concern** |  |  |  |  |  |  |
|  | **Small deviation from KPI or requirement/ monitor** |  |  |  |  |  |  |
|  | **Material deviation from KPI or requirement/ concerned** |  |  |  |  |  |  |
|  | **Not applicable/ No information** |  |  |  |  |  |  |

# COMPLIANCE

The compliance of Petra’s Organisations is measured against the applicable environmental legislation in the respective countries of operation. The section below is dedicated to identify any non-compliances by the organisations.

## 1.1 Directives and Instructions

There is an array of environmental legislation that allows for the issuing of either Administrative instructions or Corrective Directives. Relevant legislation includes the National Environmental Management Act and National Water Act. Instructions and directives issued under these pieces of legislation are done through the Environmental Management Inspectorate (EMI’s), also known as the “Blue” and “Green Scorpions”.

In Tanzania this function is performed by either inspectors from the Ministry of Energy and Minerals (MEM) or the Tanzanian Mining Audit Authority (TMAA) in terms of the Environmental Management Act of 2004.

*Petra Diamonds set a KPI of a maximum of 1 legal instruction or directive (≤1) per organisation within the group for this financial year.*

Table 2: *Details of Environmental Directives/Instructions issued in this period*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Mine** | **Q1** | **Q2** | **Q3** | **Q4** | **TOTAL**  **YTD** |
| **CDM** | 0 | 0 |  |  | 0 |
| **FDM** | 0 | 0[[1]](#footnote-1) |  |  | 0 |
| **KDM** | 0 | 0 |  |  | 0 |
| **WDL** | 0 | 0 |  |  | 0 |
| **TOTAL per Quarter** | **0** | **0** |  |  | **0** |

|  |  |
| --- | --- |
| **Organisation:** | None of the organisations was issued with a Directive or Instruction |
| **Date of Directive / Instruction:** |  |
| **Authority:** |  |
| **In terms of Legislation:** |  |
| **Detail of Instruction:** |  |
| **List of Actions to Address Instruction:** |  |
| **Due Date of Reply:** |  |
| **Status:** |  |

## 1.2 Authority audits and inspections

Authorities are mandated to do site inspections and audits to check on compliance to permit and license conditions, as well as general compliance to all applicable legislation.

Table 3: *Authority audits and inspections*

| **Organisation** | **Authority** | **Date of Inspection** | **Scope of inspection** | **No. of Findings/Description** |
| --- | --- | --- | --- | --- |
| FDM | Department of Mineral Resources and Energy (DMRE) | 12/10/2020 | EMPr compliance | **6 findings**:   * Hydrocarbon spillages at Yellow tag to be cleaned up * Unused equipment and vehicles to be parked at demarcated impermeable area – Yellow tag * Move equipment with potential of spilling hydrocarbons to impermeable grounds – Yellow tag * Remove steel from landfill area * Address mixture of waste at recycling bins * Fix leaking pipe at oil water separator - plant |

## 1.3 General Compliance

General compliance issues that are material to the organisations for the period under review, will typically include revision of permits and licences and communication with authorities on the issuing of authorisations.

Table 4: *Material Compliance Issues*

| **Organisation** | **Compliance issues for this period** |
| --- | --- |
| **CDM** | * Water use license (WUL) and environmental authorisation (EA) applications required prior to the development of the new raw water supply infrastructure at the Wilge Dam): A detailed action plan has been developed and is tracked via IsoMetrix. * Amendment of the existing CDM WUL: A Water Specialist has been appointed for updating of the existing wetland delineation study. Final submissions to DWS are expected by 31 March 2021 * Environmental Management Programme (EMPr) Review and amendment: A process for review of the mine EMPr has commenced, workshops with different Departments were held in Dec 2020. An amendment application is expected to be lodged by 31 March 2021. |
| **FDM** | * BSP decommissioning EIA Process: The time frame on the authorisation for the decommissioning of the BSP will have to be reviewed. The name of the BSP was incorrectly indicated in the document. Correspondence with the authority is under way. No formal feedback was received to date on the requested amendment of the authorisation |
| **KDM** | * None reported |
| **WDL** | * Internal Drainage Water Basin (IDWB) Workshop, 30/09/2020-07/10/2020: Feedback was given to communities and training to village representatives and executive officers on the National Mine Closure Committee (NMCC) recommendations. The workshop resulted in visiting of nine villages that are direct beneficiaries of the Songwa and Nhumbu dams to establish a joint Community of Water Users Association. Three representatives were selected from each village. * IDWB Follow- up visit, 18-25/11/2020: The follow-up visit focussed on the training of representatives and village executive officers from villages that are direct beneficiaries of the Songwa Dam. * Completion of safe disposal of Asbestos material from Mwadui Technical School to the Salvageable and Recovery Laydown area * Submission of the feedback reports concerning the Annual Environmental Report to the Mining Commission and NEMC as per received letters, after the final review and General Manager’s approval. |

## 1.4 External Complaints

External complaints from interested and affected parties are considered as very important, especially in view of the reputational implications to the relevant organisation and Petra Diamonds as a whole. Thus, all external complaints are prioritised and managed by means of thorough investigation, effective actions and prompt feedback.

Table 5: *Details of External Complaints Received during this period*

|  |  |
| --- | --- |
| **Organisation** | **External complaints received** |
| **CDM** | * On 15/10/2020 a complaint was lodged regarding a ‘Minnaar Family’ gravesite located historically within CDM property that has currently been invaded by new unknown graves. The scheduled inspection has since been postponed by the complainant. * On 18/12/2020 a complaint was received on the risk of snakes as a result of the dense vegetation next to the old hospital. An inspection of the area confirmed that the property belongs to the municipality who is responsible for vegetation management. The incident is thus closed with no further action required. |
| **FDM** | None |
| **KDM** | None |
| **WDL** | None |

# ASSURANCE

This section of the report focuses on the internal processes and systems on mine. Areas such as certification and Group Projects / Initiatives are reported on.

## 2.1 ISO 14001 Certification

The certification body for ISO 14001 certification for all the South African organisations is BSI (British Standards Institute). All the South African Organisations migrated successfully from the ISO 14001:2004 to the ISO 14001:2015 systems during the past two years. Williamson Diamonds Limited in Tanzania is not formally certified, but the Group Environmental Lead developed a simplified Environmental Management System based on the principles of ISO 14001:2015. It was rolled out in March 2020.

*The KPI for Petra Diamonds is that all the South African organisations are to retain their ISO 14001:2015 certification for the current financial year*

Table 6: *Details of ISO 14001 Audits conducted in this quarter*

|  |  |  |  |
| --- | --- | --- | --- |
| **Organi-sation** | **Date of Audit** | **No of Major NC[[2]](#footnote-2)** | **Details of Major non-conformances** |
| KDM | 9-13/ 12/2019 | 0 | No Major non-conformances were found. The mine was recommended to retain its certification. |

Graph 1*: ISO 14001:2015 audit findings*

## 2.2 Incident Reporting

All environmental incidents reported, are logged on Isometrix (with the exception of WDL where a paper system is in use). Environmental incidents are rated into one of 5 severity classes with medium, high and major incidents classified as significant environmental incidents.

Graph 2: *Total Number of incidents reported per organisation for this period*

## 2.3 Significant Environmental Incidents

Only Medium, High or Major Environmental Incidents reported in this quarter, are reported on in this sub-section. The following table indicates further details of all significant environmental incidents reported.

Petra Diamonds set a KPI of zero Major Environmental Incidents for the current financial year.

Table 7: *Description of Significant Environmental Incidents*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Date** | **Organisation** | **Severity** | **Description and Progress on Actions to Address the Incident** | **Investigation Status** |
| 22/12/2020 | FDM | Medium | On 22/12/2020 heavy rains over a 24 h period resulted in an overflow from Five Mission dam into the neighbouring mine’s land. The incident was rated as a medium incident and reported to the Department of Water Affairs and Sanitation (DWS). An investigation was conducted and the action plan submitted to DWS.  Action Plan:   * Bigger pipes and pumps installed to move larger volumes of water in a shorter time period. * Automated pump start-up set at 50% to create capacity during high rainfall events. * Dam desilting to be done in-house. * Desilting placed on the maintenance schedule | Completed |

## **2.4 Internal** Assessments

Due to legislative requirements, as well as the self –regulatory approach of ISO 14001, the organisations undergo numerous internal and external audits/assessments per year. Only assessments conducted by either on-site personnel, group personnel or consultants contracted for assessments to be used internally only, are noted in this section.

Table 8: *Internal Assessments Conducted in this period*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Organisation** | **IWWMP/ GN R704** | **Legal compliance** | **CAP[[3]](#footnote-3)** | **Internal EMS** | **Other** |
| **CDM** |  | 29/11/2020-03/12/2020:  Final report awaited |  |  |  |
| **FDM** |  |  | 9-12/11/2020:  5 Non-Conformances;  3 Opportunities for Improvement |  |  |
| **KDM** |  |  |  |  |  |
| **WDL** |  |  |  |  |  |
| **Petra** | The annual third party GHG emissions audit to verify the FY 2020 GHG emissions of the Company, as well as each of the organisations (WDL for the first time), is nearing finalisation. The draft audit report has been submitted for review to the organisations. The audit is conducted according to ISO 14064-1 requirements. | | | | |

## 2.5 Mine closure and Rehabilitation

Rehabilitation is a keystone requirement in all EMPRs and has a major impact on the financial provision for each operation. The required documentation is developed for implementation by the operations and implementation is evaluated on an annual basis with the amendments of mine closure liability assessments.

*Petra Diamonds set a KPI of a finalised Annual Rehabilitation Plan with proof of management workshops for the compilation and finalisation of the document.*

Table 9: *Progress on Annual Rehabilitation Plan Document*

|  |  |  |
| --- | --- | --- |
| **Organisation** | **Dates of Management Workshops** | **Progress on document** |
| **CDM** | 04 November 2020 | The draft annual rehabilitation report was received for comments and returned to the Group Mine Closure and Rehab. |
| **FDM** | 15 September 2020 | 16/09/2020: An updated 3 year rehabilitation cost estimate was submitted as per meeting request, to the acting financial manager.  23/10/2020: The topsoil balance was calculated and balance determined between available and planned rehabilitation areas  1-31/10/2020: Rehabilitation site map was internally updated. |
| **KDM** | No meeting conducted | The Closure Risk Assessment (RA) has been finalised and needs to be populated with KPIs.  Rehabilitation areas updated on MAP internally. |
| **WDL** | The National Mine Closure Committee (NMCC) conducted an inspection in September 2020.  The District Mine Closure Committee scheduled a meeting for 15 October 2020. | The mine submitted the first and second progress reports to the Chief Inspector of Mines on the implementation of actions to address the findings received during the NMCC’s inspection.  The mine is still awaiting the final minutes of the 15 October meeting that was aimed at discussing options stipulated I the WDL Mine Closure Plan and recommendations made. |

## 2.6 Financial Liability

Each organisation must annually amend the closure liability calculations and submit to the DMRE for approval. Effective and successful concurrent rehabilitation results in a decrease of the total financial provision for mine closure.

Table 10:  *Financial Liability*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Organisation** | **Amendment for FY 2021 completed** | **Amendment approved by DMRE** | **Total Financial Liability for Mine closure** | **Percentage change in total Financial Liability as compared to FY 2020 (increase (-); decreased (+))** |
| **CDM** | Yes | Due Feb 2021 | R262 603 108 | -4.6% |
| **FDM** | yes | Due Feb 2021 | R262873013 | 11.6% |
| **KDM** | Yes | Due Feb  2021 | R106407144.12 | 3.9% |
| **WDL** | No information submitted |  |  |  |

# MONITORING

The section below indicates all monitoring records for the mines that are legally required to be available. It should be noted that results have a lagging time of one month to allow for analysis results to become available from external laboratories used. All the South African mines make use of a SANAS accredited laboratory.

**Water quality** (surface and underground) is determined in terms of various parameters (e.g. Total dissolved solids (TDS), Electrical conductivity (EC), Total hardness, pH, sodium (Na+), chlorides (Cl-), fluorides (F-), sulphates (SO42-), Magnesium (Mg2+), nitrates (NO3-), E.coli, Biological Oxygen Demand (BOD), etc.) that can be compared to the DWS Target Water Quality Range values for different water uses. The specific standard used, is based on the planned end use of that water source.

However, as all the mines in SA have been issued with Water Use Licenses, specific water quality standards for each mine are included as license conditions and exceedances will have to be reported to the Department of Water Affairs and Sanitation (DWS). It should be noted that kimberlite crushing results in elevated values of chloride and/or fluorides and sulphates. Many relevant localities are also sampled and analysed for microbiological contaminants according to the DWS General Release standard, SANS 241:2011 Microbiological Requirements allowable for drinking water.

Environmental **Fall-out dust**, as well as **PM10** and **PM2.5**concentrations are measured against the standards set in the relevant regulations (National Dust Control Regulations (2013), National Ambient Air Quality Standards for PM2,5(2012) and National Ambient Air Quality Standards (2009)) to the National Environmental Management: Air Quality Act, Act 39 of 2004. All South African operations are registered on the National Air Environmental Information System (NAEIS) and report directly on the system.

Table 11: *Fall-out dust targets according to legislation*

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Conditions** | **Target/standard concentration** | **Permitted frequency of exceeding dust fall rate** |
| **Dust fall rate (D) in**  **(mg/m2/day, 30 days average)** | Residential area | D < 600 | Two within a year, not sequential months |
| Non-Residential area | 600 < D < 1200 | Two within a year, not sequential months |
| **PM10 (µg/m3, 24 hours average)** | 1 Dec 2015 - | PM10 < 75 | Four within a year |
|  | 1 Jan 2016-31 Dec 2029 | PM 2.5  < 40 | Four within a year |

**Environmental noise** (outdoor noise) is measured against the standards set by the Department of Environmental Affairs, based on SANS 10131.

Table 12: *Typical rating levels for Environmental Noise in different districts/areas*

|  |  |  |  |
| --- | --- | --- | --- |
| **Type of District** | **Maximum rating level (*L*Req,T)**a **for ambient noise (**dBA) | | |
| Day/night (24h) | Day time  (06:00 to 22:00) | Night time (22:00 to 06:00) |
| Rural districts | 45 | 45 | 35 |
| Suburban districts with little road traffic | 50 | 50 | 40 |
| Urban districts | 55 | 55 | 45 |
| Urban districts with one or more of the following:  workshops; business premises; and main roads | 60 | 60 | 50 |
| Central business districts | 65 | 65 | 55 |
| Industrial districts | 70 | 70 | 60 |

All exceedances to the relevant monitoring standards for water quality, air quality, as well as environmental noise, are managed as *‘non-conformances to standard*’ by the different organisations.

## CDM environmental monitoring

Detailed water analysis reports containing graphs and trends are available on mine.

CDM: Surface water monitoring (monthly):

All surface and groundwater samples are measured against the WUL conditions.

Table 13: *CDM Surface Water Quality Non-conformances*

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Variable monitored** | pH | EC | SS | DO | Turbidity | Oil and grease | **Coordinates: monitoring locality** |
| **Unit** | pH | mS/m | mg/l | mg/l | NTU | mg/l |
| **Standard's value** | 6.0 – 8.5 | <70 | <25 | ≥6 | <25 | <2.5 |
| Premiermynloop |  | 137 |  | 4.56 |  |  | 25°39'6.25"S  28°27'41.56"E |
| Lapa Dam |  |  |  | 4.13 |  |  | 25°40'2.57"S  28°28'29.18"E |
| No.1 PCD | 9.61 | 176 |  | 4.96 |  |  | 25°39'13.32"S  28°27'59.06"E |
| No.7 Dam Seepage | 8.68 | 155 |  | 5.18 |  |  |  |
| McHardy Dam | 8.37 |  |  | 5.55 |  |  | 25°39'35.17"S  28°27'49.02"E |

CDM: Groundwater monitoring (Quarterly):

Table 14: *CDM Groundwater Quality Non-conformances*

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Variable monitored** | pH | EC | Na | Cl | SO4 | Ca | NO3 | NH4 | F | Zn | TDS | **Coordinates: monitoring locality** |
| **Unit** | mg/l | mS/m | mg/l | mg/l | mg/l | m | mg/l | mg/l | mg/l | mg/l | mg/l |
| **Standard's value** | **5.0**  **-**  **9.2** | **10**  **-**  **48** | **9.0**  **-**  **75** | **1.0**  **-**  **67** | **1.0 - 250** | **NP[[4]](#footnote-4)** | **0.1**  **-**  **18** | **0.01**  **–**  **3.0** | **1**  **-**  **19** | **<5.0** | **<1200** |
| Lapa Borehole |  |  |  |  |  |  |  |  |  |  | <0.263 | 25°40'11.47"S  28°28'25.66"E |
| Du Toits Borehole |  | 79.5 |  |  |  |  |  |  |  |  | <0.263 | 25°38'54.35"S  28°27'10.73"E |
| Nell’s Borehole |  |  |  |  |  |  |  |  |  |  | <0.263 | 25°38'59.34"S  28°26'32.10"E |
| Vorster’s Borehole |  | 5.32 |  |  | 0.948 |  |  |  |  |  | <0.263 | 25°38'57.03"S  28°32'11.36"E |
| Mampa Borehole |  | 91.3 |  |  |  |  |  |  |  |  | <0.263 | 25°39'9.87"S  28°28'19.30"E |
| PM1 |  |  |  |  |  |  |  |  |  |  | <0.263 | 25°39'6.05"S  28°30'5.03"E |
| PM4 |  |  |  |  |  |  |  |  |  |  | <0.263 | 25°39'16.98"S  28°28'22.43"E |
| PM5 |  |  |  | 77.4 |  |  |  |  |  |  | 0.862 | 25°40'9.39"S  28°29'20.04"E |
| PM2 |  |  |  |  |  |  |  |  |  |  | <0.263 | 25°39'53.22"S  28°31'17.12"E |
| CDMBH58 |  |  |  |  |  |  |  |  |  |  | <0.263 | 25°39'54.88"S  28°29'24.29"E |
| CDMBH59 |  | 2.71 |  |  | 0.495 |  |  |  |  |  | <0.263 | 25°38'33.45"S  28°30'6.59"E |
| PM3B |  |  |  |  |  |  |  |  |  |  | <0.263 | 25°40'55.03"S  28°30'43.10"E |
| CDMBH2 |  |  |  |  | 0.585 |  |  |  |  |  | <0.263 | 25°40'34.12"S  28°31'23.93"E |
| CDMBH3 |  |  |  |  |  |  |  |  |  |  | 0.346 | 25°40'31.22"S  28°31'32.39"E |
| CDMBH16 |  | 90.7 |  | 72 |  |  |  |  |  |  | <0.263 | 25°39'23.36"S  28°32'22.69"E |
| CDMBH17 |  |  |  |  |  |  |  |  |  |  | <0.263 | 25°39'9.08"S  28°32'21.41"E |

CDM: Fall out dust (quarterly), PM10 (annual) and PM2.5 (annual) monitoring

Table 15: *CDM Air Quality Monitoring Non-conformances*

| **Sampling date.** | **Monitoring Location Name/ID** | **Monitoring Location Coordinates** | **Exceedances to standard** | | |
| --- | --- | --- | --- | --- | --- |
| **Dust Fall-Out Rate**  **(mg/m2/day)**  **Residential < 600** | **PM10**  **(ug/m3)** | **PM 2,5**  **(ug/m3)** |
| Oct | Cullinan Diamond Lodge (Residential) | 25°40'22.30"S; 28°31'7.34"E | 627 | Monitoring not due Q2 | Monitoring not due Q2 |

CDM: Environmental noise monitoring (annual):

Table 16: *CDM Environmental Noise Monitoring Non-conformances*

|  |  |  |  |
| --- | --- | --- | --- |
| **Sampling date.** | **Monitoring Location Name/ID** | **Monitoring Location Coordinates** | **Exceedances to standard** |
| Dec | No non-conformances |  |  |

## 3.2 FDM environmental monitoring

Detailed water analysis reports containing graphs and trends are available on mine

FDM: Surface water monitoring: (Not a requirement in the amended Water Use License since 2018)

FDM: Groundwater monitoring (Quarterly):

Table 17: *FDM Groundwater Quality Non-conformances*

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Variable monitored[[5]](#footnote-5)** | Electrical conductivity (EC) | Total dissolved solids (TDS) | Total alkalinity | Magnesium (Mg) | Sodium (Na) | Chloride (Cl) | Sulphate (SO₄) | Manganese (Mn) | **Coordinates: monitoring locality** | |
| **Unit** | mS/m | mg /l | mg CaCO3/l | mg/l | mg/l | mg/l | mg/l | mg/l |  | |
| **Standard's value** | 100 | 800 | 400 | 80 | 80 | 100 | 250 | 0.2 | Latitude | Longitude |
| GOB06 | 101 |  | 469 |  |  |  |  |  | -28.41006924 | 23.46572223 |
| F4 |  |  |  |  |  |  |  | 5.2 | -28.37844896 | 23.46415572 |
| M1 | 174 | 1228 |  |  | 181 | 176 | 540 |  | -28.37486 | 23.45493 |
| M4 | 127 | 827 |  |  |  |  |  | 0.414 | -28.37441716 | 23.46105722 |
| E18 | 149 | 1017 |  | 89.5 |  |  | 436 |  | -28.38840197 | 23.44779235 |
| E20 | 103 |  | 523 | 87.7 |  |  |  | 0.255 | -28.39869856 | 23.44738664 |
| E21 | 151 | 1018 | 524 | 99.5 |  |  | 327 | 0.457 | -28.40084007 | 23.44920181 |
| E4 | 295 | 2221 |  | 203 | 133 | 308 | 913 |  | -28.38256 | 23.48479 |
| GA01A | 112 |  | 426 |  |  |  |  |  | -28.37925 | 23.47183333 |
| GA02A | 101 |  |  |  |  |  |  |  | -28.38903333 | 23.4739 |
| GA03A | 136 |  |  | 84.7 |  | 150 |  |  | -28.38346667 | 23.47108333 |
| GA04B |  |  |  |  |  |  |  | 0.409 | -28.38423333 | 23.47763333 |
| M3 | 161 | 1043 |  |  | 96.4 | 133 | 290 |  | -28.38257469 | 23.47916132 |
| G4 |  |  |  |  |  |  |  | 0.22 | -28.37273 | 23.43742 |
| E29 | 112 |  |  |  |  |  |  |  | -28.37439308 | 23.4466113 |
| E31 |  |  |  |  | 106 |  |  |  | -28.3802606 | 23.43465825 |
| E24 | 306 | 2431 |  | 197 | 228 | 185 | 1306 |  | -28.3856717 | 23.46553396 |
| E25 | 235 | 1860 |  |  | 159 | 140 | 853 |  | -28.39256502 | 23.46029903 |
| E26 | 268 | 2190 |  | 87.5 | 202 | 193 | 1101 | 1.61 | -28.39484557 | 23.46097213 |
| E27 | 129 | 852 |  |  |  |  | 267 |  | -28.40157519 | 23.47196081 |
| KLM5 | 223 | 1594 |  | 109 | 194 | 162 | 690 | 2.37 | -28.40122 | 23.47923 |
| KLM6 | 176 | 1228 | 590 |  | 218 |  | 323 |  | -28.39463 | 23.48007 |
| E19 |  |  |  |  | 92.3 |  |  | 0.258 | -28.37828491 | 23.4512084 |
| E30 | 104 |  |  |  |  |  |  |  | -28.37701613 | 23.45828328 |
| E28 | 177 | 1238 |  |  | 102 | 182 | 452 |  | -28.36922899 | 23.47677545 |
| G10 |  |  |  |  |  |  |  | 0.319 | -28.40143054 | 23.42547897 |
| G11 |  |  |  |  |  |  |  | 0.231 | -28.39593722 | 23.42781414 |

FDM: Fall-out dust (monthly), PM10 and PM 2.5 monitoring (annual)

Table 18: *FDM Air Quality Monitoring Non-conformances*

| **Sampling date.** | **Monitoring Location Name/ID** | **Monitoring Location Coordinates** | **Exceedances to standard** | | |
| --- | --- | --- | --- | --- | --- |
| **Dust Fall out rate (mg/m2/day)**  **Residential < 600** | **PM10**  **(ug/m3)** | **PM 2,5**  **(ug/m3)** |
| Oct; Nov; Dec | Five Mission | S 28°22’50.671”; E 23°27’46.502” | No exceedances to standard | Monitoring not due Q2 | Monitoring not due Q2 |
| Dec | Norfin | S 28°22’19.686”; E 23°27’52.877” | 882 |  |  |
| Oct; Nov; Dec | Lime Acres Village | S 28°21’52.589”;  E 23°27’46.213” | No exceedances to standard |  |  |
| Oct; Nov; Dec | Lime Acres Finville –(Hostel) | S 28°22’42.319”;  E 23°26’27.369” | No exceedances to standard |  |  |
| Oct; Nov; Dec | Bonza Quarry | S 28°25’00.289”;  E 23°29’09.624” | No exceedances to standard |  |  |
| Oct; Nov; Dec | Bonza Farm | S 28°24’19.652”;  E 23°29’08.774” | No exceedances to standard |  |  |
| Oct; Nov; Dec | South Brits | S 28°23’31.885”;  E 23°25’50.205” | No exceedances to standard |  |  |
| Oct; Nov; Dec | West Brits | S 28°24’11.919”;  E 23°25’25.754” | No exceedances to standard |  |  |
| Oct; Nov; Dec | Bergplaas | S 28°24’13.919”;  E 23°28’02.917” | No exceedances to standard |  |  |
| Oct; Nov; Dec | LA Bosbokstraat |  | No exceedances to standard |  |  |

FDM: Environmental noise monitoring points and exceedances (annual):

Table 19: *FDM Environmental Noise Monitoring Non-conformances*

| **Sampling date.** | **Monitoring Location Name/ID** | **Monitoring Location Coordinates** | **Exceedances to standard** |
| --- | --- | --- | --- |
| Oct | No 1 | S28°22.506; E23°26.672 | No exceedances to standard |
|  | No 2 | S28°22.941; E23°25.849 | No exceedances to standard |
|  | No 3 | S28°23.607; E23°26.579 | No exceedances to standard |
|  | No 4 | S28°23.635; E23°27.557 | No exceedances to standard |
|  | No 5 | S28°22.630; E23°27.207 | No exceedances to standard |
|  | No 6 | S28°22.506; E23°26.672 | No exceedances to standard |

## KDM environmental monitoring

Detailed water analysis reports containing graphs and trends are available on mine.

KDM: Surface water monitoring (monthly):

All surface water samples are measured against the KDM WUL parameters.

Table 20: *KDM Surface Water Quality Non-conformances*

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Variable monitored** | **Electrical conductivity (EC)** | **Chloride**  **(Cl)** | **Total Dissolved Solids**  **(TDS)** | **Total Hardness** | **Sulphate**  **(SO4)** | **E.Coli** | **Coordinates: monitoring locality** |
| **Unit** | **mS/m** | **Mg/l** | **Mg/l** | **Mg CaCO3/l** | **Mg/l** | **CFU/100ml** |
| **Standard's value** | **100** | **Dom-0-100**  **Ind-0-500**  **Livestock-0-3000**  **Irrigation-0-1.0** | **<1600** | **<1000** | **Dom-0-200**  **Ind-0-500**  **Livestock-0-1000** | **<1** |
| Paddocks (Oct) | 510 | 1231 | 2989 | 547 | 593 |  | 25.006067  -29.422650 |
| Paddocks (Nov) | 494 | 1081 | 2931 | 741 | 727 |  | 25.006067  -29.422650 |
| Holding Dam (Oct) | 485 | 958 | 2671 | 426 | 719 | - | 24.997363  -29.423683 |
| Holding Dam (Nov) | 658 | 1123 | 4529 | 882 | 1787 | - | 24.997363  -29.423683 |
| Mine to Lake (Oct) | 435 | 986 | 2536 | 661 | 579 |  | 25.010835  -29.421765 |
| Mine to Lake (Nov) | 483 | 1020 | 2714 | 752 | 689 | - | 25.010787  -29.419473 |
| Municipality (Oct) | 46.6 | 34.9 | 271 | 147 | 28.5 | <1 | 24.996207  -28.410439 |
| Municipality (Nov) | 48.1 | 37.0 | 292 | 167 | 25.8 | <1 | 24.996207  -28.410439 |
| Plaashuis  (Oct) | 103 | 95.6 | 642 | 533 | 94.9 | - | 24.979562  -29.444915 |
| Plaashuis  (Nov) | 101 | 98.2 | 648 | 492 | 79.7 | - | 24.979562  -29.444915 |
| Kalkfontein (Oct) | 45.8 | 31.9 | 265 | 139 | 24.8 | - | 25.013140  -29.421944 |
| Kalkfontein (Nov) | 42.2 | 33.0 | 293 | 179 | 33.2 | - | 25.013140  -29.421944 |
| River 1  (Oct) | 384 | 873 | 2242 | 909 | 369 | - | 25.017182  -29.421819 |
| River 1  (Nov) | 337 | 685 | 1841 | 813 | 323 | - | 25.017182  -29.421819 |
| River 2  (Oct) | 236 | 562 | 1440 | 624 | 215 | - | 25.009493  -29.401787 |
| River 2  (Nov) | 216 | 420 | 1169 | 573 | 205 | - | 25.009493  -29.401787 |
| Lake  (Oct) | 240 | 564 | 1412 | 425 | 209 | 1 | 25.010787  -29.419473 |
| Lake  (Nov) | 250 | 599 | 1527 | 562 | 317 | <1 | 25.010787  -29.419473 |

KDM: Groundwater monitoring (monthly):

Table 21: *KDM Groundwater Quality Non-conformances*

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Variable monitored** | | **e.g.**  **Electrical conductivity (EC)** | | **Chloride**  **(Cl)** | | **Total Dissolved Solids**  **(TDS)** | **Total Hardness** | **Sulphate**  **(SO4)** | **E.coli** | **Coordinates: monitoring locality** |
| **Unit** | | **mS/m** | | **Mg/l** | | **Mg/l** | **Mg CaCO3/l** | **Mg/l** | **CFU/100ml** |
| **Standard's value** | | **100** | | **Dom-0-100**  **Ind-0-500**  **Livestock-0-3000**  **Irrigation-0-1.0** | | **<1600** | **<1000** | **Dom-0-200**  **Ind-0-500**  **Livestock-0-1000** | **<1** |
| KFM 1 (Oct) | 725 | | 1486 | | 5534 | | 3818 | 2101 | - | 25.001373  -29.423933 |
| KFM 1 (Nov) | 697 | | 1498 | | 5434 | | 3334 | 2180 | - | 25.001373  -29.423933 |
| KFM 2 (Oct)) | 591 | | 1275 | | 4184 | | 2810 | 1382 | - | 25.005480  -29.424202 |
| KFM 2 (Nov) | 591 | | 1348 | | 4246 | | 2553 | 1460 | - | 25.005480  -29.424202 |
| KFM3 (Oct) | 466 | | 923 | | 2930 | | 1066 | 820 | - | 24.996191  -29.427004 |
| KFM3 (Nov) | 464 | | 935 | | 3007 | | 985 | 861 | - | 24.996191  -29.427004 |
| KFM 5 (Oct) | 48.5 | | 43.5 | | 286 | | 8 | 13.4 | - | 25.004579  -29.433401 |
| KFM 5 (Nov) | 48.0 | | 40.5 | | 294 | | 6 | 12.9 | - | 25.004579  -29.433401 |
| KFM 6 (Oct) | 449 | | 858 | | 3204 | | 22629 | 1157 | - | 25.000753  -29.436664 |
| KFM 6 (Nov) | 441 | | 856 | | 3268 | | 2459 | 1277 | - | 25.000753  -29.436664 |
| Cement Dam (Oct) | 153 | | 274 | | 897 | | 618 | 203 | - | 24.946977  -29.421942 |
| Cement Dam (Nov) | 162 | | 271 | | 949 | | 755 | 182 | - | 24.946977  -29.421942 |
| Grond Dam (Oct) | 87.4 | | 27.5 | | 517 | | 440 | 66.1 | - | 24.947815  -29.443807 |
| Grond Dam (Nov) | 85.3 | | 26.7 | | 590 | | 470 | 61.3 | - | 24.947815  -29.443807 |
| Rooi Dam (Oct) | 108 | | 30.1 | | 683 | | 528 | 155 | - | 24.972123  -29.412096 |

KDM: Fall out dust (annual), PM10 (annual) and PM2.5 (annual) monitoring:

Table 22: *KDM Air Quality Monitoring Non-conformances*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Sampling date.** | **Monitoring Location Name/ID** | **Monitoring Location Coordinates** | **Exceedances to standards** | | |
| **Dust Fall-Out Rate**  **(mg/m2/day)**  **Residential < 600** | **PM10**  **(ug/m3)** | **PM 2,5**  **(ug/m3)** |
| Oct- Dec | DB1 | 29⁰25’24.56’’S, 25⁰00’27.26’’E |  |  |  |
| Oct- Dec | DB2 | 29⁰25’31.40’’S, 25⁰00’35.95’’E |  |  |  |
| Oct- Dec | DB3 | 29⁰26’03.50’’S, 25⁰00’16.36’’E |  |  |  |
| Oct- Dec | DB4 | 29⁰26’17.52’’S, 24⁰59’58.83’’E |  |  |  |
| Oct- Dec | DB5 | 29⁰25’32.21’’S, 24⁰58’54.27’’E |  |  |  |
| Oct- Dec | DB6 | 29⁰24’40.38’’S, 24⁰59’45.03’’E |  |  |  |
| Oct- Dec | DB7 | 29⁰24’55.17’’S, 24⁰59’53.32’’E |  |  |  |
| Oct- Dec | DB8 | 29⁰25’09.94’’S, 25⁰00’32.81’’E |  |  |  |

KDM: Environmental noise monitoring (annual):

Table 23: *KDM Environmental Noise Monitoring Non-conformances*

|  |  |  |  |
| --- | --- | --- | --- |
| **Sampling date.** | **Monitoring Location Name/ID** | **Monitoring Location Coordinates** | **Exceedances to standards[[6]](#footnote-6)** |
| No monitoring in Q2 | DB01 | 29⁰25’24.56’’S, 25⁰00’27.26’’E |  |
|  | DB02 | 29⁰25’31.40’’S, 25⁰00’35.95’’E |  |
|  | DB03 | 29⁰26’03.50’’S, 25⁰00’16.36’’E |  |
|  | DB04 | 29⁰26’17.52’’S, 24⁰59’58.83’’E |  |
|  | DB05 | 29⁰25’32.21’’S, 24⁰58’54.27’’E |  |
|  | DB06 | 29⁰24’40.38’’S, 24⁰59’45.03’’E |  |
|  | DB07 | 29⁰24’55.17’’S, 24⁰59’53.32’’E |  |
|  | DB08 | 29⁰25’09.94’’S, 25⁰00’32.81’’E |  |

## 3.4 WDL environmental monitoring

WDL: Surface water monitoring (Quarterly):

Table 24: *WDL Surface Water Quality Non-conformances*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Sampling Date** | **Monitoring Report Name/ID** | **Location**  **(Coordinates)** | **Non-Conformance** | **Standard[[7]](#footnote-7)** |
| Nov | Mine Crescent Pond 3 | E565038,N9610722 | pH- 9.3 | 6.5-8.5 |
| Nov | Main Gate Pond 1 | E564379,N96110271 | Colour - 316 | 300 TCU |
| Nov | Main Gate Pond 1 | E564379,N96110271 | Phosphorus- 6.7 | 6mg/l |
| Nov | Main Gate Pond 1 | E564379,N96110271 | Total Coliform Organisms 89,000,000 | 10,000counts/100mL |
| Nov | Main Gate Pond 2 | E564379,N96110271 | TSS - 440 | 100mg/l |
| Nov | Main Gate Pond 2 | E564379,N96110271 | Phosphorus- 7.1 | 6mg/l |
| Nov | Main Gate Pond 2 | E564379,N96110271 | Total Coliform Organisms 7,000,000 | 10,000counts/100mL |
| Nov | Main Gate Pond 3 | E564379,N96110271 | Total Coliform Organisms 9,300,000 | 10,000counts/100mL |
| Nov | Recovery Dam 02 | E568651,N9609735 | pH- 9.5 | 6.5-8.5 |
| Nov | Recovery Dam 02 | E568651,N9609735 | Sulphate - 744 | 500mg/l |
| Nov | Recovery Dam 02 | E568651,N9609735 | Total Coliform Organisms 5,500,000 | 10,000counts/100mL |
| Nov | Plant RO Water | - | pH- 8.6 | 6.5-8.5 |
| Nov | Plant RO Water | - | TSS - 437 | 100mg/l |
| Nov | Plant RO Water | - | Turbidity - 371 | 300 NTU |
| Nov | Plant RO Water | - | Colour - 5330 | 300 TCU |
| Nov | Plant RO Water | - | Iron total- 20.3 | 5mg/l |
| Nov | Plant RO Water | - | Aluminium – 4.2 | 2mg/l |
| Nov | Plant RO Water | - | Total Coliform Organism 210,000 | 10,000counts/100mL |
| Nov | H 05 | E567585,N9609246 | Colour - 63 | 1.5-50 TCU |
| Nov | Reservoir No 1 |  | TSS - 170 | 100mg/l |
| Nov | Reservoir No 1 |  | Colour - 1480 | 300 TCU |
| Nov | Reservoir No 1 |  | Iron total- 5.9 | 5mg/l |
| Nov | Reservoir No 1 |  | Chloride- 222 | 200mg/l |
| Nov | Reservoir No 1 |  | Total Coliform Organisms 6,000,000 | 10,000counts/100mL |

WDL: Ground water monitoring (Bi-annually):

Table 25: *WDL Groundwater Quality Non-conformances*

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Variable monitored** | **e.g.**  **Electrical conductivity (EC)** |  |  |  |  |  |  |  | **Coordinates: monitoring locality (Latitude and longitude values as recorded in WUL)** |
| **Unit** | **mS/m** |  |  |  |  |  |  |  |
| **Standard's value** | **100** |  |  |  |  |  |  |  |
| WDL did not conduct any Groundwater monitoring in Q2 | | | | | | | | | |

WDL Fall out dust (annual), PM10 (annual) and PM2.5 (annual) monitoring Air Quality monitoring:

Table 26**:** *WDL Air Quality Non-conformances*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Sampling date.** | **Monitoring Location Name/ID** | **Monitoring Location Coordinates** | **Exceedances to standards** | | |
| **Dust Fall-Out Rate**  **(mg/m2/day)** | **PM10**  **(ug/m3)** | **PM 2,5**  **(ug/m3)** |
| WDL did not conduct any monitoring in Q2 | | | | | |

WDL: Environmental noise monitoring:

WDL does not monitor environmental noise, but only occupational noise on a monthly basis

## PERFORMANCE

This section seeks to describe the progress made by the organisations regarding their physical performance in the implementation of sound environmental management principles. The physical performance of the Petra organisations are measured against: Waste Management, Mine Rehabilitation and Land and Biodiversity Management, Water and Effluent Management, Energy Management, Materials Consumption and Waste Management. Ultimately, environmental performance is measured against the carbon footprint or total Green House Gas emissions of each organisation, as well as the Group, as it determines the impact of our diamond mining and recovery activities on a National and International scale. It is on this contribution to Global Warming and Climate Change that Petra Diamonds has to pay Carbon tax since 1 June 2019, when the first carbon tax in SA was due for the period 1 June 2019 to 31 December 2019.

*To be noted that Williamson Diamond Mine’s operating status is “Care and Maintenance”. Thus, KPI tracking could not be applied as most KPIs are normalised against tonnes treated.*

## 4.1 Production

Most consumption figures will be normalised by using the Group’s official production figures.

Table 27: *Production figures*

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Element** | **Unit** | **CDM** | **FDM** | **KDM** | **WDL** | **PETRA** |
| **Ore Treated**  **ROM** | Tonnes | 1 158 996 | 565 598 | 193 730 | 0 | 1 918 324 |
| **Ore Treated from Dumps** | Tonnes | 116 288 | 0 | 0 | 0 | 116 288 |
| **Total**  **Production** | Tonnes | 1 275 284 | 565 598 | 193 730 | 0 | 2 034 612 |
| **Overburden Moved** | Tonnes | 0 | 0 | 0 | 0 | 0 |
| **Waste tonnes hoisted** | Tonnes | 315 | 0 | 0 | 0 | 315 |
| **Carats**  **Recovered** | Carats | 476 827 | 274 534 | 15 155 | 0 | 766 516 |

## 4.2 Land Management

This section indicates the progress towards concurrent rehabilitation as implemented via the Mine Rehabilitation Focus area. It should be noted that those organisations that actively undertake concurrent rehabilitation, are also actively decreasing their final closure costs and closure liabilities on Petra Diamonds, as concurrent and final closure costs are inversely proportional to each other.

Table 28: *Concurrent Rehabilitation Figures*

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Concurrent Rehabilitation Status** | **Unit** | **CDM** | **FDM** | **KDM** | **WDL** | **PETRA** |
| **Total Area Disturbed** | ha | 1642.00 | 1 764.83 | 1642 | 699.26 | 5 748.09 |
| **Total Area Considered Rehabilitated During the Reporting Period** | ha | 0 | 15.20 | 0 | 0 | 15.20 |
| **Cumulative Area Considered as Rehabilitated** | ha | 10.80 | 329.98 | 6.00 | 405.47 | 752.25 |
| **Cumulative Area Undergoing Rehabilitation** | ha | 0 | 11.37 | 0 | 0 | 11.37 |
| **Total Area Still Requiring Rehabilitation** | ha | 1631.20 | 1 423.48 | 1636 | 293.79 | 4 984.47 |

Graph 3: *Rehabilitation as a percentage of Total Mining Area*

## 4.3 Water Management

Water Management is one of the key environmental focus areas, due to the implications for operational sustainability, as well as legal compliance. The organisations’ performance is evaluated against total water consumption and abstraction, normalised water consumption/abstraction measured against production, as well as effluent management. These three indicators are key aspects of the different Operational Water Management Strategies, as well as the Approved Water Use Licenses for CDM, FDM and KDM.

## 4.3.1 Water Abstraction and Consumption

All licensed and registered water uses are subject to authorised maximum volumes that may be extracted/ consumed per source. Exceeding these maximum volumes will result in fines. All organisations in SA will have to pay levies to DWS for all water abstracted from the resource (groundwater, rivers, wetlands, etc.) on approval of their Integrated Water Use License Applications as all water uses will then automatically be registered by DWS. Water saving on mines is and will even more so become a crucial requirement for environmental and economic sustainability.

Petra Diamonds use the DWS Water Demand and Conservation definitions as contained in the Common Vocabulary document to align water management on the mines to the DWS Guidelines for The Development and Implementation of Water Conservation and Water Demand Management Plans for the Mining Sector.

*Petra Diamonds set a KPI for water efficiency measured in m3/t, to be maintained within 1% from the FY 2020 water efficiency figures, thus water efficiency must be ≤ FY 2020 +1%.*

Table 29: *Water Consumption Figures for this period*

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Water Source** | **Unit** | **CDM** | | **FDM** | | **KDM** | **WDL** | **Petra** | |
| **Off- Mine Potable Water Consumption** | m³ | 0 | 175 569 | | 0 | | 315 894 | 491 463 |
| **On-Mine Potable Water Consumption** | m³ | 31 183 | 85 781 | | 1 005 | | 69 550 | 187 519 |
| **Raw Water** | m³ | 1.91 | 204 000 | | 102 508 | | 49 127 | 355 637 |
| **New water intake** | m³ | 151 071 | 700 352 | | 335 613 | | 118 677 | 1 305 713 |
| **Consumptive water** | m³ | 151 071 | 700 352 | | 335 613 | | 118 677 | 1 305 713 |
| **Re-Used / Recycled Water** | m³ | 4 533 356 | 316 350 | | 540 000 | | 0 | 5 389 706 |
| **Underground Dewatering used in mining circuit** | m³ | 119 886 | 410 571 | | 232 100 | | 0 | 1 070 457 |
| **Underground Dewatering NOT used in mining circuit** | m³ | 0 | 0 | | 0 | | 0 | 0 |
| **[[8]](#footnote-8)Total water use on mine** | **m³** | 151 071 | 700 352 | | 335 613 | | 118 677 | 1 305 713 |
| **Total water use per tonne treated (water use efficiency)** | **m³/t** | 0.118 | 1.24 | | 1.73 | | N/A | 0.64 |
| **Rainfall** | **mm** | 241.6 | 317 | | 3.50 | | 324.4 | 644.90 |
| **Percentage change in total water use per ton treated (as compared to KPI value)** | **%** | -26% | +12% | | -18% | | N/A | -34% |

Graph 4: *Water Consumption, Raw Water Intake and Percentage Water Recycled*

## 4.4 Effluent Management

Sewerage effluent is discharged by CDM to the McHardyspruit after treatment to the authorised standard and by FDM to a purification works from where it is re-used, while WDL releases effluent to a surface water body 9stream), after treatment in a settling pond system.

Table 30: *Effluent Volumes*

|  | Unit | **Max licensed volume per quarter** | **Volume discharged** |
| --- | --- | --- | --- |
| **Effluent Discharged to Surface Water Bodies** | m³ | 152 400 | 94 020 |
| **Effluent Discharged to a Purification works** | m³ | N/A | 53 610 |

## 4.5 Energy Management

Climate change and South Africa’s signing of the Paris agreement commits the country to keep the increase of global average temperatures to “well below” 2oC. In line with the national commitment and the proposed implementation of carbon tax as a method to curb carbon emissions, Petra Diamonds must implement energy efficiency programs. The Company partook in the Carbon Disclosure Project (CDP) since FY 2012. As part of this disclosure project, companies were asked to describe the projects and processes put in place to save energy (energy efficiency). The annual CDP questionnaire puts great emphasis on the savings realised through the implementation of indicated energy saving processes. As baseline KPIs were established in FY 2015, improvement KPIs have been set for each operation since FY 2016.

As the carbon footprint of each operation is mainly determined by its energy consumption, the implementation of energy efficiency programs is of crucial importance and all operations are required in FY 2021 to demonstrate at least maintained electricity use efficiency by meeting the *KPI of electricity efficiency in kWh/t to be within 1% deviation from the FY 2020 figures, thus total electricity consumption per ton treated ≤ FY 2020 + 1%.*

*In order to save on fuel use, another strong contributor to the carbon footprint, Petra Diamonds set a KPI of a 1% year on year reduction in Trackless Mobile Machines diesel consumption measured in l/ton treated, thus TMM diesel consumption ≤ FY 2020 figure – 1%.*

Table 31*: Energy Consumption*

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Energy Source** | **Unit** | **CDM** | **FDM** | **KDM** | **WDL** | **Petra** |
| **Diesel for vehicles** | litre | 431 546 | 316 757 | 135 528 | 32 565 | 2 010 637 |
| **Diesel for electricity generation** | litre | 0 | 257 | 0.00 | 3 679 | 12 139 |
| **Total diesel consumption** | litre | 431 546 | 317 015 | 135 528.00 | 36 244 | 2 022 776 |
| **Electricity Generated** | kWh | 1 859 | 0.00 | 0.00 | 11 432 | 41 267 |
| **Electricity Purchased** | kWh | 49 044 613 | 33 433 764 | 11 019 072 | 2 116 615 | 200 471 559 |
| **Total electricity used** | kWh | 49 046 472 | 33 433 764 | 11 019 072 | 2 128 047 | 200 512 826 |
| **Petrol** | Litre | 2 728 | 8 389 | 595 | 2 666.20 | 23 722 |
| **LPG[[9]](#footnote-9)** | kg | 0 | 144 | 48 | 90.00 | 486.00 |
| **Electricity efficiency** | kWh/t | 38.46 | 59.11 | 56.88 | N/A | 47 |
| **Diesel efficiency (TMM)** | l/t | 0.34 | 0.560 | 0.700 | N/A | 0.45 |
| **Percentage change in Electricity use per tonne treated as compared to KPI value** | % | -19.72 % | +2.69 % | +14.95 % | N/A | +25.82 % |
| **Percentage change in TMM diesel use as compared to KPI value** | % | -40% (Group determined KPI value)  (- 49 % against CDM determined KPI value of 0.67) | -10.60 % | +1.43 % | N/A | -39.91 % |

Graph 5: *Electricity Consumption (kWh/t) Comparison Q2 FY 2019 – FY 2021*

## 4.6 Materials Consumption

Materials Consumption impacts on the Waste Management focus area, as lower consumption results in less waste, as well as on the carbon footprint of Petra Diamonds. Paper use has a very important impact on each organisation’s carbon footprint due to the indirect environmental impact on trees /forests as major carbon dioxide consumers and oxygen generators.

Table 32: *Materials consumption*

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Material** | **Unit** | **CDM** | **FDM** | **KDM** | **WDL** | **Petra** |
| **Calcium Carbonate** | kg | 0 | 0 | 0 | 0 | 0 |
| **Calcium Chloride** | kg | 3 750 | 0 | 0 | 0 | 3 750 |
| **Ferrosilicon** | t | 117 | 99 | 80 | 0 | 296 |
| **Ferrosilicon per tonne treated** | g/t | 92 | 175 | 413 | 0 | 145 |
| **Flocculants** | kg | 0 | 3 200 | 2 000 | 24 500 | 29 700 |
| **Grease** | kg | 3 513 | 0 | 134 | 0 | 3 647 |
| **Oils & Hydraulic Fluids** | Litre | 29 708 | 3 260 | 13 167 | 2 225 | 48 360 |
| **Oils & Hydraulic Fluids per tonne treated** | l/t | 0.02 | 0.01 | 0.07 | N/A | 0.02 |
| **Paper Bought** | kg | 3 035 | 1 825 | 988 | 250 | 6 097 |
| **Sodium Nitrate** | kg | 0 | 0 | 0 | 0 | 0 |
| **Sodium Nitrite** | kg | 0 | 0 | 0 | 0 | 0 |
| **Steel** | t | 0 | 0 | 0 | 0 | 0 |
| **Timber** | t | 0.16 | 0.00 | 0.00 | 0.70 | 0.86 |
| **Oxy-Acetylene** | kg | 790 | 264 | 0 | 1 028 | 2 082 |
| **Trichloro-ethylene[[10]](#footnote-10) (TCE)** | Litre | 0 | 587 | 23 | 21 | 631 |

## 4.7 Waste Management

The aim of Waste Performance Management is to drive the culture on our mines away from being “waste generators” to “waste consumers”. The international accepted waste hierarchy model of Reduce, Reuse and Recycle, is advocated at all the Petra Mines. The Waste management focus area for FY 2021 prioritises the minimisation of waste disposed to landfill sites.

*Petra Diamonds set a KPI of 1% year on year improvement in the volumes of waste disposed to landfill by each organisation, thus tonnes waste disposed to landfill ≤ FY 2020 -1%*

Table 33: *Waste Disposal Streams per organisation for this period*

| **Waste Generated** | **Unit** | **CDM** | **FDM** | **KDM** | **WDL** | **PETRA** |
| --- | --- | --- | --- | --- | --- | --- |
| **Mine Waste** | | | | | | |
| **Fine (slimes)** | Tonnes | 895 237 | 243 189 | 66 612 | 0 | 1 205 038 |
| **Coarse ( tailings)** | Tonnes | 383 673 | 294 128 | 113 079 | 0 | 790 880 |
| **Waste Disposed to Landfill** | | | | | | |
| **Hazardous Waste Disposal** | Tonnes | 4.64 | 7.50 | 0.00 | 0.00 | 12.14 |
| **General Waste Disposal** | Tonnes | 67.04 | 92.21 | 22.06 | 928.33 | 1 109.64 |
| **Total waste to landfill site** | Tonnes | 71.68 | 99.71 | 22.06 | 928.33 | 1 121.78 |
| **Waste Recycled** | | | | | | |
| **Cardboard / Paper** | Tonne | 1.60 | 9.59 | 0.00 | 0.00 | 11.19 |
| **Conveyor Belting** | Tonne | 147.66 | 0.00 | 0.16 | 0.00 | 147.82 |
| **E-waste** | Tonne | 0.62 | 0.00 | 0.00 | 0.00 | 0.62 |
| **Lead Acid Batteries** | Tonne | 0.13 | 2.05 | 0.00 | 0.07 | 2.25 |
| **Plastic** | Tonne | 3.59 | 12.32 | 0.00 | 0.00 | 15.91 |
| **Scrap Metal** | Tonne | 167.84 | 343.56 | 27.29 | 0.00 | 538.69 |
| **Timber** | Tonne | 5.16 | 0.00 | 0.78 | 0.00 | 5.94 |
| **Toner / Ink Cartridges** | Tonne | 0.00 | 0.00 | 0.00 | 0.01 | 0.01 |
| **Fluorescent Tubes** | Tonne | 0.64 | 0.12 | 0.00 | 0.00 | 0.76 |
| **Rubber** | Tonne | 0.00 | 12.50 | 0.00 | 0.00 | 12.50 |
| **Tyres** | Tonne | 12.60 | 0.00 | 0.00 | 1.12 | 13.72 |
| **Used Oil** | Tonne | 14.56 | 20.48 | 8.10 | 1.02 | 44.16 |
| **Total Waste Recycled** | Tonne | 354.40 | 400.62 | 36.33 | 2.23 | 793.57 |
| **Waste Incinerated** | | | | | | |
| **Medical Waste** | Tonnes | 0.04 | 0.91 | 0.00 | 1.46 | 2.41 |
| **Other Waste** | Tonnes | 0.00 | 0.45 | 0.00 | 0.74 | 1.19 |
| **Total Waste Incinerated[[11]](#footnote-11)** | Tonnes | 0.04 | 1.21 | 0.00 | 2.20 | 3.60 |
| **Total waste generated** | Tonnes | 426.11 | 501.55 | 58.39 | 932.76 | 1 918.96 |
| **Percentage change in total tonnage of waste to landfill as compared to KPI value** | % | **-11.92% (Group determined KPI) (-43% compared to CDM determined KPI value of 124.68)** | **+83.60%** | **-50.83%** | **+64.51%** | **+50.61%** |

Graph 6: *Total Waste generated per organisation in tonnes Q2 FY 2021 vs Q2 FY 2020*

Graph 7: *Percentage contributions of Hazardous, General and Recycled waste to Total Waste:*

## 4.8 Biodiversity Management

Biodiversity Management is crucial to the Rehabilitation focus area and it forms an integral part of all Rehabilitation and Closure plans. Performance in this focus area can be measured against the eradication of alien, invasive species, the increase in indigenous species and the conservation of red data and protected species.

Table 34: *Biodiversity Figures*

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Element** | **UNIT** | **CDM** | **FDM** | **KDM** | **WDL[[12]](#footnote-12)** | **PETRA** |
| **Total Protected Area[[13]](#footnote-13)** | ha | 2 673 | 1 388 | 2014 | 906 | 6 981 |
| **Number of Invasive Plant Species** | No | 30 | 10 | 16 | 34 | 90 |
| **Number of Red Data Flora Species[[14]](#footnote-14)** | No | 0 | 2 | 2 | 0 | 4 |
| **Number of Red Data Fauna Species[[15]](#footnote-15)** | No | 1 | 0 | 5 | 0 | 6 |

## 4.9 Ozone Depleting Substances

South Africa is a signatory to the Montreal Protocol for the protection of the Ozone Layer and as Petra Diamonds aims to comply to the basic principles / requirements of the International Treaties / Conventions that the country is a signatory to, it aims to develop long-terms action plans to achieve compliance. Therefore continuous monitoring of Ozone depleting substances used on the different operations and replacement programs must be in place. No operation procures new ozone depleting substances. However, most old air-conditioners, freezers and fridges still contain ozone depleting substances as coolant gases.

Table 35: *Ozone Depleting Substance consumption in this period*

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Element** | **Unit** | **CDM** | **FDM** | **KDM** | **WDL** | **PETRA** |
| **1,1,1-trichloroethane (TCA)** | kg | 0 | 0 | 0 | 0 | 0 |
| **Carbon Tetrachloride (CTC)** | kg | 0 | 0 | 0 | 0 | 0 |
| **Halon** | kg | 0 | 0 | 0 | 0 | 0 |
| **Methyl Bromide** | kg | 0 | 0 | 0 | 0 | 0 |
| **R 134a** | kg | 0 | 4 | 0 | 0 | 4 |
| **R 410** | kg | 0 | 20 | 0 | 0 | 20 |
| **R 507** | kg | 0 | 9 | 0 | 0 | 9 |
| **R 404** | kg | 0 | 15 | 0 | 0 | 15 |
| **Total Ozone depleting substances** | kg | 0 | 48 | 0 | 0 | 48 |
| **R 22** | kg | 4.95 | 18 | 0 | 6.3 | 29.25 |

## 4.10 Carbon emissions

The Carbon Footprint (Greenhouse Gas emissions) of an organisation is closely linked to its energy consumption. Scope 1, Scope 2 and Scope 3 activities are split up to determine direct and indirect emissions. The carbon footprint is expressed either as an absolute (gross) total tonnes of Carbon dioxide equivalent gas (CO2-e), or normalised as tonnes of CO2-e per production measure. In Petra’s case, carats are used (t CO2-e/ct).

As Petra Diamonds follows a centralised approach based on the GHG Protocol principles for the gathering of information on its GHG emissions, the organisational carbon footprints are calculated at Group level by the Group HSEQ Data Analyst and Reporting Coordinator. Emission calculations are thus standardised across all the organisations (operations), but based on data and information supplied by the organisation. The organisational reporting of verified, accurate and reliable data**/** information is key in this process. Petra Diamonds have decided on a materiality threshold of 5% for Scope 1 and Scope 2 emissions and 10% for Scope 3 emissions. All GHG emission calculations and reporting are based on the GHG Protocol principles of relevance, completeness, consistency, transparency and accuracy. To ensure compliance to these principles, a third party audit is conducted annually.Petra Diamonds account for and report on the emissions of Carbon Dioxide (CO2), Methane (CH4), Nitrous oxide (N2O) and Hydrofluorocarbons (HFCs).

Table 36: *GHG emissions accounted for*

|  |  |
| --- | --- |
| **Scope** | **Emissions** |
| **Scope 1: Direct Emissions** | **Mobile combustion**: Diesel and petrol use for company owned/controlled vehicles;  jet fuel use for company owned jet  **Stationary combustion**: Diesel use for generation of electricity; combustion of LPG in workshops;  **Fugitive hydrofluorocarbon (HFC) emissions**: Air conditioning;  **Process emissions**: Effluent treated at treatment plants under direct control of a mine |
| **Scope 2: Indirect emissions** | **Electricity** purchased from:  Eskom (South Africa)  Tanesco (Tanzania) |
| **Scope 3: Other Indirect Emissions** | **Business travel**: Employee commute; car hire; business flights -air lines and chartered aeroplanes  **Paper use**  **Waste**: General, hazardous, non-biomass waste disposed to landfill; Scrap metal for recycling;  **Potable water:** pumping |
| **R-22** |  |

Carbon emissions have a financial implication for South African operations as the first carbon tax payment in terms of the National Carbon Tax Act came into effect. The first payment was due for the period 1 June to 31 December 2019. The tariff is R120 / t CO2-e for Scope 1 activities only, but with several allowances, including a general 60% allowance that Petra qualifies for. It is to be noted that emission thresholds need to be exceeded before carbon tax will be due.

All GHG emissions related information as required by the GHG Protocol, will be reported on in the *Annual GHG Emissions Report for Petra Diamonds - FY 2021*. This report will be published on SharePoint and the official Petra website (*Petradiamonds.com*).

Table 37: *Carbon Footprint of Petra Diamonds YTD*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **Quarter 1** | **Quarter 2** | **Quarter 3** | **Quarter 4** | **Total YTD** |
| Scope 1 | 3 373.58 | 2 980.00 |  |  |  |
| Scope 2 | 107 949.72 | 98 453.89 |  |  |  |
| Scope 3 | 1 174.46 | 774.92 |  |  |  |
| Total t CO2-e (Sc1 + Sc2 +Sc3) | **112 098.22** | **102 339.20** |  |  |  |
| t CO2-e/t | 0.048 | 0.050 |  |  |  |
| t CO2-e/ct | 0.115 | 0.134 |  |  |  |
| Percentage change in tCO2-e as compared to FY 2020 | -20% | -23% |  |  |  |
| R-22 | 31.49 | 52.91 |  |  |  |

Graph 8: *Normalised GHG emissions per organisation (tCO2-e/ct)[[16]](#footnote-16)*

Graph 9: *Percentage contribution of total GHG emissions (tCO2e) by organisation*

# PROJECTS AND ACHIEVEMENTS

This section is used to describe all current projects and findings of completed projects, as well as any achievements or awards relevant to environmental management.

## 5.1 Research Projects

Please note any research that the operation plans to do or is busy with.

|  |  |
| --- | --- |
| **Project Description** | **WDL:** Vegetation Assessment |
| **Service Provider** | Tanzania Forest Research Institute |
| **Planned Outcome** | The assessment results to be used for concurrent rehabilitation and during mine closure |
| **Inception Date** | 18/09/2020 |
| **Planned Due Date** | On going |
| **Progress** | On going |
| **Actual Outcome** | To determine the best tree species apart from indigenous trees, that has other values to ensure financial sustainability for the surrounding communities e.g. timber. |

## 5.2 Energy Efficiency Projects

Energy efficiency is a high level priority area within Petra. The Operations are encouraged to implement measures to save energy such as electricity and diesel on a Gross scale or to use these resources more efficiently where gross reductions are not feasible.

|  |  |
| --- | --- |
| **Project Description** | No new energy efficiency projects were reported in Q2 |
| **Service Provider / Project Manager** |  |
| **Planned Outcome** |  |
| **Inception Date** |  |
| **Planned Due Date** |  |
| **Progress** |  |
| **Actual Outcome** |  |

## 5.3 Consumption Reduction Plans

Other reduction programmes or plans implemented during the reporting period:

|  |  |
| --- | --- |
| **Project Description** | No new consumption reduction plans were reported in Q2 |
| **Service Provider / Project Manager** |  |
| **Planned Outcome** |  |
| **Inception Date** |  |
| **Planned Due Date** |  |
| **Progress** |  |
| **Actual Outcome** |  |

## 5.4 Achievements

|  |  |
| --- | --- |
| **Achievement** | **WDL:** Second runner up Mining Sector |
| **Awarded by** | Mining Exhibition Shinyanga town |
| **Reason/Motivation** |  |
| **Award date** |  |

|  |  |
| --- | --- |
| **Achievement** | **WDL:** Tree Planting |
| **Awarded by** |  |
| **Reason/Motivation** | Two thousand trees were planted next to Mine camp roads as part of the mine camp rehabilitation and 22 991 trees were donated to different institutions (Governmental, non-governmental and individuals). |
| **Award date** |  |

1. FDM received a Notice of Intent to issue a compliance directive ito NEMA Section 31L from DMRE – see table 3 for more detail [↑](#footnote-ref-1)
2. Non-Conformances [↑](#footnote-ref-2)
3. CAP audits are conducted by the Group HSEQ team under control of a third party [↑](#footnote-ref-3)
4. Not provided [↑](#footnote-ref-4)
5. All variables are monitored, but only exceedances indicated. [↑](#footnote-ref-5)
6. No specific standard. KDM targets 45dB [↑](#footnote-ref-6)
7. Record value of standard [↑](#footnote-ref-7)
8. The sum of potable, raw and dewatering water. Recycled water is excluded as per DWS Water Demand and Conservation definitions [↑](#footnote-ref-8)
9. Note Only LPG used for energy purposes (e.g. cooking, furnace), not cutting [↑](#footnote-ref-9)
10. Carcinogenic liquid used typically for cleaning grease off concentrate surfaces and as an additive in belt splicing glues or solvents. Also known as ‘trichlor’. [↑](#footnote-ref-10)
11. Include explosive boxes [↑](#footnote-ref-11)
12. Assume similar to Q4 FY 2020 [↑](#footnote-ref-12)
13. e.g. game Farms [↑](#footnote-ref-13)
14. Confirmed species only [↑](#footnote-ref-14)
15. Confirmed species only [↑](#footnote-ref-15)
16. Williamson and PDSA head office contributions included in Petra value [↑](#footnote-ref-16)