

## PART 8: MONITORING AND AUDITING

The effective implementation of an EMP<sup>1</sup> (including EIA<sup>2</sup>) will determine the success thereof. Compliance monitoring is therefore crucial since it will ensure that the environmental requirements stipulated in the EMP (incl. EIA) are being complied with. In addition, monitoring allows for on-going impacts to be tracked so that the effectiveness of the mitigation can be measured.

A monitoring programme is also required by Regulation 527 (51)(b)(iv), dated April 2004, under the MPRDA<sup>3</sup> (2002).

### 8.1 MONITORING PROGRAMME

It is the intention of this part of the EMP (Incl. EIA) to provide a summary of the monitoring programmes that are currently implemented at De Beers Kimberley Mines. Monitoring at the mine is conducted according to the Standard Procedure KM-EM-PR-09, titled "*Environmental Monitoring and Measurement*", dated April 2013, is attached as **Appendix F2**. The objectives of the mentioned Standard Procedure is to describe which components De Beers Kimberley Mines will monitor and measure and to ensure that monitoring and measuring of all aspects of the environment that are anticipated to be impacted upon as a result of the mining and related activities taking place at De Beers Kimberley Mines are undertaken and the results thereof are recorded.

Refer to **Table 8.1** below for a summary of the environmental monitoring programmes currently implemented at the mine.

**Table 8.1: Summary of environmental components that are monitored at De Beers Kimberley Mines, (Environmental Monitoring and Measurement Procedure, dated February 2010).**

Environmental Aspect	Works Instruction/Operational Procedure that Governs Monitoring	Procedure Reference
Air Emissions	Environmental Fallout Dust Monitoring	KM.EM.PR-28
Noise	Occupational Health Procedure for Noise Monitoring	COP for Noise Monitoring M/COP/CM 014
Waste (Domestic and Industrial)	Waste Management	KM.EM.PR-18
	Managing Fluorescent Tube Waste	KM.EM.PR-27
Surface and Groundwater Quality	Environmental Water Quality Monitoring	KM.EM.PR-29
Land Management	Rehabilitation Procedure (Soil and Vegetation)	KM.EM.PR-33

<sup>1</sup> EMP: Environmental Management Programme.

<sup>2</sup> EIA: Environmental Impact Assessment.

<sup>3</sup> MPRDA: Mineral and Petroleum Resources Development Act, Act No. 28 of 2002.

Water and Power Usage	Power/Water Consumption Reporting Off Mine	DEPT-ENG procedure
Energy	Fuel and Oil Loading and Offloading	KM.EM.PR-15
Materials	Herbicide Management	KM.EM.PR-26
	Waste Management Procedure	KM.EM.PR-18
	Hydrocarbon and Chemical Spill Handling	KM.EM.PR-17
	Hazardous Materials Handling	DEPT-ENG-GO3
Other (EMS)	Internal Environmental Audits	KM.EM.PR-23
	Environmental Planning	KM.EM.PR-02
Alien Invasive Monitoring	Invasive Vegetation Management Procedure	KM.EM.PR-31
Radio-active source	Group IV Radioactive Sources	KM.CTP.PO-02 KM.PLT.PR-02
Fire	Surface Fire Fighting	KM.SHE.PR-20

### 8.1.1 WATER QUALITY

#### 8.1.1.1 Water quality monitoring programme at De Beers Kimberley Mines

According to the Standard Procedure KM-EM-PR-29 '*Environmental Water Quality Monitoring and Measurement Procedure*', dated April 2013 (attached as **Appendix F2**), the objective of the water quality monitoring procedure is to ensure that:

- The monitoring and measurement of the surface and groundwater quality of De Beers Kimberley Mines which have an impact on the quality of the water resources is undertaken.
- The results are recorded.
- The results are compared with specified guidelines.
- The results are analysed and interpreted.
- The results are reported to the relevant role players.

This will then determine all the corrective and preventative actions for continual improvement in the water quality management by De Beers Kimberley Mines.

The Environmental Water Quality Monitoring System Manual, dated October 2007, indicates that the main objective of the monitoring programme is to assess and quantify the impacts associated with De Beers Kimberley Mines on the aquatic ecosystems and receiving water bodies, especially with regards to the physical-, chemical- and microbiological quality of the water. These aspects can be defined as follows:

- Physical quality.
  - The physical quality affects the aesthetics as well as the chemical quality of the water and refers to the water quality properties (i.e. temperature, electrical

conductivity, pH, TDS<sup>4</sup>, turbidity and oxygen content) that may be determined by physical methods.

- Chemical quality.
  - The nature and concentrations of dissolved substances (e.g. organic / inorganic compounds, including metals), in the water resource are regarded as the chemical quality. The parameters of the chemical quality include alkalinity, major anions and cations, hardness as well as heavy metals. Although many chemicals contained in water are essential to the biotic community and form an integral part of the nutritional requirements of such a biotic community, elevated levels may limit the use of water by downstream water users.
- Microbiological quality.
  - The microbiological quality of the water refers to the presence of micro organisms, such as protozoa, bacteria and viruses. Several of these microbes are associated with the transmission of infectious water-borne diseases (e.g. gastro-enteritis and cholera). The microbiological status and safety of water in terms of water related diseases are generally indicated through indicator organisms, i.e. faecal and total coliform bacteria.

In general, De Beers Kimberley Mines is committed to implementing the following management measures to assist in reaching the objective and targets towards water monitoring during the Operational Phase:

- The water monitoring system will be maintained, reviewed and improved (if and when required) to ensure compliance with changes to policy and regulatory requirements as well as to provide for the needs of the mine.
- Reduce frequency of spills or leakages by implementing accurate monitoring measures as well as the development and implementation of contingency measures.
- The latest policy of the DWA<sup>5</sup> as contained in the relevant Best Practise Guideline will be reflected in the regular review and audit of the water monitoring system.

In general, a water quality monitoring programme should be a well co-ordinated and balanced evaluation of all impacts on downstream users. In order to accomplish this, sampling cannot be done in isolation, but rather integrated into various steps necessary to manage the quality of the receiving environment. The various steps / aspects which comprise the water quality monitoring programme of De Beers Kimberley Mines, so as to ensure the most accurate information, include the following (and have been described below):

- Methodology.
- Sampling procedure.
- Monitoring schedule.
- Verification and description of the monitoring localities.
- Description of monitoring and laboratory testing procedures.

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<sup>4</sup> TDS: Total Dissolved Solids.

<sup>5</sup>DWA: Department of Water Affairs.

### **8.1.1.1.1 General methodology**

#### *8.1.1.1.1.1 Conversion of information*

The conversion of information is conducted in such a manner that it includes historical information as well as information generated by specialist studies. In addition, all the specialist environmental reports and previous monitoring results are to be incorporated into the programme.

#### *8.1.1.1.1.2 IEM<sup>6</sup> procedures*

All approaches, methods, procedures and documentation are to be in accordance with the IEM procedures and principles. The IEM procedures will ensure optimum consideration of the possible impacts on the water resources of the surrounding environment due to the current mining and related activities undertaken at De Beers Kimberley Mines.

#### *8.1.1.1.1.3 Guarantee of professional standards*

According to the Water Quality Monitoring System Manual, dated October 2007, Clean Stream Scientific Services guarantees that all aspects of monitoring will be undertaken to the highest professional standards.

#### *8.1.1.1.1.4 South African conditions*

The water quality monitoring methods used are all adapted to South African conditions and are accepted by the DWA.

### **8.1.1.1.2 Sampling methodology**

Correct sampling procedures and methods are of absolute importance to ensure the accuracy as well as the reliability of analytical results, and therefore correct conclusions. The sampling methods that are implemented at De Beers Kimberley Mines are described in detail in the Water Quality Monitoring System Manual, dated October 2007, and are summarised within this part of this EMP (incl. EIA) document.

#### *8.1.1.1.2.1 Sample collection*

Sampling is conducted by Clean Stream Scientific Services in such a manner as to ensure a representative sample as well as the highest possible scientific integrity. According to the Water Quality Monitoring System Manual, dated October 2007, a representative sample can be defined as:

*“A sample taken in the correct manner at a point that truly represents the water body at the time, at the specific locality of concern”.*

Water samples are collected in new clean 500 ml polyethylene bottles and stored in dust free thermo-isolated containers to minimise potential cross-contamination. Samples are not preserved (acidified) straight after sampling since re-suspension and remobilisation of substances could occur if water samples are not properly filtered. This will result in “false-positive” results.

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<sup>6</sup> IEM: Integrated Environmental Management.

#### *8.1.1.1.2.2 Sample storage*

The storage of samples usually requires preservation to ensure that the water quality of each sample reflects the original status of the area sampled at a specific time. As mentioned previously, preservation cannot be done without the sample being filtered properly. As described in the Water Quality Monitoring System Manual, dated October 2007, field filtration is a very time consuming and expensive exercise.

In addition, preservation is normally only recommended if chemical analyses are not possible within a few days. The water samples of De Beers Kimberley Mines are handed over to the laboratory within a sufficient time-period to prevent chemical changes within the water quality profile of the sampled water.

#### *8.1.1.1.2.3 Sampling report*

A custom-made data sheet in accordance with SABS<sup>7</sup> Guidelines 5667-1 to 5667-3 was developed by Clean Stream Scientific Services to assist the field scientist in recording the physical and environmental information of the sampling locality. Information within this data sheet is necessary to interpret water quality; especially should any sudden changes at a specific locality be indicated within the laboratory results.

The data sheet includes the following information:

- Location and name of the sample site.
- Details of the sampling point (i.e. surface water / underground water).
- Method of collection.
- Time of collection.
- Name of collection.
- Name of collector.
- Nature of pre-treatment, if any.
- Preservative or stabiliser added, if any.
- Other data gathered at this point.

#### **8.1.1.1.3 Water user requirements**

The framework set out by the NWA<sup>8</sup> (1998) for the management of water resources in South Africa provides for the establishment of water management institutions. These institutions are made up out of role-players in each catchment. It is therefore of utmost importance that the requirements of downstream users be determined pro-actively.

The values or concentrations where no impact is expected on the specific user group are regarded as the target water quality guidelines. These values and concentrations are used to evaluate the water qualities at De Beers Kimberley Mines and are presented in **Table 8.2** below.

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<sup>7</sup> SABS: South African Bureau of Standards.

<sup>8</sup> NWA: National Water Act, Act 36 of 1998.

**Table 8.2: Target water quality guidelines.**

Variable	Dom <sup>1</sup>	Aqua <sup>2</sup>	Live <sup>3</sup>
pH	6.0 –9.0		
Electrical Conductivity (mS/m)	70		500
Sulphate (mg/l SO <sub>4</sub> )	<200	-	<1 000
Nitrate (mg/l NO <sub>3</sub> )	<6	-	<100
Chloride (mg/l Cl)	<100	-	<3 000
Fluoride (mg/l F)	<1	<0.75	<2
Ammonia (mg/l NH <sub>3</sub> )	2 max	<0.007	-
Calcium (mg/l Ca)	<32	-	<1 000
Magnesium (mg/l Mg)	<30	-	<500
Aluminium (mg/l Al)	<0.15	<0.005	<5
Manganese (mg/l Mn)	<0.05	<0.18	<10

**Note:**<sup>1</sup> DWAF TWQR for Domestic use<sup>2</sup> DWAF TWQR for Aquatic life<sup>3</sup> DWAF TWQR for Livestock watering

In addition to the variables within the table above, all surface water and groundwater samples will be scanned annually by means of ICP-OES<sup>9</sup> methods to determine the possible occurrence of trace metals. Any variables that reveal significant levels will be included into the routine parameter suite.

**8.1.1.1.4 Data management**

The data obtained from the laboratory analysis of the water samples for each monitoring locality is verified and captured in a database. This database is designed to cater for the statistical and graphical evaluation of the information, as well as for easy retrieval of information. It is important to note that, although Clean Stream Scientific Services manages the database, the contents of which are the property of De Beers Kimberley Mines and are available for future use.

Clean Stream Scientific Services has designed an add-on programme to the database, which allows such evaluation of the data, thus adding value to the monitoring programme. The add-on programme has the ability to provide the following features:

- Data presentation in tabular format.
- Time series graphs with comparison abilities.
- Statistical analysis (minimum, maximum, average, percentile values) in tabular format.
- Graphical presentation of statistics.
- Linear trend determination.
- Performance analysis in tabular format.
- Presentation of data, statistics and performance on diagrams and maps (GIS<sup>10</sup>).

<sup>9</sup> ICP-OES: Inductively coupled plasma optical emission spectrometry.<sup>10</sup> GIS: Geographical Information System.

- Comparison and compliance to South African Water Quality Guidelines and any other given objectives.
- Quick understandable reports.

#### **8.1.1.1.5 Reporting**

The water quality database with regards to the water quality information of De Beers Kimberley Mines is managed on a monthly basis.

Values that are questionable are determined and referred back to the laboratory for re-analyses. In addition, monitoring localities where problematic water quality results are reported, are flagged. This allows De Beers Kimberley Mines to respond to any pollution incidents, since a short electronic monthly report is prepared.

##### *8.1.1.1.5.1 Monthly electronic reports*

As mentioned previously, a monthly report is produced to portray the latest data to the mine. The mine will be notified of any significant changes or potential problematic water quality results. This will enable De Beers Kimberley Mines to detect the source of the pollutant, as well as to implement appropriate mitigation measures prior to the occurrence of any major impacts.

##### *8.1.1.1.5.2 Annual evaluation report*

An extensive Annual Water Quality Report containing a full evaluation of all the water quality results obtained over a period of one year will be submitted to De Beers Kimberley Mines. In general, the Annual Water Quality Report will include the following information:

- A statistical summary of all the chemical variables for all the monitoring localities.
- Time-graphs.
- Water quality maps indicating pollution sources and impacts on the receiving water body.
- A discussion and recommendation section.

The Annual Water Quality Report will be used in the annual auditing of the EMP for De Beers Kimberley Mines. The information contained within this report will be available to the DWA on request and will furthermore assist in obtaining an Integrated Water Use Licence under the NWA (1998).

#### **8.1.1.1.6 Monitoring schedule**

As described in the Water Quality Monitoring System Manual, dated October 2007, surface water samples at De Beers Kimberley Mine are taken on a monthly basis. It is important to note that samples are only taken at localities where flow is observed. Samples taken in localities where no flow is observed will result in incorrect results. The groundwater quality of the study area is sampled on a quarterly basis.

In addition, the surface water monitoring programme of De Beers Kimberley Mines is subject to flow conditions that vary with rainfall experienced during the different climatic seasons. Therefore, several of the monitoring localities are dependent on storm water flow as well as overflow from pollution control measures.

According to the DWA, a monthly sampling frequency is a generally expected practise. The sampling frequency will give a good indication of the current environmental conditions as well as of the seasonal variation.

For detail regarding the surface water and groundwater sampling schedule currently implemented at De Beers Kimberley Mines, refer to Tables 8.1 and 8.2 attached in **Appendix K** (extracts of the Water Quality Monitoring System Manual, dated October 2007).

#### **8.1.1.1.7 Monitoring localities**

##### *8.1.1.1.7.1 Surface water localities*

The De Beers Kimberley Mines water quality monitoring programme is comprised of 19 surface water monitoring localities. Refer to Figure 9.1-1 in **Appendix K** for an indication of the spatial distribution of the surface water monitoring localities at De Beers Kimberley Mines. A detailed description of each surface water monitoring locality is given within the Water Quality Monitoring System Manual, dated October 2007, which can be obtained from the mine on request.

As committed to in the document titled “*De Beers, Kimberley Mines, Integrated Water Use Licence Application*”, dated October 2006, with reference number DB/KM/05/2006, and compiled by Clean Stream Environmental services (hereafter referred to as the IWULA, dated October 2006), hydrocarbon analyses will be conducted on a quarterly basis at the appropriate monitoring localities at the wash bay, Plants and workshops to quantify the impacts thereof, if any, to comply with procedures.

##### *8.1.1.1.7.2 Groundwater localities*

The De Beers Kimberley Mines water quality monitoring programme comprises of 23 groundwater monitoring localities. Refer to Figure 9.2 attached in **Appendix K** of this EMP (Incl. EIA) document for an indication of the spatial distribution of the groundwater monitoring localities at De Beers Kimberley Mines. A detailed description of each groundwater monitoring locality is provided within the Monitoring System Manual, dated October 2007, which can be obtained from the mine on request.

As committed to in the IWULA, dated October 2006, additional boreholes will be included in the existing water monitoring programme to assess the impacts associated with the tailings resources, backfilling activity and wastewater impoundments (including the Emergency slimes holding facility).

## **8.1.2 WATER QUANTITY**

Water usage at De Beers Kimberley Mines is monitored and reported on a monthly basis.

As committed to in the IWULA, dated October 2006, groundwater level monitoring will be instated around the open pits as well as at those contaminated water storage facilities where no monitoring currently takes place.



### 8.1.3 BIOMONITORING

No natural watercourses traverse the study area; however, both the Dutoitspan and Paardebergvlei are situated within the mine boundary of De Beers Kimberley Mines. Although Dutoitspan is currently being utilised as a return water dam as part of the dirty water management system of the mine, various animal species do occur within, and in close proximity to, this pan.

As part of the biodiversity study to be undertaken at De Beers Kimberley Mines (as mentioned previously), biomonitoring will be conducted to provide baseline information on the current aquatic habitat and ecological status of Dutoitspan, as well as to possibly identify whether the water quality in the pan has had an effect on the aquatic fauna. Necessary management measures will be included in the biodiversity management plan that was developed for the mine in accordance with the requirements of the NEM:BA<sup>11</sup> (2004).

### 8.1.4 AIR QUALITY

#### 8.1.4.1 Fallout dust

As stated in the Standard Procedure KM-EM-PR-09 'Environmental Monitoring and Measurement', dated April 2013, Fallout Dust monitoring is conducted at De Beers Kimberley Mines. Dust monitoring at De Beers Kimberley Mines is conducted by Dustwatch CC. The dust monitoring results are documented in a monthly dust monitoring report, referred to as the Dustwatch Report, which is available from the Environmental Management Department.

Refer to **Appendix N1** attached hereto for copies of the Dustwatch Reports 2012 – 2013 reports.

As described in the Dustwatch Reports, monthly dust monitoring at De Beers Kimberley Mines is conducted at the following units / locations:

- North on Dronfield Farm
- North of Gemdene TMR
- Colville
- Rooifontein (Slimes)
- Rooifontein (Ore receiving)
- HOH / CBD
- Geology
- West on Boshof road
- De Beers Mine (Small mining KMF -situated around De Beers Mine)

In addition, additional *ad hoc* samples are collected by the mine at specific locations as and / or when requested. Furthermore, total particulates at the different mining operations are measured on an *ad hoc* basis by the OHD for environmental purposes, as required.

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<sup>11</sup> NEM:BA: National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004).

De Beers Kimberley Mines is committed to conducting air quality monitoring in order to facilitate the identification of any impact on the environment, as well as on I&AP<sup>12</sup>s, including employees. Refer to **Table 8.3** below for an indication of the fallout dust standard according to the SANS<sup>13</sup> (as documented in the Dustwatch Reports attached in Appendix M).

**Table 8.3: Fallout dust standards (according to SANS 1929:2005)**

Classification	Dust fall (mg / m <sup>2</sup> day) – averaged over 30 days	Permitted frequency of exceeding the levels
Target – long-term average	300	Long-term average (Annual).
Action - residential	600	Three within any year, no two sequential months.
Action - industrial	1 200	Three within any year, no two sequential months.
Alert threshold	2 400	None. First time exceeded, triggers remediation and reporting to authorities.

The dust fallout monitoring results, form part of the De Beers Kimberley Mines Annual Environmental Report.

#### 8.1.5 NOISE

As described in the Standard Procedure KM-EM-PR-09 'Environmental Monitoring and *Measurement*', dated February 2010, noise monitoring is conducted on environmental perimeter nuisance noise. This is conducted by the OHD and the results from the mentioned monitoring are recorded and filed at the OHD.

The mentioned monitoring results form part of the De Beers Kimberley Mines Annual Environmental Report.

#### 8.1.6 REHABILITATION

The areas disturbed by mining and related activities that have been rehabilitated will be monitored to establish the success of the rehabilitation process and identify the appropriate mitigation measures to be implemented where needed. Monitoring of the progress of the rehabilitation process will entail an observation of the state of the reinstated area and will take an integrative approach, i.e. the several aspects will be observed simultaneously since they are interdependent. The following ecological aspects will be monitored regarding rehabilitation:

- Soil.
- Vegetation.
- Animal life.

The status of the rehabilitation process in terms of the above-mentioned ecological aspects is to be documented and reported to the relevant Authorities on an annual basis.

<sup>12</sup> I&APs: Interested and Affected Parties.

<sup>13</sup> SANS: South African National Standards.

### **8.1.7 SURFACE MOVEMENT**

Monitoring of the stability of the side-walls of the open pits will be undertaken during the remaining life of mine and areas found to be unsafe, will be fenced off. Incidences of surface subsidence should be recorded and monitored by De Beers Kimberley Mines and identified cracks and sinkholes should be repaired on the surface as far as possible.

### **8.1.8 ELECTRICITY CONSUMPTION**

As described in the Standard Procedure KM-EM-PR-09 'Environmental Monitoring and Measurement', dated April 2013, the power consumption reporting off mine is described in the in the Standard Procedure DEPT-ENG procedure 'Power/Water Consumption Reporting Off Mine'. The power consumption at De Beers Kimberley Mines is measured and monitored by the Engineering Department. The results of such monitoring are documented in monthly reports, which are available from the mine on request, as well as in the De Beers Kimberley Mines Annual Environmental Report.

### **8.1.9 FOSSIL FUEL CONSUMPTION**

The Stores Section of the Commercial and Financial Services conducts monitoring, including measurement, on the consumption of fossil fuel at De Beers Kimberley Mines. The results from the mentioned monitoring are recorded in a quarterly report which is sent for evaluation and trends identification. These reports are available from the mine on request. The mentioned monitoring results also form part of the De Beers Kimberley Mines Annual Environmental Report.

### **8.1.10 WASTE MONITORING**

According to the Standard Procedure KM-EM-PR-18 'Waste Management Procedure', dated July 2012, waste monitoring (i.e. general waste and hazardous waste) is conducted at De Beers Kimberley Mines. The waste monitoring results form part of the De Beers Kimberley Mines Annual Environmental Report.

#### **8.1.10.1 General waste**

As described in the Standard Procedure KM-EM-PR-18 'Waste Management Procedure', dated July 2012 (attached hereto as Appendix F), the transport and disposal of general waste is the responsibility of the Engineering Manager. The responsible person keeps records of the volumes of waste that are disposed of.

#### **8.1.10.2 Hazardous waste**

As described in the Standard Procedure KM-EM-PR-18 'Waste Management Procedure', dated July 2012, records of hazardous waste disposal are maintained by the Document Controller at the Environmental Management Department.

## **8.2 PERFORMANCE ASSESSMENT / AUDIT**

According to Regulation 55 (1) of the R. 527 Mineral and Petroleum Resources Development Regulations, dated April 2004, under the MPRDA (2002), "as part of the general terms and conditions for a ... mining right ... and in order to ensure compliance

*with an environmental management programme ... and to assess the continued appropriateness and adequacy of the environmental management programme ... a holder of such a ... right must-*

- (a) conduct monitoring on a continuous basis,*
- (b) conduct performance assessments of the environmental management plan or programme as required; and*
- (c) compile and submit a performance assessment report to the Minister in which compliance with paragraph (b) is demonstrated.”*

In compliance with the legislative requirements as indicated above, an EMP PA<sup>14</sup> has been undertaken for the De Beers: Kimberley Mines for the purpose of determining compliance to the commitments made in the approved EMPR<sup>15</sup>, dated 2009, and subsequent approved addenda and amendments thereto, as well as for the purpose of determining the applicability of the commitments in the mentioned EMPR, amendments and addenda.

The results of the EMP PA are discussed in detail within the report, titled “Environmental Legal Compliance Report: *EMP Performance Assessment Report*” Dated August 2011, Compiled by Environmental Legal Services.

The mentioned EMP PA contains the following:

- “Information regarding the period applicable to the Performance Assessment.
- The scope of the assessment.
- The procedure used for the assessment.
- The interpreted information gained from monitoring the approved environmental management programme.
- The evaluation criteria used during the assessment.
- The results of the assessment.
- Recommendations on how and when non-compliance and deficiencies will be rectified.”

### **8.2.1 PERIOD**

The EMP PA was done on the De Beers Kimberley Mines Environmental Management Programme, dated 2009.

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<sup>14</sup> EMP PA: Environmental Management Programme Performance Assessment.

<sup>15</sup> EMPR: Environmental Management Programme Report.

### 8.2.2 SCOPE OF ASSESSMENT

The main objective of the performance assessment was to determine the level of compliance with the Environmental Management Programme (EMP), dated 2009, and to assess the continued appropriateness and Adequacy of the EMP on behalf of De Beers Kimberley Mines.

The areas that were audited were those which have been disturbed by mining and related activities undertaken at De Beers Kimberley Mines, as well as those that have not been affected by mining and related activities, but still require management.

### 8.2.3 EVALUATION CRITERIA USED

The evaluation criteria used for the assessment that was undertaken, were the commitments contained in the De Beers Kimberley Mines EMP, as well as the environmental authorisations, monitoring records, environmental surveys and site visits.

### 8.2.4 RESULTS OF ASSESSMENT

The results of the EMP PA are described below through the provision of extracts from the EMP PA Report, dated August 2011, compiled by Environmental Legal Services.

It was found that the 2009 EMP is no longer adequate to reflect De Beers Kimberley Mines' commitments towards the current and future mining activities, including closure, this is due to the fact that:

- The EMP still includes the Phase I and Phase II areas sold to Petra Diamonds.
- The impacts of mining activities on the Benfontein Pan during flood events, is not included.
- The CTP<sup>16</sup> FRD<sup>17</sup> mitigation measures and alterations were included in the 2008 EMP but never approved.
- The use of the emergency slimes holding facility is not included in the EMP.
- Pipelines transferring water from the Kamfer Dam to the CTP FRD.
- The ash dump was discovered next to the administrative offices.
- The quarries adjacent to the Boshoff Dump and Paardebergvlei.

It was also found that projects were not completed prior to the target dates and these projects include:

- Investigation of current status of soils.
- Expansion of the surface and groundwater monitoring network.
- Completion of groundwater monitoring network.
- Establishment of current status of vegetation.
- Full biodiversity study.
- Assessment of impacts of water quality in Dutoitspan on fauna.
- Investigation of the impacts of backfilling.
- Implementation of additional stormwater measure.

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<sup>16</sup> CTP: Combined Treatment Plant.

It was also found that dust control measures on haul roads need to be implemented on a more regular basis and the graveyards need to be fenced off due to their heritage value.

#### **8.2.5 RECOMMENDATIONS / RECTIFICATIONS**

The EMP PA Report, dated August 2011, compiled by Environmental Legal Services, brought forward the recommendation that the De Beers Kimberly Mines' EMP should be reviewed to include all current and future mining activities. It was also brought forward that projects that are not completed, must be undertaken and completed as a matter of urgency with the then implementation of adequate mitigation measures.

#### **8.3 INTERNAL ENVIRONMENTAL MANAGEMENT SYSTEM AUDITS**

Internal EMS<sup>18</sup> Audits are carried out regularly to determine if the EMS is properly implemented and maintained. The results of the internal EMS audits are reviewed at the Management Review meetings.

Other types of audits, such as site, waste or risk audits, are carried out on an *ad hoc* basis. The reports of these audits are forwarded to the relevant sections for their attention; action plans are managed through the electronic database.

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<sup>17</sup> FRD: Fine Residue Deposit.

<sup>18</sup> EMS: Environmental Management System.