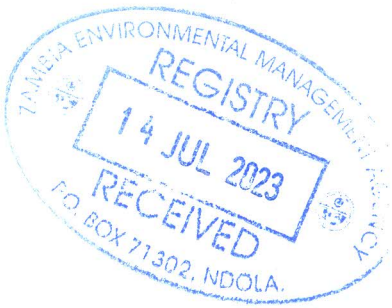
KCM SmelterCo LTD

KCM (SMELTERCO) LIMITED (A subsidiary of KCM plc)

KCM/SCO/NK/13/23

14th July, 2023.



The Director-General,
Zambia Environmental Management Agency,
Corner Suez and Church Roads,
P O Box 35131,
LUSAKA.

Dear Sir/Madam,

RE: BI-ANNUAL STATUTORY REPORT FOR KCM (SMELTERCO) LIMITED – NKANA REFINERY

In fulfilment of the requirements under The Environmental Management Act 2011, Environmental Management (Licensing) Regulation 112 of 2013 which requires submission of bi-annual reports to the Zambia Environmental Management Agency Inspectorate, please find enclosed a copy of the statutory report covering the licences listed below for the period January to June 2023:

1. **Pesticides and Toxic Substances Licence – NDL/PTS/00673/Z10/2014/2**
    - Storage of Pesticides and Toxic Substances – Nkana Anode Storage Casting room, Nkana Tankhouse, Nkana Acid Storage Tank No. 1, Nkana Acid Storage Tank No. 2 and Nkana Analytical Services Department.
    - Transportation of Pesticides and Toxic Substances – Nkana Refinery

2. **Emission Licence – NDL/EMM/00673/Z10/2014/2**
    - Discharge of Effluent – East Gate into North Uchi Stream
    - Discharge of Effluent – Nkana Refinery into South Uchi Stream
    - Emission of Air Pollutants at No. 4 Anode Furnace Stack – Anode Furnaces
    - Emission of Air Pollutants at No. 5 Anode Furnace Stack – Anode Furnaces
    - Emission of Air Pollutants at No. 6 Anode Furnace Stack – Anode Furnaces

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- Emission of Air Pollutants at Nkana HFO Boiler stack – Nkana HFO Boiler

3. **Hazardous Waste Licence – NDL/WM/00673/Z10/2014/2**
    - Generation of Used Oil, Fluorescent Tubes and Batteries – Nkana Refinery
    - Storage of Used Oil, Fluorescent Tubes and Batteries – Nkana Refinery
    - Generation and Storage of Healthcare Waste – Nkana Clinic
    - Generation, Transportation and Handling of Expired Chemicals
    - Generation, storage of spent copper electrolyte

4. **Waste Management Licence – NDL/LHWM/00673/Z10/2014/2**
    - Own and operate Slag Dam No. 67

5. **Ozone Depleting Substances Licence – NDL/ODS/00673/Z10/2014/2**
    - Handling of ozone depleting substances (ODS)

We thank you for your continued support.

Yours faithfully,

RAYMOND CHEEBA
REFINERY MANAGER

CC Manager ZEMA – Northern Region

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BI-ANNUAL REPORT TO THE ZAMBIA ENVIRONDENTAL MANAGEMENT AGENCY (ZEMA) FOR THE PERIOD JANUARY TO JULY 2023

PART 1: The Environmental Management (Licensing) Regulations, 2013

1.0 PESTICIDE AND TOXIC SUBSTANCE LICENCE (Regulations 25, 27 and 28)

1.1 REAGENTS -REFINERY TANKHOUSE

The main reagents used for the metallurgical processing of copper at KCM SmelterCo ltd Nkana Refinery are ligonosulphate and glue. They are ordered through Commercial, drawn and stocked at the Refinery reagent storage shed.

1.1.1 STORAGE

The reagents are kept at the refinery storage shed and transported on demand to the processing section for mixing. The Refinery reagents warehouse is constructed of a concrete floor, concrete walls and iron roofing sheets. The storage shed is secured and well ventilated. Below are the quantities of glue and lignosulphate that were consumed during the period under review:

Table 1: Reagents used at Refinery

MONTH	Glue Opening Stock (KG)	Glue Receipt (KG)	Consumed (KG)	Glue Closing Stock (KG)	Ligonosulphate Opening Stock (KG)	Lignosulphate Receipt (KG)	Consumed (KG)	Lignosulphate Closing Stock(KG)
Jan-23	31,003.05	0	292.90	30,710.15	39,941.75	0	232.15	39,709.60
Feb-23	30,710.15	0	384.71	30,325.44	39,709.60	0	300.27	39,409.33
Mar-23	30,325.44	0	474.16	29,851.28	39,409.33	0	374.77	39,034.56
Apr-23	29,851.28	0	482.18	29,369.10	39,034.56	0	376.89	38,657.67
May-23	29,369.10	0	268.18	29,100.92	38,657.67	0	209.73	38,447.94
Jun-23	29,100.92	0	291.58	28,809.34	38,447.94	0	228.19	38,219.75
TOTAL			2193.71				1722	

Note: No new stock of both glue and lignosulphate was ordered nor received at Commercial stores during the period under review.

1.2 Anode Casting Storage Room

No Barium Sulphate was used during the period under review.

1.3 SULPHURIC ACID

KCM SmelterCo Nkana refinery uses Sulphuric acid during the electrolytic refining of copper. It is used as an additive in electrolyte to refine copper anodes to copper cathodes. The transporter for Sulphuric acid from KCM SmelterCo Nchanga to KCM SmelterCo was;

AWET Investments Limited,
Plot No. 5559/6,
Kasuba Road,
Ndola.

1.3.1 STORAGE

The storage facility is surrounded by bund walls which are sufficient to mitigate exposure concerns in an event of a bulk material release. The floor of the storage area is made of impervious material and safety signs are displayed at appropriate places. Access to the area is highly restricted to deter unauthorised entry. Additionally, the area is equipped with emergency spill kits designed to contain, control and clean up spills. Below are the quantities of Sulphuric acid that was transported to KCM SmelterCo Nkana refinery during the period under review.

Table 2: Sulphuric acid received at KCM Nkana refinery

DATE	QUANTITY RECEIVED (MT)
Jan-23	90.72
Feb-23	63.18
Mar-23	91.02
Apr-23	94.76
May-23	32.12
Jun-23	63.88
TOTAL	**435.68**

1.4 WATER TREATMENT PLANT

Sodium chloride was used for the water treatment process at KCM SmelterCo Refinery. It is used for softening water that is used at the HFO fired boiler. The table below indicates the amount of sodium chloride that was used at water treatment.

Table 3: Sodium Chloride usage at water treatment

MONTH	Opening Stock (KG)	Receipt (KG)	Closing Stock (KG)	Consumed (KG)
Jan-23	700	0	400	300
Feb-23	400	1000	1400	0
Mar-23	1400	0	1100	300
Apr-23	1100	0	800	300
May-23	800	400	1200	0
Jun-23	1200	0	900	300
TOTAL				**1200**

1.5 REAGENTS – ANALYTICAL LABORATORY

KCM SmelterCo Nkana analytical laboratory uses reagents to process various elemental analysis. The analytical laboratory draws the reagents from commercial stores and stocks them in a reagent storage shed which is well ventilated; and has an impermeable concrete floor, concrete walls and secured roofing.

Table 4: Analytical laboratory reagents

No.	REAGENT NAME	OPENING STOCK (01.01.2023)		RECEIPTS		CLOSING STOCK (31.06.2023)		VARIANCE (CONSUMED)	
		QTY	UOM	QTY	UOM	QTY	UOM	QTY	UOM
1	Acetic acid	50	L	12.5	L	50	L	12.5	L
2	Ammonium hydrogen difluoride	0	GM	11500	GM	9000	GM	2500	GM
3	Cupric Sulphate	3000	GM	0	GM	3000	GM	0	GM
4	Nitric Acid	75	L	0	L	50	L	25	L
5	Potassium Thiocyanate	9000	GM	2000	GM	9000	GM	2000	GM
6	Potossium Iodide	7500	GM	9000	GM	12500	GM	4000	GM
7	Std Solution Gold 1000mg/l	0	ml	1000	ml	750	ml	250	ml
8	Iron Standard solution	0	ml	1000	ml	500	ml	500	ml
9	Std Solution Manganese 1000mg/l	0	ml	500	ml	250	ml	250	ml
10	Std Solution Silver 1001+/-2 mg/l	2500	ml	0	ml	2500	ml	0	ml

PART 2: The Environmental Management (Licensing) Regulations, 2013

2.0 EMISSION LICENCE (EFFLUENT DISCHARGE, Regulation 4)

KCM SmelterCo Nkana refinery uses various management and engineering controls to prevent effluent from reporting to the environment. KCM SmelterCo Nkana refinery has employed Zero discharge to prevent effluent discharge to the environment. Effluent generated from the plant is captured in the ponds and recycled for re-use for other plant operations.

Our Environmental Management System includes actions required to prevent pollutants from entering discharges from the mine and hence the environment. KCM is committed to not only meeting the limits set by Zambian Regulations but achieving the World Bank and IFC guidelines as part of its sustainability program.

Pollution Control Actions

The following pollution Control plans are in place;

- Regular cleaning of internal and Plant main drains.
- An effluent recycle pump that pumps effluent to the old power plant cooling water ponds to allow for settling of soluble compounds. A sand filter further treats the effluent to meet process quality requirements before being recycled back into the tank-house for re-use.
- Refinery surfaces are progressively rehabilitated to ease clean-up of any possible spills that may have a potential of ending up in the drains.
- Regular calibration of pH probes to ensure high reading efficiency.
- Programme of identifying water leaks and sealing off the same is ongoing.

2.1 EFFLUENT QUALITY IN LICENSED DRAINS

2.1.1 South Uchi

There was no effluent discharged to South Uchi during the period under review. KCM-SmelterCo Nkana is under Zero discharge. Effluent generated is captured, treated and recycled back into the system for re-use for other plant operations.

2.1.2 North Uchi

There was no effluent discharged to North Uchi during the period under review. Effluent discharged is pumped to the old power plant cooling water ponds and recycled back to the system for other plant operations. KCM SmelterCo-Nkana is under Zero discharge.

2.2 EMISSION LICENCE (EMISSION TO AIR, Regulation 4)

The permits to emit air pollutants at KCM SmelterCo Nkana refinery relates to the operations of the Anode furnaces No.4, No.5, No. 6 and HFO fired boiler. In order to comply with the general requirements of The Environmental Management (Licensing) Regulations, 2013, Konkola mine has engaged Tibon Environmental Solutions to monitor emissions from the stacks.

2.2.1 Emission Discharge at No.4, No.5 and No.6 Anode Furnaces

The operations at anode furnaces No 4, 5 and 6 were on cold standby during the period under review. No emissions were discharged to the environment.

2.2.2 Emission Discharge at HFO Boiler Stack

Table 5 HFO Boiler stack emissions

MONTH	HFO BOILER STACK			
	Dust mg/Nm^3	**CO mg/Nm^3**	**SO_2 mg/Nm^3**	**NO_x mg/Nm^3**
	50	**100**	**850**	-
Jan-23	39.65	12.50	834.58	189.65
Feb-23	47.59	97.48	843.16	81.66
Mar-23	38.57	7.50	828.87	211.52
Apr-23	44.63	44.98	831.72	125.39
May-23	40.74	60.82	744.07	119.59
Jun-23	43.62	97.06	839.35	111.11

INCIDENTS RECORDED

No emission incidents were recorded during the period under review

3.0 HAZARDOUS WASTE LICENCE (GENERATION AND STORAGE, Regulation 19)

The plant generates hazardous waste namely; waste oil, used fluorescent tubes and used batteries. Waste oil is stored in the used oil tank. The storage area has an impervious floor and sufficient concrete bund wall capable of containing massive bulk spills if the tank were to suffer a catastrophic leak of the liquid. Spent fluorescent tubes generated are stored and crushed in fabricated storage drums within the plant premises. Used batteries are stored in the hazardous material storage shed which is secure and has restricted access. The used batteries are disposed off through recycling/reuse through contractors.

3.1 USED OIL INVENTORY

Table 6: Shows the amount of used oil that was generated and stored during the period under review

Month	Opening Stock	Generated	Stored	Closing Stock
Jan-23	525	0	525	525
Feb-23	525	0	525	525
Mar-23	525	20	545	545
Apr-23	545	0	545	545
May-23	545	0	545	545
Jun-23	545	0	545	545
TOTAL		**20**	**545**	**545**

NOTE: Unit of measure is litres

3.2 USED BATTERIES INVENTORY

Table 7: Indicates the amount of spent batteries that was generated and disposed/sold during the period under review

Month	Opening Stock	Generated	Stored	Sold	Closing Stock
Jan-23	74	1	75	0	75
Feb-23	75	3	78	0	78
Mar-23	78	2	80	0	80
Apr-23	80	0	80	0	80
May-23	80	0	80	0	80
Jun-23	80	0	80	0	80
TOTAL		**6**	**80**	**0**	**80**

Note: Unit of measure is each.

3.3 FLUORESCENT TUBES INVENTORY

Table 8: Shows the amount of spent fluorescent tubes that was denerated and crushed during the period under review

Month	Generated	Crushed
Jan-23	0	0
Feb-23	0	0
Mar-23	0	0
Apr-23	0	0
May-23	4	4
Jun-23	4	4
TOTAL	8	

Note: Unit of measure is each.

3.4 SCRAP LEAD INVENTORY

No scrap lead was generated nor stored during the period under review

3.5 SPENT ELECTROLYTE INVENTORY

During the period under review, a total of 3,323.22 MT of spent electrolyte was generated at Refinery Tank house and transported to Tailings leach plant in Nchanga for re-use.

Table 9: Spent electrolyte

Month	Generated (MT)
Jan-23	273.62
Feb-23	275.26
Mar-23	434.4
Apr-23	919.1
May-23	790.06
Jun-23	630.78
TOTAL	**3323.22**

3.6.1 GENERATION OF HEALTH CARE WASTE

Clinical waste generated from the mine clinic and plant site clinic is collected and transported to Kitwe teaching hospital for incineration. The clinical waste is transported in specialized secured containers which have warning signs. No incidences/accidental spillages relating to the transportation of healthcare waste were recorded during the period under review.

The quantities generated are presented in Table 11 below:

Table 10: Clinical waste generated during the period under review

Month	Generated (MT)	Disposed through incineration (MT)
Jan-23	0.182	0.182
Feb-23	0.103	0.103
Mar-23	0.056	0.056
Apr-23	0.031	0.031
May-23	0.031	0.031
Jun-23	0.191	0.191
TOTAL	**0.594**	**0.594**

3.7 GENERATION, TRANSPORTATION AND HANDLING OF EXPIRED CHEMICALS

During the period under review there was no generation, transportation and handling of expired chemicals.

PART 4: The Environmental Management (Licensing) Regulations, 2013

4.0 WASTE MANAGEMENT LICENCE

KCM Nkana refinery has reclaimed the slag from the dump following its reclamation program which was initiated in May 2017 with the last reclamation being done in October, 2021. Dumping of slag on the dump ceased in February 2009. The entry to the slag dump is strictly by authorization from the security team which is re-enforced by the state paramilitary police. The statutory monitoring of the dump was conducted on 31st March 2020 by Knight Piesold.

Table 11: Slag dump No.67

Area (Hectares)	11.83
Slag reclaimed by KCM during the period under review (tons)	0
Slag as at 30.06.2023 (tons)	5,600

PART 5: The Environmental Management (Licensing) Regulations, 2013

5.0 OZONE DEPLETING SUBSTANCES LICENCE

Ozone depleting substances are used in refrigeration and air conditioning equipment in office buildings.

5.1 HANDLING AND STORAGE OF OZONE DEPLETING SUBSTANCES

Whenever an ODS using unit is being decommissioned or serviced, refrigerants are recovered. During the recovery process, refrigerants are transferred into a cylinder that is empty or that contains the same type of refrigerant. This is always carried out in ways that ensure ODS do not leak to the atmosphere. Only competent personnel are responsible for handling, storage, transportation and disposal of contaminated refrigerants. Tools are available to identify potential leakage points of refrigeration and air conditioning equipment. Hazard and safe working practices for installation, commissioning and handling of refrigerants are also in place.

R410a was used on the plant for servicing and repairing air conditioners and fridges. The gas is stored in cylinders and kept at the instrumentation workshop which is well secured. During the period under review 1.3 Kg of R410a was used for servicing air conditioners.

Actions to prevent contamination to the environment:

- Testing for leakage of refrigerants.
- Monitoring of monthly Ozone Depleting Substances (ODS) consumption.

The table below shows the amount of R410a that was used during the period under review.

Table 12: Ozone depleting substances

Month	Ozone depleting substance	Quantity	Ozone Depleting Potential**	CFC Equivalent for the quarter	Sources of emission/area of usage
Jan-23	R-410a	0.3	0.0000	0.0000	Air Conditioners and Refrigeration
Feb-23	R-410a	0.0000	0.0000	0.0000	Air Conditioners and Refrigeration
Mar-23	R-410a	0.4	0.0000	0.0000	Air Conditioners and Refrigeration
Apr-23	R-410a	0.6	0.0000	0.0000	Air Conditioners and Refrigeration
May-23	R-410a	0.0000	0.0000	0.0000	Air Conditioners and Refrigeration
Jun-23	R-410a	0.0000	0.0000	0.0000	Air Conditioners and Refrigeration
Total		**1.3**			

NOTE: Unit of measure is Kg.

Ground Water Quality

There is historical contamination of ground water at KCM SmelterCo Nkana refinery which has been identified as a joint liability with Mopani Copper Mines. KCM SmelterCo Nkana engaged Golder Associates, an independent competent consultant who conducted a detailed study of contaminated ground water and flow movements. The table below outlines monitoring results for ground water during the period under review.

Table 13 Borehole monitoring data

SAMPLE DATE	SAMPLE DESCRIPTION	BOREHOLE ID	pH	TCu (ppm)	TCo (ppm)	TFe (ppm)	TMn (ppm)	DCu (ppm)	DCo (ppm)	DFe (ppm)	DMn (ppm)	Sulphates
Jan-23	Settling ponds	NK-WM-01	6.01	92.87	5.19	0.94	4.15	2.00	1.10	0.11	0.49	302
	HFO Day Tanks	NK-WM-02	5.31	2.53	1.36	1.33	1.38	2.10	1.14	1.21	1.06	986
	Main HFO Tanks	NK-WM-03	3.56	2310.00	307.60	283.00	343.00	2232.00	302.20	281.60	343.40	5036
	Mining siding Acid L/bay	NK-WM-04	-	-	-	-	-	-	-	-	-	-
	Copper loading bay	NK-WM-05	3.10	34.8	1.31	1.13	3.11	22.97	0.96	1.02	0.71	1931
	Refinery Northern boundary	NK-WM-06	4.40	92.84	2.04	9.33	14.14	90.47	1.98	9.04	13.86	842
	No. 4 Acid plant	NK-WM-07	-	-	-	-	-	-	-	-	-	
	No. 3 Acid plant	NK-WM-08	6.11	91.00	3.04	7.17	12.05	84.39	3.00	6.05	11.44	2221
Feb-23	Settling ponds	NK-WM-01	4.39	2.88	0.25	1.86	1.04	1.06	0.20	0.40	0.97	414
	HFO Day Tanks	NK-WM-02	4.75	2.36	0.53	2.29	0.82	1.19	0.52	0.01	0.79	1008
	Main HFO Tanks	NK-WM-03	3.42	8684.00	398.00	39.80	207.20	4252.00	221.00	38.00	196.80	7181
	Mining siding Acid L/bay	NK-WM-04	-	-	-	-	-	-	-	-	-	-
	Copper loading bay	NK-WM-05	4.43	22.3	3.76	2.10	0.00	14.45	3.19	1.90	0.00	538
	Refinery Northern boundary	NK-WM-06	4.31	138.00	5.13	0.89	0.36	128.70	4.78	0.07	0.30	924
	No. 4 Acid plant	NK-WM-07	-	-	-	-	-	-	-	-	-	-
	No. 3 Acid plant	NK-WM-08	4.41	4.96	0.38	1.48	0.00	3.17	0.29	0.00	0.00	3390
Mar-23	Settling ponds	NK-WM-01	4.7	1.76	1.92	1.67	2.54	1.00	1.37	0.00	2.52	1001
	HFO Day Tanks	NK-WM-02	3.8	4.73	1.94	1.02	2.20	4.20	1.68	0.76	2.18	583
	Main HFO Tanks	NK-WM-03	3.5	4652	485	141	417.6	4026	402	105.2	413.2	7255
	Mining siding Acid L/bay	NK-WM-04	-	-	-	-	-	-	-	-	-	-
	Copper loading bay	NK-WM-05	3.4	18.9	16.86	1.52	15.61	13.9	9.45	0.77	14.29	2165
	Refinery Northern boundary	NK-WM-06	3.2	122.00	14.49	1.54	14.95	14.49	121.35	0.53	13.00	1690
	No. 4 Acid plant	NK-WM-07	-	-	-	-	-	-	-	-	-	-
	No. 3 Acid plant	NK-WM-08	4.3	1.82	0.24	1.34	1.92	1.24	0.11	0.46	1.81	1480
WHO DRINKING WATER STANDARDS				1.00	N/A	2.00	0.01	-	-	-	-	

SAMPLE DATE	SAMPLE DESCRIPTION	BOREHOLE ID	pH	TCu (ppm)	TCo (ppm)	TFe (ppm)	TMn (ppm)	DCu (ppm)	DCo (ppm)	DFe (ppm)	DMn (ppm)	Sulphates
Apr-23	Settling ponds	NK-WM-01	5.9	5.34	0.75	2.46	2.27	4.29	0.68	0.27	2.26	985
	HFO Day Tanks	NK-WM-02	5.6	2.75	0.59	1.30	1.98	2.05	0.56	0.00	1.62	1008
	Main HFO Tanks	NK-WM-03	3.4	4914	367	29	526	4690	340	22.0	480.2	3822
	Mining siding Acid L/bay	NK-WM-04	-	-	-	-	-	-	-	-	-	-
	Copper loading bay	NK-WM-05	4.1	135.9	5.13	1.03	14.94	126.4	4.37	0.04	13.92	1892
	Refinery Northern boundary	NK-WM-06	4.2	15.37	2.21	3.02	9.41	12.94	2.10	0.27	8.06	2454
	No. 4 Acid plant	NK-WM-07	-	-	-	-	-	-	-	-	-	-
	No. 3 Acid plant	NK-WM-08	4.9	2.45	0.51	4.70	1.75	1.12	0.46	0.00	1.67	945
May-23	Settling ponds	NK-WM-01	4.9	3.19	0.33	1.88	1.70	2.59	0.21	1.62	1.66	415
	HFO Day Tanks	NK-WM-02	5.3	82.05	0.24	0.95	9.26	81.57	0.19	0.93	8.12	1010
	Main HFO Tanks	NK-WM-03	3.1	2656	262	188	443	2620	259	180.8	406.8	4081
	Mining siding Acid L/bay	NK-WM-04	-	-	-	-	-	-	-	-	-	-
	Copper loading bay	NK-WM-05	3.8	60.2	3.30	1.33	14.14	12.2	2.52	1.27	8.72	1630
	Refinery Northern boundary	NK-WM-06	4.2	86.75	1.41	3.31	13.58	85.33	1.37	3.29	13.14	731
	No. 4 Acid plant	NK-WM-07	-	-	-	-	-	-	-	-	-	-
	No. 3 Acid plant	NK-WM-08	4.8	3.54	0.00	0.70	1.59	1.47	0.00	0.61	1.50	338
Jun- 23	Settling ponds	NK-WM-01	5.9	1.23	0.68	1.27	1.27	0.79	0.36	0.10	1.46	281
	HFO Day Tanks	NK-WM-02	5.6	0.36	0.15	0.77	0.77	0.29	0.10	0.06	0.51	195
	Main HFO Tanks	NK-WM-03	3.4	2086	162	11	251	1976	153	2.6	236.4	544
	Mining siding Acid L/bay	NK-WM-04	-	-	-	-	-	-	-	-	-	-
	Copper loading bay	NK-WM-05	4.1	47.3	2.84	0.54	0.54	13.0	2.02	0.23	7.12	107
	Refinery Northern boundary	NK-WM-06	4.2	87.41	3.87	0.17	0.17	53.87	1.85	0.09	5.98	98
	No. 4 Acid plant	NK-WM-07	-	-	-	-	-	-	-	-	-	-
	No. 3 Acid plant	NK-WM-08	4.9	1.76	0.58	1.69	1.69	1.54	0.31	0.00	1.58	90
WHO DRINKING WATER STANDARDS				1.00	N/A	2.00	0.01	-	-	-	-	

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.....

EUNUCE HAMALALA

ENVIRONMENTAL COORDINATOR

.....

MUNKONDYA MOSES

MANAGER ENVIRONMENT SMELTERCO

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